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Injecting climate finance into SME lending in Germany: Opportunities for and limitations of regional savings and cooperative banks

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Abstract: Although small and medium-sized enterprises (SMEs) contribute considerably to Germany's carbon emissions, regional savings and cooperative banks – SMEs' most important financiers – hardly consider this aspect in lending to these businesses. However, given Germany's commitment to climate neutrality by 2045, suitable approaches for injecting climate finance into these SME lending processes are greatly required. Against this background, the paper at hand aims to introduce the specific case of regional banks into the debate on green finance and green banking and suggest future research in this context. In discussing the state of research on the peculiarities of regional savings and cooperative banks, we outline the resulting opportunities and limitations for climate impact assessments in SME lending. We argue that while the dual bottom-line orientation of regional banks in Germany precludes them from applying simple positive or negative screenings, their in-depth knowledge about local clients and circumstances enables them to be active and engaging partners for the green transformation of SMEs. Nonetheless, we explain why developing solutions to utilise this knowledge for climate finance by integrating climate impact assessments into routine lending processes remains a particularly challenging task.

Keywords: regional banks; savings banks; cooperative banks; SME lending; climate finance; green banking; climate impact assessment; ESG ratings; Germany

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1 Introduction

Following the German Federal Constitutional Court ruling on 29 April 2021, the country's *Climate Change Act* was amended to raise carbon emission reduction targets for 2030 and lay down the goal of achieving climate neutrality by 2045 (German Federal Government 2021a). To finance this green transformation, significant investments will be necessary. A study by McKinsey & Company concludes that additional investments of around €1 trillion will be required in the sectors of energy, transport, industry, buildings and agriculture to accomplish the net-zero transition by 2045 (Helmcke et al. 2021). Another study commissioned by the German state-owned promotional bank (KfW) estimates that additional investments in the sectors of energy, transport, industry, commerce and private households will need to total around €1.9 trillion to achieve climate neutrality by the previously set target year of 2050 (Burret et al. 2021). It is evident that the tremendous investments required on the way to climate neutrality cannot only be provided by public financing. The key role of the private financial sector is therefore emphasised in the *German Sustainable Finance Strategy* adopted in May 2021 (Federal Ministry of Finance et al. 2021) as a part of the *German Sustainable Development Strategy* (German Federal Government 2021b), as well as in the European Commission's *Strategy for Financing the Transition to a Sustainable Economy* published in July 2021 (European Commission 2021) within the framework of the *European Green Deal* (European Commission 2019).

However, present and upcoming legislation relating to sustainable finance largely excludes lending to small and medium-sized enterprises (SMEs), which are defined as enterprises with less than 250 employees and an annual turnover below €50 million (Federal Statistical Office 2023). This blind spot is highly problematic for Germany's green transformation as SMEs constitute a major pillar of the country's economy by contributing 42.3 % of gross value added at factor cost in 2020¹ (Federal Statistical Office 2023, authors' calculation) and therefore contribute substantially

¹ So-called microenterprises with up to 9 employees and a turnover of up to €2 million are included.

to carbon emissions in Germany. Most SMEs finance a large part of their investments through loans from the ca. 1,100 regional savings banks (*Sparkassen*) and cooperative banks (*Genossenschaftsbanken*) (Deutsche Bundesbank 2023). These regional savings and cooperative banks (henceforth “regional banks”) accounted for 54.2% of the total lending volume of banks in Germany to non-financial firms and the self-employed in July 2021 (Deutsche Bundesbank 2023, authors’ calculation following Gärtner and Flögel 2017). As other financing instruments such as private equity, bonds and shares are of limited importance to SMEs in Germany’s bank-based financial system (Allen & Gale 2000; Beck et al. 2001; Flögel 2019; Zademach 2021), the lending practices of regional banks have great potential to drive and support the green transformation.

However, in contrast to large financial companies, regional banks are less well-equipped in terms of capacity and resources to integrate climate impact assessments into routine lending processes. Furthermore, unlike large industrial companies, SMEs are usually not ESG-rated (Environmental, Social and Governance), do not disclose non-financial information such as their climate impact, and often do not even know such information. This complicates climate impact assessments in the SME lending of regional banks and currently green banking is hardly considered in their everyday lending to SMEs. Yet, for the green transformation of the German economy to be successful, it will be crucial to extend the implementation of climate finance to the SME lending business of regional banks. This, in turn, requires the development of suitable approaches for assessing the carbon-related impacts of SME loans.

The debate on green finance is generating tremendous scholarly interest, also among economic geographers (Castree & Christophers 2015; Zademach & Dichtl 2016; Dörry & Schulz 2018; Langley & Morris 2020). Critical accounts of green finance practices are increasingly available (Grote & Zook 2022). Nevertheless, the role of regional banks as key financiers of SMEs to accelerate or hinder the green transformation has been neglected. The paper contributes to the debate on green finance by introducing the particular case of regional banks in Germany and discussing their opportunities and limitations in terms of green banking and specifically climate finance in SME lending. We outline the conflicts of interest of public and cooperative banks (dual bottom-line institutions) when pursuing a green agenda but also indicate their great potential to push for actual industry changes in the regions they operate in. By creating an understanding of green banking in the context of regional banks, we hope to stimulate research in this field to advance the net-zero transition of SMEs in Germany and other countries where regional banks hold an influential position.

