The green banking gap or why are banks not financing the green transition

Nicolás Aguila, Paula Haufe, Riccardo Baioni, Simon Schairer, Jan Fichtner, Janina Urban, Joscha Wullweber (Universität Witten/Herdecke)

DRAFT VERSION – PLEASE DO NOT QUOTE WITHOUT AUTHORS' PERMISSION

Abstract

Despite growing societal awareness of the enormous financial requirements of the green transition, banks have taken only moderate steps to decarbonise their portfolios, a phenomenon that we call the "green banking gap." Indeed, banks have been slow to increase green lending while they continue to finance dirty activities. The paper asks: why are banks not financing the green transition? Based on 21 interviews with banks employees, supported with 55 interviews with practitioners working in areas related to sustainable finance in non-bank financial institutions, the public sector, and civil society organisations, we argue that explanations for the green banking gap can be grouped in three broad categories related to structural, institutional, and policy levels. First, interviewees argue that there are not enough bankable green projects, that is, projects that meet their desired risk/return profile, while dirty projects continue to be bankable. Second, interviewees argue that there are constraints to decarbonise their portfolios arising from the characteristics of lending business, including that balance sheets are locked in old loans and that they prioritise long-term relationships with their clients. Moreover, interviewees argue that their business model has significantly changed in recent decades and thus (green) corporate, and particularly project, lending is no longer their major business. Finally, interviewees argue that there are constraints on green lending arising from financial (liquidity and capital requirements) and sustainability regulation (including the EU taxonomy and the Sustainable Finance Disclosure Regulation).

Keywords: banks, green transition, green financing gap, environmental and climate risks,

Introduction

Despite growing societal awareness of the severity of the environmental crisis, there is still an enormous gap between the estimated investments needed for the green transition and current expenditures. Estimates place the global climate finance needs at between 8.1 and 9 trillion dollars per year between now and 2030, rising to more than 10 trillion between 2031 and 2050 (Climate Policy Initiative, 2023). An important part of the explanation for the green financing gap is due to the behaviour of banks. To date, banks have taken only moderate steps to decarbonise their portfolios, leading to what we call the "green banking gap." Indeed, banks have been slow to increase green lending (Altavilla et al., 2023; EBA, 2021; ECB, 2024) and continue to finance high carbon emitting activities (Mack, 2023; Rainforest Action Network et al., 2024). Moreover, the literature provides ambiguous results as to whether banks are charging lower interest rates to green activities or higher rates to dirty ones. The evidence is also mixed regarding whether banks that could be considered "green" behave differently than "non-green" banks in terms of their lending decisions and interest rates.

Against this background, the paper asks why are banks not financing the green transition? Several recent academic articles focus on different financial actors' obstacles to contribute to the green transition such as institutional investors (Christophers, 2019; Ameli et al., 2020), index providers (Fichtner et al., 2023) and asset managers (Baines & Hager, 2022), but a systematic assessment of the role of commercial banks, and particularly their traditional lending activities, is still largely missing. While the existing literature has begun to shed light on the behaviour of banks vis à vis the environmental challenge, to the best of our knowledge, Christophers (2024) is the only one who looks at the obstacles banks face to finance green investments, but he only studies banks in relation to renewable energy firms. Our article fills a gap in the literature by providing a discussion of the challenges that banks face to decarbonise their portfolios.

To find an answer, we interviewed 21 bank employees supported with 55 interviews with practitioners working in areas related to sustainable finance in non-bank financial institutions, the public sector, and civil society organisations. As most of our interviews were done in Europe to European entities and the academic literature we draw upon is empirically based in Europe, the geographical scope of our paper is on the European continent. However, our interviewees from other geographies as well as academic literature have pointed to similar issues in other jurisdictions. Moreover, Europe is leading on sustainable finance regulation, to which the many international banks operating in Europe must comply, so some of our results apply to non-European entities as well. Finally, European banks are internationally active, so some of the challenges that they report are also likely to be found in their operations outside of Europe. All things considered, while the focus of our paper is on Europe, we believe that the findings could apply to other places, or at least fruitfully inform future research with a different regional scope.

Our main contribution is to argue that the explanations advanced by interviewees for the green banking gap could be grouped into three broad categories: bankability, business model, and regulation. To make sense of these outcomes, we deploy recent insights from critical political economy. These three categories could be mapped into three analytical levels: structural, institutional, and policy.

The first category pertains to structural features of capitalism. Interviewees argue that green projects are generally not bankable, meaning that they do not meet bankers' expected risk/return profiles. This is because green projects are either not sufficiently profitable or are deemed too risky due to their use of technologies that are not mature and their long-term investment horizons. Moreover, when green projects are profitable, increased competition between lenders quickly squeezes their profitability. In this respect, our findings are fully aligned with recent scholarship highlighting the lack of bankability of green projects (Ameli et al., 2020; Christophers, 2019, 2024; Kedward et al., 2020). In contrast, our interviewees claim that dirty

projects continue to have the desired properties, above all, they remain highly profitable, so banks keep investing in them.

The second category relates to institutional aspects and market dynamics within the banking sector. It pertains to the question how the financing of green (and respectively dirty) projects fit into path dependent recent institutional developments and the contemporary set up of banks. Interviewees claim that banks face certain limits to increase green lending or decrease dirty lending which arise from the characteristics of their business model. On the one hand, they claim that the character of the lending process itself does not allow for a fast decarbonisation of banks' portfolios because their balance sheets are locked in old loans that take time to be repaid. Moreover, banks' business model prioritises long-term relationships with clients, which leads them to aim to work with them towards a transition path instead of divesting. On the other, as recently argued by critical political economists, in the past decades banks have changed their business model away from corporate (and particularly, project) finance towards household lending, market-based activities, and the provision of financial services (Beck, 2022a; Braun and Deeg, 2020; Knafo, 2022; Sgambati, 2019). Thus, interviewees claim that (green) lending is no longer banks' major business practice, and expecting them to increase it runs against the reality of what banks actually do.

A third category of critique is policy-oriented and describes problems related to the efficacy and quality of the respective regulation. Interviewees argue that banks face some challenges to increase green lending derived from regulations, including financial regulation as well as sustainable finance regulation. Regarding the former, they claim that capital and liquidity requirements constrain green lending. Academic literature also points to the bias of such regulations against green assets (Campiglio, 2016; Chenet et al., 2021; D'Orazio and Popoyan, 2019; Gabor et al., 2019). When it comes to the latter, interviewees emphasise that sustainability regulation in Europe, including the EU taxonomy for sustainable activities and the Sustainable Finance Disclosure Regulation (SFDR) are too costly, unnecessarily complex, and entail burdensome reporting requirements. As a result, they contend that banks prefer to avoid using the label "green" to avoid complying with that regulation and instead issue regular instruments.

The systematisation and interpretation of the empirical material shows how banking practices are impaired by structural, institutional, and policy-related circumstances. The elaboration bridges different scales and thus provides a more nuanced understanding of the challenges of financing the green transition and divesting from high-carbon emitting activities. This could hopefully contribute to the design of policies that, departing from an accurate understanding of the workings of the contemporary banking system, can be more successful in mobilising financial flows towards green sectors and away from dirty ones.

The remainder of the paper is organised as follows. The first section reviews the literature on the position of banks in relation to the green transition, focusing on the European context. The second section explains the methodology of the paper and provides our findings to the question of the challenges that banks face to increase green lending and decrease dirty lending, organised in three subsections reflecting the three broad categories of explanations: bankability, business model, and regulations. The conclusion summarises the main arguments and elaborates on the political consequences of our findings for discussions on the financing of the green transition.

Banks and the green transition: the current state of affairs

The main approach taken by policymakers in the Global North and international financial institutions to bridge the so-called green financing gap has been to argue that, given the high numbers involved, the state could not provide the necessary financing and thus it is necessary to mobilise private finance through

derisking (Gabor, 2021, 2023). Among financial institutions, policymakers in Europe have directed their efforts towards capital markets (Mack, 2023). For example, board members of the European Central Bank (ECB), while acknowledging that banks have a role to play, argue that "stock markets are more effective than banks in supporting the decarbonisation of the economy" (Schnabel, 2023: 4). In support of this statement, ECB board members often quote an ECB working paper that finds that "CO2 emissions per capita are significantly lower in economies where equity financing is more important relative to bank lending" (Haas and Popov, 2019: 4). As a consequence of this approach, European policymakers have been increasingly calling for a "Green Capital Markets Union" (Lagarde, 2023).

