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The role of central banks in promoting reduction of investments in the fossil fuel sector – the cases of Brazil and the United Kingdom

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CIÊNCIAS SOCIAIS
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Resumo

A crise climática mobiliza diversos atores para o debate e ação. O sistema financeiro foi incluído nesta discussão após a assinatura do Acordo de Paris, em 2015, e as instituições financeiras tem-se mostrado mais conscientes do risco que as alterações climáticas representam. A estabilidade financeira pode ser afetada devido a riscos físicos e de transição e, por este motivo, os riscos climáticos devem integrar as rotinas das instituições financeiras. Setores económicos que emitem grandes quantidades de CO_2, como a indústria do petróleo e gás, são os maiores causadores das alterações climáticas e, portanto, representam um alto risco para investidores. Neste sentido, os bancos centrais têm um papel preponderante enquanto entidades supervisoras e que visam a estabilidade económica. O presente estudo tem como objetivo discutir o papel dos bancos centrais em promover a redução do investimento no setor de petróleo e gás. Utilizando teorias do institucionalismo histórico, o trabalho apresenta um estudo de caso das políticas climáticas adotadas pelos bancos centrais do Reino Unido e do Brasil e a análise do respetivo impacto na tendência de empréstimos de bancos comerciais dos dois países nos setores estudados entre 2018 e 2023. Os resultados demonstraram diferenças na abordagem dos dois bancos centrais e os efeitos na tendência de investimento dos bancos comerciais. A base teórica utilizada permitiu compreender fatores que influenciam a tomada de decisão e pode ser útil em outros estudos sobre o impacto dos bancos centrais no comportamento de investimento da banca, e de que forma estes podem contribuir para a redução do financiamento de setores carbono-intensivos.

Palavras-chave: bancos centrais, finanças sustentáveis, risco climático, alterações climáticas, Banco Central do Brasil, Bank of England

Código JEL: G20, E58

Abstract

The climate crisis has mobilised various stakeholders for both debate and action. The financial system was brought into this discussion following the signing of the Paris Agreement, in 2015, and financial institutions have since become increasingly aware of the risks posed by climate change. Financial stability may be affected by physical and transition risks and, for this reason, climate risks must be integrated into financial institutions routines. Economic sectors that emit large quantities of CO_2, such as the oil and gas industry, are the primary contributors to climate change and therefore present a significant risk for investors. In this context, central banks play a crucial role as supervisory entities with a mandate to maintain economic stability. The present study aims to discuss the role of central banks in promoting the reduction of investment in the oil and gas sector. Drawing on theories of historical institutionalism, the work presents a case study of climate policies adopted by the central banks of the United Kingdom and Brazil, and analyses their impacts on the lending trends of commercial banks in both countries for the studied sectors between 2018 and 2023. The results highlighted differences in the approaches taken by the two central banks and discuss the effects on investment trends of commercial banks. The theoretical framework used elucidated some factors influencing decision-making and may prove valuable for other studies examining the impact of central banks on the investment behaviour of financial institutions, and how they may contribute to reducing financing for carbon-intensive sectors.

Key words: central banks, sustainable finance, climate-related risks, climate change, Central Bank of Brazil, Bank of England

JEL Code: G20, E58

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CHAPTER 1

Introduction

The imperative of tackling climate emergency has triggered an important body of research. Addressing climate risks is a broad theme which has gathered increasing interest, as life support systems depend on finding ways to reduce those risks. Within this theme, the relationship between the financial sector and climate risks is attracting increased interest. This may relate to clearer estimates of the important financial impact of climate risks.

There is a growing recognition that the impacts in financial systems caused by climate risks imply that those risks can affect macroeconomic stability. Estimations of financial risk from climate change impacts may range from US$ 693 billion to US$ 2.5 trillion, according to some reports (Dietz et al, 2016), and this is probably the main reason that explains the attention gained by this issue in financial institutions in the last decade. Climate-related risks can be associated to physical impacts caused by global warming or transition risks caused by changes in political and economic context that impact economic sectors linked to carbon emissions (Balint et al, 2016). The latter category of impacts is justified because decarbonizing the economy implies to change the source of energy that the world relies on today, shifting from carbon-intensive fuels to renewables, such as wind and solar power plants. Scenarios of net-zero emissions in 2050 estimates that the oil and gas shares in global energy supply must fall from 29% and 23%, respectively, to only 7% each (Costa et al, 2023). It means that most of the fossil fuel reserves should stay unexplored, which brings a problem for investors in this sector, as these assets will become stranded. The losses associated to stranded asset in the fossil fuel industry can exceed $1trillion over the next years (Semieniuk et al, 2022).

In this context, central banks can play an important role in considering and incorporating climate-related risks in the financial sector (Bank of England, 2015; Carney, 2015; NGFS, 2018).

The different ways in which central banks are addressing the climate-related risks, considering more or less active approaches, is a political decision (Dikau & Volz, 2021). However, research to date has not yet determined whether more active policies from central banks are associated with a greener investment portfolio of the financial institutions.

Although many researchers showed the importance of the consideration of climate-related risks by the financial sector, and also how this concern is being internalized in the bank system, there is still a gap in the literature regarding the role played by central banks in influencing a

shift towards more climate friendly investments made by the supervised financial institutions. This study aims to contribute to fill this gap, assessing the association of policy instruments of central banks and investment portfolios of commercial banks.

The purpose of this research is to assess whether policy instruments from central banks considering climate change risks are associated with a reduction in investments in carbon intensive sectors, more specifically the fossil fuel sector – represented here by the oil & gas industry –, from the supervised financial institutions – represented here by commercial banks. This thesis will aim to test the hypothesis that climate-related policies from central banks influence financial institutions' consideration for climate-related risks, persuading banks to reduce investments in the fossil fuel sector.

To this end, it will be conducted a case study analysis of central banks from two countries, the United Kingdom (UK) and Brazil, comparing their climate policies, the level of consideration of climate-related financial risks, and how they recommend that other banks should also incorporate these concerns. To assess whether these central banks' policies influence investment behaviour of commercial banks, it will be analysed investment data of commercial banks of those countries, aiming to identify trends of investment in the fossil fuel industry.

The choice of these countries can be justified by the fact that the UK and Brazil are good examples of developed liberal economy and emerging economy country, respectively, being both oil producers. Besides, the Bank of England was the first central bank to set supervisory expectations for banks and insurers on the management of climate-related financial risks (Campiglio et al, 2018), and it is also a founding member of the Central Banks and Supervisors Network for Greening the Financial System (NGFS), which Brazil has become part of later on.

According to IPCC report (IPCC, 2022), the oil & gas sector was responsible for 47% of the energy sector's emissions in 2019. Global energy system is the single largest contributor to global GHG emissions and, despite its emissions growth has slowed down in recent years, global oil & gas use was still growing (Jackson et al, 2019). It will be necessary to leave a substantial amount of fossil fuels unburned in order to limit global warming to 2°C or below. In this context, oil & gas assets are projected to be at risk of being stranded towards mid-century (IPCC, 2022). A report made by the Bank of England (2023a) also recognizes this sector as one in which banks projected the highest loss rates. Considering the UNFCCC COP 28 decision of *"Transitioning away from fossil fuels in energy systems, in a just, orderly and equitable manner, accelerating action in this critical decade, so as to achieve net zero by 2050 in keeping with the science"*, the oil & gas sector is strongly related to transition risks, as countries should

adopt mechanisms to progressively phasing out of this energy source (UNFCCC, 2023). It illustrates the relevance of taking this sector as a focus of study, considering its impact in the financial markets. Furthermore, it is not sufficient to analyse banks' commitments with a low-carbon economy, but it is also important to investigate whether the banks are really reducing investments in the fossil fuel sector. Sastry et al (2024) found that banks see a substantial improvement in their ESG rating after making net-zero commitments, even when these commitments are not translated in redirecting investments from fossil fuel to clean sectors.

This case-study analysis sheds light on the importance of state intervention, manifested through central banks policies, in guiding financial markets towards the green transition and avoiding climate-risks impacts in economic stability. The comparative analysis between two different economies supported by an historical institutionalism approach demonstrates how these differences have influenced diverse choices made by central banks, and what are the consequences observed in investment behaviour of commercial banks in each country. This assessment will enable a discussion and future research on the identification of trends followed by banks in countries with different central banks' political profiles, as well as contributing to understand factors that can impact bank's decision to avoid financing carbon-intensive activities.

