Banks' Industry Position and Carbon Lending*

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Abstract

We develop a simple model and empirically examine how banks' positions within industry lending markets shape their response to climate transition risk. Using international syndicated-loan data and the Paris Agreement as a shift in the salience of transition risk, we find that high-market-share banks allocate relatively more credit to higher-emitting firms than other banks. This continued access to credit is associated with higher firm leverage and capital expenditures, while firms subsequently reduce their carbon emissions over longer horizons. The effects are concentrated in carbon-intensive industries and remain robust when accounting for banks' portfolio specialization. Our findings show that banks' pre-existing positions within industry lending markets shape the allocation of climate-related credit and are associated with firms' subsequent transition outcomes.

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1 Introduction

The transition to a low-carbon economy creates a fundamental challenge for the allocation of bank credit. Carbon-intensive firms face increasing regulatory, technological, and market risks as climate policies tighten. Yet climate transition is not merely a collection of firm-specific risks. Adjusting to the transition can require substantial financing for changes in firms' operations and investment, often across many firms within the same industry. By affecting many firms within the same industry at the same time, transition risk can expose their lenders to a common industry-wide shock.

Banks enter this transition with very different positions in the lending markets of the industries most affected by it. Banks that account for a substantial share of industry lending have more at stake in industry-wide outcomes and may therefore internalize consequences that are largely external to individual lending relationships (Giannetti and Saidi, 2019). In contrast, banks with a smaller position in an affected industry have less at stake in its broader adjustment and may be more willing to retrench from carbon-intensive borrowers, thereby reducing their exposure to transition risk.

Surprisingly little is known about how these differences in banks' industry positions shape credit allocation in response to climate transition risk. The Paris Agreement marked an important shift in the policy and financial environment surrounding climate change and increased the salience of transition risk for financial institutions. We study whether banks' lending responses to this shift vary with their pre-existing positions in the industries they finance.

How do banks' positions within industry lending markets shape their response to climate transition risk? The Paris Agreement marked an important shift in the policy and financial environment surrounding climate change, increasing the salience of climate-related risks for financial institutions. Yet carbon-intensive firms continue to require substantial external financing as they adapt to the transition toward a low-carbon economy. Given the central role of banks in financing the real economy, understanding how banks' pre-existing positions within industries shape their lending responses is important for assessing how climate policy affects credit allocation and firms' transition outcomes.

Banks have shown mixed and sometimes conflicting responses to climate-related risks. On the one hand, many large financial institutions have expressed commitments to reducing

the carbon intensity of their loan portfolios through initiatives such as the Net-Zero Banking Alliance (NZBA) and the Science Based Targets Initiative (SBTi). On the other hand, empirical evidence documents continued lending to carbon-intensive sectors (Kacperczyk and Peydró, 2026; Giannetti, Jasova, Loumioti, and Mendicino, 2026), while other studies find that carbon-intensive firms may face higher borrowing costs following the Paris Agreement (Ehlers, Packer, and De Greiff, 2022; Delis, Greiff, Iosifidi, and Ongena, 2024). These findings suggest that banks' responses to climate transition risk are heterogeneous and raise the question of what determines this heterogeneity.

A growing literature explores heterogeneity in banks' responses to climate risk. Existing studies emphasize differences across countries, regulatory regimes, and ownership structures as important determinants of banks' lending behavior (Degryse, De Jonghe, Gambacorta, and Huylebroek, 2026; Reghezza, Altunbas, Marques-Ibanez, Rodriguez d'Acri, and Spaggiari, 2022). Much less attention has been paid to how banks' pre-existing positions within industry lending markets affect climate-related credit allocation. This dimension may be particularly important in carbon-intensive industries, where changes in climate policy can generate industry-wide transition risks and where banks with substantial exposure may have stronger incentives to internalize the consequences of these shocks. In particular, a bank that accounts for a large share of lending to an industry is more exposed to deterioration in industry-wide credit conditions and may therefore have stronger incentives to continue supporting firms through periods of adjustment (Giannetti and Saidi, 2019). As emphasized by Morse and Sastry (2025), banks' market position may therefore shape how credit is allocated when industries face changing economic and regulatory conditions.

This paper examines whether banks' position within industry lending markets affects their provision of credit to carbon-intensive firms following the Paris Agreement. We measure a bank's industry position using its market share in the borrower's industry prior to loan origination. High Market Share is an indicator equal to one when a bank's share of lending to the borrower's industry is in the top 20%, measured over the three years preceding loan origination. This measure captures the bank's importance within the industry: a bank with a high market share accounts for a substantial fraction of credit supplied to that industry. We ask whether banks with such positions respond differently to the increasing salience of climate transition risk following the Paris Agreement, and whether their greater exposure to industry-wide outcomes leads them to internalize the consequences of the transition shock.

We develop a simple model to rationalize how banks' pre-existing industry positions can shape their response to transition risk. In the model, banks with larger industry positions enter the transition with a larger base of incumbent lending relationships and therefore have more relationship value exposed when transition risk becomes salient. Because engaging in transition financing requires a fixed capability investment, these banks also have greater scale over which to deploy the required capability. The model therefore predicts that banks with larger pre-existing industry positions are more likely to remain engaged with affected borrowers following a transition shock.

Our empirical analysis uses an international sample of syndicated loans covering two decades. We find that banks with a high market share in a borrower's industry relatively increase lending to more carbon-intensive firms following the Paris Agreement. The effect is concentrated in high-emission industries, where the transition away from carbon-intensive activities is likely to create particularly substantial financing needs. Importantly, we do not find evidence that banks with lower market shares systematically reduce lending to carbon-intensive firms. Rather, the main result is that credit provision to these firms becomes relatively more concentrated among banks that already occupy an important position within their industries. These results are robust to a rich set of fixed effects, including bank-year, industry-year, and country-year fixed effects, which absorb time-varying bank characteristics, industry-level credit demand, and cross-country differences in financial and regulatory environments.

We next examine whether the additional credit associated with high-market-share banks translates into changes in firms' financing and investment decisions. At the firm level, borrowers with access to high-market-share banks obtain greater aggregate syndicated credit following the Paris Agreement. They subsequently experience higher debt growth and capital expenditures, while we find no systematic changes in cash holdings or total assets. These results suggest that the additional credit is associated with greater borrowing and investment rather than simply being accumulated as liquidity or reflected in broad balance-sheet expansion. The effects are again concentrated among firms in high-emission industries, consistent with the loan-level evidence.

Finally, we investigate whether continued access to credit from high-market-share banks is associated with firms' subsequent environmental outcomes. We examine Scope 1 emissions over one- to four-year horizons following loan origination. We find no significant reduc-

tion in emissions at shorter horizons, but emissions decline significantly at longer horizons among firms with access to high-market-share banks. The reduction is concentrated in high-emission industries. This evidence suggests that continued access to credit may facilitate firms' adjustment during the transition, with environmental improvements emerging over longer horizons.

We conduct several analyses to distinguish the role of industry market position from alternative explanations. In particular, we compare our High Market Share measure with High Portfolio Share. While market share captures the bank's importance in the industry, portfolio share captures the importance of the industry within the bank. The lending response remains associated with High Market Share when portfolio specialization is included in the analysis, whereas the corresponding portfolio-share effect is not significant. This evidence suggests that the main results are not simply capturing banks' informational specialization or concentrated loan portfolios.

Overall, our findings identify banks' pre-existing position within industry lending markets as an important source of heterogeneity in climate-related credit allocation. Banks that account for a large share of lending to an industry relatively increase credit provision to more carbon-intensive firms following the Paris Agreement, particularly in high-emission industries. This continued access to credit is associated with greater borrowing and capital expenditures at the firm level and, over longer horizons, with reductions in carbon emissions. The findings therefore point to a more nuanced role for banks in the transition to a low-carbon economy: rather than uniformly withdrawing from carbon-intensive industries, banks with established positions within these industries may have stronger incentives to internalize industry-wide transition risks and continue financing firms as they adjust to the changing climate-policy environment.

Related Literature: Our paper relates to three strands of literature on climate-related lending, bank market structure, and the role of financial intermediaries in firms' transition. First, a growing literature examines how banks respond to climate transition risk following the Paris Agreement. Several studies document a reallocation of credit away from carbon-intensive firms and industries. Kacperczyk and Peydró (2026) show that banks with greater exposure to carbon risk reduce lending to carbon-intensive firms, while Reghezza, Altunbas, Marques-Ibanez, Rodriguez d'Acri, and Spaggiari (2022) find that European banks reduce

lending to heavy-polluting firms following the Paris Agreement. Other studies, however, document continued lending to carbon-intensive sectors despite banks' stated commitments to decarbonize their portfolios (Giannetti, Jasova, Loumioti, and Mendicino, 2026; Sastry, Verner, and Marques-Ibanez, 2024). This mixed evidence suggests that banks do not respond uniformly to climate transition risk. Our contribution is to identify banks' position within industry lending markets as an important source of this heterogeneity. We show that banks with a high market share in an industry relatively increase lending to more carbon-intensive borrowers after the Paris Agreement, particularly in carbon-intensive industries.

Our findings also relate to research examining how climate risk is reflected in the terms of bank credit. Ehlers, Packer, and De Greiff (2022) show that carbon intensity is reflected in loan pricing, while Delis, Greiff, Iosifidi, and Ongena (2024) document a carbon premium following the Paris Agreement for firms with greater exposure to stranded fossil-fuel assets. Bruno and Lombini (2023) similarly find that banks charge higher rates to carbon-intensive borrowers after the Paris Agreement, while lending to highly polluting industries does not decline. More broadly, bank characteristics such as environmental orientation and industry specialization shape credit allocation (Degryse, Goncharenko, Theunisz, and Vadasz, 2023; Degryse, De Jonghe, Gambacorta, and Huylebroek, 2026). We complement this literature by showing that the response to transition risk varies with banks' pre-existing importance within industry lending markets. Thus, the pricing and supply of credit to carbon-intensive firms depend not only on borrower characteristics and bank environmental orientation, but also on banks' position within the industries they finance.

Second, our paper builds on the literature linking bank market structure to lending incentives. Morse and Sastry (2025) emphasize that banks' market positions can shape credit allocation as industries adjust to changing economic and regulatory conditions. Giannetti and Saidi (2019) show that banks with a larger market share in an industry are more likely to continue lending when that industry experiences distress, consistent with banks internalizing the broader consequences of credit withdrawal for an industry in which they have a substantial lending position. We extend this literature by asking whether a similar market-internalization mechanism operates when the shock is generated by climate transition risk rather than conventional financial distress. Our results suggest that it does: banks that are more important lenders within an industry continue to provide credit to carbon-intensive firms following the Paris Agreement. Importantly, this relationship remains when we control

for portfolio specialization, indicating that the result is linked to a bank's importance within the industry rather than simply to the importance of that industry within the bank's own portfolio.