The relative neglect of banks is surprising. Bank loans account for 75 per cent of European corporate borrowing (Mack, 2023) and 30 per cent of all funding sources (Buch, 2024). Although the share of bank assets in total euro area financial assets is declining since the early 2000s due to the growth of non-bank financial institutions, banks remain the largest financial institutions in the European financial system (ECB, 2022b): their assets represent 290 per cent of GDP, compared to only 120 per cent in the U.S. (Buch, 2024). Importantly, banks play a crucial role in key areas for the green transition, including that they finance the bulk of SMEs, building retrofits, renewable power plants, among others (Mack 2023).

Moreover, a consensus has been growing in the past decade stating that banks and other financial institutions should concern themselves with the environmental crisis because of the so-called double materiality. On the one hand, the environmental crisis affects banks via exposing them to so-called environmental and climate (E&C) risks (Aguila and Wullweber, 2024b; Battiston et al., 2021; Chenet et al., 2021; Christophers, 2017; DiLeo, 2023; Kedward et al., 2024; Langley and Morris, 2020; Smoleńska and van 't Klooster, 2022; Thiemann et al., 2023). The environmental crisis involves physical (arising from material destruction), transition (arising from changes in policy, technology, or preferences), and liability risks which expose banks to falls in asset prices and default of their lenders (Bolton et al., 2020; NGFS, 2019). In turn, transition risks could increase credit and reputational risk, and to a lesser extent market, liquidity, and operational risks (ECB, 2024). Hence, banks should alter their behaviour to shelter themselves from the materialisation of environmental and climate risks. On the other hand, double materiality also means recognising that banks' activities, including their lending decisions, have an impact on the environment. Thus, transitioning to a green economy requires that banks alter their behaviour, helping to fill the green financing gap while stopping to finance high carbon emitting activities.

Recognising the importance of the environmental crisis, some banks have already taken certain voluntary measures, in addition to measures implemented to comply with the emerging green financial supervision. Among others, banks are setting up sustainability divisions, disclosing E&C risks, creating new climate metrics, making decarbonisation commitments, and drafting transition plans as well as requiring their customers to make them. They are also adopting credit risk assessment models incorporating E&C risks which could lower (increase) capital requirements for green (dirty) lending, adopting exclusion criteria which have sometimes led to divestment, and adopting engagement approaches to influence their clients' decisions (ECB, 2022c, 2022d, 2023, 2024). (Interview 28/29, 39, 41, 44, 45, 46, 47, 59)

However, these steps have so far been moderate. According to Altavilla et al., (2023), the models used by banks to assess risks have limitations to account for future changes in regulation, technology, or systemic risks. Societal pressures may lead banks to internalise environmental and climate risks for reputational reasons, but this pressure may not be successful because banks' loan portfolios are typically more opaque than securities portfolios of institutional investors. An ECB analysis of 95 European banks covering 75 per cent of euro area loans finds that about 90 per cent face high transition risks due to the misalignment of their portfolios with the goals of the Paris Agreement, and some 70 per cent are also subject to high

reputational and litigation risk as 72 banks made public net-zero commitments while 67 of them are not yet fulfilling (ECB, 2024).

Banks are so exposed to environmental and climate risks because, to date, they have not yet significantly increased their lending to green sectors while they continue to finance dirty ones. According to the World Bank (2024), green loans amounted to only 0.15% of GDP in advanced economies and a meagre 0.06% in emerging market and developing economies in 2023, while sustainability-linked loans did only marginally better, reaching 0.29% and 0.15% respectively. Moreover, these figures have been declining since their peak in 2021. In the case of Europe, a pilot exercise of the European Banking Authority (EBA) estimates that the green asset ratio, that is, the share of taxonomy-aligned exposures over taxonomy-eligible ones, is only 7.9 per cent (EBA, 2021). Moreover, European banks derive more than 60 per cent of their total non-financial corporate interest income from the 22 most GHG-emitting industries (ECB, 2022a).

According to the ECB (2024), over 50 per cent of banks' misalignment is due to the financing of clients that are too slow to phase out their high-carbon production capacities (for example, internal combustion cars) and over 30 per cent from insufficient financing of build-out efforts (for example, renewable energy production capacity). Moreover, average loans to misaligned corporations are more than double those of aligned ones. Banks are misaligned in every sector considered (oil and gas, coal mining, power generation, automotive, steel, and cement) but steel, while the power sector is the most important source of the overall misalignment. In this last sector, the International Energy Agency (IEA) shows that the ratio of clean energy over fossil fuel financing by banks remains too high: in 2022, for every 1 USD loaned to the fossil fuel sector, only 73 cents went to clean energy companies (IEA, 2024).

Reghezza et al. (2022) show that following the Paris Agreement, euro area banks' decreased their credit to the more polluting corporations. However, banks are still highly engaged in lending to fossil fuels and other high-carbon emitting activities (Mack, 2023). The total amount of fossil fuel financing by the world's largest 60 banks increased from 891 billion USD in 2016 to 956 billion in 2019, and since then fell to 706 billion in 2023 (Rainforest Action Network et al., 2024). That number is still very high and there are individual lenders (including some of the world's largest fossil fuel financers) that have increased their financing in 2023.

Furthermore, the decrease in bank financed emissions in the euro area may not necessarily indicate a decrease in overall financed emissions. First, because banks could diminish lending to fossil fuels in the Global North while continuing or even increasing fossil fuel financing in the Global South. Indeed, research shows that European banks have increased their lending to high carbon emitting activities in other countries with less stringent climate policies (Altavilla et al., 2023; Benincasa et al., 2022; Laeven and Popov, 2023). Most lending by European banks to emissions-intensive sectors happens outside of the euro area. For example, Sastry et al., (2024) show that, in 2018, lending by euro area banks to euro area borrowers in the mining sector represented less than a quarter of their worldwide mining lending. Moreover, while European banks are decreasing their exposure to oil and gas in the euro area, they continue to finance the expansion of production in those sectors outside the euro area (ECB, 2024). In particular, Benincasa et al., (2022) show that European banks increase their lending to emerging markets. Similarly, using data on syndicated loans, Laeven and Popov (2023) argue that in response to the introduction of a carbon tax in the domestic country, internationally active banks reallocate fossil lending in foreign countries with less stringent environmental regulations and supervision practices. Second, because a decrease in bank lending to fossil fuels may be (more than) compensated by an increase in other forms of fossil fuel financing in which banks play a role. According to Rainforest Action Network et al., (2024), the share of loans in total fossil fuel financing comprises 58 per cent decreasing from 65 per cent in the previous year. Through bond underwriting, loan securitisation, lending to private equity, and other mechanisms, banks indirectly continue

to play a key role in the financing of fossil fuels (Kedward et al., 2024). In contrast, Beyene et al., (2021) estimate that bonds issued by fossil fuel companies have higher yields than other corporate bonds, but interest rates on syndicated loans do not. Thus, according to them, when climate policy becomes more stringent, fossil fuel firms substitute bonds with syndicated bank loans as banks take less environmental and climate risks into account than corporate bond market actors.

The evidence is also mixed when it comes to whether banks are charging higher interest rates to high-carbon emitting corporations and projects or lower interest rates to green firms and projects. The comparability of results is difficult due to the different regional focus, the different markets studied (syndicated loan market, total portfolio, etc), and different definitions of "green" and "dirty" sectors. Nevertheless, broadly speaking, one group of scholars find that banks charge a higher interest rate to firms with high carbon emissions (Altavilla et al., 2023; Ehlers et al., 2021) while another group does not find that result (Beyene et al., 2021; Bruno and Lombini, 2023; Delis et al., 2019).

The literature has also studied whether lending practices and interest rates differ between banks that are considered "green" - using one or another indicator - and those that are not. Sastry et al., (2024) find that European banks that joined the Net-Zero Banking Alliance (NZBA) reduce lending to polluting sectors targeted as priority sectors for decarbonisation by about 20 per cent and also relatively reduce lending to these sectors compared to non-targeted, i.e. non-polluting and green sectors. However, the authors find no evidence of changes in interest rates charged to targeted sectors or firms in the EU taxonomy and only small increases for mining. Finally, they find that NZBA banks do not divest more from targeted sectors (or non-targeted, high-emission sectors like mining or firms outside of the EU taxonomy) relative to non-NZBA banks. Even more surprising, NZBA banks are more likely to enter new relationships with clients in the targeted polluting sector, they are not more likely to exit relationships with mining firms, and are not more likely to enter relationships with firms in the EU taxonomy compared to non-NZBA banks. In contrast, Bruno and Lombini (2023), do not find differences in lending policies in the syndicated loan market between banks members of the United Nations Environment Programme Finance Initiative (UNEP FI) and "non-green" banks in terms of loan pricing and volume, although post Paris-Agreement they are more likely to reduce the weight of sectors affected by transition risks in their portfolios. Furthermore, Giannetti et al. (2023) show that banks with more extensive and ambitious environmental disclosures are paradoxically lending more to dirty industries, without demanding higher interest rates or reducing debt maturity. According to the authors the main reason of banks' lending choices is their attempt to prevent distress of brown "zombie" borrowers (those with low profitability, low productivity, limited financing options, and low interest rate coverage), with which they entertain exclusive relationships.