This document is organized as follows: the second chapter will present the literature review on the relationship between climate and the financial sector, how central banks and other banks have been involved on that discussion, and how historical institutionalism theories contribute to elucidate the decision-making process within financial institutions; the third chapter presents the methodology of the study, justifying the choice of the countries and contextualizing the importance of the fossil fuel sector for their energy matrix; main findings are presented in the fourth chapter and discussed in chapter 5; the last chapter brings final remarks.

CHAPTER 2

Literature Review

2.1. Global climate governance, climate-related risks and the financial sector

Recent research demonstrates a significant increase in the consideration of environmental and climate risks by investors after the Paris Agreement, adopted in 2015. After the diplomatic failure in Copenhagen 6 years earlier, the accord signed in Paris formalizes a decentralized and voluntary pledge system, where countries decide their emissions reduction targets, and also acknowledges the important role of non-Party stakeholders, such as cities and businesses (Lövbrand et al, 2017).

Further, this agreement set out, among other things, the goal of "*making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development*" (UNFCCC, 2016). This historical agreement called the attention of the financial system for climate-related risks and therefore had the role of pushing for change in financial rules and institutions, so that they started addressing climate emergency. The relation between climate change and financial system can take two directions: financial institutions can be impacted by environmental hazards, but they also have the potential to directly influence the environmental crisis by financing polluting or sustainable activities (Balint et al, 2016).

González & Núñez (2021) review the current state of the role of financial institutions in the climate crisis. After the Paris Agreement, in 2016, it was created the Group of Twenty (G20) Green Finance Study Group, which provides a starting point for the main countries to become involved in developing measures related to the financial system's sensitivity to climate change risk and consider it in its decision-making process. In 2018, the European Commission launched an "Action Plan on Financing Sustainable Growth", which seeks to align the financial sector to European political goals set out in the European Green Deal, the Sustainable Development Goals (SDGs) and European Climate Policies. The adoption of these instruments at the European level have influenced many member states at national level.

Climate-related financial risks in particular can be divided in three different categories: (i) physical risks, (ii) liability risks, and (iii) transition risks. The latter focuses on the socioeconomic reaction to climate change. This means that, as governments are committed to decarbonize the economy, investments in carbon intensive companies are seen as not compatible with this transition, which represents a risk for this kind of investments. Liability

risks describe climate or environmental risks that happen due to uncertainty around financial losses and compensation related to damages caused by climate change–related natural hazards (Bank of England, 2015; Carney, 2015). Physical risks account for the direct impacts the changes in climate conditions have (e.g., extreme weather events) (Chenet et al, 2021).

There is an emerging consensus that physical and transition risks are able to influence macroeconomic stability and amplify the risks to individual financial institutions and the financial system, which leads to the importance of climate-related risks being considered by central banks (Bank of England, 2015; Carney, 2015; NGFS, 2018). While most central banks' initiatives at the moment are focused on their own governance and micro-prudential supervision, many have already started or are planning to develop various sustainable finance measures, understanding that responding to the threats posed by climate change is fully in line with their existing mandates of stabilising the economic system.

2.2. The role of the state and central banks in maintaining financial stability: an historical institutionalism approach

Central banks mandates have varied over time and is still different among countries. Provision of money, supervision of financial system, exchange rate management, promotion of economic development, inflation control, and maintenance of financial stability are some of the functions of central banks' portfolio. Considering the changes in financial markets and economic scenarios across history, central banks need to adapt their policy instruments. For instance, liberalisation, reregulation, globalisation of finance, and the multiples financial crisis, altered the sophistication of financial markets and, consequently, the relationship between central banks and financial institutions (Dow, 2015).

Under neoliberal principles, there is a rationale that central banks should be independent to reduce political instrumentalization of price stability and inflation targeting (Dow, 2015). However, recent crises challenged the efficient markets hypothesis and the assumption that deviations in the equilibrium of the system would be fixed by the market. The relation between financial and economic stability, as well as the interdependencies between government and central banks became evident and central banks were called to assume a more active role of promoting financial stability (Mazzucato, 2015). Central banks have then been more active in promoting economic development by, for instance, encouraging commercial bank lending to finance investment in particular sectors. Pursuing this goal, central banks have adopted instruments like credit controls, capital controls, exchange rate management and financing the

state. This does not mean that central banks should be subservient to the state, but their function in pursue economic goals more broadly should be recognized (Dow, 2015).

Further, climate change did not emerge on the agenda of central bankers simply as a result of new information, paradigmatic ideas, or financial interests, as would be a normal assumption of free market theories. Instead, the controversies over central banking after 2008 crisis and the Paris Agreement signal that "all levels of government and various actors" should be involved in the solutions, brings central banks and private finance to became key pieces in the puzzle (Jabko & Kupzok, 2024).

There are many different reasons and ways that governments can influence financial markets. One of them is to fulfil social objectives. Under this category, government intervention could be providing consumer protection, ensuring bank solvency, improving macroeconomic stability, stimulating growth, and improving allocation of resources (Stiglitz, 1994). The role that central banks should play in the climate crisis could be related to some of these objectives, such as improving macroeconomic stability, promoting bank regulation and monitoring, and contributing to the allocation of resources for the energy transition (Dow, 2015).

Furthermore, considering that fighting the climate emergency is ultimate a social goal, governments play a crucial role in promoting the green transition. This can be achieved through environmental regulation, public procurement, demand and supply-side policies, among others. Countries where the state is more actively engaged in these tasks are currently leading the energy transition from fossil fuel to renewable energy sources, for example. In these cases, states are assuming the risk of investing in new technologies and companies that private investors consider too risky, contributing to accelerate the shift towards greener economies (Mazzucato, 2015). This rationale is in line with Karl Polanyi's (1944) work related to the role of state in shaping and creating markets. Development banks, which are guided by government priorities, are also important players in this field, given their significant amount of resources and consequent capacity to shape economic development. The European Investment Bank, for instance, announced in 2013 that they will no longer finance coal power plants. These arguments support the assumption that, in instead of leaving market processes correct climate impacts in the financial systems by themselves, it is more efficient to have the state participating in the decisions and making use of the best tools available to promote a low-carbon economy (Mazzucato, 2015). The adoption of strong regulations and climate-risks related policies by central banks aiming to encourage the reduction of investment in climate intensive sectors is perfectly aligned with this perspective.

Once climate-related risks are understood as a risk for financial stability and taking into account the role of central banks in ensuring effective functioning of financial markets and supervising financial institutions, it is not required to alter central banks' mandate to avoid climate impacts in the financial sector. Moreover, even if needed, this modification would not be historically unusual, as it has been changing according to political and economic scenario. In this more interventionist role, that emerged mainly after the economic crisis (Mazzucato, 2015), central banks played an active part in promoting economic development, guiding commercial banks to invest in particular sectors or regions, financing the state, promoting credit and capital controls. The Bank of England, for instance, was responsible for providing policy advice, administering a system of controls and managing markets in the period from 1930 to 1960 (Mazzucato, 2015).

Incorporating the interdependencies between the state and financial systems in central banks policies, amplifying their mandate to a more widely control of financial stability, is also a matter of designing institutional arrangements (Dow, 2015). A distinction can be drawn between the central banks of high-income regions and the central banks of developing economies (Campiglio et al, 2018) and this can be elucidated by institutionalism theories. According to the historical institutionalism theory, institutions are seen as the legacy of concrete historical processes. Power and its asymmetrical relations play an important role, and their evolvement will be path-dependent. For historical institutionalists, the origin of institutions, the way they were created, and how power is distributed among different groups are extremely relevant to understand their decision-making process and evolutionary course. This variant of institutionalism rejects the idea that the same action will generate the same outcome everywhere, as they argue that the effect of those actions will depend on contextual features often inherited from the past (Thelen, 1999). The use of fossil fuel in our economy is a case of path-dependence, and a low-carbon transition involves a radical readjustment in order to move societal functions away from carbon-intensive technologies. Thus, climate policies and instruments that central banks will adopt to address climate crisis find numerous challenges to confront this historical dependence (Rosenbloom et al, 2019).

Another concept that might help to analyse choices taken by institutions is policy feedback. This term was coined by Pierson, 1993 (cited in Béland, 2010), and refers to the impact of policies in shaping policy development over time. Creating bureaucratic constituencies that can later influence policy making, policies that stimulate interest group formation that can later mobilize for their interests, subsidies for a specific sector, and lock-in effects are examples of policy feedbacks that may explain how political decisions are taken (Béland, 2010).

