Journal of Development Economics 181 (2026) 103760

Contents lists available at ScienceDirect

Journal of Development Economics

journal homepage: www.elsevier.com/locate/devec

Short communication

Walking the Talk? Bank climate commitments and green lending in emerging markets

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ARTICLE INFO

JEL classification:
D22
G21
G32
O12
Q54
Q56
R51

Keywords:
Climate change
Banks
Emerging markets
Green management
Greenwashing

ABSTRACT

We document how banks' voluntary climate commitments relate to both their green lending practices and their borrowers' environmental investments. Using structured surveys of 648 bank CEOs and heads of credit across 33 low- and middle-income countries, we develop indices of banks' green management and lending practices. These unique organizational data reveal that banks signing international climate initiatives ('talk') indeed exhibit stronger green practices ('walk') than non-signatories. We then merge our bank data with detailed surveys of 4,719 firms and show that firms borrowing from climate-committed banks are more likely to undertake green investments. Exploiting geocoded bank branch and firm locations, we further find evidence of spatial matching: environmentally-oriented firms preferentially borrow from climate-committed banks in their vicinity. These patterns are consistent with voluntary climate commitments reflecting genuine environmental orientation rather than greenwashing.

1. Introduction

The transition to a low-carbon economy will require unprecedented financial mobilization, with estimates suggesting trillions of dollars in annual investment over the coming decades. Recognizing this challenge, Article 2.1 of the Paris Agreement explicitly calls for "*making finance flows consistent with a pathway toward low greenhouse gas emissions and climate-resilient development*". Policymakers have emphasized that private capital, particularly bank lending, must complement public funding to achieve global decarbonization (Carney, 2021).

The financial sector has responded with ambitious promises, with more than $130 trillion in assets now aligned with net-zero targets (Glasgow Financial Alliance for Net Zero, 2021). However, it remains unclear whether these voluntary commitments reflect meaningful differences in bank lending. This potential gap between climate pledges and actual lending behavior is particularly worrying in emerging markets, where the gains from improving energy efficiency are the largest and climate vulnerability the most acute. Understanding whether voluntary climate commitments represent genuine change or merely 'greenwashing' is essential to assess how private finance can help achieve the ambitious goals of the Paris Agreement. The growing attention of central banks and financial regulators to climate-related financial stability, catalyzed by Carney's seminal speech and formalized through the Network for Greening the Financial System (NGFS), has made understanding banks' environmental practices all the more urgent, including in emerging economies where supervisory capacity is still developing.

In this short paper, we provide some first evidence on how banks' climate commitments relate to their internal practices and lending decisions across 33 low- and middle-income countries in Emerging Europe, Central Asia, and North Africa. To do so, we leverage unique survey data that allow us to lift the hood of banking organizations and observe internal green lending practices that have remained unobserved in previous research. Unlike earlier studies, we directly measure

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[1] Our data are based on structured survey responses rather than independently verified administrative records, an inherent limitation of measuring organizational practices in settings where such records do not exist. We discuss the mitigating features of our survey design in Section 2.2 and Appendix B.

https://doi.org/10.1016/j.jdeveco.2026.103760
Received 12 September 2025; Received in revised form 16 February 2026; Accepted 16 February 2026
Available online 20 February 2026

banks' environmental governance, climate risk assessment procedures, and green lending policies through detailed surveys with 648 bank CEOs and heads of credit of 337 banks. Our data thus capture concrete organizational features that have remained unobserved in previous research. To our knowledge, this is the first study to use systematic data on both lenders' and borrowers' internal environmental management practices, rather than inferring them from external indicators or emissions data.[1] Despite considerable discussion of greenwashing in policy circles, there is a clear absence of systematic empirical evidence on how banks actually incorporate firms' environmental performance into their lending decisions. Our paper helps fill this gap by documenting whether environmental practices are associated with tangible differences in bank lending.

Our analysis proceeds in three steps. First, we examine whether banks that sign international climate initiatives operate with greener internal practices. We find that signatory banks score 0.83 standard deviations higher on green management practices and 0.48 standard deviations higher on green lending practices compared to non-signatories. These differences reflect concrete organizational practices. Climate-committed banks are more likely to employ dedicated environmental managers reporting to senior leadership, maintain explicit climate risk frameworks, and conduct environmental screening of loan applications. Importantly, these differences hold even when controlling for bank ownership (foreign or domestic), size, culture, and main lending technology.

Second, we investigate the link between bank characteristics and borrower behavior by merging our bank data with detailed information on 4,719 firms—predominantly small- and medium-sized enterprises (SMEs) that form the backbone of many emerging economies. This firm–bank matching, rare in cross-country studies, suggests that firms borrowing from climate-committed banks are associated with a 5.4 percent higher likelihood of undertaking green investments over a three-year horizon. We emphasize that our cross-sectional data cannot distinguish selection from causal effects. Whether our results reflect causal effects of bank lending on firm investments, selection effects whereby greener banks choose greener clients, or a combination of both, they demonstrate that the environmental commitments of banks are not merely greenwashing. Even under the most conservative interpretation, where the correlations are driven entirely by selection, the findings carry important implications: if climate-committed banks already possessed stronger green practices beforehand, this demonstrates that these commitments serve as credible signals of genuine environmental orientation.

Third, we exploit a unique feature of our data: geocoded locations of both firms and bank branches across all sample countries. This allows us to examine not only existing lending relationships, but also potential matches between firms and nearby banks. We document significant assortative matching between green banks and green firms within local credit markets. Firms undertaking green investments preferentially borrow from climate-committed banks in their vicinity. The matching extends to banks' internal environmental capabilities: firms making green investments are more likely to borrow from banks with strong green management practices.

This paper makes three contributions to the emerging literature on banks and the green transition. First, we address an important geographic gap. Existing research focuses almost exclusively on high-income countries with strong environmental regulation and developed financial sectors. We examine low- and middle-income countries, where different institutional constraints, financing patterns, and climate vulnerabilities may limit the transferability of findings from developed markets (De Haas, 2025).[2]

Second, we overcome some key data limitations. The sustainable banking literature relies heavily on syndicated loan data, limiting analysis to large, publicly-traded firms (Degryse et al., 2023; Martini et al., 2023; Delis et al., 2024). These studies find that banks have begun pricing climate risks and reallocating credit away from carbon-intensive industries, especially after the Paris Agreement. In particular, Degryse et al. (2023) document a "green meets green" matching pattern where environmentally conscious banks lend to green firms at preferential rates. However, many developing countries are characterized by small private firms that lack access to international credit markets. Our firm–bank matched data capture lending to these smaller firms, filling a gap left by syndicated loan research. Moreover, while De Haas et al. (2025) collect survey data on small firms' green management practices across emerging Europe, we are the first to gather comparable information for banks. Using these data, we document that banks with stronger environmental capabilities exhibit distinct lending patterns.