The remainder of the paper is structured as follows. The next section introduces green and climate finance in the context of bank lending (green banking) and provides an overview of regional banks in the German banking system, followed by a discussion of climate impact assessments for SME lending in the third section. The paper then turns to the state of research about regional banks, examining three peculiarities of such banks and their impact on implementing climate finance: the spatial proximity advantage of regional banks in SME lending (Section 4), their dual bottom-line orientation that obligates them to not-for-profit missions (Section 5), and their integration in finance groups (Section 6). The final section discusses and summarises our considerations and concludes.

2 Green and climate finance and regional banks

2.1 Green and climate finance

With growing global concern for environmental protection and sustainable development, both policymakers and researchers from social and economic sciences have increasingly subjected the financial sector to critical scrutiny. In particular, the climate change implications associated with financial products and services have attracted attention (Castree & Christophers 2015; Weber & Feltmate 2016; Folger-Laronde & Weber 2018; CDP 2021; Akomea-Frimpong et al. 2022). *Climate finance* relates to the objectives of the 2015 Paris Climate Agreement and can be regarded as a subset of *green finance*, i. e., “the financial stocks and flows aiming at supporting the achievement of the environment and climate-related SDGs [Sustainable Development Goals]” (Migliorelli 2021, p. 5). Green finance, in turn, is a subset of *sustainable finance*. Sustainable finance considers ESG standards in financial evaluations. We use the term “climate finance” in the following sections to refer to sustainable finance with climate-related objectives.

Two pronounced strands can be distinguished in the literature on green finance (Weber 2014; Weber & Feltmate 2016; Scholtens 2017; Dörry & Schulz 2018; Folger-Laronde & Weber 2018). The first one focuses on the integration of environmental considerations into investment decisions. Concerning climate finance, this means that the impact of investments and business activities on the climate is of concern (an inside-out perspective on business activities). The second strand deals with solutions for investors threatened with huge and unanticipated losses in non-sustainable

assets caused by regulatory changes, climate hazards and other climate-related risks (an outside-in perspective on business activities). While the relevance of both perspectives and their interrelatedness is acknowledged, the paper at hand focuses on the former as it deviates from short-term economic rationales and therefore requires greater persuasion to ensure it is integrated into ordinary lending practices.

Current debates on green finance and sustainable investments are dominated by the search of big institutional investors for alternative options to invest large amounts of capital according to ESG standards (Dörry & Schulz 2020). According to estimations by the United Nations Conference on Trade and Development (UNCTAD), the global value of sustainability-themed investment products amounted to \$5.2 trillion in 2021, corresponding to a 63 % increase compared to 2020 (UNCTAD 2022). Funds and bonds make up the lion's share of the market, while loans only play a minor role. Europe represents the global centre of ESG investments, with a share of more than 80 % of all sustainable assets under management in 2021 (UNCTAD 2022).

Concerning the impact of climate finance on real-world greenhouse gas reductions, Grote & Zook (2022) describe the transmission chain as intended by the financial industry. Private households (ultimate investors) that have decided to invest in green finance rely on financial intermediaries via deposits at ESG banks, the purchase of green shares, bonds or funds from brokers, or indirectly through their pension funds or life insurance. ESG ratings – produced in-house or from rating agencies – guide financial intermediaries in their capital allocation to green investment projects and sustainable companies. By this means, the business activities of companies are influenced through two channels: *financing* and *engaging*. While financing refers to better financing conditions (e.g., lower interest rates) in return for ESG conformity, engaging concerns the voice that large investors and financiers have towards their portfolio companies. The latter is exemplified by BlackRock, the world's largest asset manager, that requires its portfolio firms to disclose plans on how their business models will be compatible with limiting global warming (Grote & Zook 2022).

However, Grote & Zook (2022) question the impact of this intended transmission chain. According to their literature review, studies consistently show that ESG investments hardly underperform in terms of financial returns compared to standard investments. Yet, only a few studies have so far considered the real-world impact of ESG investments, and none of them could unambiguously demonstrate a real positive impact on climate change mitigation. The authors explain this miniscule impact first) by the minor price differences between ESG and standard investments and the limited price elasticity of capital demand;

second) by the absence of clear ESG standards resulting in extensive reporting and communication by companies and the financial industry and encouraging greenwashing of business activities; and third) by the observation that many green investments would have been conducted in the same way without green finance. A real-world impact of climate finance on climate change mitigation can be claimed only for the few green investments that reduce greenhouse gas emissions and would not have been funded by standard finance. Despite their overall pessimistic evaluation of the real-world impact of ESG investments, Grote & Zook (2022) expect some impact via the engaging channel. Sustainable finance places ESG-related topics higher on managers' agendas, which may result in earlier and more extensive investments in sustainable production.

2.2 Green retail banking

Only a limited number of studies have so far focused on green finance in the context of the retail banking sector (*green banking*). The initial motivation for many banks to integrate environmental risk criteria into their lending decisions in the 1990s was outside-in driven to reduce financial risk (Weber et al. 2008; Calderon & Chong 2014; Weber 2018). Since then, there has been increasing pressure from international organisations and civil society for banks to assume environmental responsibility (Campiglio et al. 2018; Chen 2018; Jung et al. 2020; Akomea-Frimpong et al. 2022). Many central banks and regulatory institutions have enforced green finance policies and introduced corresponding requirements for banks, primarily, but not exclusively, driven by the outside-in perspective to reduce the financial risk of climate change and climate protection regulations (Durrani et al. 2020; Langley & Morris 2020; Akomea-Frimpong et al. 2022).