Path dependence and policy feedback explain why is so hard to change the direction of policymaking. However, in some situations, institutions are compelled to change and take different paths. The Covid-19 pandemic was an example of a critical event that produced impacts in the way central banks intervene in financial stability. As considering public interests was crucial in that scenario, central banks have expanded their conventional toolkit and adopted unconventional policies to address social concerns during and post-crisis. It happens because, even in neoliberal economies and maintaining central banks independence, these institutions need a certain degree of public trust. To ensure their credibility and legitimacy, they cannot ignore the political context and must consider a wider range of interests beyond the expectations of financial markets (Moschella, 2024). Climate emergency is undoubtedly a situation where unconventional policies should be applied and central banks are increasingly responding in this direction, like in the case of Covid-19 crisis, as will be demonstrated in the next session.

These new challenges that can destabilize existing arrangements and generate conjunctures of institutional changes are described by institutionalists as critical junctures, and their study has been a major theme of comparative-historical analysis and historical institutionalism. While in path-dependent processes each step increases the likelihood of further steps along the same pathway, critical junctures are points where one option is chosen from two or more possibilities and new branches or developmental pathways are initiated (Sorensen 2023).

Institutional transformations can also be caused by endogenous sources. Mahoney and Thelen (2010) provide arguments to theorize institutional changes that happen gradually, due to a combination of internal factors, and not only in response to external shocks. The proposed framework discuss how internal characteristics of institutions interacts with political contexts to produce different possibilities of change. It helps to illuminate why some changes are more likely to occur in institutions with a specific profile than in others. Different interpretations of rules or minor complementation in existing rules, for instance, are types of institutional changes that can promote transformation to accommodate new understandings in institutions where a full displacement of old assumptions is more difficult. These kinds of changes are also more likely to occur when the institution is ruled by groups that have the possibility to block more abrupt transformations, as to change the status quo, based on their interests. This can be the case of diverse interpretations of central banks mandates enabling different ways of intervention in the financial system.

Additionally, the concept of transition pathways tries to elucidate that, while early choices usually create self-reinforcing courses that make certain possibilities more difficult in the

future, later choices may still further reinforce these directions, and in the end cumulative interaction among early and later choices will help define a low-carbon transition pathway (Rosenbloom et al, 2019).

In conclusion, there is a range of instruments that central banks can adopt to reduce climate risks in financial systems. Nevertheless, what central banks will do to support an orderly low-carbon transition will still be dependent on their mandates, how this is interpreted, and their willingness to act. Taking the theories presented into account, it is fundamental for this study to comprehend these contextual features of the Brazilian and the British central banks in order to understand how their decisions are made and/or influenced in the context of the climate crisis.

2.3. Central banks in the climate crisis

In addition to the Paris Agreement, the speech of the governor of the Bank of England, Mark Carney, in 2015, also contributed for climate-related risks gained momentum in the financial debate and called the attention of central banks and financial supervisors for the importance of taking this issue into account in their decisions (Monasterolo, 2020).

Following this path, it was created the Network for Greening the Financial System (NGFS), in 2017. Central banks and supervisors in the NGFS endeavour to enhance the role of the financial system to manage risks and mobilise capital for climate-sustainable investments to meet the goals of the Paris Agreement (NGFS, 2019). The rationale behind this network is that central bank's climate policies should be oriented around a net-zero carbon goal, in order to lead financial institutions to do the same. The increased attention of central banks to climate risks is reflected in the growing membership of the NGFS, which started with eight central banks and supervisors in 2017 and reached 121 members in March 2023.

Considering the complexity of the green transition, researchers started to investigate the role of central banks and financial regulators in supporting an orderly transition. This role could include developing methods and instruments to facilitate understanding the risks, promote research and advocacy, guidance on how those risks should be disclosed and managed, and incorporation of climate-related risks in financial regulations and central banks' supervisory and monetary policies (Campiglio et al, 2018; Jabko & Kupzok, 2024).

Central banks are incorporating climate issues in their routine at different levels. Some have integrated climate risks in their supervisory practices, prudential instruments, and financial stability analysis, while others are also integrating sustainable principles to the management of

their own portfolios (González & Núñez, 2021). They have also been encouraging transparency and limiting the information gap between financial institutions and consumers (Chenet et al, 2021). Some central banks are developing climate stress tests on the financial systems (González & Núñez, 2021). As part of their supervisory role, central banks could require financial institutions to submit net-zero plans (Dikau et al, 2021), including a greening of their investment portfolios. Naturally, the ways in which central banks will address climate-related risks will inevitably differ, and this will have different implications in the way commercial banks incorporate climate concerns in their investment decisions.

Dikau & Volz (2021) conducted an analysis of mandates and objectives of central banks, using the IMF's Central Bank Legislation Database, and compared these to sustainability-related policies that central banks have adopted in practice. Out of 135 central banks, only 12% operate under a mandate that explicitly includes the promotion of sustainable growth or development as an objective, but another 40% are tasked to support their governments' national policy objectives. Sustainability objectives can fit as a secondary or indirect concern, as they must also follow government objectives. They presented a list of those countries, with the information regarding monetary policy framework and mandated objectives. Further, the article provides an overview of the adoption of different types of green activities by central banks over time, as well as cases of differences in interpretation of policies and mandates. According to the article, the main objective of the Central Bank of Brazil is pursuing the needs of the economy and development, while for the UK is clearly maintain price and financial stability. The article showed that climate risks can very directly impact on traditional core responsibilities of central banks, notably monetary and financial stability. Consequently, an integration of ESG factors into central banks' core policy implementation frameworks may not only be necessary to safeguard price and financial stability, it would be also covered by mandates that make no explicit or implicit reference to sustainability. The extent to which a central bank adopts a more activist approach to support a government's sustainability objectives is ultimately a political decision. Nevertheless, it should be clear that climate crisis and mitigation policies will have profound impacts on economies, with potentially significant implications for macroeconomic and financial stability.

Climate finance regulations developed by central banks are crucial to direct capital flows to meet climate goals (Gunningham, 2020). A study that conducted a document analysis and interviews with members of central banks and other financial actors in the UK and Australia demonstrated that mandatory instruments, such as obligation of disclosure, risk management requirements, best practice guidelines, mandatory responsibility for portfolio, are more

effective than self-regulation or voluntary measures, counter-arguing the claim that free market is capable of achieving the public interest and, because of that, no state intervention is needed. Nonetheless, this affirmation is a matter of debate and depends on the perception of the role that state and central banks should play in the economy.

2.4. Commercial banks and climate-related risks

Banks and investors are progressively making commitments to net-zero emissions, with initiatives such as the United Nations-convened Net-Zero Asset Owners Alliance bringing more than 40 banks, 30 pension funds and insurers, to set their paths and goals (Dikau et al, 2021). The green bonds market, where funds are used to finance sustainable projects (nature conservation, low carbon transition, etc.), has grown substantially since 2014, reaching a cumulative amount of almost US$1.4 trillion in 2021 (González & Núñez, 2021).

According to the Risk Assessment Questionnaire conducted by the European Bank Authority in 2020, 58% of respondent banks declared they have already issued some type of green financial instrument, which shows the increasing concern of financial institutions with climate-related risks (González & Núñez, 2021). Nonetheless, beyond investments in green sectors, it is extremely important to reduce the growth of climate intensive activities in order to meet climate goals.

Banks are increasingly adopting measures to cope with climate risks. Delis et al (2019) found that, especially in the post-Paris Agreement period, banks have considered the climate policies and transition risk in their loan pricing decisions and have increased loan spreads to the fossil fuel industry comparing to other industries. The rationale to support these decisions is that banks perceive it is becoming increasingly unsafe to invest in carbon intensive sectors, once 33% to 35% of current global oil reserves, and 49% to 52% of current global gas reserves are estimated to became stranded assets as the world needs to accomplish with the target of limiting global warming to 2ºC (McGlade & Ekins, 2015; Semieniuk et al, 2022).