Third, we extend research examining how banks' environmental commitments correlate with lending patterns and borrower characteristics. The existing literature presents largely discouraging evidence on voluntary climate commitments. Giannetti et al. (2026) document that European banks with extensive environmental rhetoric often maintain substantial exposure to carbon-intensive industries. Kacperczyk and Peydró (2022) find that even when climate-committed banks reduce credit to high-carbon companies, borrower environmental performance does not improve. Recent evidence reinforces these concerns: Sastry et al. (2024) find that European banks joining the Net Zero Banking Alliance show no meaningful changes in lending patterns or borrower engagement, while Berg et al. (2025) document that tightening the Equator Principles fails to shift project finance away from brown projects. Only Green and Vallée (2025) find positive effects, demonstrating that banks' voluntary coal exit policies can reduce carbon emissions.[3]

Several factors specific to our low-income context can explain why we observe stronger associations between voluntary commitments and lending practices than the null results documented in most (though not all) prior studies. First, developing countries offer greater scope for impact given lower baseline environmental standards. This is particularly true for SMEs, which typically lack the environmental management systems common among the large, publicly traded firms accessing syndicated loan and project finance markets studied elsewhere. Second, our unique data on the green management practices of both banks and their clients reveal the 'green inside' (the actual organizational practices) of both lenders and borrowers, moving beyond the environmental rhetoric examined by Giannetti et al. (2026) and emissions proxies used elsewhere. We observe how commitments are associated with concrete changes (dedicated environmental personnel, explicit climate risk frameworks, and systematic environmental screening of loan applications) not captured by analyses of portfolio composition or borrower emissions.

2. Data

We construct our data set by merging three key data sources. First, we track whether and when banks joined three major climate initiatives: the Principles for Responsible Banking/Investment (PRB/PRI), the Science Based Targets initiative (SBTi), and the Task Force on Climate-related Financial Disclosures (TCFD). These initiatives differ in

[2] Fan et al. (2021) show that China's mandatory green credit policies successfully raised loan costs for non-compliant firms and encouraged pollution abatement. Their focus on mandatory regulation leaves open whether voluntary climate commitments can achieve similar results in emerging markets.

[3] Our approach also connects to the broader literature on the informational role of voluntary environmental commitments. Foster and Gutierrez (2013) show that voluntary environmental certification carries informational value—patterns of certification are consistent with credible signaling, and stock markets respond positively to certification announcements. We adopt a similar informational perspective in the credit market, examining whether banks' voluntary climate commitments reveal underlying differences in their internal organization and lending practices.

scope and approach: PRB/PRI encompasses broad ESG-oriented commitments, TCFD focuses narrowly on climate risk disclosure from a prudential perspective, and SBTi takes a promotional approach aimed at aligning strategies with Paris Agreement trajectories. Second, the Banking Environment and Performance Survey (BEPS III) provides unique information on bank management and lending practices. Third, the latest Business Environment and Enterprise Performance Survey (BEEPS VI) captures firm borrowing and green investment characteristics. Appendix Table A1 provides all data sources and definitions.

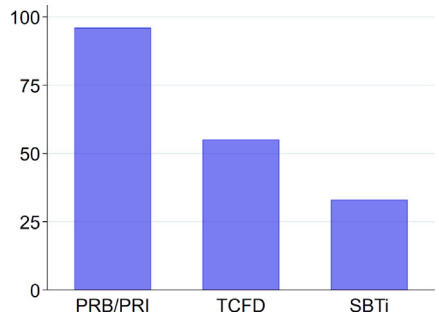
2.1. Banks' climate commitments

We measure bank climate commitments using a dummy variable that indicates whether a bank signed at least one of the three initiatives mentioned above. We collect this information directly from the official websites maintained by these initiatives. The Principles for Responsible Banking (2019) and Investment (2006) were developed by the United Nations, with PRB targeting banks and PRI covering the broader investment industry. We treat both principles as equivalent given their similar objectives. When committing to PRB, banks agree to conduct impact analysis of their products, set at least two targets aligned with Sustainable Development Goals, and report progress. PRI signatories commit to incorporate ESG issues into investment analysis and report on responsible investment activities.

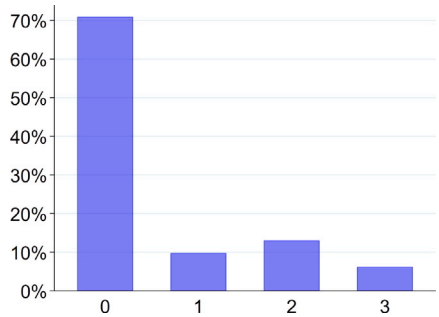
The Task Force on Climate-related Financial Disclosures was established by the Financial Stability Board in 2015 to promote more informed investments by encouraging disclosure of climate-related risks and opportunities. The initiative provides recommendations for disclosure in four areas: governance, strategy, risk management, and metrics and targets.

The Science Based Targets initiative emerged in 2015 as a collaboration between the Carbon Disclosure Project, UN Global Compact, World Resources Institute, and World Wide Fund for Nature. This initiative sets targets to align signatories' strategies with Paris Agreement guidance to achieve carbon neutrality. Banks joining the SBTi must develop greenhouse gas emission reduction targets within 24 months, with validated targets communicated publicly and emissions disclosed and monitored.

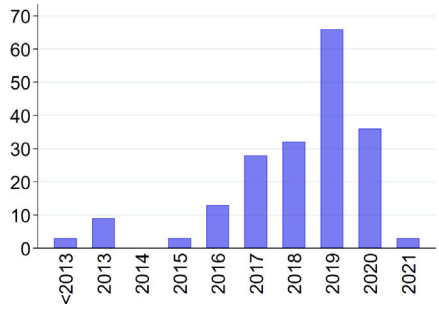
For each of these initiatives, signing up requires banks to complete a form and pledge to follow the initiative's guidance. Enforcement is limited: SBTi and PRI delist non-compliant banks after two years, PRB after two violations, while TCFD sets no time limits. In our sample, 29% of the banks had committed to at least one initiative at the time of our survey: 28% joined PRB/PRI, 16% TCFD, and 10% SBTi. This results in 10% joining one initiative, 13% two initiatives, and 6% three initiatives. Although the first commitment occurred in 2008, systematic adoption began in 2016, peaking in 2019 with PRB's launch (Fig. 1).