Third, our paper relates to the broader debate over whether banks should respond to climate risk by withdrawing from carbon-intensive firms or by continuing to finance and engage with them during the transition. The existing evidence is mixed. Some studies document reductions in lending to polluting firms (Kacperczyk and Peydró, 2026; Reghezza, Altunbas, Marques-Ibanez, Rodriguez d'Acri, and Spaggiari, 2022), while others find that banks maintain or even expand lending to carbon-intensive sectors despite climate commitments (Giannetti, Jasova, Loumioti, and Mendicino, 2026; Sastry, Verner, and Marques-Ibanez, 2024). This distinction is important because withdrawing credit may limit firms' ability to finance the investments and adjustments required for decarbonization. Consistent with this concern, Kacperczyk and Peydró (2026) find that reductions in bank credit do not necessarily translate into improved environmental outcomes. At the same time, Green and Vallee (2025) provide evidence that banks' voluntary coal-exit policies can be associated with reductions in borrowers' emissions.

Our analysis contributes to this debate by examining not only whether banks continue to lend to carbon-intensive firms, but also what happens to those firms subsequently. We find that firms borrowing from high-market-share banks obtain larger amounts of syndicated credit, increase leverage and capital expenditures, and reduce Scope 1 emissions over longer horizons. These findings suggest that continued access to bank credit can coexist with subsequent improvements in firms' environmental performance. Rather than implying that banks' continued lending represents a failure to respond to climate risk, our results point to a more nuanced possibility: banks with a substantial position in an industry may have incentives to remain engaged with carbon-intensive firms and provide financing during the transition, with environmental improvements emerging over a longer horizon.

Overall, our paper connects the literature on climate-related bank lending with the literature on bank market structure and industry exposure. We show that banks' pre-existing importance within industry lending markets is an important determinant of how credit is allocated to carbon-intensive firms following the Paris Agreement and that this lending is associated with firms' subsequent transition outcomes. In doing so, we highlight banks' industry position as a previously underexplored dimension of heterogeneity in the transmission

of climate transition risk through credit markets, consistent with the idea that banks with a larger position within an industry have stronger incentives to internalize industry-wide transition risks.

The remainder of this study proceeds as follows. Section 2 develops the model and derives the empirical predictions. Section 3 describes the data, followed by the empirical results in Section 4 and robustness checks in Section 5. Section 6 concludes.

2 Model and Empirical Predictions

We develop a simple model to examine how banks' pre-existing industry positions shape their response to climate transition risk. Banks enter the transition with heterogeneous positions in the lending markets of affected industries. When transition risk becomes salient, banks decide whether to develop the capabilities required to finance borrowers' adjustment or instead exit and reallocate lending capacity elsewhere. The model links this decision to banks' pre-existing industry positions and generates predictions for the allocation of credit following the transition shock.

2.1 The Setting

There are two industries, H and L. Industry H represents carbon-intensive industries exposed to climate transition risk, while L represents the remainder of the economy. There are two banks, indexed by $b \in \{1, 2\}$, and a unit mass of firms in H. Let s_b denote bank b's pre-transition share of lending to industry H, with

$$s_1 > s_2, \qquad s_1 + s_2 = 1. \tag{1}$$

We normalize each H-firm's initial borrowing to one. Because the mass of H-firms is also normalized to one, s_b measures both bank b's share of lending to industry H and the mass of its installed relationships in that industry.[1]

The model has two dates. At $t = 0$, an unexpected transition shock affects industry

[1] We take banks' pre-transition industry positions as given in the main analysis. Appendix A provides one possible microfoundation for heterogeneous industry positions and shows that banks can differ in industry market share even when they have identical portfolio shares.

H. Firms in H require financing to adjust to the transition, and banks decide whether to develop a transition-financing capability and remain engaged with these firms or instead exit and reallocate lending capacity toward L. At $t = 1$, firms financed at $t = 0$ remain in the process of transition and require continued financing. Banks compete à la Bertrand for these borrowers. We solve the model backward.

2.2 Continued Financing and Relationship Value at $t = 1$

Consider an H-firm that received transition financing from bank b at $t = 0$. At $t = 1$, the firm has not yet completed its transition and continues to require bank financing.

Financing the firm's transition at $t = 0$ gives its incumbent lender relationship-specific transition-financing expertise. The incumbent has learned the firm's transition plan, structured its financing arrangements, and monitored its progress. Let c_I denote the incumbent's marginal cost of providing continued transition finance. A competing bank that replaces the incumbent faces marginal cost c_E, where

$$c_I < c_E. \tag{2}$$

This cost difference is relationship specific. Conditional on having financed a firm's transition at $t = 0$, banks 1 and 2 are otherwise symmetric. Thus, the advantage does not arise because one bank is intrinsically better at transition finance; it is created by the transition-financing relationship itself.

Replacing the incumbent lender also imposes a real switching cost $q > 0$ on the borrower. This captures the costs of replacing existing credit arrangements, renegotiating transition-related conditions, transferring monitoring responsibilities, and restructuring financing arrangements.

Banks compete in lending rates. The entrant cannot profitably quote a rate below c_E. The incumbent can therefore charge

$$r_I^* = c_E + q, \tag{3}$$

leaving the borrower indifferent between remaining with the incumbent and switching to an entrant charging its break-even rate. We assume that an indifferent borrower remains with

its incumbent lender.

The incumbent consequently earns the equilibrium transition-financing rent

$$m = r_I^* - c_I = c_E - c_I + q > 0. \tag{4}$$

Thus, financing a firm's transition creates relationship-specific expertise and preserves a valuable lending relationship. Importantly, this relationship value is not imposed exogenously. It arises from the incumbent lender's relationship-specific cost advantage and the borrower's cost of replacing its transition lender. Let

$$M \equiv \delta m \tag{5}$$

denote the discounted continuation value at $t = 0$ of establishing the transition-financing relationship.

2.3 The Transition Shock and Banks' Engagement Decisions at $t = 0$

At $t = 0$, an unexpected climate-transition shock affects industry H. Firms in H cannot costlessly continue operating under their existing technologies and require financing to undertake transition investment. The shock therefore exposes the continuation value of banks' existing relationships in the industry: preserving these relationships requires banks to remain engaged and finance borrowers' adjustment to the transition.

Banks choose between two actions:

$E =$ engage in transition financing, $\qquad X =$ exit and reallocate lending capacity toward L.

Engagement requires a bank to acquire a transition-financing capability at fixed cost $K > 0$. The fixed cost captures the infrastructure required to evaluate transition plans, structure transition-related credit, design and monitor transition-related conditions, and manage the associated risks. Once incurred, the capability can be deployed across multiple borrowers.

Firms differ in the cost of financing their transition. Let κ_i denote the opportunity cost

of financing firm i's transition rather than deploying the same resources in L. We assume

$$\kappa_i \sim F(\kappa). \tag{6}$$

This heterogeneity allows transition financing to be allocated selectively rather than implying that an engaging bank finances every carbon-intensive firm.

2.3.1 Incumbent borrowers

Suppose bank b has paid K. Financing one of its existing H-borrowers i costs κ_i relative to reallocating the funds to L. In return, financing the borrower preserves the relationship and generates the continuation value M.

The bank therefore retains borrower i whenever

$$M - \kappa_i \geq 0, \tag{7}$$

or equivalently,

$$\kappa_i \leq M. \tag{8}$$

Define the expected surplus from preserving an incumbent H-relationship as

$$V_I = E[(M - \kappa)_+] = \int_0^M (M - \kappa)\, dF(\kappa). \tag{9}$$

The quantity V_I captures the expected value of preserving an incumbent relationship through the transition. Because bank b enters the transition shock with a mass s_b of incumbent H-relationships, its pre-existing industry position determines the aggregate relationship value exposed when transition financing becomes necessary. A bank with a larger s_b has more such relationship value at stake.

2.3.2 Borrowers switching between banks

Suppose instead that the rival bank exits. An engaging bank may take over some of the rival's borrowers. Because the borrower must replace its incumbent lender at $t = 0$, switching entails the same real cost q.

The surplus from acquiring borrower i is therefore

$$M - \kappa_i - q. \tag{10}$$

The bank profitably takes over the borrower whenever

$$\kappa_i \leq M - q. \tag{11}$$

Define

$$V_P = E[(M - q - \kappa)_+] = \int_0^{M-q} (M - q - \kappa)\, dF(\kappa). \tag{12}$$

Provided $M > q$,

$$V_I > V_P > 0. \tag{13}$$

The difference reflects the value of incumbency. Some firms are sufficiently attractive to finance even after bearing the cost of switching lenders, while others are worth financing only by their existing lender.

The resulting financing decisions are therefore characterized by

$$\begin{aligned}
&\kappa_i \leq M - q && : \quad \text{the firm can be financed even after switching lenders,} \\
&\kappa_i \in (M - q, M] && : \quad \text{the firm is financed only by its incumbent lender,} \\
&\kappa_i > M && : \quad \text{transition financing is not privately worthwhile.}
\end{aligned} \tag{14}$$

2.3.3 Industry position and transition engagement

Suppose first that both banks engage. Each bank retains the viable subset of its incumbent borrowers, giving bank b

$$\Pi_b(E, E) = s_b V_I - K. \tag{15}$$

Equation (15) captures the model's central mechanism. A bank with a larger pre-existing industry position enters the transition with a larger installed base of lending relationships and hence more aggregate relationship value at stake. At the same time, because acquiring the transition-financing capability involves a fixed cost, a larger installed borrower base provides greater scale over which to deploy that capability. Banks with larger pre-existing industry positions therefore have both greater exposure to the loss of relationship value

when transition risk becomes salient and stronger incentives to incur the fixed cost required to preserve that value.

If bank b engages while the other bank exits, it retains its own viable borrowers and can additionally acquire the subset of the rival's borrowers for which switching is worthwhile:

$$\Pi_b(E, X) = s_b V_I + s_{-b} V_P - K. \tag{16}$$

Exit yields the normalized outside payoff

$$\Pi_b(X, \cdot) = 0, \tag{17}$$

because the competitive return available from reallocating lending capacity to L is already incorporated in κ_i.

We focus on the parameter region[2]

$$s_2 V_I + s_1 V_P < K \leq s_1 V_I + s_2 V_P. \tag{18}$$

Under Equation (18), bank 2 does not find it profitable to incur the fixed cost of transition engagement even when bank 1 exits and bank 2 can acquire some of bank 1's borrowers. In contrast, bank 1 finds engagement profitable when bank 2 exits. The unique equilibrium is therefore

$$(d_1, d_2) = (E, X). \tag{19}$$

The equilibrium illustrates how banks' pre-existing industry positions shape their response to transition risk. Bank 1 enters the transition with a larger base of incumbent relationships and therefore has stronger incentives to incur the fixed cost of developing the transition-financing capability and remain engaged. Once it has incurred K, it can also finance some borrowers abandoned by bank 2.