Regarding interest rates, Altavilla et al., (2023) find that banks that signed a commitment letter to join the Science Based Targets initiative (SBTi) charge a higher climate risk premium (that is, an interest rate above the default risks of firms) than other banks. Looking at the syndicated loan market, Degryse et al., (2023) find that, after the Paris Agreement, consortia with only green lenders (meaning bank members of the UNEP FI) provide cheaper financing to green firms (that is, those that report to the Carbon Disclosure Project), showing a "green meets green" effect. Moreover, they show that green banks charge higher interest rates to dirty firms compared to non-green banks. Ehlers et al., (2021) reach a different conclusion. According to them, in the syndicated loan market, "green banks" (including those that signal to be green such as the members of the UNEP FI or parties of the Equator Principles, and also those who are de facto green as they lend less to carbon intensive sectors) do not charge a higher interest rate to high emitting sectors compared to non-green banks, although they might screen out companies with high carbon exposure as they display a greater proportion of loans with lower carbon intensity.

To sum up, while some banks have taken steps to decarbonise their portfolios, there is still a long way to go, as there is no unambiguous evidence of banks reducing their lending to high carbon emitting sectors or increasing their lending to green ones, while there is likewise no clear evidence regarding higher interest rates for the former and lower for the latter. Against this background, we ask: why are banks not financing the green transition? Different and scattered arguments elaborated in the academic literature help answering this question. We pick these up in the subsequent sections to support the results from the qualitative interview analysis.

Why are banks not financing the green transition?

To answer this question that motivates the article, we conducted 76 semi-structured interviews with 37 practitioners working at financial institutions in divisions related to sustainability (of which, 21 work at banks) in Europe and the US, 15 people working in the public sector in areas related to finance (including central banks, the European Commission, and others), and 24 working at civil society organisations with a focus on the environmental and/or financial topics (including social movements, think tanks, lobby groups, among others). The appendix presents a list of the characteristics of the interviewees respecting their anonymity.

Interviews were conducted between November 2022 and May 2024 in a variety of locations in Belgium, France, Germany, Luxemburg, Switzerland, the Netherlands, the UK, the US, and online. In addition, we organised a day-long Policy Innovation Lab (PIL) in Berlin February 2024 with members coming from academia, civil society organisations, the public sector, and financial institutions. In that meeting, we presented some preliminary results from the interviews and discussed some of the challenges of the financial system to support the green transition. The discussion at the PIL allowed us to identify the key factors at stake, which we translated into preliminary criteria to subsequently code the interviews using MAXQDA. Due to the focus of this paper, the interviewees with people working in banks carried the weight of the information. As a consequence, we use them to guide the analysis, while the other interviews help us to cross check the results.

When asked what challenges banks face to increase green lending/reduce dirty lending, interviewees working in banks typically provide several answers that can be grouped into three broad categories: bankability, business model, and regulations. The choice of the categories was also supported with the other interviews, which yielded consistent results.

Bankability

The issue the relative lack of bankability of green projects has recently been the object of critical analysis in the literature (Ameli et al., 2020; Christophers, 2019, 2022, 2024; Kedward et al., 2020). Briefly, the argument is that green projects generally do not meet the desired risk/return profile of bankers, while dirty projects do. Perhaps the best analysis of the topic has been provided by Brett Christophers in a series of recent contributions. Discussing renewable energy, Christophers (2024: xxix) argues that "The developments that renewables project sponsors propose to capital-rich financial institutions all too frequently are not considered suitable, investible or—to use the word favoured by the finance sector—'bankable'. And, invariably, the primary reason is... 'bankable' essentially means 'expected to be profitable'."

Christophers (2024) argues that, unlike fossil fuel energy, the costs of a renewable energy (wind and solar) project are mostly bore up front, while the revenues are spread over a period of twenty years or more.

Renewable energy projects are more capital-intensive and require larger upfront investments that need to be financed (Egli et al., 2018). These costs are rarely financed using cash holdings (among other reasons because renewable energy firms are relatively new, so they do not already have large sources of cash inflow or accumulated money) so they have to be financed, whether by debt, equity, or a combination of both. Developers typically prefer debt, as it is cheaper and its costs are more easily assessed (the interest rate). Thus, developers are highly leveraged: debt represents between 70 and 80 per cent of wind finance (Christophers, 2024). Given that renewable energy projects have few operating costs, this means that debt servicing costs are typically their main cost. This makes green projects particularly sensitive to interest rates increases (Aguila and Wullweber, 2024a).

According to Christophers, if sufficient debt cannot be raised, then a renewable energy project is unlikely to take place, so financing is the "ultimate chokepoint." He (2024: 94) argues that "financing is the challenge to which a solution simply must be readily and widely available in future if investment in solar and wind capacity on anything like the necessary scale and with anything like the necessary alacrity is to occur." However, banks have so far been unwilling to provide the necessary financing because renewable energy projects are not profitable enough for them.

Christophers (2024) argues that bankers have only one question in mind: will the borrower be able to meet payment obligations in time? So, they want to know as precisely as possible how much income the borrower will generate, and on what schedule, to assess its debt-servicing capacity. One first issue in this regard pertains to the expected returns of green projects (Murau et al., 2023). Kedward et al., (2020) argue that green investments are sometimes by their nature not profitable. Natural protection and conservation projects, for example, are meant to prevent economic activity from happening and thus cannot be monetised. Even those from which an income stream could be derived, are typically small scale or confined to a local area so they do not meet the minimum investment values required to justify the transaction costs involved (Ameli et al., 2020; Gabor et al., 2019; Kedward et al., 2020).

Estimates place the share of climate mitigation projects that meet the expected risk/return profile at 40 per cent and the number falls to 20 per cent to adaptation projects (Finance Watch, 2024). But even those that could potentially yield sufficient profits are plagued by a variety of risks which impair the calculus of bankers. In renewable energy projects, for example, an important risk is the volatility of market prices (Christophers, 2024). Green projects are also riskier because they typically entail the use of technologies that are not yet mature. According to one interviewee, green technologies "are often not well established or let's say, younger, less mature - which means they are riskier, right?" (Interview 39). Similarly, another interviewee argues that: "you have some technologies that are not mature and green doesn't mean less risk as such. So it raises some competing problems between inherent risks associated with new technologies that are not mature yet (Interview 28/29)" Moreover, green projects involve risks derived from their long time horizons. They generally involve long-term commitments that exceed the time horizon in which bankers are comfortable. As one interviewee puts it, "Often also the tenors are long - so we talk about 20 years. I mean, it's infrastructure, right? So it's quite long dated. And hence, the challenges banks will face is that it often falls outside of their risk appetite" (Interview 39). Similarly, another interviewee states that banks investment horizons are typically 5 to 7 years, whereas those of green investments are beyond 15 or 25 years (Interview 26). One way of curbing risks and thus improving the bankability of green projects are insurances. However, even they, echo the banker's concern, over insuring operating costs over such long periods of time (Interview 42). One interviewee also deplored a lack of collaboration between banks and insurance companies on these matters (Interview 42). These characteristics of green projects make them generally unattractive for banks. One interviewee summarises the issue as follows: "So you have something like quite low profitability, high risk, uncertainty (…) it's a lot of issues (Interview 39). As a result, another

interviewee argues that: “most of the financial industry infrastructure is built around risk and return. And I think that there it's really hard to insert net zero or climate impact into this like bilateral framework” (Interview 46). Another interviewee elaborates further:

> And even if you look alone, renewable energies, wind and solar transactions in Europe have become quite risky (…). So, what I would like to say is that green loans do not mean risk-free loans. And the risk profile of renewable energies is increasing massively. So, we haven't had any defaults yet, but (…) the structures are getting weaker and weaker (…). (Interview 37)

Christophers (2024) summarises the issue as follows: “Essentially, there are not enough projects characterised by a level of revenue risk that potential financiers deem to be acceptable – or, at least, project in which financiers are prepared to invest at a cost of capital that developers, in their turn, are willing to pay.” (Christophers, 2024: 177).