(a) Number of banks committed to each initiative



(b) % of banks, by number of initiatives



(c) Number of initiatives committed per year

Fig. 1. Banks' Commitment to Climate Change Initiatives.
Notes: (a) Number of banks in our sample committed to Principles for Responsible Banking (PRB) or Responsible Investment (PRI), Task Force on Climate-related Financial Disclosures (TCFD), and Science Based Targets initiative (SBTi); (b) Percentage of banks, by number of initiatives signed at time of survey (c) Number of initiatives signed each year by all banks in the sample.

2.2. Banking environment and performance survey III

2.2.1. BEPS III survey design

We overcome a fundamental limitation of the existing literature by using surveys to directly capture banks' internal environmental practices—information that remains unobservable in studies relying on public disclosures or regulatory filings. The third round of the European Bank for Reconstruction and Development's Banking Environment and Performance Survey (BEPS III) was conducted across 33 economies during 2020–2021, with 337 banks participating.[4] The survey was designed to be nationally representative. To construct the target sample, commercial, cooperative, and savings banks were ranked by total assets and added sequentially until they covered at least 95% of each country's banking assets. Taking into account attrition, the final sample represents 78% of banking assets in the BEPS III economies, ensuring comprehensive coverage of both large and small banks.[5]

The survey was conducted through online interviews with the bank's CEO and head of credit, using separate structured questionnaires tailored to their areas of expertise. BEPS III expanded on previous survey waves by retaining core questions while adding new modules. Most importantly for this study, the third wave included a comprehensive set of questions on climate change and environmental practices. In addition to survey responses, BEPS III incorporated geospatial data on bank branch locations collected by a separate specialized team of consultants. We also merged the survey data with financial metrics from Bureau Van Dijk's ORBIS and S&P's SNL Financial datasets to capture bank size and profitability.

[4] Appendix B.1 provides details on survey procedures, sampling design, and data quality controls. See also Beck et al. (2018) and De Haas et al. (2023).

[5] Table A2 in the Appendix provides a list of all countries and the respective bank and firm sample sizes.

2.2.2. General bank characteristics

We classify banks along several key dimensions using standard measures. Foreign banks are those with 50% or more foreign ownership, identified through Orbis data, following the standard threshold used in the banking literature (e.g., Claessens et al. 2001). Bank size is measured by total assets in millions of euros, with large banks defined as those in the top third of the asset distribution. We categorize banks as relationship banks if they consider relationship lending techniques "very important" for both large enterprises and SMEs, based on CEO responses in the BEPS III survey, and following Beck et al. (2018). Bank culture is captured through a binary variable distinguishing value creation approaches: banks emphasizing commitment, communication, development, innovation, transformation, and agility are coded as '1', while those prioritizing efficiency, timeliness, consistency, market share, and profitability are coded as '0'. This classification draws on the distinction between development-oriented and efficiency-oriented organizational cultures in the management literature (Cameron and Quinn, 2011). Approximately two-thirds of all banks have a culture that focuses relatively more on development and innovation than efficiency and profitability. Our sample comprises 45% foreign-owned banks, one-third large banks, and 72% relationship banks (Table A3, Panel A in the Appendix).

2.2.3. Green banking indices

CEOs and heads of credit were asked a comprehensive set of questions about their bank's green management and lending practices. We use the responses to construct a Green Management Index (GMI) and a Green Lending Index (GLI), analogous to similar indices developed by Martin et al. (2012) and De Haas et al. (2025) for firms.

Green management index. This index captures banks' internal climate management capabilities through three components. First, environmental manager seniority, scored from 0 to 3: no designated manager (0), manager reporting indirectly to CEO (1), manager reporting directly to CEO (2), or CEO personally managing environmental issues (3). Second, environmental policies and risk management: the average of four binary indicators covering explicit climate policies, risk management integration, stress testing inclusion, and strategic response documentation. Third, quantitative climate risk analysis: the average of three indicators measuring climate-related, transition, and vulnerable asset risks. Each component is standardized and averaged to create a z-score where positive values indicate above-average green management practices. Table A4 and Table A5 in the Appendix contain all survey questions and related descriptive statistics, respectively.

Green lending index. This index measures environmental considerations in lending decisions using responses from both CEOs and heads of credit. It captures the bank's years of experience with energy efficiency loans, environmental impact assessments, and frequency of ESG-based loan rejections. All components are standardized and averaged to create a z-score where positive values indicate above-average green lending practices. Table A6 and Table A7 in the Appendix contain all survey questions and descriptive statistics, respectively.

Fig. 2 presents kernel density distributions to examine how banks' GMI and GLI vary across five organizational dimensions: climate signatory status, ownership, size, corporate culture, and lending technology. Both indices are normalized to zero, with GMI ranging from −1 to 3 and GLI from −1.7 to 3.3.

We find that climate-committed banks exhibit pronounced rightward shifts in both indices compared to non-signatories, indicating substantially stronger green practices. Moreover, foreign banks outperform domestic institutions on green management, while large banks show superior green management practices compared to smaller ones, though lending practice differences are more modest. Banks emphasizing development and innovation demonstrate significantly greener lending practices than those focused on efficiency and profitability, while relationship-oriented banks exhibit stronger green lending practices than transaction-focused institutions, suggesting that long-term relationships enable better environmental screening. These patterns provide some first evidence that banks' environmental commitments align with actual green practices, suggesting that climate pledges reflect genuine managerial differences and not just greenwashing.

2.3. Business environment and enterprise performance survey

For firm-level data, we turn to the sixth round of the Business Environment and Enterprise Performance Survey (BEEPS VI), conducted by the EBRD, World Bank, and European Investment Bank in 2018–2020 through face-to-face interviews with 4,719 firm managers across the same countries as BEPS III.[6]

The survey's Green Economy module helps us to construct several key variables. First, "green investments" indicates whether a firm undertakes any of the following: heating/cooling improvements, renewable energy generation on site, machinery upgrades, energy management, waste management, air pollution control, water management, fleet upgrades, lighting improvements, or other pollution control measures. Second, we create a variable "climate investment" that only includes investments in renewable energy generation on site, machinery upgrades, energy management, heating/cooling improvements, and fleet upgrades. This narrower measure focuses specifically on investments that directly reduce greenhouse gas emissions, distinguishing climate mitigation from broader environmental improvements. Third, we create the variable "green machinery", indicating whether the firm invested to upgrade machinery, equipment, or vehicles. These investments involve purchasing fixed assets with an embedded greener technology. We find that 80% of the companies made at least one green investment over the past three years, with 73% specifically investing in climate investments, and 62% in machinery or fleet upgrades (Table A3, Panel B in the Appendix).