The transition shock consequently reallocates credit toward the bank with the larger pre-existing position in the affected industry. This reallocation is selective: bank 1 retains its viable incumbent borrowers and acquires those borrowers of bank 2 for which switching remains worthwhile, while firms with sufficiently high transition costs do not receive transition

[2]This region is nonempty because $s_1 > s_2$ and $V_I > V_P$, which imply $s_1 V_I + s_2 V_P > s_2 V_I + s_1 V_P$.

financing.

2.4 Empirical Predictions

The model provides a simple mechanism linking banks' pre-existing industry positions to their response to transition risk. Banks with larger positions in affected industries enter the transition with a larger base of incumbent relationships and therefore have more relationship value exposed when transition risk becomes salient. At the same time, their larger borrower base provides greater scale over which to deploy the fixed-cost capability required for transition financing. These banks consequently have stronger incentives to remain engaged with affected borrowers rather than exit and reallocate lending capacity elsewhere. Applied to the Paris Agreement, which increased the salience of climate transition risk for financial institutions, the model predicts that the response of credit provision to borrower emissions should vary with banks' pre-existing industry positions.

Prediction 1. Banks with a high market share in a borrower's industry relatively increase lending to more carbon-intensive firms in the post–Paris Agreement period.

The model also distinguishes a bank's position within an industry from the importance of that industry within the bank's own portfolio. The engagement mechanism operates through the bank's installed base of relationships in the affected industry, captured by its industry market share. It therefore predicts that the lending response associated with industry market share should not simply reflect portfolio specialization.[3]

Continued access to credit may subsequently affect firms' financing and investment decisions. Firms borrowing from banks that remain engaged in transition financing have greater access to external finance as they adjust to the transition. Such continued credit availability may allow firms to increase borrowing and undertake additional investment following the Paris Agreement. This motivates our second empirical prediction.

Prediction 2. Firms borrowing from banks with a high market share in their industry increase their borrowing and capital expenditures in the post–Paris Agreement period.

Finally, continued financing may facilitate operational and technological changes required for firms' adjustment to transition risk. Such changes need not affect emissions immediately:

[3] Appendix A formalizes this distinction by showing that banks can have different industry market shares even when they choose identical portfolio shares.

investments undertaken during the transition may take time to alter firms' production processes and environmental performance. We therefore examine whether firms with continued access to high-market-share banks subsequently reduce their carbon emissions over longer horizons.

Prediction 3. Firms borrowing from banks with a high market share in their industry subsequently exhibit lower carbon emissions over longer horizons.

3 Data

For our main analysis, we use an international sample of firms that obtain syndicated bank loans between 2004 and 2024. We combine syndicated loan data from LSEG LoanConnector Dealscan with firm-level financial information from Compustat and carbon emissions data from the S&P Trucost Environmental Database. LSEG Dealscan provides detailed information on syndicated loans to firms worldwide, including loan amount, pricing, maturity, purpose, borrower location, and the lenders participating in each syndicate.[4] We use the linking file provided by Chava and Roberts (2008) to match LSEG borrower identifiers to Compustat gvkeys. This identifier also allows us to link borrowers to Trucost.

LSEG Dealscan provides information on all lenders participating in each syndicated loan. Following Bharath, Dahiya, Saunders, and Srinivasan (2007), we identify a lead bank for each deal. For deals with a single lender, that lender is assigned as the lead bank. For deals with multiple lenders, we assign as the lead bank the lender classified as "Lead Arranger." If no lender is classified as "Lead Arranger," we assign the lender listed as "Admin Agent." When multiple lead banks are involved in a deal, we divide the loan amount equally among them. We focus on the lead bank because the lead arranger is responsible for structuring and monitoring the loan, while other syndicate members are typically passive participants (Chodorow-Reich, 2014; Schwert, 2018). For lender-specific information, we aggregate lenders to their ultimate parent companies, consistent with prior literature (see, e.g., Sufi, 2007; Murfin, 2012; Giannetti and Saidi, 2019).

[4]LSEG Dealscan, formerly known as LPC Dealscan, is the largest and most widely used database of syndicated lending in the literature.

3.1 Sample Selection

We begin with all syndicated loans originated between 2003 and 2024 in LSEG LoanConnector Dealscan. We obtain the borrowing amount in US dollars, all-in-drawn spread (AISD), maturity, borrower country, borrower industry, and lender information. We exclude deals with missing information on the borrower industry or lead bank, as well as deals for which the borrowing amount in US dollars is unavailable. We also exclude observations classified as "Deal Amended," which typically represent adjustments to previously negotiated deals rather than new loan originations (Roberts, 2015). Since our analysis focuses on newly originated loans, we exclude these observations from the sample.

We next impose the borrower-level data requirements. Borrower industry, borrower identifier, and loan volume are essential for our primary analysis. We use the linking table provided by Chava and Roberts (2008) to match LSEG borrower identifiers to Compustat gvkeys.[5] Borrowers for which no valid gvkey match can be established are excluded from the sample. We then use the Compustat identifier to obtain accounting information for our borrower controls and to link borrowers to the S&P Trucost Environmental Database. Trucost provides emissions data for a broad set of international listed firms and has previously been used as a source for economic studies incorporating emissions data (Kacperczyk and Peydró, 2026; Ehlers, Packer, and De Greiff, 2022). We use Scope 1 emissions, which capture greenhouse gas emissions from sources directly owned or controlled by the firm, as our main measure of carbon emissions, consistent with prior literature (Ehlers, Packer, and De Greiff, 2022; Giannetti, Jasova, Loumioti, and Mendicino, 2026; Albuquerque, Kruttli, Ma, and Watugala, 2025). Scope 1 emissions are directly attributable to the firm's activities and therefore more closely capture changes resulting from firms' own actions than Scope 2 or Scope 3 emissions (Kacperczyk and Peydró, 2026). They are also more precisely measured because their calculation does not require assigning emissions across multiple entities in a firm's supply chain (Giannetti, Jasova, Loumioti, and Mendicino, 2026).

After assigning a lead bank to each deal, we calculate *Bank Market Share* for each bank-industry-year as the bank's share of total lending to the borrower's two-digit SIC industry in a given year:

$$\text{Bank Market Share}_{b,i,t} = \frac{\text{Loans}_{b,i,t}}{\sum_{b'} \text{Loans}_{b',i,t}}. \tag{20}$$

[5]The most recent version of the linking table is updated to include new borrowers through January 2023.

In our empirical analysis, *High Market Share* identifies banks whose bank market share in the borrower's industry is in the top 20 percent, calculated over the three-year period prior to loan origination. This measure captures banks' pre-existing exposure to the borrower's industry.

Our final sample consists of 2,841 borrowers that obtain syndicated loans from 380 lenders across 60 countries. The resulting estimation sample contains 17,046 bank–borrower–year observations over a 20-year period.[6]

3.2 Descriptive Statistics

Table 1 presents descriptive statistics for the main variables used in our analyses. Panel A reports the loan-level variables used in the first part of the empirical analysis. The dependent variable, $Loans_{f,b,t}$, has a mean of 19.85, corresponding to approximately US$400 million in loan volume. This magnitude is broadly consistent with other studies using international samples constructed from the LSEG Dealscan database (Degryse, Goncharenko, Theunisz, and Vadasz, 2023; Delis, Greiff, Iosifidi, and Ongena, 2024; Demetriades and Politsidis, 2025). The average loan maturity is approximately four years, while the average loan spread is around 250 basis points, also consistent with this literature. Market Share has a mean of 3% and a median of 2%, indicating that the typical bank accounts for a relatively small share of lending within an industry. The distribution is right-skewed, with the 90th percentile reaching 7%, reflecting the presence of banks with substantially larger positions within industry lending markets.

Panel B presents the firm-level variables. We measure emissions as the natural logarithm of Scope 1 emissions to reduce the influence of extreme values in the raw emissions data. Trucost reports emissions in tonnes of CO_2. The mean of log emissions is approximately 12, which is comparable to other studies using the same data.[7]

[6] Variable definitions and data sources are provided in Table B1 in the Appendix.

[7] Böhm, Eufinger, Kadach, and Sakasai (2025) report a mean of 11.3, while the sample in Kacperczyk and Peydró (2026) has a mean of 11.8.

4 Results

4.1 Baseline Results

We begin the analysis by examining the role of banks' pre-existing industry exposure in lending outcomes during the post-Paris Agreement period. Specifically, we estimate the following regression:

$$\begin{aligned} Loans_{f,b,t} = \alpha &+ \beta_1 \text{High Market Share}_{b,i,t} \times Post_t \times Emissions_{f,t-1} \\ &+ \beta_2 \text{High Market Share}_{b,i,t} \times Post_t + \beta_3 Emissions_{f,t-1} \times Post_t \\ &+ \beta_4 \text{High Market Share}_{b,i,t} + \beta_5 \text{High Market Share}_{b,i,t} \times Emissions_{f,t-1} \\ &+ \beta_6 Emissions_{f,t-1} + \gamma X_{f,t-1} + \lambda_{b,t} + \kappa_{i,t} + \delta_{c,t} + \epsilon_{f,b,t}. \end{aligned} \tag{21}$$

where $Loans_{f,b,t}$ is the logarithm of the loan volume extended by bank b to firm f in year t. High Market Share$_{b,i,t}$ is an indicator equal to one if the bank b's market share in the borrower f's industry i, defined according to Equation 20 using lending over the three years preceding loan origination, is in the top 20 percent. Thus, the measure captures the bank's pre-existing exposure to the borrower's industry. $Post_t$ is an indicator equal to one for loans originated after the Paris Agreement in 2015. $Emissions_{f,t-1}$ measures the borrower's carbon emissions in the calendar year preceding loan origination, calculated as the logarithm of Scope 1 emissions. $X_{f,t-1}$ is a vector of firm-level control variables capturing firm characteristics and credit quality: firm size, leverage, profitability, and tangible assets. Finally, $\lambda_{b,t}$, $\kappa_{i,t}$, and $\delta_{c,t}$ denote bank-year, industry-year, and country-year fixed effects, respectively.

Table 2 presents the baseline results. We first examine whether the relationship between borrower emissions and credit supply changes following the Paris Agreement. In column (1), we estimate the baseline specification without accounting for banks' industry exposure. The specification includes borrower controls as well as bank-year and industry-year fixed effects to absorb time-varying bank and industry characteristics. In column (2), we additionally include country-year fixed effects to account for changes in country-specific regulatory and macroeconomic conditions.