Despite the fact that environmental hazards and sustainability transition are perceived as a risk, there are financial institutions that do not account for it in their policies and portfolios. The Banking on Climate Chaos 2024 report found that, from 2016 to 2023, banks' financing to the fossil fuel sector reached US$ 6.9 trillion, with US$ 705 billion in fossil fuel financing in 2023 alone. Other studies showed that, between 2017 and 2019, financial institutions invested almost US$800 billion in new coal plants and fossil fuel companies (Gunningham, 2020). In 2018, less

than 0.5 per cent of the assets of the world's 80 largest insurers were invested in low carbon projects.

According to an assessment made by the Bank of England (2023a), British banks are starting to embed climate risks in their accountability and risk management frameworks, but these practices are not in line with the urgency nor the magnitude of climate impacts.

Regardless the need of reducing carbon-intensive activities, some scholars advert to unintentional and potentially dangerous impacts that divesting from these sectors might cause. Divestment is when the owner of a company assets decides to withdraw capital from this business with the aim of weakening company's operation, decreasing its attractiveness to investors and, ultimately, its dismantlement. But despite the apparent good rational behind this concept, examples of divestment efforts in other sectors have raised questions on the effectiveness of this strategy. First, because limiting the supply of credit to firms with significant exposure to climate change risk might be detrimental as it reduces their ability to finance the transition to a low-carbon economy. Secondly, if some banks decide to divest from specific sectors, this movement can promote a drop in the asset prices of those firms, which might awaken the interest of more investors that are not concerned with environment and climate issues (Plantinga & Scholtens 2024). Kacperczyk and Peydró (2024) counterargue the former argument by showing that even when brown firms receive incentives to reduce climate-risks exposures, this expenditure does not enact an increase in the environment score and a reduction in carbon emissions, meaning that credit restrictions are not necessarily a determinant factor that will constrain firms to became greener. Moreover, divestment campaigns produce positive outcomes such as raise awareness over the urgency of phasing out fossil fuel and contribute to the narrative that stigmatises this industry, representing reputational problems for them (Bergman, 2018).

CHAPTER 3

Methodology

3.1. Case study selection

This study will analyse climate policies of the Bank of England (BoE) and the Central Bank of Brazil (originally in Portuguese: Banco Central do Brasil, BACEN), followed by an assessment of investment data of British and Brazilian commercial banks in fossil fuel industries from 2018 to 2023. This comparative analysis will be case-oriented, which can provide a rich description of a few instances of a certain phenomenon.

A case study analysis is "*a research strategy based on the in-depth empirical investigation of one, or a small number, of phenomena to explore the configuration of each case, and to elucidate features of a larger class of similar phenomena, by developing and evaluating theoretical explanations*" (Vennesson, 2008). Contrary to quantitative analysis, that often requires a large number of cases to be considered valid, this approach allows an in-depth investigation of important and diverse dimensions of few cases. This method has become the preferred strategy for social and political research, as it enables a macrodimensional, interdimensional and institutional processes understanding (Vanesson, 2008). The capacity of this method to go beyond descriptive statistical measures, towards a profound understanding of historical processes makes it the approach of choice for social scientists. Focusing on a small number of cases, case-oriented comparison points at differences and similarities through thick descriptions and dense narratives, considering many characteristics and their interactions along history.

Usually, statistical analysis of a large-N permits generalizations, even with more generic explanations. In qualitive analysis, by contrast, generalizations are not the main interest, but they can be provided in some level by the analysis of ideal types, which are models of specific features that are wanted to investigate (Vanesson, 2008). In the present study, the UK and Brazil can be considered ideal types of developed liberal economy and emerging economy country, respectively, being both oil producers. Besides, the Bank of England Governor's speech in 2015 is consider a landmark and a turning point for financial markets to start understanding climate change as a risk (Bank of England, 2015). It is also a founding member of the Central Banks and Supervisors Network for Greening the Financial System (NGFS), co-founded by eight central banks in 2017. BACEN became part of the NGFS three years later, in 2020, and since 2022 is member of its Steering Committee (Banco Central do Brasil, 2023).

The in-depth study of these two countries will provide room for discussions on political choices, institutions, economic systems, geopolitical contexts, interests, among others. The analysis of all these different aspects that might influence investment decisions would not be possible through a quantitative approach of a large number of countries.

The choice for two countries that have relevant differences on their development level, how they are positioning themselves in the global economy, the level of relevance of their national commercial banks in the international finance system, among others, was made to avoid conclusions that apply only in a specific context, which is a disadvantage of comparing similar cases. A *most-different systems* design allows for checking if a correlation remains true no matter in which country, analysing whether similar mechanisms can drive changes in divergent national contexts (Vanesson, 2008).

The next sub-section provides information about the importance of the fossil fuel sector for the two countries, highlighting differences between them that will be relevant to discuss some of the following results.

3.2. Fossil fuel industry in the Brazilian and British contexts

To have a better sense on the role that the oil & gas sector plays in Brazilian and British economies, it is worth to know how the energy matrix is composed in both countries, what are the main economic motors and how climate and energy policies are shaped by these factors. This context will help to understand the basis where the decision-making process of central banks in both countries are made.

The agribusiness is the main exporting sector in Brazil, being responsible for 23,8% of the Brazilian GDP in 2023 (CEPEA, 2024). The oil & gas share is substantially smaller, reaching less than 3% in 2022 (CNI, 2023). Nonetheless, Brazil is an important oil producer globally, being the 9th largest oil producer in the world in 2022, remaining in the same position as the previous year (IBP, 2023).

Contrasting with the global average, where the energy matrix is hugely dependent on non-renewable sources such as coal, oil and natural gas (80.3% in 2021, according to the International Energy Agency), the Brazilian energy matrix is composed by a high percentage of renewable sources. Summing up hydropower, sugarcane derivatives, wind, solar and other renewables, almost half of the country's energy matrix (49.1% in 2023) is constituted by renewables and 89.2% of the Brazilian electric matrix is clean. Oil & gas sources are

responsible for 44.7% of the Brazilian energy matrix and less than 10% of the electric matrix, numbers that are in a decreasing trend (EPE, 2024).

In line with these features, land-use change is responsible for the majority of carbon emissions in Brazil (48%), while the energy sector accounts for 18%. The agribusiness sector is the second biggest driver, being responsible for 27% of CO2 emissions in Brazil (SEEG, 2023). It implies that Brazilian climate policies is more focused on combating deforestation, while the UK and other developed and emerging countries dedicate more attention to the energy transition. The period when Brazilian emissions experienced its lowest numbers was exactly when the main policy to halt deforestation – the Action Plan for Prevention and Control of Deforestation in the Amazon (PPCDAm) - was in place and in its "golden years". While in 2004 the forest loss reached 27,700 km2, by 2012 this figure had been reduced to 4,500 km2, representing a reduction of almost 84% and which helped Brazil lower its share of global emissions from 6.2% in 2004 to 2.9% in 2012 (SEEG, 2023). By correctly implementing domestic policies of land-use control and zero deforestation, Brazil would stay on a clear path towards net-zero GHG emissions by around 2040(Soterroni et al, 2023).

The UK climate policy and governance is centred in the Climate Change Act (CCA), published in 2008, and the Climate Change Committee (CCC). CCA established an overall cut in emissions of at least 80% by 2050, relative to 1990, and it was amended in 2019 with a target of reaching net zero emissions by 2050, becoming the first major economy to pass into law such a domestic requirement. The European Union played a significant role in increasing the ambitious of UK climate policies, and targets agreed under EU governance frameworks have concretely contributed for the reduction in UK emissions and for scaling up energy transition (Lockwood, 2021). But, as it can be observed in the "10-point plan for a green industrial revolution", published by Prime Minister Boris Johnson in the end of 2020, climate commitments were maintained even after the Brexit, possibly because the two dominants political parties in the UK embrace the climate change fight in their discourses. It was possible mainly due to the fact that British climate policy was framed in line with a desirable flexibility that the market expects in a neoliberal economy. Despite that the rapid decline in coal-fired power generation was primarily encourage by EU regulations, the Conservatives accepted the idea of a low-carbon growth as an opportunity to job creation and investments (Lockwood, 2021).

Most of the mitigation efforts achieved by the UK to meet decarbonization commitments has been associated with the reduction in the use of coal to generate electricity and improvements in energy efficiency in the industry sector, which helps to reduce energy demand.