In addition, we classify firms as green-managed using a Green Management Index (GMI) constructed similarly to the bank GMI. The firm GMI also has four components: strategic environmental objectives; environmental manager seniority (CEO/Board/Owners = 3, direct CEO report = 2, indirect report = 1, none = 0); emissions/energy/water monitoring; and environmental targets. Firms with positive scores exhibit above-average green management practices (questions in Table A8 in the Appendix). Figure A1 in the Appendix shows the right-skewed GMI distribution, with only one-third of all firms being relatively well managed in the green sense.

Our sample is dominated by smaller enterprises, with micro firms (fewer than 10 employees) representing 19%, small firms (10–49 employees) comprising 42%, and medium-sized firms (50–249 employees) accounting for 29%, while large firms constitute only 9%.[7] The sectoral composition is 62% goods-producing (manufacturing and construction), 24% trade, and 13% other services. To assess whether firms in our estimation sample differ systematically from other BEEPS firms, Appendix Table A9 compares the 4,719 firms in our final sample (those with loans from BEPS III banks) against two comparison groups: firms with loans from other banks not covered by BEPS III, and firms without bank loans. Our estimation sample is broadly comparable to firms borrowing from other banks in terms of size distribution, sectoral composition, and firm age. Compared to firms without bank loans, our sample firms are predictably larger and more likely to export, reflecting

[6] The BEEPS VI survey methodology and sampling procedures are further documented in a publicly available sampling and implementation report (EBRD, 2024).

[7] This classification is consistent with the official European Union SME definition established in Commission Recommendation 2003/361/EC (in effect since January 1, 2005) and is also widely adopted by the OECD for cross-country comparisons of enterprise demographics.

the well-documented selection into bank borrowing. Appendix B.2 provides further detail on the BEEPS VI sampling methodology.

Two features of our research design mitigate concerns about sample selection. First, the BEEPS sampling frame covers enterprises across a wide range of sizes, sectors, and regions within each country, reducing the likelihood of systematic selection on environmental orientation. Second, in our spatial matching analysis (Section 3.3), we construct the full set of potential firm–bank pairs within each radius, so that identification relies on variation in which nearby bank a firm actually borrows from rather than on whether a firm appears in the sample. Firm fixed effects further absorb any time-invariant firm characteristics that might correlate with sample selection.

3. Empirical analysis and results

We conduct our empirical analysis in three steps. First, we examine whether banks that join international climate initiatives exhibit stronger environmental management and lending practices than non-signatory banks, controlling for other key bank characteristics (Section 3.1). Second, we investigate whether firms borrowing from climate-committed banks display better green management and are more likely to make green investments (Section 3.2). Third, we exploit the spatial distribution of bank branches and firms to examine whether environmentally-oriented firms preferentially match with green banks (Section 3.3).

3.1. Climate commitments and green banking practices

Sample and empirical approach. We first examine whether banks' voluntary participation in international climate initiatives correlates with their environmental management and lending practices. The sample consists of 337 banks in 33 low- and middle-income countries covered by the BEPS III survey. We estimate the following cross-sectional regression:

$$\text{Green Practice}_{ic} = \alpha + \beta \cdot \text{Climate Sign}_i + \gamma' \mathbf{X}_i + \delta_r + \epsilon_{ic} \quad (1)$$

where $Green\ Practice_{ic}$ represents either the Green Management Index (GMI) or the Green Lending Index (GLI) for bank i in country c. Both indices are standardized z-scores with mean zero and standard deviation one. $Climate\ Sign_i$ is an indicator variable equal to one if the bank has signed at least one of the three climate initiatives, and zero otherwise. The vector $\mathbf{X}_i$ includes the following bank-level characteristics: foreign ownership status, bank size (large bank indicator), relationship banking orientation, bank culture (development-focused versus efficiency-focused), and financial performance measures (return on equity and debt-to-assets ratio). We include region fixed effects δ_r to account for systematic differences across five main geographic regions.[8] Standard errors are clustered by country.

Results. Table 1 presents the regression results for both the GMI (Panel A) and GLI (Panel B). The univariate specification in column (1) reveals a strong positive association between climate commitments and green practices. Banks that have signed climate initiatives exhibit green management practices that are 0.857 standard deviations higher than non-signatory banks ($p<0.01$). This association remains economically large and statistically significant at 0.832 standard deviations when we include the full set of controls in column (6).

Given that the GMI has a standard deviation of 1.0 by construction, climate-committed banks score nearly a full standard deviation above non-committed banks in their green management capabilities. This reflects meaningful internal differences: climate-committed banks are more likely to have dedicated environmental managers reporting directly to senior leadership, maintain climate risk frameworks integrated into their overall risk management systems, and conduct quantitative assessments of climate-related financial risks. These differences are present even when we control for other important bank attributes (and potential drivers of banks' green credentials), such as bank ownership, size, and culture.

For green lending practices (Panel B), we observe a positive but somewhat smaller association. Climate signatory banks score 0.435 standard deviations higher on the GLI in the univariate specification (column 1), increasing slightly to 0.475 standard deviations with full controls in column (6) (both $p<0.01$). This indicates that climate-committed banks not only organize themselves differently internally, but also translate their commitments into different lending decisions. More concretely, they are more likely to offer energy efficiency loans, conduct environmental impact assessments before loan approval, and reject loan applications based on ESG considerations.

Examining the control variables provides additional insight into the correlates of green banking practices. Foreign banks show significantly stronger green management practices, though this association disappears when we control for other bank traits, suggesting that foreign ownership correlates with such green-promoting characteristics. Large banks similarly display stronger green management (even with full controls), consistent with scale economies in developing environmental capabilities. Bank culture is also an important correlate of green practices. Banks that emphasize innovation and development over pure efficiency show higher green management and green lending scores. Interestingly, relationship banking orientation correlates positively with green lending but not with green management, suggesting that close client relationships may facilitate the implementation of green lending policies.