The coefficient on $Post_t \times Emissions_{f,t-1}$ is positive and statistically significant, indicating that, following the Paris Agreement, more carbon-intensive firms receive relatively more credit than in the pre-2015 period. This result suggests that carbon-intensive firms did not

experience an aggregate contraction in syndicated credit following the Paris Agreement.

Columns (3) and (4) introduce banks' pre-existing industry exposure. Our coefficient of interest is the triple interaction High Market Share$_{b,i,t} \times Post_t \times Emissions_{f,t-1}$, which captures whether banks with greater exposure to an industry adjust lending to carbon-intensive firms differently following the Paris Agreement. The coefficient is positive and statistically significant, indicating that banks with a high market share in a borrower's industry relatively increase lending to more carbon-intensive firms in the post-Paris period.

The magnitude of the triple interaction is also economically meaningful. Using the estimates from the full specification in column (4), the coefficient implies that a one percent increase in borrower emissions is associated with an approximately 0.047 percent larger increase in lending from high-market-share banks relative to other banks in the post-Paris period. Given that the standard deviation of log emissions is 2.77, a one-standard-deviation increase in borrower emissions is associated with approximately a 13.2 percent larger increase in lending from high-market-share banks relative to other banks in the post-Paris period.

To further examine whether these effects are concentrated in industries with greater exposure to carbon emissions, we split the sample according to industry-level emissions. Specifically, industries are classified as high- or low-emission based on whether their average annual emissions, calculated using the full Trucost universe at the SIC-2 level, are above or below the yearly median.[8]

The results are reported in Table 3. The baseline findings are concentrated in high-emission industries. In columns (1) and (2), the coefficient on High Market Share$_{b,i,t} \times Post_t \times Emissions_{f,t-1}$ is positive and statistically significant, indicating that banks with a high market share in a borrower's industry relatively increase lending to more carbon-intensive firms following the Paris Agreement. In contrast, the corresponding triple interaction is negative but statistically insignificant in low-emission industries. The difference across the two groups suggests that the relationship between banks' pre-existing industry exposure and lending to carbon-intensive firms is concentrated in industries with greater emissions.

These findings provide further support for the view that banks' pre-existing positions

[8]The classification is based on the full Trucost sample, including firms that do not appear in the syndicated loan market. This allows us to capture the overall emissions profile of industries rather than only the emissions profile of borrowing firms. The resulting split is uneven, with approximately 80% of loan observations belonging to high-emission industries, suggesting that syndicated borrowers are disproportionately concentrated in carbon-intensive sectors.

within industries shape their response to the climate transition. The stronger effect in high-emission industries is consistent with banks with established market positions having greater incentives to continue supporting carbon-intensive firms as these industries adjust to the transition.

We next examine whether the differential lending response of high-market-share banks is reflected in loan contractual terms. Prior research shows that climate-related risks can affect both loan pricing and contractual design, including loan spreads, maturity, and collateral requirements (Ehlers, Packer, and De Greiff, 2022; Degryse, Goncharenko, Theunisz, and Vadasz, 2023). We examine whether these loan characteristics vary with banks' pre-existing industry exposure when lending to carbon-intensive firms following the Paris Agreement. The results are reported in Table 4.

The results indicate that the differential lending response is not accompanied by systematic changes in loan pricing or maturity. The triple interaction High Market Share$_{b,i,t}$ $\times$ $Post_t \times Emissions_{f,t-1}$ is statistically insignificant for both the loan spread and maturity. Thus, although high-market-share banks relatively increase lending to more carbon-intensive firms after the Paris Agreement, we do not find evidence that this additional lending is accompanied by systematically different pricing or maturity terms.

We do, however, find a significant effect on collateral requirements. The triple interaction is positive and statistically significant for the full sample, indicating that high-market-share banks are more likely to require secured lending when extending credit to more carbon-intensive firms following the Paris Agreement. The magnitude is economically meaningful: the coefficient of 0.0202 implies that a one-standard-deviation increase in borrower emissions is associated with an approximately 5.6 percentage-point increase in the probability that the loan is secured when the borrower borrows from a high-market-share bank in the post-Paris period (2.77×0.0202).

The results are concentrated in heavy-polluting industries. In this subsample, the triple interaction for Secured is positive and statistically significant, while the corresponding coefficients for loan spread and maturity remain insignificant. In low-emission industries, none of the triple interactions is statistically significant.

Overall, the results indicate that the post-Paris lending response varies systematically with banks' pre-existing industry exposure. High-market-share banks relatively increase lending to more carbon-intensive firms, with the effect concentrated in heavy-polluting in-

dustries. This differential lending is not accompanied by systematic changes in loan spreads or maturity, but is associated with a greater likelihood of secured lending, particularly in heavy-polluting industries. The findings therefore suggest that banks with established positions in an industry continue to support carbon-intensive borrowers following the Paris Agreement while adjusting certain contractual protections. We next examine whether this differential access to bank credit translates into changes in firms' financing and investment decisions.

4.2 Firm-level Results

The baseline results show that banks with a high pre-existing market share in a borrower's industry relatively increase lending to more carbon-intensive firms following the Paris Agreement. We next examine whether this differential access to bank credit translates into changes in firms' aggregate borrowing, financial policies, investment, and environmental outcomes. Because firms typically maintain multiple banking relationships, bank–borrower level analyses do not necessarily capture changes in firms' overall access to credit. We therefore aggregate borrowing to the firm level and identify firms that borrow from at least one high-market-share bank. This allows us to examine whether exposure to banks with greater pre-existing industry exposure affects firms' overall financing and subsequent real outcomes.

We begin by examining firms' total syndicated borrowing. Specifically, we estimate:

$$\begin{aligned} Loans_{f,t} = \alpha + \beta_1 \text{High Market Share}_{f,t} \times Post_t + \beta_2 \text{High Market Share}_{f,t} \\ + \gamma X_{f,t-1} + \lambda_f + \kappa_{i,t} + \delta_{c,t} + \epsilon_{f,t}. \end{aligned} \tag{22}$$

where $Loans_{f,t}$ is the logarithm of total syndicated loan volume obtained by firm f in year t. High Market Share$_{f,t}$ is an indicator equal to one if firm f borrows from at least one bank whose market share in the firm's two-digit SIC industry is in the top 20 percent, based on lending during the three years preceding loan origination. Thus, the measure captures whether the firm has access to a bank with a substantial pre-existing position in its industry. $Post_t$ is an indicator equal to one for loans originated after the Paris Agreement in 2015. $X_{f,t-1}$ is a vector of firm-level control variables capturing firm size, leverage, profitability, and tangible assets. The specifications also include firm, industry-year and country-year fixed effects.

Table 5 reports the results. In the full sample, the coefficient on High Market Share$_{f,t} \times Post_t$ is positive but statistically insignificant, indicating no systematic increase in aggregate syndicated borrowing among firms with access to high-market-share banks. The effect is concentrated in high-emission industries, where the coefficient is (0.334) and statistically significant at the 10% level. This estimate implies that firms with access to high-market-share banks obtain approximately 40% more syndicated credit in the post-Paris period relative to firms without such access. We find no comparable increase in borrowing among firms in low-emission industries. These results suggest that the differential lending behavior of high-market-share banks translates into greater overall access to syndicated credit specifically for firms operating in carbon-intensive industries.

We next examine whether greater access to credit is reflected in firms' financing and investment decisions. The additional lending documented above may allow firms to adjust their balance sheets and undertake investment following the Paris Agreement. We therefore examine changes in firms' debt, cash holdings, capital expenditures, and total assets.

Table 6 presents the results. Firms borrowing from high-market-share banks experience a significant increase in debt following the Paris Agreement. The magnitude of the coefficient (0.180) implies approximately 20% higher debt growth relative to firms without access to high-market-share banks. This effect is concentrated in high-emission industries, consistent with the evidence on aggregate syndicated borrowing. The results suggest that the additional credit supplied by high-market-share banks translates into higher firm-level debt rather than being offset by reductions in other sources of financing.

We also find that firms borrowing from high-market-share banks increase capital expenditures following the Paris Agreement. The coefficient on High Market Share$_{f,t} \times Post_t$ is 0.327 and statistically significant at the 1% level, implying approximately 39% higher capital expenditure growth relative to firms without access to high-market-share banks. This effect is again concentrated in high-emission industries. By contrast, we find no statistically significant changes in cash holdings or total assets.

Taken together, these results suggest that the additional credit available from high-market-share banks is associated with greater borrowing and investment, rather than a systematic increase in liquidity or overall asset accumulation. The findings are consistent with firms using the additional financing to undertake investment following the Paris Agreement.

Finally, we examine whether continued access to credit from high-market-share banks is associated with firms' subsequent environmental outcomes. The baseline results show that these banks continue to lend to more carbon-intensive firms after the Paris Agreement. This raises the question of whether continued financing is associated with continued emissions or instead supports firms' adjustment to the climate transition.

There are two potential interpretations. On the one hand, banks with substantial exposure to an industry may have incentives to support borrowers' transition in order to reduce the long-run risks associated with deterioration in the industry's performance (Giannetti and Saidi, 2019). Such engagement may allow banks to maintain lending relationships while encouraging firms to undertake costly adjustments (Giannetti, Jasova, Loumioti, and Mendicino, 2026). On the other hand, continued lending may simply reflect banks' willingness to maintain exposure to carbon-intensive industries without affecting firms' environmental behavior, consistent with evidence that carbon exposure is increasingly incorporated into financial decisions (Kacperczyk and Peydró, 2026).

To examine these possibilities, we estimate the relation between firms' exposure to high-market-share banks and their subsequent Scope 1 emissions over one- to four-year horizons following loan origination.

Table 8 reports the results. We find no evidence of a reduction in emissions at shorter horizons. Over longer horizons, however, the results indicate a significant decline in emissions among firms with access to high-market-share banks. In the four-year specification, these firms experience approximately a 23% reduction in Scope 1 emissions relative to firms without such exposure. Table 9 shows that the reduction is concentrated in high-emission industries, where transition pressures and the potential benefits of continued access to financing are likely to be greatest.

Taken together, the firm-level results indicate that continued lending by high-market-share banks is associated with meaningful changes in firms' financing and real outcomes. Firms with access to these banks obtain more syndicated credit, increase debt and capital expenditures, and subsequently reduce their emissions over longer horizons. The absence of significant effects on cash holdings and total assets suggests that the additional financing is not simply accumulated as liquidity or reflected in broad balance-sheet expansion. Instead, the results are consistent with continued access to credit supporting investment and adjustment among carbon-intensive firms, with environmental benefits emerging over longer

horizons.