Grote & Zook's (2022) transmission chain can be applied to retail banks: private households may allocate deposits to ESG banks, like the German GLS Gemeinschaftsbank eG, which only invest in assets that meet high ESG standards such as loans to renewable energy corporations. Moreover, conventional retail banks that conduct some ESG-related activities can attract more deposits from ESG-motivated private households at better terms. In accordance with the so-called market-based banking concept, the same holds for the wholesale refinancing of modern retail banks, as they are heavily tied to financial markets and their evaluation standards (Hardie & Howarth 2013b). Stock prices of publicly listed retail banks depend directly on capital market evaluation, while refinancing costs and the evaluation of bank assets are further linked to financial markets via

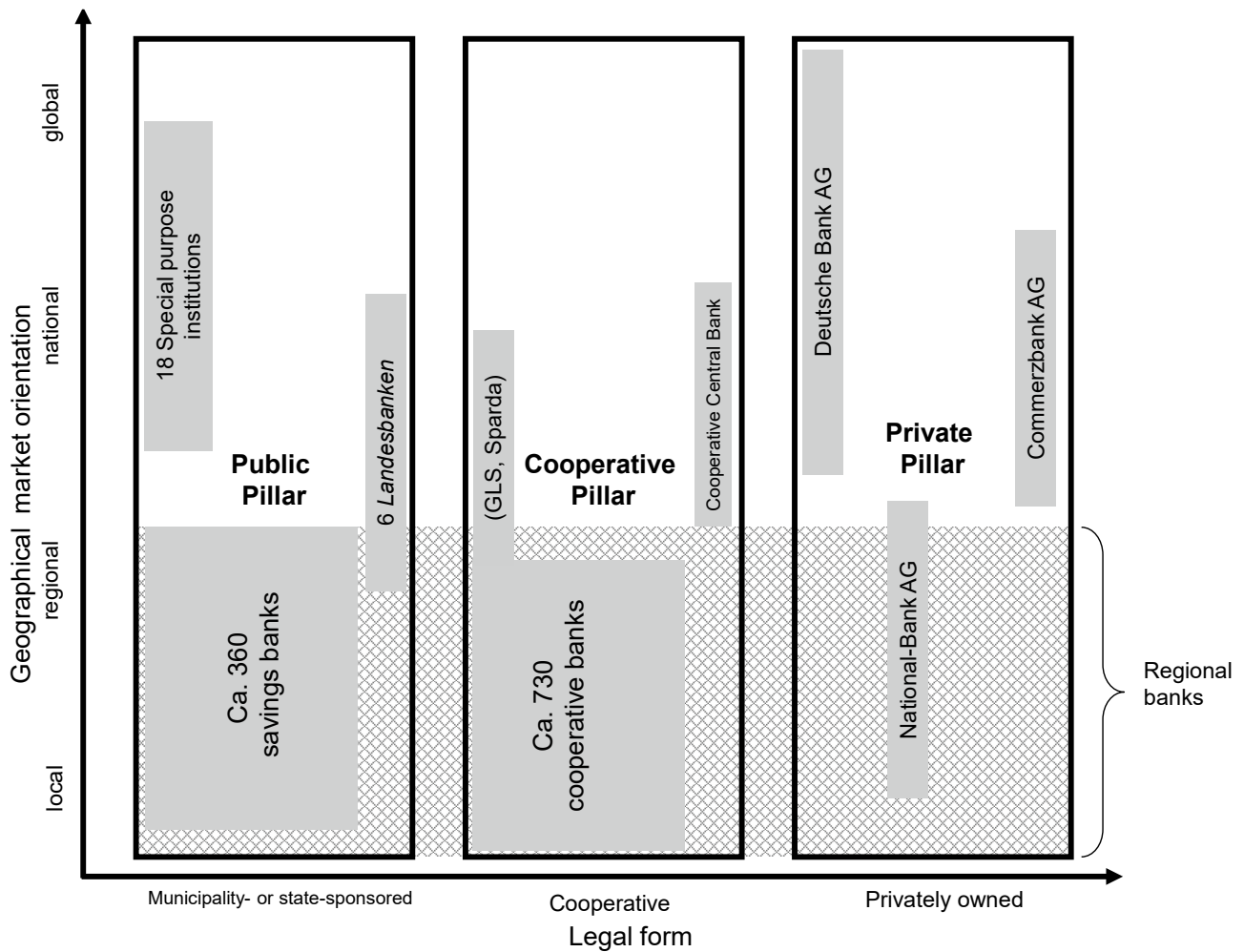


Figure 1: The German banking system from a spatial perspective
Source: Gärtner & Flögel 2017, p. 87 (modified)

bonds, wholesale loans and other financial vehicles. In contrast to most non-financial firms, refinancing costs represent a highly relevant cost factor for retail banks. Hence, if green finance goes mainstream, market-based retail banks are likely to follow.