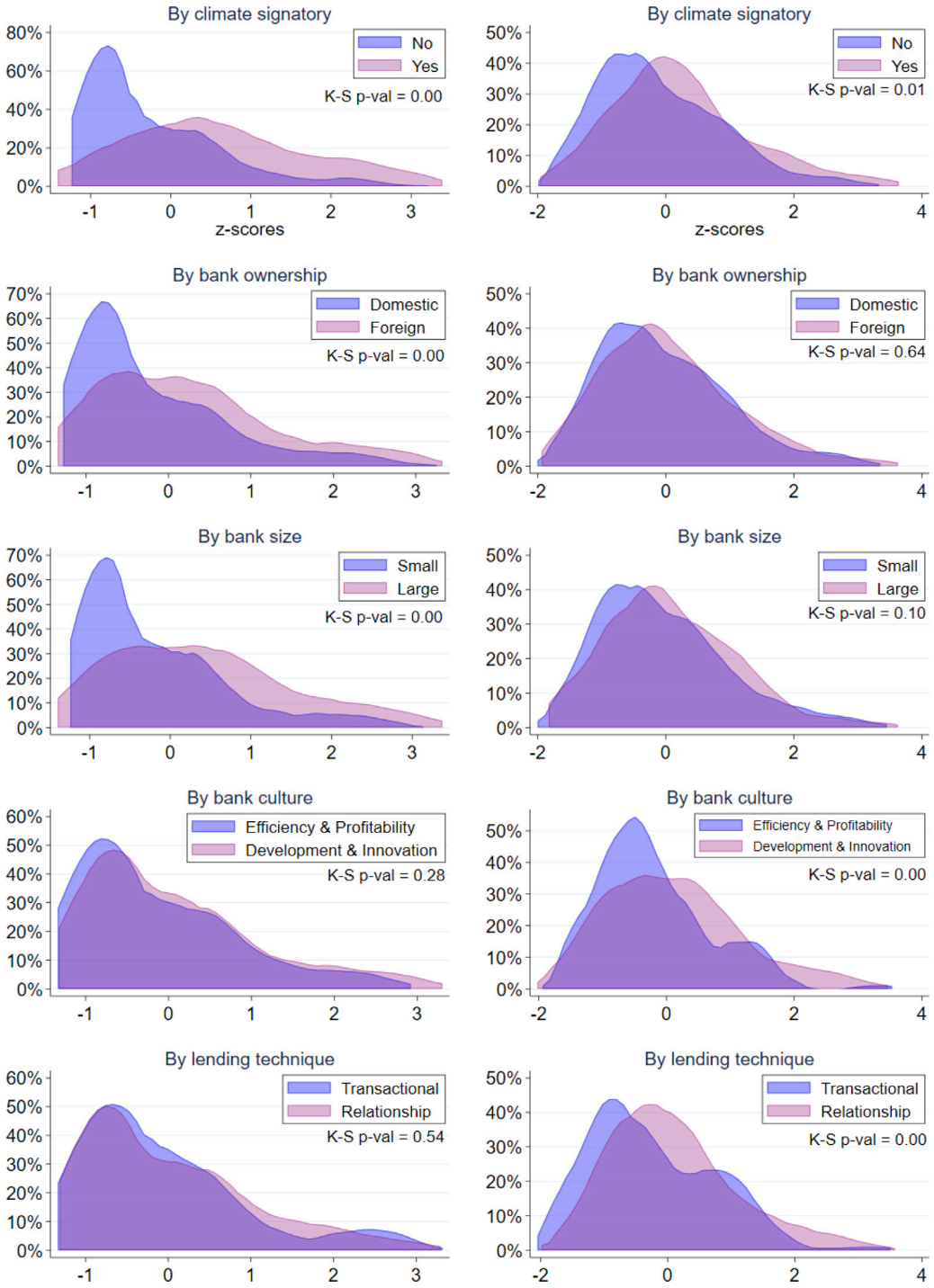
In all, the strong and persistent correlations between participation in climate initiatives and both green management and lending practices suggest that these commitments reflect genuine organizational differences rather than mere public relations exercises (greenwashing). The magnitude of the associations (particularly for green management practices) indicates that climate-committed banks differ substantially in terms of investments in their environmental capabilities: they walk the talk.

The larger association for green management (0.832 s.d.) than for green lending (0.475 s.d.) likely reflects a substantive pattern rather than a reporting artefact. Internal management practices (such as appointing environmental managers, developing climate risk frameworks, and conducting stress tests) are more directly under a bank's organizational control and can be implemented relatively quickly. Lending practices, by contrast, involve interactions with borrowers and market conditions and may take longer to adjust. This is consistent with a sequencing whereby banks first build internal environmental capabilities before translating them into changes in their external lending behavior.

A potential concern is that our survey-based indices may reflect some social desirability bias, as bank officials could overstate their environmental practices. Several features of the BEPS III survey design mitigate this concern: the questions ask about concrete, verifiable organizational features rather than subjective self-assessments; the interviewers were trained financial consultants using structured instruments; and the CAPI system flagged internally inconsistent responses. Moreover, our results would only be affected if reporting bias were systematically stronger among climate signatory banks, which is not obvious a priori.

Our findings are consistent with at least two mechanisms: banks may improve their green practices after signing climate initiatives,

[8] South-eastern Europe, Central Europe and the Baltic States, Eastern Europe and the Caucasus, Central Asia, and Northern Africa. We use region rather than country fixed effects because many countries contain relatively few banks (limiting within-country variation for identification) and including 33 country dummies would substantially reduce statistical power. Clustering at the country level still accounts for within-country correlation in errors.



(a) Green Management Index (b) Green Lending Index

Fig. 2. Distribution of Green Management Index and Green Lending Index, by Bank Type.
Notes: Kernel density estimates of the Green Management Index (left) and Green Lending Index (right) using an Epanechnikov kernel. Kolmogorov–Smirnov (K–S) test *p*-values indicate statistical significance of distributional differences between groups.

or banks with pre-existing green orientations may self-select into these commitments. In practice, both mechanisms likely operate simultaneously. Our cross-sectional data do not permit us to distinguish selection from causal effects. However, even under the most conservative interpretation (where the correlations are driven entirely by selection) the findings carry important implications. If climate-committed banks already possessed stronger green management and lending practices beforehand, this demonstrates that these commitments serve as credible signals of genuine environmental orientation, which is inconsistent with the greenwashing hypothesis.

Table 1
Climate commitments and green banking practices.