5 Robustness Checks

5.1 Alternative Interpretation: Industry Specialization

A potential alternative interpretation of our results is that banks with high market share in an industry are also highly specialized in that industry. If portfolio specialization provides banks with informational advantages through repeated interactions with borrowers, the baseline results could reflect information-based relationship lending rather than banks' broader position within an industry. The literature commonly uses banks' portfolio share in an industry as a measure of specialization and informational capital (Acharya, Hasan, and Saunders, 2006; Blickle, Parlatore, and Saunders, 2026; Jiang and Li, 2022; Paravisini, Rappoport, and Schnabl, 2023). At the same time, a bank's importance as a lender within an industry may create stronger incentives to internalize industry-wide outcomes and the effects of industry-specific shocks (Giannetti and Saidi, 2019). This distinction is particularly relevant in the context of climate transition, where banks that account for a larger share of industry lending have more at stake in the industry's future performance and may therefore be more likely to internalize the effects of industry-wide transition shocks.

To distinguish between these two dimensions, we retain our baseline High Market Share measure and introduce High Portfolio Share as an alternative proxy for banks' industry specialization. High Portfolio Share is an indicator equal to one if the borrower's industry accounts for a share of the bank's total lending that is in the top 20%, also measured over the three years preceding loan origination.

Our market-share and portfolio-share measures therefore capture distinct dimensions of banks' relationships with industries. Market share captures the bank's importance in the industry, measuring the fraction of total lending to an industry supplied by a given bank. Portfolio share captures the importance of the industry within the bank, measuring the fraction of the bank's own lending portfolio allocated to that industry. Thus, a bank can have a high market share in an industry without that industry representing a large share of its overall lending portfolio. Conversely, a bank may have a highly concentrated portfolio in an industry while accounting for only a small fraction of lending to that industry.

We re-estimate the baseline specification by including High Portfolio Share alongside our baseline High Market Share measure. The results are reported in Table 10. Column (1) reproduces the baseline specification and confirms the positive and statistically significant coefficient on the triple interaction High Market Share$_{b,i,t} \times Post_t \times Emissions_{f,t-1}$. Column (2) replaces High Market Share with High Portfolio Share. The corresponding triple interaction is negative and statistically insignificant. Finally, column (3) includes both measures simultaneously. The triple interaction involving High Market Share remains positive and statistically significant, while the corresponding interaction for High Portfolio Share remains statistically insignificant.

These results suggest that the baseline lending response is not driven by banks' portfolio specialization. Rather, the response is associated with banks' importance within the industry: banks that account for a larger share of lending to an industry relatively increase credit provision to more carbon-intensive borrowers following the Paris Agreement, even after controlling for the extent to which that industry represents a large share of the bank's own lending portfolio. This distinction supports the interpretation that our baseline results reflect banks' position within industry lending markets rather than informational specialization alone, consistent with the idea that banks with a larger position in an industry have stronger incentives to internalize industry-wide transition risks and the associated externalities.

5.2 Alternative Carbon Emission Measure

We next examine whether our findings are robust to an alternative measure of firms' carbon emissions. Specifically, rather than using the level of Scope 1 emissions, we measure firms' carbon intensity as Scope 1 CO2 emissions scaled by total assets. This measure captures carbon emissions relative to firm size.

Table 11 reports the main results using this alternative measure. The coefficient on the triple interaction High Market Share$_{b,i,t} \times Post_t \times Intensity_{f,t-1}$ is positive and statistically significant. In the specification with country-by-year fixed effects, the coefficient is 0.0589 and significant at the 5% level. This result is consistent with our baseline findings: following the Paris Agreement, banks with high market share increase lending relatively more to firms with higher ex ante carbon intensity. The magnitude is comparable to the corresponding coefficient in our baseline specification, indicating that our main finding is not driven by the

use of emissions levels rather than emissions intensity.

The results remain robust across the other dimensions of our analysis. Table B2 shows that the lending response is concentrated in high-emission industries, consistent with our baseline evidence. Table B3 shows that the results for loan characteristics are broadly unchanged when carbon intensity is used instead of emissions. Finally, Table B4 confirms that the distinction between market share and portfolio share remains robust, with the positive market-share effect persisting after controlling for portfolio specialization.

Overall, these results confirm that our main findings are robust to measuring firms' carbon exposure using emissions intensity rather than the level of Scope 1 emissions.

6 Conclusion

This paper examines how banks' position within industry lending markets shapes credit allocation in response to climate transition risk. Using an international sample of syndicated loans over two decades, we find that banks with a high market share in an industry relatively increase lending to more carbon-intensive firms following the Paris Agreement. This effect is concentrated in high-emission industries, suggesting that banks' responses to the changing climate-risk environment depend, in part, on their pre-existing importance within industry lending markets. Consistent with this interpretation, the lending response is associated with banks' market position rather than their portfolio specialization.

Our model provides a simple rationale for this pattern. Banks with larger pre-existing industry positions have a larger base of incumbent relationships and therefore more relationship value exposed when transition risk becomes salient. Their larger borrower base also provides greater scale over which to deploy the capabilities required for transition financing, strengthening their incentives to remain engaged with affected borrowers.

At the firm level, continued access to high-market-share banks is associated with greater borrowing and investment. Firms borrowing from these banks experience higher debt growth and capital expenditures following the Paris Agreement, while we find no systematic changes in cash holdings or total assets. Over longer horizons, these firms also reduce their Scope 1 emissions, with the decline concentrated in high-emission industries. Taken together, these findings are consistent with continued access to bank credit facilitating firms' investment and adjustment during the transition, with environmental improvements emerging only over

time.

Overall, our findings identify banks' pre-existing position within industry lending markets as an important and previously underexplored source of heterogeneity in the transmission of climate transition risk through credit markets. Rather than uniformly withdrawing from carbon-intensive borrowers, banks with substantial positions in affected industries may have stronger incentives to remain engaged as firms adjust to a changing climate-policy environment. More broadly, the results suggest that continued financing of carbon-intensive firms need not be inconsistent with subsequent emissions reductions, highlighting a more nuanced role for bank credit in the transition to a low-carbon economy.

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Tables

Table 1 Summary statistics

This table presents descriptive statistics for the main variables used in the analysis. Panel A reports loan-level variables used in the bank–borrower analysis. Loan volume is defined as the natural logarithm of total loan amounts (in US dollars). Secured is a dummy variable equal to one if the loan is secured. Maturity is measured in years as the difference between the deal's active date and the maturity date. Spread (AISD) is the all-in-drawn spread. Panel B reports firm-level characteristics. Emissions are measured as the natural logarithm of Scope 1 CO_2 emissions. Leverage is defined as total debt scaled by total assets. Size is defined as the natural logarithm of total assets. Return on assets (ROA) is operating income before taxes scaled by total assets. Tangible assets are measured as property, plant, and equipment scaled by total assets. CapEx is Natural logarithm of capital expenditures. Cash is the natural logarithm of cash and short-term investment.

	N	Mean	SD	P10	Median	P90
Panel A: Loan-level Descriptives						
Loan Volume (log)	17046	19.849	1.976	17.99	19.84	21.89
Market Share	17046	0.0285	0.0322	0.001	0.0196	0.0685
High Market Share	17046	0.87	0.32	0.00	1.00	1.00
Secured	16990	0.113	0.317	0.00	0.00	1.00
Maturity (years)	16093	3.965	3.720	1.00	3.00	7.00
Spread (AISD)	9053	250.163	159.945	75.00	225.00	450.00
Panel B: Firm-level Descriptives						
Emissions	6581	12.33	2.74	9.02	12.13	16.31
Size	6581	9.10	1.63	7.03	9.13	11.20
ROA	6581	0.10	0.06	0.04	0.09	0.17
Leverage	6581	0.29	0.17	0.08	0.28	0.53
Tangible Assets	6581	0.33	0.23	0.07	0.29	0.69
CapEx	6157	5.73	1.87	3.25	5.85	8.02
Cash	6482	6.37	1.61	4.38	6.38	8.42

Table 2 Banks' market share and loans

This table examines whether credit provision changed following the Paris Agreement and whether the response varies with banks' market share in the borrower's industry. The dependent variable in all columns is the natural logarithm of loan volume extended by bank b to firm f in year t. Emissions$_{t-1}$ captures the ex ante carbon emissions of the borrower, measured as the natural logarithm of Scope 1 CO_2 emissions. Post is an indicator equal to one for all years after 2015. Bank industry market share is defined as bank b's share of total lending to the borrower's industry. High market share is an indicator equal to one if the bank's market share in the borrower's industry is in the top 20%, calculated over a three-year window prior to loan origination. All regressions include the following borrower characteristics: firm size, profitability (ROA), leverage, and tangible assets. Standard errors are reported in parentheses, clustered at the borrower level, and adjusted for heteroskedasticity.

	(1)	(2)	(3)	(4)
Emissions$_{t-1}$	-0.0495***	-0.0188	-0.0553***	-0.0223
	(0.0133)	(0.0126)	(0.0206)	(0.0183)
Post×Emissions$_{t-1}$	0.0313*	0.0274*	-0.0170	-0.0118
	(0.0161)	(0.0157)	(0.0281)	(0.0261)
High market share$_t$			0.118**	0.139***
			(0.0546)	(0.0502)
High market share$_t$×Emissions$_{t-1}$			0.00522	0.00254
			(0.0179)	(0.0149)
High market share$_t$×Post			0.0231	0.0573
			(0.0775)	(0.0724)
High market share$_t$×Post×Emissions$_{t-1}$			0.0573**	0.0472*
			(0.0266)	(0.0252)
Additional Borrower Controls	Y	Y	Y	Y
Bank×Year FE	Y	Y	Y	Y
Industry×Year FE	Y	Y	Y	Y
Country×Year FE	N	Y	N	Y
Observations	18,289	17,037	18,201	16,954
Adjusted R-squared	0.460	0.558	0.462	0.560

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3 Banks' market share and loans: high- and low-emission industries
This table examines whether the response of credit provision to banks' market share varies across industries with different levels of carbon emissions. The sample is split based on industry-level carbon emissions. Specifically, industries are classified as heavy- or light-polluting based on whether their average annual emissions, calculated using the full Trucost universe at the SIC-2 level, are above or below the yearly median. The dependent variable in all columns is the natural logarithm of loan volume extended by bank b to firm f in year t. Columns (1) and (2) report results for high-emission industries, with Column (2) including country-by-year fixed effects. Columns (3) and (4) report results for low-emission industries. Emissions_{t-1} captures the ex ante carbon emissions of the borrower, measured as the natural logarithm of Scope 1 CO_2 emissions. Post is an indicator equal to one for all years after 2015. Bank industry market share is defined as bank b's share of total lending to the borrower's industry. High market share is an indicator equal to one if the bank's market share in the borrower's industry is in the top 20%, calculated over a three-year window prior to loan origination. All regressions include the following borrower characteristics: firm size, profitability (ROA), leverage, and tangible assets. Standard errors are reported in parentheses, clustered at the borrower level, and adjusted for heteroskedasticity.