Our findings are fully aligned with his assessment. Most of our interviewees highlighted the lack of bankable green projects as a key factor (Interview 8, 21, 23, 26, 28/29, 31, 37, 39, 41, 42, 47). In the words of one interviewee: “I don't actually think we have a lack of funding out there. I think we have a lack of bankable, robust projects out there.” (Interview 49). Similarly,

> One issue I've never understood is, and I read this everywhere, there's a lack of money for transformation, so I think if you're traveling in developing countries now, then I can completely understand the argument. (…) But in Europe? There is so much ready-to-invest money that likes to go into these green applications, what is missing are viable business models. (Interview 37)

Another interviewee similarly states:

> the narrative that has been created and I think it has been catalysed around COP26 (...) is that you have a wall of green capital, investors who are willing to invest are going to invest in the real economy, and we're going to see changes in public policy. For us, it is the complete opposite, like the order should be completely reversed, because ultimately, when you think about what an investor does, if it's not an impact investor and philanthropic investor, they will have to have the right risk-return profiles. So essentially what they're going to do is they're going to look at the sustainable finance investment and think, okay, is this going to contribute to our firm's sustainability targets and is it going to drive profit? Does it have the right level of risk? Right. Because the money we use is the money of our clients. It's not our money. So we are not in a position to go to our clients and tell them, you know, invest in this. They have to come to us already with a strategy that requires capitalisation that we can provide help facilitate in whatever form. (Interview 45).

The interviewee concludes that: “We facilitate the transition, but we are not in a position to drive it, because that would mean that we would have to be, you know, denying the market conditions or the risk return profiles or whatever is happening in the real economy (Interview 45)”

The lack of profitable green projects is furthermore related to a lack of knowledge on the clients’ side on how to originate a green project or asset with the necessary requirements in terms of information disclosure, certifications, among others (Interviews 21, 41, 49). An interviewee working at a bank pointed to the need to improve the sustainable finance education of the corporate clients: “there is a lot of education that needs to happen because most of it, even when you talk about private entities in the markets we operate, quite a lot of companies we work with are not listed. So they don't have the same exchange rules and regulations on them.” (Interview 41).

Banks do sometimes lend to renewables, but typically only those that have a high risk tolerance, and they charge a high interest to compensate for the risk (Christophers, 2024). In other words, they lend only when it is profitable. An interviewee working at a bank stressed the importance of showing the profitability potential of sustainable finance to get the executives of the bank on board:

> And so that proof of concept we'd built around sustainable finance really started to take off as an idea, but I think our board and our executives probably spotted the opportunity before they realised the money was going to be there (…) No one else is there. So we have to be the ones to do this. And yes, we're going to make money from doing it (Interview 41).

Putting things clearly, "To be honest, our investor group is not really [a group of] activist investors. They're interested, but they're more interested from the perspective of how are you going to make sure that these commitments don't interfere with your returns." (Interview 41).

Nevertheless, even in the cases where green investments are profitable, their profitability gets quickly squeezed due to increasing competition in the financing of green projects (Christophers, 2024). Our interviewees argue that increased competition by banks to green their portfolios also reduces the pool of available profitable green projects (Interview 28/29, 31, 37). Many banks and other financial investors have in the past years been drawn to the sustainable finance market. Increased competition in the context of limited green projects has squeezed profits for financial investors. Indeed, from getting a green premium due to higher risks of renewable projects, financial investors could now even pay a green price premium to gain more exposure to green assets. According to Christophers (2024: 221), this is unlikely to last: "banks, of all capitalist firms, are not charities. If we can be sure of anything, it is that their willingness to pay the premium in question will be limited."

Our interviewees mention that increased competition among lenders gave more bargaining power to borrowers, who could, paradoxically, force banks to lend also dirty projects in exchange for allowing them to fund their green ones:

> So green assets are more and more in demand and we see more and more clients coming to us and saying, 'if you want my green project, then you will first finance my ten other brown projects', because they start to understand the power of the green. Because when you start, you say, 'I will take this one and I don't want to take this one.' So in the beginning, you are the only one to say that. But today there are not enough green projects. So they have understood this point, and they are able to tell you that if you want the green, then you will have to finance the brown. It's also the game of the transition (Interview 28/29).

Christophers (2019, 2024) also calls attention to the profitability of financial investors. In contrast to developers of productive green projects, for whom a low interest rate increases their profitability and could lead to more investment, from the perspective of financial investors, a low interest rate means lower profits and thus less willingness to finance them. In this regard, interviewees criticise the presumption that they have to give money cheaply to governments or to green projects:

> For public players, I have to be honest, we're getting a bit desperate because local authorities, in particular, expect free loans, and we'll never give them. The public sector would have to step up to the plate itself: Either we finance them all. If that's what they want from us, then it's A more expensive and B more complicated, because we also want to do due diligence and things like that. (...) I believe that the state could make the distinction between what the state finances and what we should finance a little clearer. (Interview 31)

In contrast to green projects, our interviewees explain that dirty projects continue to have the desired properties, above all, they remain highly profitable, so banks keep investing in them (Interview 21, 37, 39). One interviewee stressed that banks could face a competitive disadvantage if they do not finance dirty projects as "someone else will do it because it's profitable" (Interview 39). In other words, it continues to be rational for them to invest in dirty projects in the short term (Ameli et al., 2020; Christophers, 2019).

Business model

Bankers also argue that they face certain limits to increase green lending or decrease dirty lending which arise from the characteristics of their business model. This involves two interrelated dimensions: the character of the process of lending itself, and the change in banks' business model during the past decades which means that corporate, and particularly project financing, is no longer their major business practice.

The character of the lending process

Our interviewees suggest that, due to the very nature of the process of lending, they cannot quickly decrease dirty lending. Interviewees argue that the process of shifting the composition of banks' balance sheets is slow. This is because they have already provided loans in the past which take time to be repaid and disappear from their balance sheets: "For banks the balance sheet is some kind of inertia (…), it's about 10 to 15 per cent of the balance sheet that changes every year (...). So it takes time to change that" (Interview 28/29). The subjective estimates of interviewees could, however, be slightly biased to overstating the risks involved. According to ECB (2024), the average maturity of a European bank loan (to one of the six sectors they analyse) is seven years, and rollovers are common as relationships are long-lasting. Moreover, they break down the portfolio and show that 40 per cent of banks loans mature in one year, and 80 per cent within five.

One interviewee highlights that the long-term relationships of banks with their customers also impose limits as a bank does not want to "step a client on the foot." For instance, the bank in which the interviewee works decided to ban coal investments, but they had existing clients who still had orders open, so the bank decided to finance them until the end and then revise the exclusion criteria (Interview 21).

Moreover, the prioritisation of long-term relationships with their clients (even in the cases in which long-term means a succession of short-term loans) implies that banks do not want to get rid of their existing dirty clients, trying instead to work with them towards a transition path (and so keep them as clients). A survey among bank executives and directors undertaken by Deloitte, found that, while exclusion policies remain a relevant part, banks increasingly focus on engagement policies and sustainable financial product and services innovation in their climate neutrality agendas (Deloitte, 2022: 34). Interviewees likewise point at these long-term relationships as a lever that banks could pull to influence their clients into shifting towards more sustainable activities (Interviews 23, 40, 41). As one of them puts it:

> And so where I see change actually happening, I suppose, is when we see clients actually shifting their behaviour, which I think is the important part, is where we have more long-term standing relationships, like revolving credit facilities with the client. So, it's an annual relationship that you renew periodically. And as part of that they just sign up to your regulatory compliance statement which is like a byline of the underwriting. But they basically will say, okay, we'll always adhere to your position statement or your criteria. So anytime we change that criteria, that's when you see the

> change happen in the client and you engage them through their normal facility and process. (Interview 41).

More concretely:

> So that when you'll change your criteria, you'll say, okay, I have two years to get this client to improve. I have two years to get this client to start to report on their disclosures. So I'm going to engage them now and say, okay, in two years, if you haven't done this, then I can't offer you a normal revolving credit facility for your everyday needs (Interview 41).

One interviewee reasons that it is better if international banks that can exert some influence on the behaviour of their clients keep financing high carbon clients, rather than leaving and letting smaller banks fill the gap:

> Because if you're one of the only international banks and you pull yourself out of that because you've made a very public commitment (…), that leaves smaller regional banks who are not going to have any qualms about it, but who are also not going to push governments towards changing and shifting their targets. So if you stay in, can you come to agreements with governments on the ground, that can have very credible targets in place at a government level? (Interview 41).