The government is committed to phase out coal use for electricity generation by October 2024. In 2023, renewable energy accounted for 42% of the electricity matrix. Some of the demand for coal is being replaced by gas, which is another fossil fuel responsible for significant carbon emissions and was responsible for 32% of electricity supply in 2023. Even though, fossil fuel share in the electricity mix presents a slight decrease since 2021. Considering the whole energy supply, fossil fuels (coal, oil and gas) share was 77% in 2022 (IEA, 2024). Oil accounted for 35% of energy supply in 2022 and, considering the reduction in oil production in the mature North Sea basin, this share has been falling since 2000 by 27% (Great Britain, Department for Energy Security and Net Zero, 2024; IEA, 2024). Crude oil production in the UK suffered a sharp decline of 70% in the period from 2000 to 2022 (IEA, 2024). Gas is responsible for almost 40% of total energy supply in the UK, and British production is also dropping (IEA, 2024). Regardless, the former Prime Minister Rish Sunak defended the maintenance of oil and gas production, as he believes that domestic production will help unlock green investment and allows a non-reliance on imports (Great Britain, Prime Minister's Office, 2023).

In a similar position, the Brazilian National Bank of Development (BNDES) also believes that the oil industry and its revenues are fundamental for the energy transition (Costa et al, 2023). In addition, there is an assumption that, even in a net-zero emissions scenario, it is projected that 18% of the world's primary energy in 2050 will come from fossil fuels, being oil responsible for 7.4% and gas for 7.6% of this total (IEA, 2022). Brazil can assume an important position in supplying this global demand, as the oil produced by its main company (Petrobras) is considered economically competitive and has one of the lowest carbon footprint in its production process (Costa et al, 2023).

Although, even if we take the argument that the Brazilian energy matrix is cleaner than the global average and that the pace of decarbonization must be higher in the UK and other industrial countries to reach net-zero emissions in 2050, Brazil still needs to reduce oil and gas consumption, decreasing from the current 45% of the national energy supply to 27% in the next decades (Costa et al, 2023). However, if considering a stated policies scenario, or even if announced pledges were meet, Brazil will be one of the countries that will increase more its oil production until 2050 (IEA, 2022). It is important to remember that, according to the Sixth Assessment Report of IPCC (IPCC, 2023), the maintenance of fossil fuel exploration is completely incompatible with the target of limiting warming to 1.5 degrees, as the world will still suffer from locked in effects from existing and already planned fossil infrastructure.

3.1. Data collection

To assess how each central bank is addressing climate-related issues and how they recommend that other banks also incorporate these concerns, it was conducted a document analysis of central banks climate policies, instruments, commitments, among others, available in the respective websites and some articles produced by BoE and BACEN. The documents considered for this assessment were:

a) Bank of England: information in the Climate Change page of the bank's website; Transition in thinking: The impact of climate change on the UK banking sector (2018); Supervisory Statement SS3/19 (2019); Letter on Managing climate-related financial risk – thematic feedback from the PRA's review of firms' SS3/19 plans and clarification of expectations (2020); Climate Change Adaptation Report (2021); Results of the 2021 Climate Biennial Exploratory Scenario (2022); Thematic feedback from the 2021/2022 round of written auditor reporting (2022); Thematic feedback on the PRA's supervision of climate-related financial risk and the Bank of England's Climate Biennial Exploratory Scenario exercise (2022); Bank of England report on climate-related risks and the regulatory capital frameworks (2023).

b) Central Bank of Brazil: Financial stability report (2022); Environmental, Social and Climate risks and opportunities report (2021 and 2023); BACEN Resolutions 4327/2014, 4557/2017, 4943/2021, 4945/2021.

To analyse the effect of these policies in commercial banks' investment behaviour, it was retrieved financial data from annual financial reports of British and Brazilian four biggest banks: UK – Barclays, HSBC, Lloyds, and Standard Chartered; Brazil – Itaú, Bradesco, Banco do Brasil, and Caixa Econômica Federal. It was assessed information on loans issued by these banks to the oil & gas industry, from 2018 to 2023.

It is important to recognize that, in general, this would not be the preferred period for investment analysis considering the Covid pandemic, but it was not possible to avoid it for this study. The sample period was defined considering availability of information in the annual financial reports. As disclosure of financial information related to climate issues started to be recommended only after the effort of central banks to incorporate climate risks in financial

institutions, many British banks did not specify the recipient sectors of their loans before 2018. To try to reduce an eventual impact, it was analysed the amount of loan to the critical sectors compared to the total loans in the bank's balance sheet, as a percentage.

CHAPTER 4

Results

4.1. Central bank climate policies

4.1.1. Climate-related instruments adopted by the Bank of England

The work of the BoE to incorporate climate-related risks into its policies and instruments started in 2015, with the speech of Mark Carney, the Governor of the BoE and Chairman of the Financial Stability Board, called "Breaking the tragedy of the horizon—climate change and financial stability". This speech was a landmark and was followed by others (Campiglio et al, 2018).

Since then, the BoE has included climate physical and transition risks as part of its mission of "maintaining monetary and financial stability to promote the good of the people of the United Kingdom", therefore incorporating this concern in its prudential, financial stability and monetary policies. However, only in 2019, it was published the Supervisory Statement SS3/19, encouraging banks to "identify, measure, monitor, manage, and report on their exposure to climate risks, which can include updating existing risk management policies". They were also expected to disclose climate-relevant information and "to conduct scenario analysis, stress tests, to evidence how they will mitigate climate risks and to have plans or policies in place for managing exposures". This prudential regulation measure was the first supervisory expectation adopted by a central bank (Bank of England, 2023b).

Apart from the value and relevance of this measure, it did not establish a deadline for banks to accomplish with the expectations. One year later, in 2020, the BoE sent a letter to banks, presenting an assessment that demonstrated that few banks have implemented measures incorporating climate risks, and asking banks to manage climate-related risks by the end of 2021, almost two years after the expectations had been set (Bank of England, 2023b).

Meanwhile, the BoE worked to develop guidelines and promote research to help banks in this mission and, in 2022, the BoE started to monitor and supervise banks against the expectations set in SS3/19. As expected, the majority of banks have not progressed in considering climate risks in their routines as needed. Therefore, in the end of 2022, the BoE sent another letter to banks' CEOs, this time a more incisive one. This letter asked banks to "clearly demonstrate how they were taking into account the recommendations set in SS3/19" and, where they were not, they "should present plans and road maps to address the gaps". The

recommendation was that “financial institutions should identify the climate-related risk drivers that could influence expected credit loss for loan portfolios that have the highest sensitivity to climate risk” (Bank of England, 2023b). With this recommendation, it is possible to identify the objective of the BoE by encouraging banks to recognize the exposure of their loan portfolios to carbon-intensive sector and quantifying potential losses of keeping investing in those sectors, considering physical and transition risks.

Another important document that worth mentioning is the Climate Change Adaptation Report, published by the BoE in 2021. This report points out to the difficulties in estimating climate risks due to uncertainties and complexities inherent to climate issues, recommending that further work is needed to fill gaps and that the use of macroprudential tools should be careful. According to this judgement, the BoE recommends a more gradual approach for fully incorporation of climate-related risks to regulatory capital frameworks, mentioning scenarios and model calibration complications, unintended consequences and material uncertainties about resilience to climate risks.

Regarding the requirement of more capital against assets exposed to carbon-intensive sectors, which is a measure that central banks can adopt as a penalising factor to disincentivize investments in unwanted sectors, the BoE’s position is that this intervention is not “supportable on prudential grounds as risks of individual assets will be correlated with the economic viability of the assets, and this will in turn be influenced as the detail of countries’ transition and energy strategies becomes clear”. While they stated the BoE’s aim of ensuring resilience of financial system to climate risks, this mission must be aligned with the concern of not generating unnecessary spillovers, stranded assets and a disorderly transition (Bank of England, 2023b).

In summary, the BoE had a remarkable role as a frontrunner in accepting climate impacts as a risk to the financial system in 2015 and issued its first supervisory expectations to banks in 2019. This initial climate policy asks banks to consider climate risks in their routine, by adopting measures such as identify, quantify, monitor, manage, disclose and mitigate these risks, or at least demonstrate their plans to meet this recommendation. The BoE began to supervise banks against the expectations in 2022 and this supervisory statement is still the concrete climate policy implemented by the BoE to promote the incorporation of climate concerns in the financial system.