In addition, the sale of sustainability-themed investment products allows retail banks to increase their fee earnings as ESG evaluation requires active management that justifies additional fees. This new business opportunity is one reason why commercial banks adopt green banking (Grote & Zook 2022). In line with their criticism of green finance, Grote & Zook (2022) question the actual impact of green banking on the climate since, for example, most banks still finance new coal, oil and gas exploration projects despite their demonstrative commitment to ESG goals. Nevertheless, their bulk business model gives retail banks great potential to push green finance with real-world impact. They can induce companies, especially SMEs that

predominantly use loans for investments, to make green investments and pull their bulk lending away from unsustainable businesses and investments. Furthermore, they can promote green investment products with real-world impact to their large private customer base. Despite this considerable potential, the academic debate on green retail banking is currently just emerging (Akomea-Frimpong et al. 2022). Particularly, the distinctive spatiality and characteristics of regional banks and their implications for climate finance still need to be addressed.

2.3 Regional banks in Germany

A particular characteristic of the German financial system is its three-pillar banking system, consisting of a private, a public and a cooperative pillar (Hackethal et al. 2006; Gärtner 2009a; Klagge et al. 2017). The private pillar com-

prises 241 commercial banks, including the three so-called *big banks* with nationwide branch networks (Deutsche Bank, Commerzbank and UniCredit). The public pillar encompasses 362 municipality-sponsored savings banks, 6 *Landesbanken* and 18 special purpose institutions. 733 cooperative banks belong to the cooperative pillar (January 2023; Deutsche Bundesbank 2023). While other countries also have pillared banking systems, the large number and market share of cooperative and public banks represent a German particularity (Ayadi et al. 2009, 2010). As Fig. 1 illustrates, regional banks comprise a significant element in this system.

Regional banks are credit institutions that operate in a dedicated sub-national market area (Gärtner & Flögel 2017). This pertains to all 362 savings banks and most of the 733 cooperative banks in Germany. In contrast, only very few privately-owned banks operate regionally (e. g., National-Bank AG in Essen and its neighbouring cities). Regarding savings banks, the regional principle restricting them to regional markets is codified in the savings banks legislation of the federal states. This obliges savings banks to only place branches within the territory of their authority and to lend to institutions, companies and private individuals in that territory first. Hence, the market areas of savings banks in Germany follow the territory of their districts (*Kreise*), corresponding to the NUTS-3 level. Most cooperative banks voluntarily apply similar regional market segregation and often run just a few branches (Bülbül et al. 2013). This regional market segregation has led to a very decentralised banking landscape where the headquarters of regional banks are located all over Germany.

Regional savings and cooperative banks in Germany run commercially (EU legislation bans public subsidies to savings banks) and are subject to regular banking supervision. German legislation bans takeovers of savings and cooperative banks by private competitors. Regional savings and cooperative banks have steadily increased their market share in lending to non-financial firms and the self-employed from 41.4 % in 2011 to 54.2 % in July 2021 (Deutsche Bundesbank 2023, authors' calculation). With a retail savings surplus² of –3.02 % for savings banks and –1.75 % for cooperative banks in January 2023, regional banks depend much less on wholesale refinancing than private commercial banks (–39.06 % retail savings surplus; Deutsche Bundesbank 2023, authors' calculation). Owing to their low dependence on wholesale refinancing and their ownership

structures, German savings and cooperative banks can be viewed as traditional banks little influenced by financial markets, as specified in the market-based banking concept (Hardie & Howarth 2013a). Several scholars argue that this independence of regional banks and their knowledge about and close relations with local clients (see Section 4) explain their continuous lending during the global financial crisis of 2008, which mitigated the credit crunch in Germany (Abberger et al. 2009; Gärtner 2009b).

The independence of regional banks poses a possible obstacle to Germany's green transformation by potentially further hindering the already weak transmission chain of green financial markets to the net-zero transition of companies. SMEs could easily circumvent the adverse financing conditions offered by market-based banks due to ESG non-conformity as long as German regional banks, which represent the joint market leader in firm finance and are present in every region, do not adopt green banking. It is therefore important to examine the specific case of regional banks for climate finance and their potential effects on the transition of SMEs to climate neutrality. As regional banks also exist in other countries (e. g., Poland, Austria, Finland and Italy also have relatively decentralised banking systems; Flögel & Hejnová 2021), our examination is not only relevant to Germany.

3 Climate impact assessments for SME lending

Given the sheer number of small borrowers in SME lending business, detailed climate impact analyses such as life cycle assessments (LCA) are usually too expensive. However, simple positive and negative screenings are unfair as standard assumptions tend to poorly represent the actual climate impact of the SME business. Starting with a critical review of current climate impact assessments by ESG ratings and in green banking, this section suggests a hands-on combination of classifications such as the EU taxonomy and LCA-oriented assessments for SME lending by regional banks.

3.1 ESG ratings

ESG ratings are, among other objectives, supposed to provide information on the climate change mitigation and adaptation compatibility of business activities and companies. However, many scholars consider ESG rating practices to be one reason for the unclear and miniscule contributions of sustainable finance to climate change mitigation

² The retail savings surplus was calculated as follows: (Liabilities to non-banks – lending to banks and non-banks)/lending to banks and non-banks*100 %.