Another interviewee likewise points out that:

> [we have] almost like a heat map then of which clients are contributing most to those financed emissions. And we realise that in order to meet our targets, yes, we can just withdraw financing, but that's also our revenue. And that doesn't necessarily drive any change in fuel economy emissions. So we need to have a way of engaging our clients. And we should be making financing decisions today, not on where clients were 2 or 3 years ago and their emissions profile, but where we expect they're going to be in 2030 and beyond. And to do that, we recognised we needed to have a process to assess our clients' transition plans. So we started that also two years ago. (Interview 46).

Nevertheless, interviewees also point to some issues with engagement policies. Interviewees explain the engagement policy at the institution where they work consists of a climate document with 30 clauses and 6 hurdles that they expect companies to reach, although they do not impose a particular date and their items are meant to be simple because they do not have insider knowledge of the business of the firm so they cannot be too specific. While highlighting the benefits of engagement compared to broad divestment (although seeing a role for divestment from the worst performers), the same interviewees argue that "we're also explicit about the escalation tools we will use, because eventually we found there was a lot of subjectivity in the way that the marketplace operates." (Interview 46). Elaborating further, the interviewees state that "still one of the fundamental challenges is that you could go to ten different asset managers and they would give you a different answer for what they consider a well-prepared company or a badly prepared company or a good strategy. And that's- so that that level of subjectivity creates problems" (Interview 46).

Some interviewees see broader issues with engagement policies via loan conditionalities or similar policies, suggesting instead that the advisory role of banks might be more relevant for changing corporate clients' behaviour: "our power to convince clients to do something is quite limited. I would say perhaps the advisory role is much more meaningful because they will come to us sometimes, like asking about policies, asking what they should do, asking about risks, asking how we can help them" (Interview 45).

Moreover, the claim that banks stay with their dirty clients based on the altruist goal of changing their behaviour for nature's benefit may, however, hide not so magnanimous motivations. As stated in the previous section, the fact remains that dirty lending continues to be a profitable business. Moreover, even in cases where dirty borrowers run into profitability issues, banks still want to get repaid. The financial

distress of “zombie” dirty borrowers could impair banks’ balance sheets, explaining banks' reluctance to cut ties with these borrowers (Giannetti et al., 2023).

Finally, Laeven and Povov (2023) argue that banks’ sector-specific specialisation could make it difficult for them to change their business model. In particular, they show that banks with relatively high fossil exposure are more likely to reallocate their fossil lending abroad. This suggests that, for these banks, it is easier to continue lending to carbon-intensive sectors in another geographical jurisdictions than to change the sectoral composition of their portfolios. Similarly, Beyene et al., (2021) argue that one reason why banks might finance more fossil fuel companies compared to bond markets is because of banks’ existing knowledge in fossil fuel technology and their high exposure to carbon assets.'

The change in banks’ business model

A different set of problems arises from the fact that banks’ business practices have significantly changed in the last decades and thus (green) lending is not something that they are in the business of doing so much anymore. In particular, corporate (and even more so, project) lending has declined in significance. Interviewees highlight that the expectation that banks should increase their green lending is based on a misunderstanding of what banks actually do.

The varieties of capitalism school has traditionally distinguished between bank-based financial systems (like those of coordinated market economies including continental Europe and Japan) from market-based ones (those of liberal market economies like the US and UK) (Beck, 2022a; Braun and Deeg, 2020; Hardie et al., 2013). According to this classical image, bank-based systems are depicted as characterised by the centrality of banks, which rely on the deposits of their loyal customers, enjoy an insider knowledge of their corporate clients based on personal relationships allowing them to engage in long-term finance (mostly loans), and are relatively shielded from competition with non-bank financial institutions due to regulations that granted them an oligopolistic status. In contrast, market-based financial systems are said to be characterised by the centrality of non-bank financial institutions which fund themselves using money market instruments and lend using a variety of tradable securities (bonds, securitised loans, etc).

Hardie et al., (2013) break with this dualistic model by introducing the idea of market-based banking. They show that banks transformed their funding sources and have become market intermediaries in lending activities, as expressed in the share of deposits in bank liabilities and the share of loans in their assets. Market-based banking involves not only banks but also shadow banks (some of which are off balance sheet entities of banks) granting loans. Unlike traditional banks, they do not necessarily keep the loans in their books but sell them, either directly or through securitisation, in a model called “originate to distribute”. If they keep the loans in their books, they mark them to market, hedge them using credit default swaps, and finance them using market sources. From the perspective of non-financial corporations, the change has been significant, as they are now exposed to shorter-term and more volatile funding sources. This is especially the case because banks have also transformed their liability structures, so they themselves are more exposed to market pressures that they transmit to their corporate clients, instead of providing patient capital.

Several recent contributions criticise not only the dichotomy between bank-based and market-based financial systems, but also the idea of market-based banking (Beck, 2022a; Dutta, 2020; Knafo, 2022; Sgambati, 2019). A growing body of literature has evidenced a “debt shift”, namely that, in the last four decades, banks have shifted their portfolios from firm to household lending, mostly mortgage credit (Bezemer et al., 2023; Braun and Deeg, 2020; Jordà et al., 2016). Moreover, Sgambati (2019) argues that banks have been growing in size and diversifying their activities. While economic theories still largely

portray banking as providing productive credit to firms or consumption credit to households, banking nowadays includes activities such as asset management, securities dealing, brokerage and proprietary trading, which involve the provision of liquidity to other financial institutions. As a result, banks' profits are no longer primarily derived from their interest income (Erturk and Solari, 2007).

Similarly, Beck (2022a) and Knafo (2022) suggest the need to take into account the power differentials within the financial sector, that is, the uneven character of financialisation. Knafo (2022) argues that financialisation was initially driven, from the 1960s onwards, by a revolution in the way in which big banks manage their liabilities moving from taking deposits (a typically stable source of funds) to raising short-term funds in money markets via certificates of deposits, repos, among others. Banks could raise flexible funds from other financial institutions with few strings attached because those institutions were limited by the regulatory environment. Thus, banks were able to exploit differences within the financial sector, deriving a source of power from their character as debtors, not creditors. The change to liability management led to a following change in the management of their asset side: their capacity to mobilise cheaply borrowed capital with few strings attached underpinned their shift to proprietary trading. Moreover, the rise of new management techniques that used a mark to market approach to the asset side, combined with the volatility of funding through liability management, made it costly and risky for banks to hold loans in their books, so they began to securitise and sell loans and develop "originate to distribute" practices.

Following the same approach, Beck (2022a, 2022b) argues that the rise of liability management allowed US banks to outcompete European ones internationally, including in Europe. The financialisation of US banks exerted pressures on European banks to catch up, forcing them to find sources of dollars, which they hitherto lacked, and get into foreign dollar markets: the Eurodollar market in the 1970s and later directly in the US. To operate in the short-term and deep US money markets, European banks had to change their business models towards liability management, overcome certain regulatory restrictions, and buy institutions and hire personnel, in short, they had to adopt a US-style of banking. One consequence of this process was that European banks reduced their corporate loans, as they no longer yielded sufficient profits, and turned towards originating and trading securities from the 1990s. European banks then adopted business models that made them highly dependent on US money markets, thus entrenching their problem of having to access large volumes of short-term dollar funding from a disadvantaged position as they do not have dollar deposits nor direct access to Federal Reserve lines.

In a nutshell, banks have increasingly shifted their activities away from corporate lending towards household lending, market-based activities, and the provision of financial services. Moreover, the bulk of their revenues is increasingly composed of fees and not of interest. This is the context in which we should discuss the greening efforts of banks. One interviewee highlights the diversity of banks' business models compared to other financial actors: "Within a bank, I can serve a wide range of clients from retail individuals right through to sovereigns. And I can serve them in a wide variety of geographies, and I can have a wide variety of products." (Interview 41).

In principle, what the shifts in banking practices indicates is that banks are increasingly avoiding to use their own balance sheet. As one interviewee puts it, "[Our activity] It's connecting. Typically in the capital markets, we do facilitate. We are not the lender [it] is not our money. But we are in the middle of that flow. And we are connecting the need for this capital and the excess capital that could allocate to it." (Interview 39). That interviewee highlights that, while the bank has objectives in terms of the decarbonisation of its balance sheet, the targets for mobilising the capital of others are much more ambitious.

Banks may perhaps want to lend to the project but not for the whole term, or not using their own balance sheet:

> I also have to go out to customer service, and that's now not just a matter of, I'm making a green investment and feel good and can report something, but actually, where do I actually have investors, be it investment, investments or banks, who are able and willing to accompany me in this transformation? And we say yes, we can support you, but we can't support you over the entire term, there are instruments that we can offer because we can't or don't want to provide our own balance sheet, and basically it's now almost a match-making process: What is the demand for capital, what is the supply, and where does it fit into which pocket? (Interview 26)

Regulations

The final broad set of answers involves the argument that regulation imposes some constraints on banks' capacity to lend. Interviewees voice their concerns regarding financial regulation (including liquidity and capital requirements), green financial regulation, and overall policy environment.