4.1.2. Climate-related instruments adopted by the Central Bank of Brazil

Over the last few years, BACEN has acted proactively in establishing measures on social and environmental aspects. Since 2008, BACEN have demonstrated its concerns with

environmental and social issues, and in 2014 it was published the Resolution nº 4.327/2014, which sets out principles that must be observed in the establishment and implementation of the financial institutions socio-environmental responsibility policy. According to this Resolution, financial institutions must observe their exposure to socio-environmental risks and must establish risk assessment criteria and mitigation mechanisms when carrying out operations related to economic activities with a greater potential to cause socio-environmental damage. In 2017, socio-environmental risks were integrated into the Resolution that sets how financial institutions should manage all types of risks. The main objectives of these regulations was promoting risk mitigation, alignment of the financial system with public policies, and improving efficiency in the sector (Banco Central do Brasil, 2017).

In 2020, socio-environmental responsibility gained more relevance when it was incorporated into BACEN strategic agenda, increasing the priority given to the implications of climate factors for price and financial stability. Also in 2020, BACEN joined the Network for Greening the Financial System (NGFS) and, in January 2022, became a member of its Steering Committee, demonstrating the bank's commitment with this topic.

In 2021, the Resolution nº 4943/2021 amended the previous one from 2017 and socio-environmental risk was divided into social risk, environmental risk and climate risk. It was the first time that BACEN expressly recognized climate-related risks as a risk for the financial system and began to require its integration into the risk management of Brazilian financial institutions. The resolution defines climate risk as transition and physical risks, requiring financial institutions to identify, measure, assess, classify, monitor and report climate risk, record relevant data for management, analyse risk scenarios based on stress tests and adopt the necessary mitigation measures (Banco Central do Brasil, 2021).

This Resolution is the most significant policy of BACEN regarding climate impacts, especially because it extends to climate-related risks the same mandatory requirements already established for traditional risks in the areas of credit, market, interest rate, operational and liquidity. It demonstrates that BACEN recognizes the importance of adequately dealing with the risks arising from climate impacts in order to maintain the stability of the national financial system (NFS).

Another instrument adopted by BACEN to decrease climate risks in the banking system is the limitation of credits to activities linked to deforestation-risks. As in Brazil the biggest driver of GHG emissions is land-use change related to deforestation, this is an important regulatory measure to guide investments towards less climate-impactful activities.

Besides the regulatory and supervisory measures, BACEN also includes climate issues in its policy instruments, estimating the effects of climate-related risks in the economy and in the NFS. In 2022, the first report assessing the NFS's exposure to transition risks identified that around 8% of credit portfolio is aimed at borrowers who may be affected by transition risk. The oil & gas sector was considered a high transition risk sector and accounts for around US$ 2 billion in the total credit portfolio, making it the third highest exposure high-risk sector (behind beef cattle and iron/steel). In 2023, BACEN included in the macroprudential monitoring framework a module to monitor climate risks and their effects on the financial system in the annual Financial Stability Survey. Further, BACEN has been developing structured macroeconomic models to address climate issues, focussing on generating macroeconomic scenarios as input for stress tests, which allow the estimation of the macroeconomic impacts of climate events and transition policies to a low-carbon economy. In 2023, the risk of an increase in inflation caused by events related to climate and environmental issues was identified by BACEN as having the greatest impact and probability in the strategic risk matrix (Banco Central do Brasil, 2023).

Summarizing, climate-risks were incorporated in the risk supervisory framework of the BACEN in 2021, establishing that banks must consider this type of risk in their routines as a mandatory measure. Banks should identify, measure, assess, classify, monitor, report and mitigate climate risks, in order to avoid climate impacts in the NFS. BACEN also implemented measures of credit restrictions to activities that could be related to deforestation, as it is the most important driver of GHG emissions in Brazil.

4.2. Commercial banks investments in the oil & gas sector

4.2.1. Assessment of British banks

From the four British banks selected for this research, HSBC was by far the biggest lender for oil & gas (O&G) companies, summing up £127 billion in loans for the sector in the 6-years period (2018 to 2023). This amount represents around 2% in average of the total loans issued by the bank, but it is possible to observe a slightly decline along that period. In 2018, loans for O&G represented 2.65% of the total, while in 2023 it declined to 1.92% (Table 4.1). This trend was followed by Lloyds, as showed in the table below. However, in the case of Barclays and Standard Chartered, the falling tendency was interrupted in 2021. Barclays investments raised

from 2021 to 2022, and in the case of Standard Chartered, the percentage of loans for O&G in 2022 recover the same level of 2018 (2.14%) and increased in 2023 (2.19%).

Table 4.1: Loans issued by British banks to the oil & gas sector from 2018 to 2023, compared to the total amount of bank loans. Data collected from banks annual reports.

	BANKS	2018			2019			2020			2021			2022			2023		
		loans O&G	total loans	%	loans O&G	total loans	%	loans O&G	total loans	%	loans O&G	total loans	%	loans O&G	total loans	%	loans O&G	total loans	%
UK (million £)	BARCLAYS	3390	326406	1,04	3287	339115	0,97	3073	342632	0,90	2365	361451	0,65	2752	398779	0,69	2256	399496	0,56
	HSBC	26050	981696	2,65	25840	1036743	2,49	20200	1037987	1,95	19600	1045814	1,87	17400	924854	1,88	18000	938535	1,92
	LLOYDS	975	444000	0,22	1393	440000	0,32	1099	440200	0,25	987	448600	0,22	825	454900	0,18	341	449700	0,08
	STD CHARTERED	4134	192524	2,15	4151	210095	1,98	3810	219923	1,73	2920	216941	1,35	5370	251211	2,14	5047	230687	2,19

As the objective of this research is to analyse the impact of central bank climate policies in promoting the reduction of investment in fossil fuels, it was not possible to observe a trend of decline in this kind of investment in the British banking system after the adoption of the BoE' Supervisory Expectation in 2019 (Figure 4.1). In absolute numbers, if we consider the total loans issued by the four banks for O&G in the whole period, there was a decline only between 2019 and 2020. However, since then, the numbers remain virtually the same, with one bank even lending more for this sector in 2022 and 2023. In 2023, the total lending amount for O&G represented 74.2% of the one in 2018.

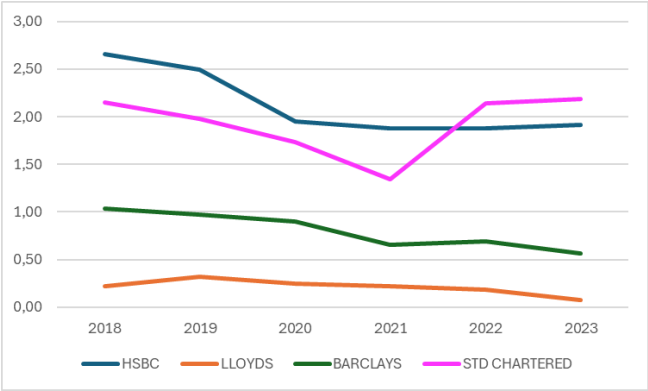

Figure 4.1: Percentage of loans to the oil & gas sector issued by British banks in relation to the total loans in the period between 2018 and 2023. Data collected from banks annual reports.

4.2.2. Assessment of Brazilian banks

Itaú lent almost R$80 billion to O&G firms from 2018 to 2023, being the largest lender to this sector, followed by Banco do Brasil (R$55 billion). However, the amount lent by Banco do Brasil represented 3.27% of the total loans issued by the bank in 2018, while for Itaú loans to O&G companies represented 2.88% of the total, demonstrating that Banco do Brasil's portfolio is more exposed to climate-risks related to this sector than Itaú. These percentages dropped

significantly through that period, and, in 2023, the share of O&G loans was only 0.58% and 1.16% of Banco do Brasil and Itaú total loans respectively (Table 4.2).

Table 4.2: Loans issued by Brazilian banks to the oil & gas sector from 2018 to 2023, compared to the total amount of bank loans. Data collected from banks annual reports.