(Hughes et al. 2021; In & Schumacher 2021; Grote & Zook 2022). Problems include “[a]bsent clear standards for measuring impact on climate change, many standard financial products are easily ‘greenwashed’, providing opportunities for higher fees by funding managers and other financial actors” (Grote & Zook 2022, p. 1). The limitations of ESG ratings to evaluate and mitigate climate impacts tend to be explained by the legitimate interest of financial investors in the outside-in perspective (the impact of the climate and climate regulation on financial assets), limited financial incentives for achieving real-world impact and a desire for complexity that benefits fee-earning businesses.

The failure of the financial industry to adequately address the climate crisis might also have deeper systemic reasons rooted in the structure of society. In the mid-1980s, sociologist Niklas Luhmann (1986) hypothesised that it is doubtful that modern societies can adequately adjust to ecological problems. Modern societies are fragmented into specialised silos and communication bubbles (such as the banking sector). Under external pressure, these bubbles can be motivated to respond to biophysical problems (such as climate change). However, their responses have the primary function of stabilising the bubbles (e. g., by selling “sustainable” or “green” financial products) instead of providing solutions to “externalities” like biophysical problems which are, by definition, outside of their silos. According to Luhmann (1986), adequate responses to ecological risks under the conditions of fragmentation and the self-referentiality of societal systems are an exception. It is more likely that responses add to the ineffective ecological communication created by the multitude of other societal silos, resulting in redundant background noise.

Modern societies have generated sufficient knowledge about the future risks of climate change, carbon budgets and where the necessary greenhouse gas reductions should come from (e. g., Akenji et al. 2021). In the context of emerging climate governance, they have invested in timely and sufficiently detailed monitoring (e. g., ERK 2022). Ineffective ecological communication (such as ambiguous ESG ratings) tends not to result from a lack of knowledge per se but rather from inadequate knowledge translation within modern societies and a lack of biophysical literacy in the financial industry.

3.2 Climate impact assessments of SMEs

As SME lending is outside the focus of modern societies, adequate knowledge is especially lacking in this context. Most SMEs are not required to carry out corporate sustainability reporting and, hence, do not disclose any informa-

tion on their climate impact upon which banks can conduct ESG ratings (Calderon & Chong 2014; Berggren & Berhe 2016). Instead, bank evaluations of SMEs typically rely on storytelling (Calderon & Chong 2014), personal interests and employees’ perceptions of sustainability (Johansson & Karlsson 2018). Such approaches to climate impact assessment lack transparency and place great responsibility on the banks’ employees, who often lack the necessary skills and guidance. In consequence of *EU DIRECTIVE 2022/2464* (European Parliament & Council of the European Union 2023), the number of sustainability reporting companies will gradually increase until 2028, but far from all companies will be obligated. This lack of coverage and the epistemic limitations of existing corporate sustainability reports and ESG ratings represent crucial obstacles for climate finance in the SME lending of regional banks, which actually need to conduct climate impact assessments of lending decisions en masse to nudge SMEs to climate change mitigation.

Systemic environmental appraisal methods are promising for gaining a holistic understanding of the business activities of SMEs. They were developed primarily in the 1990s when it became apparent that the incremental end-of-pipe approaches of established environmental policies addressed the symptoms but not the root causes of ecological pressures. Concepts developed by the field of industrial ecology to systematically address industrial production and consumption patterns led to LCA, which were successively combined with other tools and econometric models (Jeswani et al. 2010). LCAs consider the entire life cycle of a product or process, i. e., extraction of raw materials, production, transport, consumption and end-of-life impacts.

LCAs and related biophysical assessments suffer from time and data gaps. Nevertheless, numerous LCAs have revealed the overall tendency of industrial societies to shift environmental and social burdens via the supply chain (Dorninger et al. 2021). Ecological and social exploitation is typically moved to low- or middle-income countries with lower social and environmental standards. Environmental burden shifting occurs at the beginning of the life cycle with the extraction of raw materials (e. g., mining, plantations, forestry and fishery) and in the resource- and labour-intensive phases of pre-manufacturing (e. g., textiles). Increasingly, the end-of-life phase of products is also shifted to other countries. In line with circular economy principles, the usability, repairability and recyclability of consumer goods should also be considered in climate impact assessments.

Considering the effort and information required to conduct LCAs, the financial sector tends to apply less complex assessment methods, such as the EU taxonomy for sustainable activities. The EU taxonomy intends to set

standards for sustainable finance and hinder greenwashing of companies and investments by classifying economic activities and sectors based on technical screening criteria (EU-TEG 2020; European Commission 2023). Sustainable activities must contribute to at least one of the six environmental objectives and do “no significant harm” to the others. The advantage of such classification systems is that they are relatively easy to apply for non-experts and less demanding regarding resources and time. As a positive screening template, the EU taxonomy only identifies sustainable economic activities, such as manufacturing of renewable energy technologies or batteries. Furthermore, the taxonomy is currently only rolled out for two objectives (climate change mitigation and adaptation). Hence, only a fraction of all economic activities that banks finance has been rated.

In addition, such classifications work on standard assumptions about relevant technologies. This can lead to major shortcomings in the analysis and misleading conclusions that further proliferate environmental burden shifting. A classic example of misguiding classification is the treatment of biofuels as a carbon-neutral technology. Resulting policies and investments have led to environmental burden shifting that has caused massive destruction of habitats and conversion of agricultural land with considerable negative impacts (Bringezu 2009). Especially for SMEs, simple classifications are in many cases too crude and can lead to unfair discrimination. For example, the sector affiliation of SMEs in terms of the NACE code may poorly depict the actual climate impacts of their business activities.