Complaining in general about banking regulation, one interviewee states that:

> The regulation of banks, the whole thing is so bureaucratic and, to some extent, box-ticking. So, the focus is on missing commas and so on and the big issues are lost sight of. In other words, when I talk to the supervisory authority, it's all about the small stuff, but not about the big strategic issues, and the banks are currently being regulated to death, which is causing the shadow banking system to grow. (Interview 37)

Academic research points, more concretely, to some limits that financial regulation imposes on green lending. For instance, liquidity requirements such as the Net Stable Funding Ratio (NSFR) or the Liquidity Coverage Ratio (LCR) aim to avoid the kind of liquidity mismatches in the balance sheets of financial institutions that could threaten financial stability. Inducing financial institutions to hold more high-quality liquid assets (cash, sovereign bonds, high rating corporate bonds, etc.) and requiring them to match long-term assets with more expensive long-term liabilities could, however, have the adverse effect of biasing them against investment in green assets, which are typically long-term and less liquid (Barmes and Livingstone, 2021; Campiglio, 2016; D'Orazio and Popoyan, 2019; Gabor et al., 2019). Similarly, at the moment, the risk weights of capital requirements are biased against green assets due to their longer pay-back period (Campiglio, 2016; Chenet et al., 2021; D'Orazio and Popoyan, 2019; Dafermos and Nikolaidi, 2021; Gabor et al., 2019; Schoenmaker and van Tilburg, 2016). Our interviewees echo such concerns (Interview 14, 40, 45, 46, 47): "obviously, you know, the Basel Capital rules make it very, very hard to hold long-term credit risk". (Interview 39). Similarly, another interviewee states that "when it comes to Basel (...) I think it's a real concern that this is going to limit investments, especially in green activities. (Interview 45)" An interviewee argues that this is particularly problematic because banks might manage to find profitable green assets, but if they are too risky, high-street banks that are heavily regulated will not lend to them due to the capital requirements associated (Interview 47).

As a complement, several interviewees voiced criticisms towards sustainability (including sustainable finance) regulation. The EU developed a regulatory framework (Busch et al., 2021) based on a green classification system of economic activities (the green taxonomy), a comprehensive disclosure regime, and the introduction of standards such as the green bond standards. As for banks, the main regulatory requirement is the disclosure of the so-called green asset ratio, a key performance indicator showing the ratio of EU taxonomy aligned assets to total assets (Brühl, 2023). Furthermore, the supervisory authority assesses banks incorporation of ESG risks and conducted climate stress testing (ECB 2022a, 2022d, 2024). While some interviewees highlight the need for measures that alter the risk-return profiles to favour green

investments, the EU regulatory framework is based on disclosure and reporting requirements to improve transparency in financial markets: ″pretty much everything is related to transparency [...] There's very little in terms of really prudential rules or other kinds of rules to change the behaviour of companies″ (Interview 19). One interviewee argues that reports are never read, evidencing that they are unnecessary (Interview 9). Another one adds, that "no one ever needs 1300 KPIs, not even for a billion dollar investment would one look at them" (Interview 23). Another claims that even when they are read, they are impossible to understand:

> 90 per cent of the sustainability reports we have are figures that nobody understands, how to put them into context, and nice anecdotes. And even as an expert, I don't know, I've seen hundreds of these things, it's not easy for me to see, is it now, is there substance in it? Is the company on the right track, or are they taking the piss? (Interview 37)

Several interviewees complain more concretely about the EU taxonomy (Interview 17, 21, 23, 26, 28/29, 37, 41, 42, 47). According to them, the taxonomy is helpful to identify green projects but it is limited to only green projects, without considering important sectors for the transition. One of them states that "the big problem today is that the taxonomy is only for green activities. And so you are assessing at least 5 per cent maybe of the economy. And what we are missing is a 'shaded taxonomy' to assess the transition (Interview 28/29)". This point is also shared by another interviewee: "This is our biggest critique of the EU taxonomy, that it does not include the rest of the work that we do on transition and actually trying to improve clients" (Interview 41). Moreover, as the taxonomy does not point to dirty sectors, more ambitious financial regulations such as imposing a dirty penalising factor are rendered impossible to apply in practice.

Interviewees also criticise the SFDR on the grounds that it imposes costly and strict requirements for something to be considered as "green" (Interviews 9, 21, 26, 41, 72/73). Thus, in some cases, they prefer to not use the label in order to avoid a potential exposure to the reputational risk of being accused of greenwashing. According to our interviewees, this risk seems to weigh heavier than the reputational risk of not financing enough green projects. Interviewees offer examples of cases in which they decided not to issue green products, choosing instead regular products (Interview 9, 21, 26). They describe that the fear of being accused of greenwashing on the client's side often leads to them refraining from using green labels all together (Interview 9). Similarly, the bankers too, prefer not to invest green, in cases where the necessary indicators are not 100 per cent convincing, instead of risking to contributing to "greenwashing" a project or corporate (Interview 21, 26). The increased scrutiny implied in green lending practices and demanded by regulation also makes it less attractive to clients. One interviewee elaborates that, clients always have a call option in lending and when they get the money for their green project cheaper or with less scrutiny from someone else, they will prefer an investor that simply "locks the bond in the cupboard" (e.g. a hedge fund or other shadow bank). All the while, maybe even keeping the exact same green qualities but with less reporting obligations (Interview 37).

Beyond the risks of greenwashing, issuing green instruments, such as green bonds, entails a process of developing new technical capabilities, hiring auditors and verifiers, among others (Christophers et al., 2020). All things considered, one interviewee suggests that green products could even lead to losses:

> From a bank's perspective, if it's like a sustainability linked product, sometimes we're even losing money on it than if we just offered the normal product line, because we're offering an incentive or a discount to get them to do sustainability. It requires significantly more governance internally and controls. So it costs us more to actually provide the products. It costs our clients more to get the product if we're going to label it because they have to disclose significantly more information. (…)

> And again, internally, there was a pretty big debate over why are we doing this? We were actually asking ourselves, why are we doing these products? When in fact we could offer the traditional. For a green purpose and not call it green. And we make more money. (Interview 41).

Finally, interviewees point to another issue arising from uncertainty regarding future policy, potentially exposing them transition risks (Interview 26, 37, 45). Previous research has also found this to be a reason for the reluctance of investors to finance green assets .

Conclusion

There is increasing evidence that banks have been slow to decarbonise their portfolios. This article is motivated by an attempt to find an answer to the question: why are banks not increasing green lending and decreasing dirty lending at the pace required for the green transition? Based on 21 interviews to banks employees, supported by 55 interviews with practitioners working in other financial institutions, the public sector, and civil society organisations, we argue that there are three broad categories of challenges that banks face: bankability, business model, and regulation. At the structural level, production in capitalism is based on the maximisation of profits. The first category, bankability refers to a lack of green projects meeting the desired risk/return profiles of banks, and the continuing existence of bankable dirty projects. A conclusion that our interviewees often draw from this is that the problem of the green transition, at least in the Global North, is not a lack of finance, but bankable projects to attract them (Interview 8, 21, 26, 28/29, 31, 37, 39, 41, 45). Consequently, they argue that policies have been misguided as they focus too much on finance as if that alone was enough to green the so-called real economy. While interviewees often exaggerate their claims, their statements are consistent with recent findings in critical political economy concerning the bankability issues of green projects. Moreover, they are broadly aligned with the conceptualisation of credit creation of the theory of endogenous money, as well as with Keynes' dictum that "anything that we can actually do, we can afford." While financing is a crucial component of the green transition, understanding the limits of a one-sided financial approach could help to inform a policy framework that combines credit and industrial policy for a green structural transformation.

On the institutional level, the business model category comprises two dimensions. On the one hand, interviewees claim that there are limits to the decarbonisation of their portfolios arising from the characteristics of the lending process, particularly the inertia of their balance sheets as they are locked in old loans, and the priority of long-term relationships with their clients. On the other hand, interviewees argue that the banking business has significantly changed, and their focus is no longer on corporate (and particularly project) lending. Thus, expecting them to increase green lending is not realistic given that their business is currently mostly based on mortgage lending, market-making, and the provision of financial services. In both cases, our findings point to the need to have an accurate understanding of banking practices to design financial policies. Policymakers are often guided by depictions of banking that are, at best, outdated, when not wholly misguided by loanable funds models.