	BANKS	2018			2019			2020			2021			2022			2023		
		loans O&G	total loans	%	loans O&G	total loans	%	loans O&G	total loans	%	loans O&G	total loans	%	loans O&G	total loans	%	loans O&G	total loans	%
BR (million R$)	BANCO DO BRASIL	21010203	641870890	3,27	11202797	621344555	1,80	12009390	669332086	1,79	2914198	770469717	0,38	2625600	877064044	0,30	5614664	964925057	0,58
	BRADESCO	10626000	531615000	2,00	10318000	623045000	1,66	11312000	686968000	1,65	5895000	812657000	0,73	7976000	891933000	0,89	6545000	877285000	0,75
	CEF	7350505	694519190	1,06	608025	693724208	0,09	1177854	787504513	0,15	1589167	867214599	0,18	1610503	1012173119	0,16	1800436	1119820258	0,16
	ITAÚ	15310763	532481496	2,88	15887768	583016945	2,73	12773583	710553000	1,80	12764152	819074000	1,56	12025096	906188000	1,33	10533936	907362000	1,16

While British banks did not present a significant trend of decline in investments in the O&G sector in the period, it is possible to observe a consistent reduction in both absolute and relative numbers in the case of Brazilian banks loans. In 2018, loans issued by the four Brazilian banks to O&G summed more than R$54 billion, while in 2023 this amount was cut by more than half, do not surpassing R$25 billion. The sharpest drop was between 2020 and 2021, pushed mainly by the reduction made by Banco do Brasil (decreasing from 1.79% to 0.38%), but the falling trend was consistent during the whole period and followed by the four banks (Figure 4.2). There were some fluctuations in the share of loans to this sector during the period, but even with this the tendency of decline is present. In 2023, the total lending amount for O&G represented 45.1% of the one in 2018, a number significantly lower than the observed for British banks.

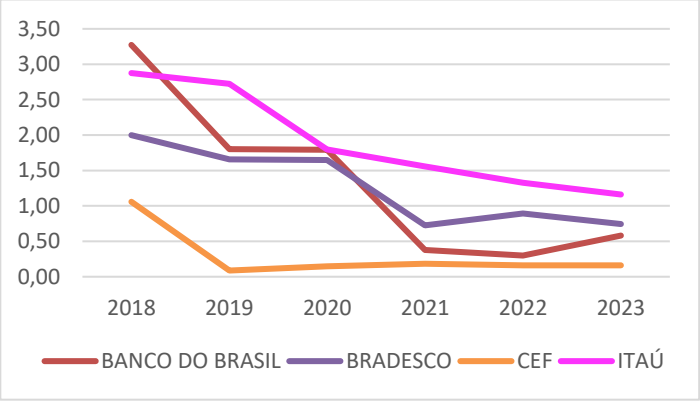

Figure 4.2: Percentage of loans to the oil & gas sector issued by Brazilian banks in relation to the total loans in the period between 2018 and 2023. Data collected from banks annual reports.

CHAPTER 5

Discussion

Assessing climate policies and instruments of the BoE and the BACEN, it was possible to observe that both central banks adopted official measures to encourage banks to consider climate-related risks in their risk management practices. Both central banks incorporated this risk in other policies, but the supervisory mechanism is the most concrete in the two countries. Although the BoE published the supervisory measure in 2019, it started to be enforced only in 2022, while in Brazil the measure started to be implemented in 2021. Another difference that can be observed is that, while the BACEN Resolution brings mandatory requirements that must be meet by Brazilian banks, the SS3-19 presented expectations of the BoE, which can be seen more as a recommendation of the British central bank for financial institutions than an obligation. This is in line with other analysis, that showed emerging economies in East Asia, Africa and Latin America as leaders in adopting mandatory green finance regulations, while European countries rely more on soft regulations (D'Orazio & Popoyan, 2019).

This difference in the approaches of central banks can be illuminated by historical, political and institutional reasons. In general, central banks in developed countries have mandates more focused on price stability and, for achieving this mission, have operational independence, refraining from intervene in market dynamics. According to historical institutionalism concepts, this can be understood to some extent as a lock in effect that makes more difficult to BoE to implement more restrictive measures to bank lending (Béland, 2010). On the other hand, central banks in emerging economies have mandates that encompass government goals for economic development, which can include environmental and social concerns. The Bangladesh Bank and the Reserve Bank of India, for instance, established a minimum credit proportion that banks should allocate to green sectors (Campiglio et al, 2018). Additionally, developing countries seem to feel more vulnerable to climate impacts, which may also influence decision-making process regarding climate risks (D'Orazio & Popoyan, 2019). It can help to explain why the BoE opted to introduce climate considerations by a softer instrument, while the BACEN adopted an obligatory mechanism and credit restrictions. Moreover, characteristics of the BoE foundation and development also help to understand decisions made by this central bank. The BoE was created at the end of seventeenth century as a way to guarantee credit for government needs, especially in the military field. Despite the possibility of keeping being financed by private donors, to constitute a solid institution was seen as advantageous for both

sides. Indeed, the establishment of the BoE contributed to consolidate a strong fiscal system, which increased even more the government incomes, as well as the government support to the BoE contributed to raise bank share prices and for corporate privileges (Broz & Grossman, 2004). Considering that central banks cannot simply disregard government and public interests, as stated by Moschella (2024), and taking into account this historical entanglement of the BoE and the government, it is possible to assume that government policies and plans have some level of influence in the decision-making of the BoE. A recent report showed that the UK annual support to fossil fuels mounted around £12 billion (Krebel et al, 2021), having remained almost unaffected after the Paris Agreement. This tax policy paves the way for a policy feedback effect represented by the difficulty of a stronger central bank policy to stimulate a reduction of investments in this sector. Once the tax and subsidies systems are not fully aligned with climate goals, some level of inertia can be expected from the financial sector.

Building on the framework proposed by Mahoney and Thelen (2010), it is plausible to conclude that, to introduce climate concerns into risk management routine, the BoE used a possible interpretation of its mandate of pursuing financial stability to encompass climate risks, as stated in the BoE's governor remarkable speech in 2015. During the long history of the BoE, the British Parliament, the government, the shareholders (private owners), and BoE managers were responsible for bank's decisions. It is not easy to promote abrupt changes which such a diverse group of interests, as any of them could have veto possibilities. Therefore, instruments that propose gradual changes, like the climate policies adopted by BoE, seems an interesting option in these cases.

The signal gave by the BoE to financial institutions in 2019 by publishing supervisory expectations was relevant and expressed not only a global increasing concern with climate impacts, but also the fact that the British economy relied less on fossil fuels since Thatcher's era. Now, the economy is more focused on the service sector than in industries, the coal industry had significantly decreased, and the UK governments are seeing the green finance as a manner to assume a leadership in global terms. It is also possible to affirm that there was political pressure for the deployment of monetary and macroprudential policies to prevent climate change, as civil society calls in this direction increased (Jabko & Kupzok 2024). Whether concerns with climate issues are not the main reason that leads BoE's adoption of climate policies, it is easier to understand why the Climate Change Adaptation Report (Bank of England, 2021) is so emphatic in defending a smooth transition towards the full incorporation of climate risks in risk management practices of the banking system, using climate change uncertainties and complexities as excuses to any delay in the implementation of measures in

this regard. Further, the modifications introduced by Thatcher in the 1960s-1970s, abolishing capital requirements, exchange controls, and promoting a deregulation in the financial system to strengthen the liberal economic model, can also help to explain the softer approached taken by the BoE (Walter & Wansleben, 2021). Nevertheless, this weaken BoE's approach can be interpreted as incoherent with the relevance given to climate-related financial risks by the BoE's Governor in his speech in 2015, as well as with the inclusion made in 2021 by the British Secretary of Treasury of sustainability and net-zero emissions by 2050 as a key component of the BoE's monetary and macroprudential policy objectives (Jabko & Kupzok, 2024).

The argument that is reasonable to wait for more clarity in climate scenarios in order to have better models to identify and measure climate risks, consequently allowing for the adoption of the right mitigation measures, is very questionable. When dealing with radical uncertainties, as in the case of climate change, there are countless outcomes possible, meaning that having sufficient knowledge to fill all gaps will probably never happen. Thus, a more responsible approach would be adopting a precautionary principle, an old friend of environmental policies, considering that, even with uncertainties, climate impacts will occur, and the more preventive actions delay, the more severe the impacts will be (Chenet et al, 2021. Along with a precautionary approach, macroprudential policies could be used to reduce risk in aggregate, stabilizing bank portfolios, for instance, considering the limited effect of microprudential instruments in tackling systemic risks (Mazucatto, 2015; Chenet et al, 2021). To enhance resilience of the financial system, it is desirable to integrate climate risks into capital adequacy requirements, monetary policy operations, quantitative credit controls and credit guidance (Chenet et al, 2021).