3.3 Hands-on solutions

Considering the limitations of simple classifications and the considerable effort required to conduct LCAs, a hands-on combination of both approaches seems reasonable. Regional banks or smaller companies can neither produce adequate information for biophysical assessments on their own nor examine all aspects of the business activities. Therefore, external knowledge is required. For example, open platforms like the *Partnership for Carbon Accounting Financials* provide necessary knowledge (Linthorst & Schenkel 2019). Moreover, partnerships with regional universities and think tanks could be a point of departure for developing epistemically and cognitively adequate information. As detailed in the following section, regional banks could exploit their proximity advantage and close relationships with SMEs to conduct climate impact assessments based on their substantial knowledge of clients' businesses.

For efficiency reasons, detailed assessments under the guidance of external experts will only be possible for a few companies with a particular impact on climate change mitigation, such as energy-intensive SMEs. Instead, classifications such as the EU taxonomy should provide the basis for the bulk of climate impact assessments in the SME business. However, if applicable, this basis should be enhanced with an LCA-oriented assessment of the key material products in question. The physical inputs (materials and energy), the supply chain (essential suppliers) and the circular economy conformity of the main products should be considered. As Hafenbrädl et al. (2016) argue for time-constrained decisions under conditions of uncertainty, heuristics and complexity reduction offer reasonably accurate assessments. Hence, climate impact assessments carried out by regional banks should not strive for scientific rigour but should generate an indication of climate implications which is imprecisely right rather than precisely wrong. As outlined in the following, several arguments suggest that regional banks are positioned to conduct such assessments in a hands-on manner.

4 The proximity advantage of regional banks in SME lending

Several scholars consider the spatial proximity between regional banks and clients as a structural advantage for firm finance, especially for SMEs' access to finance (Gärtner 2009a; Handke 2011; Flögel & Zademach 2017; Klagge et al. 2017). Theories on asymmetric information in small-firm finance depict the distance dependency of information gathering when information is soft (Stein 2002; Pollard 2003; Alessandrini et al. 2009). According to Stein's (2002, p. 1982) definition, soft information “cannot be directly verified by anyone other than the agent who produces it”. Short distance eases the transmission of soft information, which is why regional banks that operate in proximity to regional clients can handle soft information better than large national and international banks, resulting in advanced risk assessments (Handke 2011; Ferri et al. 2019; Flögel 2019). This reduces asymmetric information between firms and banks and lessens the inclination of banks for credit rationing, leading to improved access to finance for firms (Stiglitz & Weiss 1981). Numerous empirical studies have confirmed the model's predictions. They show that a short distance to the decision-makers of banks eases SMEs' access to finance by facilitating the consideration of soft information in lending decisions (Alessandrini et al. 2009; Behr et al. 2013; Lee & Brown 2017; Zhao & Jones-Evans 2017). Owing

to their decentralised headquarter locations, Germany's regional banks possess a soft-information advantage as decision-makers up to the CEO level are located within the region.

The proximity advantage of regional banks can potentially improve climate impact assessments. Deep knowledge about the clients' production and supply processes can be used as a basis for hands-on LCA-oriented assessments, while the proximity between locations allows the permanent observation of business activities. Proximity also tends to improve the reliability of soft information on the client's self-assessment regarding climate-relevant aspects. The climate impact assessment is best integrated into the annual disclosure and rating process, where the default risk of the client is calculated. Graduated by the size and type of disclosing company (e. g., manufacturer, service company), German savings banks apply an extensive qualitative rating model in which questions on the production process and value chain are discussed (Theis 2009; Flögel 2019). The qualitative rating model as well as subsequent rating counselling can be expanded by questions on climate change mitigation and adaptation. At this point, the climate finance influence channel of engaging comes into play. Owing to their in-depth knowledge about clients, regional banks are equipped to help SMEs in their business transition to sustainable activities.

However, the long-term client relationships of regional banks may clash with evidence-based climate impact assessments. Consequently, regional banks could be too lenient with their clients and reduce the pressure on them to become greener. This disadvantage of a lenient lender is frequently associated with regional house banks (Boot 2000; Handke 2011). Regional banks may dilute rigid climate impact criteria, refrain from challenging engagement and, thus, minimise the influence channels of climate finance on real-world climate change mitigation. Furthermore, there are incentives to greenwash clients in order to protect close and profitable business relationships.

Flögel's (2019) ethnographic study of German savings banks indicates that close relationships with customers and the use of soft information do not lead to softer lending decisions. Instead, banks use soft information about clients to understand critical hard information and conduct lending decisions that are appropriate to the situation. In other words, loans are granted because of soft information despite poor hard information, but loans are not given if soft information advises so despite satisfactory hard information. However, this finding may not hold true for soft information about climate impacts because banks and their customer advisors do not bear the damage of faulty assessments (in contrast to a credit default). Soft informa-

tion about individual SMEs, their technologies, markets and supply chains, promises to be an important ingredient for regional banks to enrich climate impact assessments and to help local clients with their green transformation. Soft information is, however, ambiguous in climate impact assessments aiming at real-world impact.