	High-emission industries		Low-emission industries	
	(1)	(2)	(3)	(4)
High market share$_t$	0.244	0.293	-1.168	-1.441*
	(0.255)	(0.217)	(0.753)	(0.759)
High market share$_t$×Post	-1.103***	-0.842**	1.476	1.577
	(0.381)	(0.346)	(0.939)	(0.985)
Emissions$_{t-1}$	-0.0499**	-0.0216	-0.110*	-0.113
	(0.0223)	(0.0202)	(0.0665)	(0.0689)
High market share$_t$×Emissions$_{t-1}$	-0.00814	-0.00955	0.102	0.145**
	(0.0200)	(0.0167)	(0.0641)	(0.0647)
Post×Emissions$_{t-1}$	-0.0466	-0.0342	0.164**	0.196**
	(0.0311)	(0.0290)	(0.0819)	(0.0929)
High market share$_t$×Post×Emissions$_{t-1}$	0.0831***	0.0662**	-0.0947	-0.133
	(0.0295)	(0.0272)	(0.0811)	(0.0870)
Additional Borrower Controls	Y	Y	Y	Y
Bank×Year FE	Y	Y	Y	Y
Industry×Year FE	Y	Y	Y	Y
Country×Year FE	N	Y	N	Y
Observations	15,015	14,014	2,521	2,201
Adjusted R-squared	0.450	0.559	0.555	0.652

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4 Banks' market share and loan characteristics

This table examines whether changes in loan characteristics following the Paris Agreement vary with banks' market share. The dependent variables are the weighted average loan spread, loan maturity measured in years, and Secured, an indicator equal to one if at least one loan between the bank and borrower is secured by collateral. Emissions_{t-1} captures the ex ante carbon emissions of the borrower, measured as the natural logarithm of Scope 1 CO_2 emissions. Post is an indicator equal to one for all years after 2015. Bank industry market share is defined as bank b's share of total lending to the borrower's industry. High market share is an indicator equal to one if the bank's market share in the borrower's industry is in the top 20%, calculated over a three-year window prior to loan origination. For the high- and low-emission industry subsamples, industries are classified as heavy- or light-polluting based on whether their average annual emissions, calculated using the full Trucost universe at the SIC-2 level, are above or below the yearly median. All regressions include the following borrower characteristics: firm size, profitability (ROA), leverage, and tangible assets. Standard errors are reported in parentheses, clustered at the borrower level, and adjusted for heteroskedasticity.

	Full Sample			High-emission industries			Low-emission industries		
	(1) Spread	(2) Maturity	(3) Secured	(4) Spread	(5) Maturity	(6) Secured	(7) Spread	(8) Maturity	(9) Secured
High market share$_t$	0.134	-0.317	0.177***	0.180	0.0905	0.178**	0.0346	-0.789	0.127
	(0.315)	(0.665)	(0.0609)	(0.374)	(0.743)	(0.0705)	(1.704)	(1.611)	(0.165)
High market share$_t$×Post	0.321	-0.223	-0.229***	-0.137	-0.379	-0.192**	-1.153	0.830	-0.132
	(0.546)	(0.844)	(0.0736)	(0.684)	(0.950)	(0.0870)	(2.345)	(2.411)	(0.203)
Emissions_{t-1}	0.0437	-0.0502	0.0112*	0.0558	-0.0383	0.00818	-0.0741	-0.187	0.0280*
	(0.0307)	(0.0607)	(0.00588)	(0.0348)	(0.0677)	(0.00658)	(0.177)	(0.206)	(0.0151)
High market share$_t$×Emissions_{t-1}	-0.0112	0.0310	-0.0151***	-0.0153	0.00527	-0.0145***	-0.00972	0.0827	-0.0133
	(0.0250)	(0.0546)	(0.00479)	(0.0288)	(0.0606)	(0.00540)	(0.154)	(0.166)	(0.0137)
Post×Emissions_{t-1}	-0.0418	0.0219	-0.0134**	-0.0704	0.0119	-0.00917	-0.148	0.265	-0.0231
	(0.0476)	(0.0725)	(0.00659)	(0.0555)	(0.0786)	(0.00752)	(0.247)	(0.250)	(0.0189)
High market share$_t$×Post×Emissions_{t-1}	-0.0246	0.0125	0.0202***	0.00872	0.0205	0.0168**	0.133	-0.0745	0.0180
	(0.0418)	(0.0662)	(0.00576)	(0.0498)	(0.0725)	(0.00662)	(0.209)	(0.237)	(0.0169)
Additional Borrower Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bank×Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry×Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country×Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	8,516	15,910	16,894	6,977	13,140	13,983	1,004	2,078	2,182
Adjusted R^2	0.295	0.219	0.436	0.287	0.227	0.437	0.306	0.115	0.616

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5 Firm-level results: Banks' market share and total loans
This table examines whether changes in total lending following the Paris Agreement vary with the borrower's access to high-market-share banks. The unit of observation is firm-year, and the dependent variable in all three columns is the total loans obtained by the borrower in the given year. High Market Share is an indicator equal to one if the borrower obtains at least one loan from a bank whose market share in the borrower's industry is in the top 20%, calculated over a three-year window prior to loan origination. For the high- and low-emission industry subsamples, industries are classified as heavy- or light-polluting based on whether their average annual emissions, calculated using the full Trucost universe at the SIC-2 level, are above or below the yearly median. All regressions include borrower controls, industry-by-year fixed effects, country-by-year fixed effects, and firm fixed effects. Standard errors are reported in parentheses, clustered at the borrower level, and adjusted for heteroskedasticity.

	Full Sample	High-emission industries	Low-emission industries
High market share	0.342***	0.224	0.598*
	(0.132)	(0.165)	(0.345)
Post × High market share	0.244	0.334*	0.123
	(0.168)	(0.201)	(0.443)
Controls Included	Yes	Yes	Yes
Industry × Year FE	Yes	Yes	Yes
Country × Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
N	6,641	5,337	915
Adjusted R^2	0.652	0.657	0.761

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6 Firm-level results: Leverage, asset growth, cash holdings, and CapEx
This table examines whether changes in firm characteristics following the Paris Agreement vary with the borrower's access to high-market-share banks. The dependent variables are the logarithm of debt, cash holdings, capital expenditures, and total assets. In each column, the dependent variable is measured as the year-on-year change scaled by last year's assets. Post is an indicator equal to one for all years after 2015. High Market Share is an indicator equal to one if the borrower obtains at least one loan from a bank whose market share in the borrower's industry is in the top 20%, calculated over a three-year window prior to loan origination. All regressions include borrower controls, industry-by-year fixed effects, country-by-year fixed effects, and firm fixed effects. Standard errors are reported in parentheses, clustered at the borrower level, and adjusted for heteroskedasticity.

	(1) Debt	(2) Cash	(3) CapEx	(4) Size
High Market Share	-0.0734	-0.0251	-0.200***	-0.00369
	(0.0486)	(0.0760)	(0.0558)	(0.0155)
Post× High Market Share	0.180***	0.0960	0.327***	0.0268
	(0.0679)	(0.103)	(0.0780)	(0.0204)
Additional Borrower Controls	Y	Y	Y	Y
Industry×Year FE	Y	Y	Y	Y
Country×Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Observations	6,555	6,448	6,070	6,571
Within R-squared	0.363	0.0988	0.225	0.724

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7 Firm-level results: Leverage, asset growth, cash holdings, and CapEx (high- and low-emission industries)

This table examines whether changes in firm characteristics following the Paris Agreement vary with the borrower's access to high-market-share banks. The sample is split based on industry-level carbon emissions. Specifically, industries are classified as heavy- or light-polluting based on whether their average annual emissions, calculated using the full Trucost universe at the SIC-2 level, are above or below the yearly median. The dependent variables are the logarithm of debt, cash holdings, capital expenditures, and total assets. In each column, the dependent variable is measured as the year-on-year change scaled by last year's assets. Post is an indicator equal to one for all years after 2015. High Market Share is an indicator equal to one if the borrower obtains at least one loan from a bank whose market share in the borrower's industry is in the top 20%, calculated over a three-year window prior to loan origination. All regressions include borrower controls, industry-by-year fixed effects, country-by-year fixed effects, and firm fixed effects. Standard errors are reported in parentheses, clustered at the borrower level, and adjusted for heteroskedasticity.

	High-emission industries				Low-emission industries			
	(1) Debt	(2) Cash	(3) CapEx	(4) Size	(5) Debt	(6) Cash	(7) CapEx	(8) Size
High Market Share	-0.0470	0.0706	-0.221***	0.0223	-0.134	-0.380**	-0.0338	-0.0146
	(0.0589)	(0.0862)	(0.0714)	(0.0215)	(0.132)	(0.185)	(0.171)	(0.0280)
Post× High Market Share	0.169**	0.00187	0.316***	-0.00170	0.0513	0.384*	0.378	0.00591
	(0.0704)	(0.121)	(0.0989)	(0.0258)	(0.291)	(0.212)	(0.234)	(0.0363)
Additional Borrower Controls	Y	Y	Y	Y	Y	Y	Y	Y
Industry×Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Country×Year FE	Y	Y	Y	Y	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y	Y	Y	Y	Y
Observations	5,270	5,173	4,874	5,282	908	896	841	908
Within R-squared	0.373	0.0895	0.233	0.725	0.341	0.264	0.230	0.817

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8 Firm-level results: Banks' market share and future carbon emissions
This table examines whether changes in firm-level carbon emissions following the Paris Agreement vary with the borrower's access to high-market-share banks. The dependent variable is the natural logarithm of the borrower's Scope 1 CO_2 emissions measured one to four years after loan origination. High Market Share is an indicator equal to one if the borrower obtains at least one loan from a bank whose market share in the borrower's industry is in the top 20%, calculated over a three-year window prior to loan origination. Post is an indicator equal to one for all years after 2015. All regressions include borrower controls, industry-by-year fixed effects, country-by-year fixed effects, and firm fixed effects. Standard errors are reported in parentheses, clustered at the borrower level, and adjusted for heteroskedasticity.