Having elaborated these structural and institutional constraints of greener banking, at the policy level, the regulation category has been a prominent topic of concern to the interviewees. It refers to constraints on green lending coming from financial regulation, which is currently biased against green assets. In this regard, our results add further evidence to the growing body of literature advocating for changes in banking regulation and more broadly, the use of credit guidance tools (Aguila and Wullweber, 2024a; Barmes and Livingstone, 2021; Després and Miller, 2023; Dikau et al., 2024; Kedward et al., 2024; Smoleńska and van 't Klooster, 2022; Volz, 2017). Additionally, regulation also involves sustainability regulation, deemed as too costly and burdensome.

While much of current research and policy making is motivated by claims on how green finance can be strengthened from now on, our research highlights the relevance of structural and institutional constraints to green banking and criticises existing regulation that does not respond to the challenges at the necessary scale and depth. Our results are, however, only preliminary findings to what we hope would become a broader research agenda. First, it is crucial to advance an accurate depiction of the current workings of the financial system. In this regard, we find that qualitative work could offer important insights to understand what financial institutions actually do. Such an understanding is necessary to design an effective green financial policy approach.

Second, while this paper focuses on banks' lending activities, banks are not so focused on lending (and even less so in corporate lending) anymore, and they are not the only important financial actors. Understanding the financial challenges of the green transition requires to take into account both the potential role of other financial institutions and banks in financing green activities via market mechanisms and also how they can evade regulation and keep financing dirty ones.

List of interviews

1. Former senior managing director investment banking, Germany (16 November 2022).
2. Member of supervisory board of large bank, Germany (14 December 2022).
3. Executive director of civil society organization, Netherlands (16 February 2023).
4. Policy director of civil society organization, Germany (10 July 2023).
5. Research director financial markets at institute for research, Germany (13 July 2023).
6. Member of supervisory board of small bank, Germany (1 September 2023).
7. Staff member of civil society organization, Germany (6 September 2023).
8. Head of division of central bank, European Union (18 September 2023).
9. Managing director of financial service provider, Germany (18 September 2023).
10. Manager of sustainable investment fund, Germany (20 September 2023).
11. Head of sustainable finance at civil society organization, Germany (4 October 2023).
12. Staff member of European Union, Belgium (11 October 2023).
13. Staff member of civil society organization, Belgium (11 October 2023).
14. Staff member of European Union, Belgium (11 October 2023).
15. Staff member of European Union, Belgium (11 October 2023).
16. Economist at central bank, South America (25 October 2023).
17. Staff member of European Union, Belgium (26 October 2023).
18. Member of private association on reporting standards, Germany (26 October 2023).
19. Staff member of European Union, Belgium (27 October 2023).
20. Head of research at civil society organization, Belgium (27 October 2023).
21. Director of civil society organization, Netherlands (1 November 2023).
22. Head of sustainable finance of large bank, Germany (7 November 2023).
23. Chief economist of reinsurance company, Germany (10 November 2023).
24. Staff member of central bank, European Union (14 November 2023).
25. Staff member of civil society organization, Belgium (17 November 2023).
26. Head of sustainable finance of large bank, Germany (20 November 2023).
27. Head of sustainability of asset manager, France (22 November 2023).

28. Sustainable finance expert at large bank, France (22 November 2023).
29. Sustainable finance and regulation expert at large bank, France (22 November 2023).
30. Head of sustainable finance at civil society organization, Germany (27 November 2023).
31. Head of sustainable finance of large bank, Germany (4 December 2023).
32. Project manager sustainability of large bank, Germany (4 December 2023).
33. Member of supervisory board of asset manager, Germany (4 December 2023).
34. Chief executive officer of financial service provider, Switzerland (11 December 2023).
35. Climate investment analyst at insurance company, Switzerland (12 December 2023).
36. Managing director at asset manager, Germany (13 December 2023).
37. Head of sustainability of small bank, Germany (13 December 2023).
38. Managing director at asset manager, France (19 December 2023).
39. Head of sustainability for markets and securities at large bank, UK (15 January 2024).
40. Sustainability expert at consulting firm, UK (15 January 2024).
41. Head of sustainability risk at large bank, UK (15 January 2024).
42. Head of ESG at reinsurance company, UK (16 January 2024).
43. Chief responsible investment officer at asset manager, UK (16 January 2024).
44. Head of risk monitoring at public asset owner, UK (17 January 2024).
45. Vice president Sustainability at large bank, UK (17 January 2024).
46. Head of sustainability at large bank, UK (17 January 2024).
47. Vice president climate and ESG at large bank, UK (17 January 2024).
48. Senior engagement manager at civil society organization, UK (18 January 2024).
49. Director for green finance at public development bank, UK (18 January 2024).
50. Executive director green finance at research institute, UK (19 January 2024).
51. Staff member of European Union, Belgium (22 January 2024).
52. Managing director responsible investment at public asset owner, NL (22 January 2024).
53. Director sustainable finance at industry association, UK (1 February 2024).
54. Head of sustainability client advisory at asset manager, NL (5 February 2024).
55. Head of sustainability at industry association, Germany (22 February 2024).
56. Head of sustainability at industry association, Germany (22 February 2024).
57. Staff member of European Union, Belgium (22 February 2024).
58. Expert in Sustainable Finance at central bank, European Union (29 February 2024).
59. Director of technical development at not-for-profit organization, UK (6 March 2024).
60. Senior analyst at national regulator, European Union (11 March 2024).
61. Former regulator, Germany (19 March 2024).
62. Senior researcher at civil society organization, Germany (27 March 2024).
63. Senior researcher at civil society organization, NL (28 March 2024).
64. Expert at public-private partnership, Germany (11 April 2024).
65. Finance expert at civil society organization, Germany (22 April 2024).
66. Senior researcher at civil society organization, France (26 April 2024).
67. Lead ESG fixed income capital markets at bank, US (27 May 2024).
68. Chief ESG officer at public asset owner, US (28 May 2024).
69. Executive director at civil society organization, US (28 May 2024).
70. Former fund manager fixed-income, US (28 May 2024).
71. Managing director at civil society organization, US (29 May 2024).

72. Capital markets analyst at bank, US (30 May 2024).
73. Capital markets analyst at bank, US (30 May 2024).
74. Sustainable finance lead at bank, US (31 May 2024).
75. Co-founder of civil society organisation, US (25 June 2024).

References

Aguila N and Wullweber J (2024a) Greener and cheaper: green monetary policy in the era of inflation and high interest rates. *Eurasian Economic Review*. DOI: 10.1007/s40822-024-00266-y.

Aguila N and Wullweber J (2024b) Legitimising green monetary policies: market liberalism, layered central banking, and the ECB's ongoing discursive shift from environmental risks to price stability. *Journal of European Public Policy*. DOI: 10.1080/13501763.2024.2317969.

Altavilla C, Boucinha M, Pagano M, et al. (2023) Climate Risk, Bank Lending and Monetary Policy. *Available at SSRN*.

Ameli N, Drummond P, Bisaro A, et al. (2020) Climate finance and disclosure for institutional investors: why transparency is not enough. *Climatic Change* 160(4): 565–589.

Barmes D and Livingstone Z (2021) The Green Central Banking Scorecard: How green are G20 Central Banks and Financial Supervisors? *Positive Money*.

Battiston S, Dafermos Y and Monasterolo I (2021) Climate risks and financial stability. *Journal of Financial Stability* 54.

Beck M (2022a) Extroverted financialization: how US finance shapes European banking. *Review of International Political Economy* 29(5): 1723–1745.

Beck M (2022b) The managerial contradictions of extroverted financialization: the rise and fall of Deutsche Bank. *Socio-Economic Review* 20(4): 2017–2040.

Benincasa E, Kabaş G and Ongena S (2022) "There is No Planet B", but for Banks "There are Countries B to Z": Domestic Climate Policy and Cross-Border Lending. *Swiss Finance Institute Research Paper*(22-28).

Beyene W, Delis M, Greiff K de, et al. (2021) Too-big-to-strand? Bond versus bank financing in the transition to a low-carbon economy. *CEPR Discussion Paper*(16692).

Bezemer D, Ryan-Collins J, van Lerven F, et al. (2023) Credit policy and the 'debt shift' in advanced economies. *Socio-Economic Review* 21(1): 437–478.

Bolton P, Despres M, Pereira da Silva, Luiz Awazu, et al. (2020) *The green swan. Central banking and financial stability in the age of climate change*.

Braun B and Deeg R (2020) Strong Firms, Weak Banks: The Financial Consequences of Germany's Export-Led Growth Model. *German Politics* 29(3): 358–381.