5 Dual bottom-line orientation and specific responsibilities of regional banks

As outlined above, most regional banks in Germany are savings and cooperative banks. According to Schmidt (2009), the distinctive characteristic of such government- and cooperative-owned banks is their dual bottom-line orientation. Dual bottom-line institutions are obliged by their owners to pursue social goals (missions) besides profit maximisation. German savings banks, for example, were founded to serve the poor (Gärtner 2009a; Schmidt 2009).

Ironically, this not-for-profit-only mission potentially conflicts with green banking objectives. This is particularly true for savings banks due to their public mandate to meet regional credit demands and promote local economic development (Schmidt 2009; Brämer et al. 2010). As they need to find solutions for all local clients, restrictions to certain green investments ("cherry picking") or the general exclusion of sectors considered unsustainable contradict this mandate. In a similar way, cooperative banks are responsible for the financial needs of their members, be they private customers, farmers or business owners. Accordingly, most cooperative banks are also limited in their ability to impose strict climate requirements. As an exceptional case, the cooperative ESG bank GLS Gemeinschaftsbank eG only finances sectors considered sustainable such as renewable energies or education. However, GLS is not a regional bank and, hence, does not pursue a regional mission.

The specific responsibility of regional banks further derives from the fact that they are often the only available lender for local clients, particularly in rural and peripheral regions (Gärtner & Flögel 2017). Thus, lending decisions potentially have a huge impact on SMEs. This is why regional banks are particularly important for the real-world impact of green banking in Germany. Adverse terms or even credit rejection based on unsatisfactory ESG ratings can put companies and jobs at risk. In such cases, acceptance of climate protection by companies and their employees could be severely undermined, especially if the rating is insufficiently evidence-based or simply unfair (for

example if the NACE code poorly represents the business activity of the rated company in a simple sector-based negative screening).

In addition, poor access to finance and firm defaults tend to reinforce environmental burden shifting to countries with less strict environmental regulations. This is the case when SMEs actively shift production to such locations and, more importantly, when products need to be imported from these places after the default of local producers. Against this background, categorically excluding polluting industries as well as cherry picking for green investments are not an option for the lending policies of regional banks – not only to fulfil their dual mission but also to contribute to the objective of climate protection. Instead, regional banks should use the engaging influence channel to help SMEs with their green transformation, for example by providing credit for developing new (sustainable) products. Better credit terms for green companies and investments further promote the green transformation in line with the financing influence channel.

6 The integration of regional banks in finance groups

Large banks achieve economies of scale and scope in business lending due to their size and can develop superior sectoral and technical competencies (Kamp et al. 2007; Udell 2008). When acting alone, regional banks have limited resources to invest in sectoral and technical specialisation. Hence, they potentially have a substantial resource disadvantage in developing expertise and purchasing external knowledge for climate impact assessments.

However, even though regional savings and cooperative banks in Germany are legally independent, they do not act in isolation from one another. The *Savings Banks Finance Group* (*Sparkassen-Finanzgruppe*) and the equivalent of the cooperative banks (*Genossenschaftliche FinanzGruppe Volksbanken Raiffeisenbanken*) with their respective associations, affiliated companies and bodies are powerful entities that support and interconnect the individual banks. For example, the associations and companies provide solutions to cope with new banking regulations and offer many services and tools like banking ICT as well as rating and scoring systems (Flögel 2019). These finance groups could facilitate climate impact assessments and, among other things, purchase the needed expertise and provide intelligence, assessment tools and bank ICT integration. In lending to non-financial firms and the self-employed, the regional banks of the two finance groups had an outstanding loan volume of

€795 bn in July 2021 (Deutsche Bundesbank 2023, authors' calculation). This loan volume represents a market share of over 54 % (31.9 % for savings banks and 22.4 % for cooperative banks), enabling economies of scale and the sharing of fixed costs for climate impact assessments.

Furthermore, the high market share of these finance groups enables access to bulk balance sheets and other client data, which is currently used to develop industry-leading retail banking tools such as detailed balance sheet reports as well as rating and scoring systems. Especially for the latter, an extensive database constitutes a substantial asset to evaluate companies' probability of default more accurately (Flögel 2019). Utilising this big-data advantage for climate impact assessments could give regional banks a competitive advantage. For example, balance sheet analyses conducted by savings banks offer best-in-class comparisons of clients' financial figures with a finely graded peer group of similar companies from the extensive client database of savings banks (Middelberg & Plegge 2010). Such best-in-class comparisons could also be implemented for raw material use and energy consumption. For this purpose, climate-relevant data must be identified and collected by all banks of the finance group in the first place, necessitating joint action.

Most savings banks have committed to joint action for sustainability in a finance group self-commitment (DSGV 2020). They state, among other things, that they will develop methods to assess the climate impact of their investment and credit portfolios. Similarly, the cooperative banks underline their commitment to green finance in a sustainability mission statement (Genossenschaftliche FinanzGruppe Volksbanken Raiffeisenbanken 2023). However, it remains unclear which actions in terms of the SME finance of regional banks will result from these commitments. The new EU taxonomy regulation (see Section 3) obligates regional banks to disclose the proportion of taxonomy-eligible assets. For this purpose, the Savings Banks Finance Group has developed the so-called "DSGV Taxonomy-Calculator" that classifies sustainable activities by the businesses' NACE codes. Hence, no climate impact assessment on the firm level is needed to fulfil the taxonomy regulation, and regional banks tend not to specify sustainable lending criteria but only disclose the information required by law (see, for example, Sparkasse Gelsenkirchen 2022).