	(1) Emissions$_{t+1}$	(2) Emissions$_{t+2}$	(3) Emissions$_{t+3}$	(4) Emissions$_{t+4}$
High Market Share	−0.0531	−0.00349	0.158**	0.171**
	(0.0701)	(0.0617)	(0.0671)	(0.0816)
Post × High Market Share	−0.00214	−0.00912	−0.245**	−0.261**
	(0.105)	(0.0955)	(0.100)	(0.121)
Borrower Controls	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y
Country × Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Observations	6,090	5,542	5,008	4,335
Within R-squared	0.0578	0.0486	0.0255	0.00885

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 9 Firm-level results: Banks' market share and future carbon emissions (high- and low-emission industries)

his table examines whether changes in firm-level carbon emissions following the Paris Agreement vary with the borrower's access to high-market-share banks across industries with different levels of carbon emissions. The sample is split based on industry-level carbon emissions. Specifically, industries are classified as heavy- or light-polluting based on whether their average annual emissions, calculated using the full Trucost universe at the SIC-2 level, are above or below the yearly median. The dependent variable is the natural logarithm of the borrower's Scope 1 CO_2 emissions measured one to four years after loan origination. High Market Share is an indicator equal to one if the borrower obtains at least one loan from a bank whose market share in the borrower's industry is in the top 20%, calculated over a three-year window prior to loan origination. Post is an indicator equal to one for all years after 2015. All regressions include borrower controls, industry-by-year fixed effects, country-by-year fixed effects, and firm fixed effects. Standard errors are reported in parentheses, clustered at the borrower level, and adjusted for heteroskedasticity.

Panel A: High-emission industries

	(1) Emissions$_{t+1}$	(2) Emissions$_{t+2}$	(3) Emissions$_{t+3}$	(4) Emissions$_{t+4}$
High Market Share	0.0173	0.0185	0.154	0.226*
	(0.0882)	(0.0757)	(0.0943)	(0.116)
Post × High Market Share	−0.0725	−0.0438	−0.277**	−0.373**
	(0.122)	(0.115)	(0.123)	(0.146)
Borrower Controls	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y
Country × Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Observations	4,906	4,481	4,069	3,526
Within R-squared	0.0540	0.0471	0.0246	0.0111

Panel B: Low-emission industries

	(1) Emissions$_{t+1}$	(2) Emissions$_{t+2}$	(3) Emissions$_{t+3}$	(4) Emissions$_{t+4}$
High Market Share	−0.291	−0.0352	0.0652	0.380**
	(0.235)	(0.200)	(0.205)	(0.165)
Post × High Market Share	0.0303	0.222	−0.0895	−0.665
	(0.284)	(0.293)	(0.421)	(0.465)
Borrower Controls	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y
Country × Year FE	Y	Y	Y	Y
Firm FE	Y	Y	Y	Y
Observations	823	728	618	524
Within R-squared	0.0730	0.133	0.0636	0.0376

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 10 Robustness: Alternative interpretation – industry specialization
This table examines whether the response of credit provision to the Paris Agreement is related to banks' industry market share after controlling for banks' portfolio specialization. The dependent variable is the natural logarithm of loan volume extended by bank b to firm f in year t. Emissions_{t-1} captures the ex ante carbon emissions of the borrower, measured as the natural logarithm of Scope 1 CO_2 emissions. Post is an indicator equal to one for all years after 2015. Bank industry market share is defined as bank b's share of total lending to the borrower's industry. High market (portfolio) share is an indicator equal to one if the bank's market (portfolio) share in the borrower's industry is in the top 20%, calculated over the three-year window prior to loan origination. All regressions include the following borrower characteristics: firm size, profitability (ROA), leverage, and tangible assets. Standard errors are reported in parentheses, clustered at the borrower level, and adjusted for heteroskedasticity.

	Loan Volume (1)	Loan Volume (2)	Loan Volume (3)
High Market Share	0.139***		0.126**
	(0.0502)		(0.0506)
Post × High Market Share	0.0573		0.0400
	(0.0724)		(0.0728)
High Market Share × Emissions_{t-1}	0.00254		0.00250
	(0.0149)		(0.0149)
Post × High Market Share × Emissions_{t-1}	0.0472*		0.0451*
	(0.0252)		(0.0239)
High Portfolio Share		0.0582*	0.0423
		(0.0335)	(0.0339)
Post × High Portfolio Share		0.0796	0.0727
		(0.0544)	(0.0550)
High Portfolio Share × Emissions_{t-1}		0.00536	0.00474
		(0.0124)	(0.0125)
Post × High Portfolio Share × Emissions_{t-1}		-0.0282	-0.0291
		(0.0212)	(0.0214)
Emissions_{t-1}	-0.0223	-0.0200	-0.0234
	(0.0183)	(0.0131)	(0.0184)
Post × Emissions_{t-1}	-0.0118	0.0318*	-0.00565
	(0.0261)	(0.0164)	(0.0252)
Borrower Controls	Y	Y	Y
Bank × Year FE	Y	Y	Y
Industry × Year FE	Y	Y	Y
Country × Year FE	Y	Y	Y
Observations	16,954	17,036	16,953
Adjusted R^2	0.560	0.559	0.560

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 11 Robustness: Banks' market share and loans – Emission intensity
This table examines whether credit provision changed following the Paris Agreement and whether such changes are influenced by banks' market share. The dependent variable in all columns is the natural logarithm of loan volume extended by bank b to firm f in year t. $Intensity_{f,t-1}$ captures the ex ante carbon intensity of the borrower, measured as the natural logarithm of Scope 1 CO_2 emissions scaled by total assets. Post is an indicator equal to one for all years after 2015. Bank industry market share is defined as bank b's share of total lending to the borrower's industry. High market share is an indicator equal to one if the bank's market share in the borrower's industry is in the top 20%, calculated over the three-year window prior to loan origination. All regressions include the following borrower characteristics: firm size, profitability (ROA), leverage, and tangible assets. Standard errors are reported in parentheses, clustered at the borrower level, and adjusted for heteroskedasticity.

	(1)	(2)	(3)	(4)
$Intensity_{f,t-1}$	-0.0177	0.00965	0.00717	0.0457**
	(0.0142)	(0.0138)	(0.0200)	(0.0179)
Post×$Intensity_{f,t-1}$	-0.0313	-0.0313	-0.0826***	-0.0823***
	(0.0210)	(0.0209)	(0.0288)	(0.0270)
High market share$_t$			0.114**	0.138***
			(0.0547)	(0.0503)
High market share$_t$×$Intensity_{f,t-1}$			-0.0283*	-0.0407***
			(0.0162)	(0.0135)
High market share$_t$×Post			0.00758	0.0449
			(0.0775)	(0.0720)
High market share$_t$×Post×$Intensity_{f,t-1}$			0.0589**	0.0589**
			(0.0250)	(0.0230)
Additional Borrower Controls	Y	Y	Y	Y
Bank×Year FE	Y	Y	Y	Y
Industry×Year FE	Y	Y	Y	Y
Country×Year FE	N	Y	N	Y
Observations	18,289	17,037	18,201	16,954
Adjusted R-squared	0.460	0.558	0.461	0.560

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

A Pre-Transition Industry Positions

This appendix provides one possible microfoundation for the heterogeneous industry positions that banks inherit at $t = 0$ in the main model. The purpose is to show that banks can have different market shares in an industry even when they choose identical portfolio shares. We take the transition shock to be unanticipated at this stage, so banks choose their portfolios based on the pre-transition investment opportunity set.

At $t = -1$, banks allocate lending across industries H and L. Let B_b denote bank b's total lending capacity. We interpret differences in B_b as arising from differences in balance-sheet strength. For example, if A_b denotes bank capital and λ denotes feasible leverage, lending capacity may be written as

$$B_b = \lambda A_b. \tag{23}$$

Suppose

$$B_1 > B_2. \tag{24}$$

Let ω_b denote the share of bank b's portfolio allocated to H. Lending amounts are therefore

$$L_{bH} = B_b\omega_b, \qquad L_{bL} = B_b(1 - \omega_b). \tag{25}$$

The distinction between portfolio share and market share is important. Portfolio share is

$$\omega_b = \frac{L_{bH}}{L_{bH} + L_{bL}}, \tag{26}$$

whereas market share is

$$s_b = \frac{L_{bH}}{L_{1H} + L_{2H}}. \tag{27}$$

Thus, ω_b measures the importance of H to bank b, while s_b measures the importance of bank b in the lending market for H.

To characterize banks' pre-transition portfolio choices, suppose returns on lending to the two industries are

$$R_H = \mu_H + \varepsilon_H, \qquad R_L = \mu_L + \varepsilon_L, \tag{28}$$

with independent industry shocks and, for simplicity,

$$\mathrm{Var}(\varepsilon_H) = \mathrm{Var}(\varepsilon_L) = \sigma^2. \tag{29}$$

Bank b's portfolio return is

$$R_b = \omega_b R_H + (1 - \omega_b) R_L, \tag{30}$$

and its variance is

$$\text{Var}(R_b) = \sigma^2 \left[\omega_b^2 + (1 - \omega_b)^2 \right]. \tag{31}$$

Banks maximize a standard mean-variance objective,

$$U_b(\omega_b) = \omega_b \mu_H + (1 - \omega_b) \mu_L - \frac{\gamma}{2} \sigma^2 \left[\omega_b^2 + (1 - \omega_b)^2 \right]. \tag{32}$$

We assume parameters such that the pre-transition portfolio allocation is interior, $0 < \omega_b^* < 1$, which requires

$$|\mu_H - \mu_L| < \gamma \sigma^2.$$

The first-order condition then yields

$$\omega_b^* = \frac{1}{2} + \frac{\mu_H - \mu_L}{2\gamma\sigma^2}. \tag{33}$$

Because the banks face the same pre-transition investment opportunities, they choose the same optimal portfolio share,

$$\omega_1^* = \omega_2^* \equiv \omega^*. \tag{34}$$

Their lending quantities in H, however, differ because their lending capacities differ:

$$L_{1H}^* = B_1 \omega^* > B_2 \omega^* = L_{2H}^*. \tag{35}$$

Their pre-transition market shares in H are therefore

$$s_b^* = \frac{B_b \omega^*}{B_1 \omega^* + B_2 \omega^*} = \frac{B_b}{B_1 + B_2}. \tag{36}$$

Hence,

$$B_1 > B_2 \quad \Longrightarrow \quad s_1^* > s_2^*, \tag{37}$$

even though

$$\omega_1^* = \omega_2^*. \tag{38}$$

This exercise establishes that heterogeneous industry market shares need not arise from differences in portfolio specialization. Banks can allocate the same fraction of their lending portfolios to an industry while accounting for different shares of total lending to that industry. The relevant state variable carried into the transition game is therefore the bank's installed position in the affected industry, s_b, rather than the share of its own portfolio allocated to that industry, ω_b.