Bruno B and Lombini S (2023) Climate transition risk and bank lending. *Journal of Financial Research* 46(S1).

Buch C (2024) Financial integration in Europe: where do we stand after the banking union's first decade? Available at: https://www.bankingsupervision.europa.eu/press/speeches/date/2024/html/ssm.sp240430~68c9861180.en.html (accessed 22 July 2024).

Campiglio E (2016) Beyond carbon pricing: The role of banking and monetary policy in financing the transition to a low-carbon economy. *Ecological Economics* 121: 220–230.

Chenet H, Ryan-Collins J and van Lerven F (2021) Finance, climate-change and radical uncertainty: Towards a precautionary approach to financial policy. *Ecological Economics* 183: 106957.

Christophers B (2017) Climate Change and Financial Instability: Risk Disclosure and the Problematics of Neoliberal Governance. *Annals of the American Association of Geographers* 107(5): 1108–1127.

Christophers B (2019) Environmental Beta or How Institutional Investors Think about Climate Change and Fossil Fuel Risk. *Annals of the American Association of Geographers* 109(3): 754–774.

Christophers B (2022) Fossilised Capital: Price and Profit in the Energy Transition. *New Political Economy* 27(1): 146–159.

Christophers B (2024) *The Price is Wrong: Why Capitalism Won't Save the Planet*. London: Verso.

Christophers B, Bigger P and Johnson L (2020) Stretching scales? Risk and sociality in climate finance. *Environment and Planning A* 52(1): 88–110.
Climate Policy Initiative (2023) *Global Landscape of Climate Finance 2023*. Available at: https://www.climatepolicyinitiative.org/wp-content/uploads/2023/11/Global-Landscape-of-Climate-Finance-2023.pdf.
D'Orazio P and Popoyan L (2019) Fostering green investments and tackling climate-related financial risks: Which role for macroprudential policies? *Ecological Economics* 160: 25–37.
Dafermos Y and Nikolaidi M (2021) How can green differentiated capital requirements affect climate risks? A dynamic macrofinancial analysis. *Journal of Financial Stability* 54: 100871.
Degryse H, Goncharenko R, Theunisz C, et al. (2023) When green meets green. *Journal of Corporate Finance* 78: 102355.
Delis MD, Greiff K de, Iosifidi M, et al. (2019) Being Stranded with Fossil Fuel Reserves? Climate Policy Risk and the Pricing of Bank Loans. *Swiss Finance Institute Research Paper*(18-10).
Deloitte (2022) Banking on climate neutrality. The global banking industry's role in transitioning to a low-carbon economy.
Després M and Miller H (2023) Prudential transition plans: the great enabler for effective supervision and regulation of climate-related financial risks? *The INSPIRE Sustainable Central Banking Toolbox Policy Briefing Paper*(15).
Dikau S, Robins N, Smoleńska A, et al. (2024) Prudential net zero transition plans: the potential of a new regulatory instrument. *Journal of Banking Regulation*. DOI: 10.1057/s41261-024-00247-w.
DiLeo M (2023) Climate policy at the Bank of England: the possibilities and limits of green central banking. *Climate Policy* 23(6): 671–688.
Dutta SJ (2020) Sovereign Debt Management and the Transformation from Keynesian to Neoliberal Monetary Governance in Britain. *New Political Economy* 25(4): 675–690.
EBA (2021) Mapping climate risk: Main findings from the EU-wide pilot exercise.
ECB (2022a) *2022 climate risk stress test*. Available at: https://www.bankingsupervision.europa.eu/ecb/pub/pdf/ssm.climate_stress_test_report.20220708 2e3 cc0999f.en.pdf (accessed 15 February 2023).
ECB (2022b) Financial Integration and Structure in the Euro Area. DOI: 10.2866/525604.
ECB (2024) Risks from misalignment of banks' financing with the EU climate objectives - Assessment of the alignment of the European banking sector. *ECB Banking Supervision*.
Egli F, Steffen B and Schmidt TS (2018) A dynamic analysis of financing conditions for renewable energy technologies. *Nature Energy* 3(12): 1084–1092.
Ehlers T, Packer F and Greiff K de (2021) The pricing of carbon risk in syndicated loans: which risks are priced and why? *BIS Working Papers*(946).
Erturk I and Solari S (2007) Banks as Continuous Reinvention. *New Political Economy* 12(3): 369–388.
Finance Watch (2024) Europe's coming investment crisis. What if capital markets could only meet a third of Europe's essential funding needs?
Gabor D (2021) The Wall Street Consensus. *Development and Change* 42(3): 429–459.
Gabor D (2023) The (European) Derisking State. *SocArXiv*. DOI: 10.31235/osf.io/hpbj2.
Gabor D, Dafermos Y, Nikolaidi M, et al. (2019) Finance and Climate Change: A progressive green finance strategy for the UK.
Giannetti M, Jasova M, Loumioti M, et al. (2023) Glossy Green Banks: The Disconnect Between Environmental Disclosures and Lending Activities.
Haas R de and Popov AA (2019) Finance and Carbon Emissions. *Massachusettts I nstitute of Technology and The London school of Economics*. DOI: 10.2139/ssrn.3459987.

Hardie I, Howarth D, Maxfield S, et al. (2013) Banks and the false dichotomy in the comparative political economy of finance. *World Politics* 65(4): 691–728.
IEA (2024) World Energy Investment 2024.
Jordà Ò, Schularick M and Taylor AM (2016) The great mortgaging: housing finance, crises and business cycles. *Economic Policy* 31(85): 107–152.
Kedward K, Gabor D and Ryan-Collins J (2024) Carrots with(out) sticks: credit policy and the limits of green central banking. *Review of International Political Economy*. DOI: 10.1080/09692290.2024.2351838.
Kedward K, Ryan-Collins J and Chenet H (2020) Managing Nature-Related Financial Risks: A Precautionary Policy Approach for Central Banks and Financial Supervisors. *UCL IIPP Working Paper*(9).
Knafo S (2022) The Power of Finance in the Age of Market Based Banking. *New Political Economy* 27(1): 33–46.
Laeven L and Popov A (2023) Carbon taxes and the geography of fossil lending. *Journal of International Economics* 144: 103797.
Lagarde C (2023) *A Kantian shift for the capital markets union*. Frankfurt am Main. Available at: https://www.ecb.europa.eu/press/key/date/2023/html/ecb.sp231117 88389f194b.en.html.
Langley P and Morris JH (2020) Central banks: Climate governors of last resort? *Environment and Planning A* 52(8): 1471–1479.
Mack S (2023) Get your priorities right. Europe must not underestimate the role of banks for the green transition. *Hertie School Jacques Delors Centre Policy Brief*.
Murau S, Haas A and Guter-sandu A (2023) Monetary Architecture and the Green Transition. *Environment and Planning A: Economy and Space* 56(2): 382–401.
NGFS (2019) A Call for Action: Climate Change as a Source of Financial Risk. *NGFS Report*(April): 1–40.
Rainforest Action Network, BankTrack, Indigenous Environmental Network, et al. (2024) *Banking on climate chaos. Fossil fuel finance report 2024*. Available at: https://www.bankingonclimatechaos.org/.
Reghezza A, Altunbas Y, Marques-Ibanez D, et al. (2022) Do banks fuel climate change? *Journal of Financial Stability* 62: 101049.
Sastry P, Verner E and Marqués Ibáñez D (2024) Business as usual bank climate commitments, lending, and engagement. *ECB Working Paper*(2921).
Schnabel I (2023) *Monetary policy tightening and the green transition*. Stockholm. Available at: https://www.ecb.europa.eu/press/key/date/2023/html/ecb.sp230110 21c89bef1b.en.html.
Schoenmaker D and van Tilburg R (2016) What Role for Financial Supervisors in Addressing Environmental Risks? *Comparative Economic Studies* 58(3): 409–429.
Sgambati S (2019) The art of leverage: a study of bank power, money-making and debt finance. *Review of International Political Economy* 26(2): 287–312.
Smoleńska A and van 't Klooster J (2022) A Risky Bet: Climate Change and the EU's Microprudential Framework for Banks. *Journal of Financial Regulation* 8(1): 51–74.
Thiemann M, Büttner T and Kessler O (2023) Beyond market neutrality. Central banks and the problem of climate change. *Finance and Society* 9(1): 14–34.
Volz U (2017) On the role of Central Banks in enhancing green finance. *United Nations Environment Programme*.
World Bank (2024) Finance and Prosperity 2024. Available at: https://www.worldbank.org/en/publication/finance-and-prosperity-2024.