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Dependent variable - Green Management Index						
Climate signatory bank	0.857***					0.832***
	(0.157)					(0.169)
Foreign bank		0.456***				−0.065
		(0.135)				(0.127)
Large bank			0.524***			0.436***
			(0.157)			(0.148)
Bank culture				0.219**		0.138
				(0.105)		(0.098)
Relationship bank					0.109	0.098
					(0.104)	(0.098)
Constant	−2.280***	−2.598***	−1.440**	−1.883***	−1.854***	−2.031***
	(0.483)	(0.583)	(0.574)	(0.639)	(0.646)	(0.489)
Adjusted R-squared	0.174	0.086	0.087	0.054	0.045	0.201
Panel B: Dependent variable - Green Lending Index						
Climate signatory bank	0.435***					0.475***
	(0.130)					(0.121)
Foreign bank		0.144				−0.138
		(0.139)				(0.141)
Large bank			0.078			0.062
			(0.140)			(0.128)
Bank culture				0.305***		0.261**
				(0.109)		(0.108)
Relationship bank					0.329***	0.292***
					(0.104)	(0.102)
Constant	−1.624*	−1.625*	−1.314*	−1.527*	−1.633**	−1.738*
	(0.867)	(0.931)	(0.770)	(0.770)	(0.720)	(0.939)
Adjusted R-squared	0.064	0.035	0.031	0.052	0.052	0.091
Observations	337	337	337	337	337	337
Region FE	Y	Y	Y	Y	Y	Y
Bank covariates	Y	Y	Y	Y	Y	Y

Notes: This table examines the relationship between banks' climate initiative participation and their environmental practices. The dependent variable in Panel A is the Green Management Index (GMI), and in Panel B is the Green Lending Index (GLI), both standardized z-scores. Climate signatory bank equals 1 if the bank has joined at least one international climate initiative (PRB/PRI, TCFD, or SBTi), 0 otherwise. Bank covariates include debt-to-assets ratio and return on equity. All specifications include region fixed effects. Standard errors clustered by country are in parentheses.

* Denote significance at the 10% levels.

** Denote significance at the 5% levels.

*** Denote significance at the 1% levels.

To explore heterogeneity across climate initiatives, Appendix Table A10 disaggregates our climate signatory variable into its three components: PRB/PRI, TCFD, and SBTi. When entered individually, all three are positively associated with the Green Management Index, with PRB/PRI showing the largest coefficient (0.831, p<0.01). However, when all three are included jointly, only PRB/PRI retains a significant coefficient (0.720, p<0.01), while TCFD and SBTi become statistically insignificant. For the Green Lending Index, only PRB/PRI is statistically significant when entered individually (0.369, p<0.01); TCFD and SBTi carry positive but imprecisely estimated coefficients. In the joint specification, PRB/PRI again dominates (0.472, p<0.05). These findings suggest that the broad ESG-oriented commitment embodied in PRB/PRI is the most predictive of actual green banking practices, possibly because its wide-ranging requirements translate most directly into the organizational changes captured by our indices.

3.2. Climate commitments and client composition

Sample and empirical approach. Having established that climate-committed banks exhibit stronger internal green practices, we next investigate whether these differences are associated with distinct lending relationships and borrower outcomes. We restrict our sample to the 4,719 firms across our 33 sample countries that have a loan with a bank in BEPS III. These borrowing firms identified their primary lender as part of the survey, enabling us to link firm-level outcomes to the environmental characteristics of their bank. We then estimate the following regression to examine the link between banks' climate commitments and their borrowers' environmental behavior:

$$Y_{isc} = \alpha + \beta_1 \cdot \text{Climate Sign}_{j(i)} + \beta_2 \cdot \text{GMI}_{j(i)} + \beta_3 \cdot \text{GLI}_{j(i)} + \gamma' \mathbf{F}_i + \delta_s + \theta_r + \epsilon_{isc} \quad (2)$$

where Y_{isc} represents the environmental outcome for firm i in sector s and country c. This is either the firm's green management index (GMI), a standardized z-score measuring the firm's environmental management capabilities, or a binary indicator for whether the firm undertook green investments in the past three years. The subscript $j(i)$ denotes the bank from which firm i borrows. A limitation is that the BEEPS VI survey only records whether firms undertook specific types of green investments, not the monetary amounts involved. Our results therefore capture the extensive margin of green investment (whether firms invest at all) but not the intensive margin (how much they invest).

Our main variable of interest is $Climate\ Sign_{j(i)}$, an indicator equal to one if firm i's lending bank has committed to at least one international climate initiative; zero otherwise. To disentangle the role of banks' public climate commitments from their actual green practices, we include the bank's Green Management Index—$GMI_{j(i)}$—and/or Green Lending Index—$GLI_{j(i)}$.[9] The vector $\mathbf{F}_i$ includes firm-size controls (for micro, small, medium, and large firms). Lastly, we include

[9] A natural concern is that climate signatory status, the GMI, and the GLI may be correlated. Appendix Table A11 confirms that climate signatory

Table 2
Climate commitments and borrower green practices.

	(1)	(2)	(3)	(4)
Panel A: Dependent variable - Firm's Green Management Index				
Climate signatory bank	0.108**			0.151***
	(0.050)			(0.052)
GMI (z-score)		−0.035		−0.050
		(0.028)		(0.029)
GLI (z-score)			−0.020	−0.014
			(0.029)	(0.029)
Constant	0.987***	1.087***	1.067***	1.002***
	(0.147)	(0.149)	(0.139)	(0.152)
Adjusted R-squared	0.136	0.135	0.135	0.138
Panel B: Dependent variable - Green Investments				
Climate signatory bank	0.047**			0.042**
	(0.018)			(0.019)
GMI (z-score)		0.012		0.009
		(0.011)		(0.012)
GLI (z-score)			−0.001	−0.006
			(0.011)	(0.013)
Constant	0.871***	0.892***	0.902***	0.869***
	(0.029)	(0.029)	(0.028)	(0.029)
Adjusted R-squared	0.034	0.032	0.031	0.034
Panel C: Dependent variable - Climate Investments				
Climate signatory bank	0.069***			0.061***
	(0.017)			(0.020)
GMI (z-score)		0.021*		0.018
		(0.011)		(0.012)
GLI (z-score)			−0.007	−0.017
			(0.010)	(0.012)
Constant	0.834***	0.864***	0.883***	0.831***
	(0.036)	(0.034)	(0.036)	(0.033)
Adjusted R-squared	0.044	0.042	0.040	0.046
Panel D: Dependent variable - Green Machinery Investments				
Climate signatory bank	0.063***			0.050**
	(0.021)			(0.020)
GMI (z-score)		0.025*		0.023
		(0.013)		(0.014)
GLI (z-score)			−0.005	−0.016
			(0.011)	(0.012)
Constant	0.774***	0.796***	0.817***	0.770***
	(0.041)	(0.038)	(0.042)	(0.037)
Adjusted R-squared	0.058	0.058	0.055	0.060
Observations	4,778	4,778	4,778	4,778
Firm size controls	Y	Y	Y	Y
Sector FE	Y	Y	Y	Y
Region FE	Y	Y	Y	Y