The portfolio share ω_b^* characterizes banks' optimal allocation under the pre-transition investment opportunity set.[9] The role of the pre-transition portfolio choice is to provide one possible microfoundation for the heterogeneous industry positions inherited at $t = 0$.

Balance-sheet strength is only one possible source of such heterogeneous pre-existing positions. The $t = 0$ and $t = 1$ results in the main model require only that banks enter the transition with heterogeneous s_b and therefore continue to hold if these positions arise from other historical or institutional sources.

B Variable Definitions and Additional Tables

[9] The unexpected transition shock at $t = 0$ changes the relative payoff to lending in H, so the pre-transition portfolio allocation need not remain optimal following the shock. The analysis therefore does not constrain banks to maintain ω_b^* at $t = 0$.

Table B1 Variable Definitions.
This table provides the definitions, calculations, and sources of the main variables used in our analyses.

Name	Calculation	Source
Market Share	Share of total lending to an industry accounted for by a given bank	LSEG Dealscan
High Market Share	Dummy equal to 1 if a bank's market share in the borrower's industry is in the top 20%, measured over the three years preceding loan origination	LSEG Dealscan
Post	Dummy equal to 1 for every year after 2015	
Emissions	Natural logarithm of Scope 1 emissions measured in tonnes CO^2	S&P Trucost Environmental Database
Leverage	Long term debt plus debt in current liabilities (dltt+dlc) divided by total assets (at)	Compustat
Size	Natural logarithm of total assets (at)	Compustat
Return on assets	Operating income before depreciation (oibdp) divided by total assets (at)	Compustat
Tangibility	Net plant, property, and equipment (ppent) divided by total assets (at)	Compustat
Loan Volume	Natural logarithm of Deal amount in US dollars	LSEG Dealscan
Loan Maturity	Loan maturity in years measured as Deal Maturity Date minus Deal Active Date	LSEG Dealscan
AISD	Weighted average AISD where weights are based on loan volume relative to total borrowed	LSEG Dealscan
Debt	Natural logarithm of debt (dlc+dltt)	Compustat
Size	Natural logarithm of total assets (at)	Compustat
Cash	Natural logarithm of cash and short-term investments (ch)	Compustat
Capex	Natural logarithm of capital expenditures (capex)	Compustat

Table B2 Robustness: Banks' market share and loans: high- and low-emission industries – Emission intensity

This table examines whether the response of credit provision to banks' market share varies across industries with different levels of carbon emissions. The sample is split based on industry-level carbon emissions. Specifically, for each year, industries are classified as above- or below-median based on total industry emissions. The dependent variable in all columns is the natural logarithm of loan volume extended by bank b to firm f in year t. Columns (1) and (2) report results for high-emission industries, with Column (2) including country-by-year fixed effects. Columns (3) and (4) report results for low-emission industries. $Intensity_{f,t-1}$ captures the ex ante carbon intensity of the borrower, measured as the logarithm of Scope 1 CO_2 emissions scaled by total assets. Post is an indicator equal to one for all years after 2015. Bank industry market share is defined as bank b's share of total lending to the borrower's industry. High market share is an indicator equal to one if the bank's market share in the borrower's industry is in the top 20%, calculated over the three-year window prior to loan origination. All regressions include the following borrower characteristics: firm size, profitability (ROA), leverage, and tangible assets. Standard errors are reported in parentheses, clustered at the borrower level, and adjusted for heteroskedasticity.

	High-emission industries		Low-emission industries	
	(1)	(2)	(3)	(4)
High market share$_t$	0.264***	0.324***	-0.154	-0.0825
	(0.0824)	(0.0750)	(0.206)	(0.211)
High market share$_t$×Post	-0.341***	-0.251**	0.864***	0.672**
	(0.130)	(0.117)	(0.299)	(0.310)
$Intensity_{f,t-1}$	0.0130	0.0451**	-0.0528	-0.0547
	(0.0208)	(0.0190)	(0.0675)	(0.0782)
High market share$_t$×$Intensity_{f,t-1}$	-0.0397**	-0.0479***	0.0630	0.124*
	(0.0175)	(0.0147)	(0.0641)	(0.0744)
Post×$Intensity_{f,t-1}$	-0.120***	-0.111***	0.203**	0.218**
	(0.0309)	(0.0290)	(0.0916)	(0.109)
High market share$_t$×Post×$Intensity_{f,t-1}$	0.0906***	0.0784***	-0.191**	-0.250**
	(0.0272)	(0.0239)	(0.0896)	(0.104)
Additional Borrower Controls	Y	Y	Y	Y
Bank×Year FE	Y	Y	Y	Y
Industry×Year FE	Y	Y	Y	Y
Country×Year FE	N	Y	N	Y
Observations	15,015	14,014	2,521	2,201
Adjusted R-squared	0.450	0.559	0.554	0.651

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B3 Robustness: Banks' market share and loan characteristics – Emission intensity

This table examines how loan characteristics change following the Paris Agreement and whether these changes vary with banks' market share. The dependent variables are the weighted average loan spread, loan maturity measured in years, and Secured, an indicator equal to one if at least one loan between the bank and borrower is secured by collateral. $Intensity_{f,t-1}$ captures the ex ante carbon intensity of the borrower, measured as the logarithm of Scope 1 CO_2 emissions scaled by total assets. Post is an indicator equal to one for all years after 2015. Bank industry market share is defined as bank b's share of total lending to the borrower's industry. High market share is an indicator equal to one if the bank's market share in the borrower's industry is in the top 20%, calculated over the three-year window prior to loan origination. The sample is split into high-emission and low-emission industries based on whether average annual industry emissions, calculated using the full Trucost universe at the SIC-2 level, are above or below the yearly median. All regressions include the following borrower characteristics: firm size, profitability (ROA), leverage, and tangible assets. Standard errors are reported in parentheses, clustered at the borrower level, and adjusted for heteroskedasticity.

	Full Sample			High-emission industries			Low-emission industries		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Spread	Maturity	Secured	Spread	Maturity	Secured	Spread	Maturity	Secured
High market share$_t$	0.0748	0.0164	0.0385**	0.0591	0.206	0.0522**	-0.227	0.258	-0.0419
	(0.104)	(0.196)	(0.0191)	(0.121)	(0.213)	(0.0233)	(0.604)	(0.748)	(0.0459)
High market share$_t$×Post	0.136	-0.178	-0.0294	-0.0247	-0.258	-0.0295	-0.427	0.264	0.101
	(0.219)	(0.323)	(0.0254)	(0.258)	(0.375)	(0.0307)	(1.110)	(0.917)	(0.0724)
$Intensity_{f,t-1}$	0.0536*	-0.0331	0.00797	0.0469	-0.0245	0.00685	-0.0671	-0.0260	-0.000224
	(0.0311)	(0.0638)	(0.00631)	(0.0338)	(0.0706)	(0.00718)	(0.267)	(0.211)	(0.0106)
High market share$_t$×$Intensity_{f,t-1}$	-0.0241	0.0156	-0.0159***	-0.0211	-0.0154	-0.0174***	0.0594	-0.0432	0.00648
	(0.0243)	(0.0495)	(0.00479)	(0.0267)	(0.0542)	(0.00553)	(0.248)	(0.170)	(0.00905)
Post×$Intensity_{f,t-1}$	-0.0247	-0.00317	-0.00224	-0.0222	0.000781	-0.000546	-0.565	0.201	0.0235
	(0.0587)	(0.0798)	(0.00784)	(0.0642)	(0.0884)	(0.00905)	(0.415)	(0.320)	(0.0227)
High market share$_t$×Post×$Intensity_{f,t-1}$	-0.0315	0.0319	0.0164***	0.00405	0.0427	0.0157**	0.223	-0.116	-0.0105
	(0.0486)	(0.0648)	(0.00614)	(0.0533)	(0.0714)	(0.00714)	(0.369)	(0.293)	(0.0208)
Additional Borrower Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y
Bank×Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Industry×Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country×Year FE	Y	Y	Y	Y	Y	Y	Y	Y	Y
Observations	8,516	15,910	16,894	6,977	13,140	13,983	1,004	2,078	2,182
Adjusted R^2	0.295	0.219	0.436	0.286	0.227	0.438	0.314	0.115	0.616

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table B4 Robustness: Controlling for portfolio share – Emission intensity
This table examines whether the response of credit provision to the Paris Agreement is related to banks' industry market share after controlling for banks' portfolio specialization. The dependent variable is the natural logarithm of loan volume extended by bank b to firm f in year t. $Intensity_{f,t-1}$ captures the ex ante carbon intensity of the borrower, measured as the logarithm of Scope 1 CO_2 emissions scaled by total assets. Post is an indicator equal to one for all years after 2015. Bank industry market share is defined as bank b's share of total lending to the borrower's industry. High market share is an indicator equal to one if the bank's market share in the borrower's industry is in the top 20%, calculated over the three-year window prior to loan origination. High portfolio share is an indicator equal to one if the share of the borrower's industry in bank b's loan portfolio is in the top 20%. All regressions include the following borrower characteristics: firm size, profitability (ROA), leverage, and tangible assets. Standard errors are reported in parentheses, clustered at the borrower level, and adjusted for heteroskedasticity.

	Loan Volume (1)	Loan Volume (2)	Loan Volume (3)
High Market Share	0.138***		0.125**
	(0.0503)		(0.0507)
Post × High Market Share	0.0449		0.0269
	(0.0720)		(0.0725)
High Market Share × $Intensity_{f,t-1}$	-0.0407***		-0.0398***
	(0.0135)		(0.0136)
Post × High Market Share × $Intensity_{f,t-1}$	0.0589**		0.0580**
	(0.0230)		(0.0228)
High Portfolio Share		0.0607*	0.0432
		(0.0339)	(0.0342)
Post × High Portfolio Share		0.0723	0.0682
		(0.0540)	(0.0546)
High Portfolio Share × $Intensity_{f,t-1}$		-0.00710	-0.00508
		(0.0126)	(0.0127)
Post × High Portfolio Share × $Intensity_{f,t-1}$		-0.0476**	-0.0495**
		(0.0241)	(0.0241)
$Intensity_{f,t-1}$	0.0457**	0.0112	0.0460**
	(0.0179)	(0.0144)	(0.0181)
Post × $Intensity_{f,t-1}$	-0.0823***	-0.0249	-0.0750***
	(0.0270)	(0.0216)	(0.0270)
Borrower Controls	Y	Y	Y
Bank × Year FE	Y	Y	Y
Industry × Year FE	Y	Y	Y
Country × Year FE	Y	Y	Y
Observations	16,954	17,036	16,953
Adjusted R^2	0.560	0.559	0.560

Standard errors in parentheses; * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$