To analyse the case of BACEN, it is worth to mention that the Brazilian Federal Constitution, the main legal instrument in the country, states that the national financial system should be structured as to promote the balanced development of the country and to serve collective interests, in all its parts. It means that BACEN's mission is much wider than just maintain price stability or inflation targets (von Borowski Dodl, 2020). Consequently, it is possible to assume that there is no need of changing the mandate to integrate climate concerns on BACEN's policies. Further, in spite of the existence of other institutional configurations that assumed the role of monetary authority in Brazil since the beginning of the nineteenth century, BACEN started its activities only in 1965 and as a non-autonomous institution. Even though, it was created an image that its decisions were impersonal, technical and protected from political interests. This sound of legitimacy was made by pursuing the public interest with low inflation, which fit perfectly in a society that experienced long periods of extremely high inflation.

However, this absence of a real independence, being controlled by a council composed mainly by government representatives, made BACEN very influenced by political and other powerful groups and their interests (Carvalho et al, 2010).

During Bolsonaro's government, Brazilian environmental policies were almost totally paralyzed and deforestation reached historical levels (Rodrigues, 2022). This raised concerns on international level, including on private sector spheres, resulting on investors pressuring the Brazilian government to implement environment protection measures, reducing reputational risks and reestablishing the confidence of the market. A letter signed by big investors in 2020 warned that the dismantling of environmental policies undertaken by the Brazilian government was creating uncertainties about conditions for investing, as their companies must comply with international standards to avoid environmental, climate and social risks. This pressure and influence of Brazilian and international economic elites might have been one of the main drivers for the inclusion of climate risks in BACEN supervisory regulations in 2021. According to the historical institutionalism framework proposed by Mahoney and Thelen (2010), these kinds of actors can be classified as opportunists, as they can act for institutional changing or maintenance depending on their interests, and the inclusion of climate risks in the risk management regulation of BACEN by just complementing a pre-existent instrument can be one type of changes promoted by this actor category.

What are the best measures that central banks should implement to avoid financial instability due to climate impacts are still largely debatable. Some researchers advocate for differentiating reserve requirements, permitting that reserve rations be lower than average for loans directed towards low-carbon sectors, incentivizing this type of investment. However, this kind of macroprudential regulation could not be effective in developed countries, since availability of reserves seems not to be a problem for banks and, most importantly, due to the fact that money no longer needs to be backed by another asset (Campiglio, 2016).

Other possible instrument is adopting climate-related criteria in assessing whether an asset should be eligible for central banks' asset purchase, excluding selected sectors. The Swiss National Bank and the Norges Bank are taking measures in this direction (Campiglio et al, 2018). Schoenmaker (2021) suggested that, by adopting a tilting approach on the asset and collateral base for monetary policy operations towards low-carbon assets, central banks can reduce carbon emissions in their corporate and bank bond portfolio by 55% without undermining concerns with the conduction of monetary policy. Banks could also introduce a ceiling of 25%, for example, of eligible capital for aggregate large exposures to relevant economic activities, trying to reduce their exposure to carbon-intensive sectors and, at the same

time, avoiding bankrupt if the risk materialises (Miller & Dikau, 2022; Schoenmaker & van Tilburg, 2016).

There is possibly justification for the introduction of a "brown penalty", which is expressed by a higher capital requirement for carbon-intensive assets, aiming at reducing lending for those sectors and the financial system riskiness, consequently (Holscher et al, 2022). This measure can have a bigger impact when compared to mechanisms to increase investments in green sectors (such as "green support factors") due to the high amount of dirty investments (Thomä & Gibhardt, 2019).

The differences in the approach adopted by the BoE and the BACEN might have influenced the differences found in the trends of investments in the oil & gas sector made by the analysed British and Brazilian banks. While the general trend of investments of Brazilian banks is descendent in the period assessed, the share of investments in the oil & gas industry made by British banks remained almost the same, with one bank even increasing its investments. It is not possible to affirm that these trends were influenced only by central banks's policies though this analysis, but it is reasonable to accept that those policies have to some extent being taken into account by banks. This is in line with other studies that analyse effectiveness of supervisory measures. Berger et al (2022) found that restrictive supervisory regulations and severe enforcement actions against banks have better results in promoting risk reduction and financial stability, while other measures may not be as effective.

Miguel et al (2024) assessed the effects of BACEN's Resolution of 2017 on bank lending and found that lending to small firms in environmentally risky sectors declined between 2.7% and 3.1% since the Resolution was published, while smaller banks that are not subject of this policy increased credit volume for companies in exposed sectors. These results are in line with the trend demonstrated here, reinforcing the importance of central banks' climate polices to redirect financial flows towards low-carbon economic activities. However, the study goes further and reveals that credits from banks that are not under the referred regulation compensated to some extent the contraction of loans from large banks, which shows that positive effects in decreasing investments in carbon-intensive sectors could have been higher if the regulation was extended for all lenders.

Considering the requirements for the integration of climate-related risks in the risk management was published by BACEN in 2021, it is not possible to attribute the observed trend only to this policy, as the decline on investments was present since 2018, but this regulation might have been relevant to the maintenance of the investments in a lower pattern after 2021, fact that was not observed in the British case. Several other factors could influence bank's

investment behaviour, such as global tendency, market dynamics, risk perception, economic conditions, interest rate policy, regulatory changes, bank-specific characteristics, ownership, reputational risks, among others (Banco de Portugal, 2022). In the case of Brazil, is important to consider that, as mentioned before, efforts to meet climate targets are much more focused on deforestation reduction than on energy transition, which is another factor that might influence bank lending decisions. As the energy matrix is not largely dependent on fossil sources, and thus the investment on national oil production and exportation is much more a matter of industrial development and economic growth, it can be easier for banks to decide on reduce the investment in this sector. On the contrary, UK energy matrix relies predominantly on fossil fuels, making the option for reducing investments in this industry much harder.

Trends on investment can be more broadly interpretate by considering other parameters beyond loans, such as bonds and shareholdings. Due to data limitations, such a more comprehensive analysis is outside the scope of this research and will be left for future research about this topic.

CHAPTER 6

Conclusion

In a global scenario of critical environmental changes, it is essential to recognize that the so needed low-carbon transition will involves fundamentally altering how societal functions are fulfilled by disentangling and replacing carbon-intensive technologies and practices. The financial system must not only adapt to changing circumstances and fully integrate climate-related risks in its practices but also be continually reinvented to match different phases of the transition. Understanding how policy change occurs and the factors influencing decision-making, particularly within the financial system, is crucial for paving the way toward a sustainable economic model.

Central banks play a crucial role in promoting investment shift in line with the green transition. This study contributes to the literature by understanding how central banks can best support this mission, the factors influencing these decisions and possible effects of adopting different measures. First, historical institutionalism theories helped to explain the reasons for a more flexible approach of BoE climate polices and the mandatory regulations adopted by BACEN. Secondly, the assessment of the lending portfolio of British and Brazilian commercial banks demonstrated the impact of the different central banks' instruments, showing that restrictive measures are generally more impactful. Further research analysing a longer period and including other types of investment beyond loans can contribute to a wider understanding on the effects of central bank policies on bank investment behaviour.

The carbon intensity of electricity in the UK requires a substantial annual reduction until 2030 to achieve Paris Agreement targets, which cannot be achieved with continued investment in oil and gas production. This highlights the need for a significant shift in investment strategies to achieve the necessary reductions in carbon emissions. Despite Brazil's potential for low-carbon development through eliminating Amazonian deforestation and promoting renewable energy, the country lags in technology. Therefore, repurposing fossil investments towards green innovation might better position the country for a sustainable future.

Divestment from fossil fuels can have unintended consequences, but it is fundamental to stress that by only increasing the investment in clean energy without curbing the operation and development of the fossil fuel industry, it is not possible to limit global warming to 1.5ºC and secure a habitable planet. Therefore, it is critical that central banks use its instruments to

promote a reduction on commercial banks investments in this sector, redirecting the money for sustainable activities to meet climate goals and enhancing resilience in the financial system.

One limitation of the study is that it cannot be stated with certainty that the trends observed in the lending behaviour of commercial banks were solely driven by central bank policies based on this analysis. However, it is reasonable to assume that these policies have been considered by banks to some degree. Moreover, the conclusions of this study may not apply for other countries, even in similar contexts, since the decision-making process is influenced by multifaceted factors. Even though, it gives some insightful thoughts that might help to delineate further studies involving emerging or developed economies.

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