Notes: This table examines lending banks' climate commitments and borrower environmental outcomes for 4719 firms with loans from BEPS III banks. The number of observations (4778) exceeds the number of unique firms (4719) because some firms are matched to more than one BEPS III bank. Panel A uses firms' Green Management Index (GMI, standardized z-score) as the dependent variable. Panels B-D use binary indicators for green, climate, and green machinery investments (past three years). Climate signatory bank equals 1 if the lending bank joined international climate initiative(s). Bank GMI and GLI are standardized green management and lending indices. All specifications include firm size, sector FE, and region FE. Standard errors clustered by country.

* Denote 10% significance.

** Denote 5% significance.

*** Denote 1% significance.

sector fixed effects—δ_s—to account for industry-specific environmental requirements and opportunities, and region fixed effects θ_r to control for geographic variation in environmental regulations and climate vulnerability. Standard errors are again clustered by country.

This specification tests whether firms borrowing from climate-committed banks exhibit systematically different environmental practices and investment patterns, even controlling for the banks' actual green management and lending capabilities. A positive and significant β_1 would suggest that banks' public climate commitments correlate with meaningful differences in their client portfolios or are associated with differences in their borrowers' environmental behavior, beyond what can be explained by the banks' internal green practices alone.

Results. Table 2 presents our findings on the link between banks' climate commitments and firms' environmental behavior. Panel A examines firms' green management, while Panels B to D focus on dif-

status correlates positively with the GMI (r = 0.397, p<0.01) and, to a lesser extent, with the GLI (r = 0.153, p<0.01). These correlations are statistically significant but moderate, indicating that climate commitments and internal green practices capture related but distinct dimensions of banks' environmental orientation.

ferent types of green investment. In Panel A, the univariate specification (column 1) reveals that firms borrowing from climate signatory banks score 0.108 standard deviations higher on the GMI compared to firms borrowing from non-signatory banks ($p<0.05$). This association strengthens in column 4, reaching 0.151 standard deviations ($p<0.01$). Given that the firm GMI has a standard deviation of 1.0 by construction, this represents a strong economic association: firms borrowing from climate-committed banks exhibit green management practices that are roughly one-sixth of a standard deviation stronger than those borrowing from non-committed banks.

The results for green investments in Panel B are striking too. Column 1 shows that firms borrowing from climate signatory banks are 4.7 percentage points more likely to make green investments ($p<0.05$). This association is stable at 4.2 percentage points when including all controls in column 4 ($p<0.05$). Relative to the baseline probability of green investment among borrowers (87.1%), this represents a 5.4% increase in the likelihood of green investment. This substantial association indicates that climate-committed banks are linked to meaningfully different firm investment behavior. We obtain similar results when focusing on specific types of green investments in Panels C and D. Column 1 shows that firms borrowing from climate signatory banks are 6.9 percentage points more likely to make climate investments and 6.3 percentage points more likely to make green machinery investments ($p<0.01$). These associations remain stable at 6.1 percentage points ($p<0.01$) and 5.0 percentage points ($p<0.05$) when including the full set of controls in column 4.

Interestingly, the bank-level green practice indices (GMI and GLI) generally show small and statistically insignificant coefficients once the climate signatory dummy is included. This pattern suggests that formal climate commitments capture a broader dimension of banks' environmental orientation than is reflected in the specific practices measured by our indices. Climate signatory status is a discrete, publicly observable signal that bundles together a bank's internal capabilities, its external positioning, and potentially its client acquisition strategy. The GMI and GLI, by contrast, measure particular organizational features and lending tools that may operate through channels other than borrower selection. For instance, a bank with a high GLI may apply environmental screening broadly across its portfolio rather than attracting a systematically different client base. We therefore interpret the signatory dummy less as a proxy for measured internal practices and more as a marker of a broader, only partly observed bank type that is associated with greener borrowers.

Three interpretations are consistent with these results. First, our results may reflect selection effects whereby greener banks systematically choose greener clients (or vice versa). Second, the patterns could reflect that climate-committed banks actively encourage green investments among their borrowers. Third, a combination of both mechanisms may operate simultaneously. Our cross-sectional data cannot distinguish between these channels. However, regardless of the specific mechanism, these patterns demonstrate that banks' voluntary climate commitments are associated with systematic differences in client composition and green-investment behavior, which is inconsistent with pure greenwashing.

These results are robust to including an extended set of firm-level covariates. Appendix Table A12 re-estimates all specifications with controls for exporter status, listed firm status, audited financial accounts, customer pressure for environmental certifications, monetary losses from extreme weather events and pollution, and exposure to energy taxes or levies. Despite a 10 percent reduction in sample size due to missing values, all coefficients retain their sign, economic magnitude, and statistical significance. Appendix Table A13 further shows that these patterns hold when restricting the sample to the goods-producing sector (manufacturing and construction), where environmental investments are most salient.

3.3. Spatial matching between green banks and green firms

Sample and empirical approach. To examine whether environmentally-oriented firms preferentially match with green banks in their vicinity, we exploit the unique geocoded locations of both firms and bank branches. We construct a firm–bank network by identifying all bank branches within 5 or 10 kilometers of each firm and keeping the closest branch from each BEPS III bank, creating 46,839 potential firm–bank pairs for the 5 km radius and 54,381 pairs for the 10 km radius.[10] Our sample includes all firms with existing loans, allowing us to observe which nearby banks they actually borrow from versus which banks they could have potentially accessed. We estimate the following linear probability model:

$$\text{Loan}_{ij} = \alpha + \beta_1 \cdot \text{Green Bank}_j + \beta_2 \cdot \text{Green Bank}_j \times \text{Green Firm}_i + \gamma \cdot \text{Distance}_{ij} + \mu_i + \epsilon_{ij} \quad (3)$$

where $Loan_{ij}$ is an indicator variable equal to one if firm i has a loan from bank j within the specified radius (5 km or 10 km), and zero otherwise. $Green\ Bank_j$ represents one of three measures of bank environmental orientation: whether the bank is a climate signatory, has above-average green management practices (GMI>0), or has above-average green lending practices (GLI>0). $Green\ Firm_i$ captures firm environmental characteristics through either the green management indicator (firm's GMI>0) or whether the firm undertook green investments. $Distance_{ij}$ measures the distance in kilometers between firm i and bank branch j, and μ_i represents firm fixed effects that control for all time-invariant firm characteristics. Because the *Green Firm* variable is measured at the firm level and does not vary across potential bank matches for a given firm, it is absorbed by the firm fixed effects and cannot be separately identified. However, the interaction term *Green Bank x Green Firm* varies across firm–bank pairs within a given firm and is therefore identified. Standard errors are clustered by country.