Central institutions have already gone one step further and disclosed sustainable financing criteria, like DekaBank owned by the Savings Banks Finance Group or Union Investment owned by the cooperative finance group (Union Investment 2023). DekaBank applies a positive list with desired investments and a negative list with undesired lending. The negative list prohibits lending to borrowers with an overall "brown" ESG score and forbids certain companies like, for

Table 1: Opportunities and limitations for regional banks to adopt climate finance in SME lending

Opportunities	Limitations
<ul style="list-style-type: none"> – Joint market leadership in lending to non-financial firms and the self-employed (especially strong with respect to SMEs), therefore large potential impact on the green transformation of the German economy – Proximity to SME clients potentially helps to gain climate-relevant (soft) information, appropriately assess climate impacts, and support local clients in their transition to climate neutrality – Ability to act at the local scale due to specific operating areas and high degree of autonomy – Economies of scale, sharing of fixed costs for climate impact assessments and big-data advantage when acting together through finance groups 	<ul style="list-style-type: none"> – Limited pressure from green financial markets due to traditional banking model and corresponding low dependence on wholesale refinancing – Non-disclosure and lack of knowledge of climate-relevant information on the part of most SMEs (usually not ESG-rated) – Potential lack of critical distance to SME clients due to being rather “lenient” and less demanding lenders – Non-applicability of simple positive and negative screenings of borrowers due to dual bottom-line orientation (mandate to serve the local economy/cooperative members) and specific responsibility as the only local lender

Source: authors

example, businesses that generate more than 30 percent of their turnover from coal production (Deka Group 2022). However, DekaBank’s lending has always been highly specialised and selective, and the public mandate to meet the regional credit demands does not apply to the central institutions, as regional savings banks are in charge. Nevertheless, these examples demonstrate that real-world experiences for joint action regarding green banking already exist within the finance groups.

Through the implementation of various projects, savings banks and their central institutions have acquired routines for joint action in developing new products, services, techniques and solutions for regulatory requirements. Projects consist of a development phase in which internal and external experts develop new solutions and methods, a pilot phase where selected member banks test the project results, and a rollout phase where results are offered and recommended for all member organisations (Flögel 2019). A project on climate impact assessment in SME lending could be one way to bring climate finance to the mainstream of SME lending through regional savings banks. Presumably, initial work by pioneer savings banks and other actors would be necessary to develop practical approaches and convince enough peers of the associated benefits.

7 Discussion and conclusion

Our examination of regional banks in Germany has revealed several opportunities that hold much promise for adopting climate finance in their ordinary SME lending practices, but also several hindering factors. These considerations are summarised in Table 1.

We have examined regional banks because of their strong market position which allows them to shape and

support the green transformation of the German economy. However, against the background of their large and stable deposit base, their traditional banking model shields them from financial market pressure to adopt green banking. So why should regional banks turn to climate finance except for moral reasons? First, their dual bottom-line orientation obligates them to social missions. As outlined above, for the savings and for most cooperative banks this mission is currently not green. The members of the cooperative banks could change this by defining such a mission. For the savings banks, the municipalities and local politicians are in charge of expanding their objectives. Second, according to the transmission chain, retail customers can shift regional banks towards green banking through their selection of banks for green deposits.

Third, SME clients may demand climate finance. Whether they are already willing to pay for climate impact assessments and advice in this field is a pertinent question. The climate neutrality objective affects all economic actors, including SMEs. At the same time, most SMEs are currently excluded from measures such as sustainability reporting, though the new EU regulation is steadily extending the number of reporting companies. Regional banks in Germany are also required to conduct CSR reporting in line with EU regulations and have gradually started disclosing the proportion of assets in taxonomy-eligible economic activities. These increasingly strict disclosure obligations represent an opportunity to integrate climate impact assessments into SME lending, however there is a risk that they will be conducted in a purely technical manner without any real-world impact.

Three pitfalls are to be avoided when incorporating climate impact assessments into the SME lending practices of regional banks. First, environmental burden shifting should be avoided and, second, it is important not to damage public acceptance of climate protection. As highlighted in

Section 5, both pitfalls are particularly virulent for regional banks as they are often the main or only local SME lender, which is why the refusal of loans (or the offering of adverse terms) due to inaccuracies in climate impact assessments could determine the very existence of an SME. Third, it is important to avoid redundant green background noise and communication with a miniscule impact on the climate. Dysfunctional climate impact assessments not only have no effect on climate change mitigation but might jeopardise the acceptance of climate governance by both SMEs and banks and increase the operational costs of regional banks in the low-margin market of SME lending. For this purpose, regional banks need to develop viable approaches to assess the real-world climate impacts of SME lending decisions.

Climate impact assessments need to be easily applicable and integrated into routine lending practices to become cost- and time-efficient for regional banks and SMEs alike. At the same time, they must consider the clients' individual circumstances to fulfil the mission of serving both the local economy and cooperative members. This challenging task indeed looks like an attempt to square the circle. Hands-on climate impact assessments that use regional banks' proximity and flexibility advantages and capitalise on the big data and scale economies of their finance groups are required.

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