The coefficient β_1 captures differential lending propensities of green banks to proximate firms, while the interaction coefficient β_2 identifies differential matching between green banks and green firms, our primary coefficient of interest. A positive β_2 would indicate that environmentally-oriented firms have a higher propensity to borrow from nearby green banks than regular firms, reflecting either demand-side sorting (green firms seeking green banks) or supply-side selection (green banks preferring green firms).

Results. Table 3 presents clear evidence of assortative matching between green banks and green firms within local credit markets. Panel A examines the relationship between climate signatory banks and various measures of firm environmental orientation, showing consistent patterns of green-on-green matching. The interaction coefficient in column 1 suggests that green-managed firms are 1.1 percentage points more likely to borrow from climate-committed banks in their vicinity compared to brown-managed firms, although this association is not statistically significant at conventional levels. The matching becomes both stronger and precisely estimated when examining actual green investment behavior. Firms with green investments are 2.3 percentage points more likely to borrow from climate signatory banks (column 2, $p<0.01$), representing a 23% increase over the baseline probability of borrowing from any specific nearby bank (approximately 10% within 5 km).[11] The relationship is similarly strong for climate investments specifically (column 3, 2.2 percentage points, $p<0.01$). Green machinery investments show a more moderate but still significant association

[10] An important feature of the BEEPS VI survey is that it samples establishments at their physical locations rather than at the enterprise or headquarters level. For the vast majority of firms in our sample the establishment and the firm are one and the same, making the single-location assumption unproblematic.

[11] Appendix Table A14 shows these results are robust to using a 10 km radius around firms.

of 1.3 percentage points (column 4, $p<0.05$). The associations are again very similar at the 10 km radius (Appendix Table A14).

Panel B examines matching based on banks' internal green management capabilities rather than external commitments. Green-managed firms do not show a significant differential tendency to borrow from green-managed banks (column 1). However, firms making actual green investments are 1.7 percentage points more likely to borrow from banks with strong green management practices (column 2, $p<0.05$). The association is particularly pronounced for climate investments at 2.2 percentage points (column 3, $p<0.01$), while green machinery investments show a 1.8 percentage point increase (column 4, $p<0.01$). These results suggest that green banks prioritize lending to firms that demonstrate real green investments rather than those that simply adopt green management practices.

Panel C shows no significant matching patterns based on banks' green lending practices. We believe this divergence from Panels A and B reflects genuine differences in what these variables capture. Climate signatory status and the GMI measure aspects of a bank's environmental orientation (its publicly stated commitments and internal organizational capabilities) that may be visible to prospective borrowers and shape how a bank screens and selects clients. The GLI, by contrast, captures the bank's operational lending practices: how long it has offered energy efficiency loans, whether it conducts environmental impact assessments, and how frequently it rejects loans on ESG grounds. These are instruments that banks deploy across their portfolio rather than selection criteria that generate assortative matching. A bank with a high GLI may apply environmental screening tools broadly, including to firms that would not themselves be classified as green. This interpretation is supported by the correlation structure in Appendix Table A11: the GLI is only weakly correlated with climate signatory status ($r = 0.153$) but more strongly associated with relationship banking orientation and bank culture. Climate commitments and green management capabilities thus appear to drive selection into lending relationships, while green lending practices may operate through the treatment of borrowers once relationships are established.

An alternative interpretation is that geographic proximity merely facilitates relationship-based lending. However, if proximity effects were unrelated to environmental characteristics, we would expect the interaction between green banks and green firms to be insignificant. Instead, the proximity effect is strongest when both the bank and the firm have genuine environmental credentials, particularly when firms have made actual green investments rather than simply adopted green management structures. This differential pattern is more consistent with informed matching based on real environmental characteristics than with mere relationship-based lending facilitated by physical closeness.

These geographic matching patterns provide further evidence against pure greenwashing: if climate commitments were merely cosmetic, we would not expect systematic differences in the geographic distribution of lending relationships. Furthermore, the stronger matching effect for firms with actual green investments compared to those with just green management structures suggests that banks value demonstrated environmental action over organizational commitments. This aligns with concerns about greenwashing at the firm level and indicates that banks may use observable investment behavior as a more reliable signal of environmental commitment than management structures alone.[12]

The negative and highly significant distance coefficients across all specifications (−0.020, $p<0.01$) confirm that geographic proximity remains highly relevant in these markets: each additional kilometer reduces lending probability by 2 percentage points, even when environmental preferences align.[13] The persistence of distance effects alongside environmental matching suggests they operate as complementary screening mechanisms in local credit markets. As such, the spatial distribution of green banking infrastructure may also create disparities in access to green credit. Firms near climate-committed banks can more easily find lenders aligned with their environmental objectives, while environmentally-oriented firms in areas dominated by traditional banks may face barriers to implementing green investments.

4. Conclusions

This paper has analyzed the associations between banks' voluntary climate commitments and both lending practices and borrower characteristics across 33 low- and middle-income countries. By combining unique survey data on banks' internal green management practices with detailed firm-level information and geocoded locations, we document three key findings that collectively suggest climate commitments represent more than mere greenwashing.

First, we document that banks signing international climate initiatives exhibit substantially stronger green management and lending practices, scoring 0.83 and 0.48 standard deviations higher, respectively, than non-signatory banks. This reflects concrete organizational differences: climate-committed banks employ dedicated environmental managers, maintain climate risk frameworks, and conduct environmental screening of loan applications. Second, firms borrowing from climate-committed banks display different environmental behavior, with a 4 percentage point higher likelihood of making green investments.[14] Third, our geographic analysis (which addresses a key limitation in the literature by examining potential rather than just observed lending relationships) reveals that environmentally-oriented firms preferentially match with climate-committed banks in their vicinity. This suggests that the spatial distribution of green banks may shape the credit allocation in emerging markets where physical proximity remains relevant for banking relationships.

We emphasize that our cross-sectional data cannot establish whether climate commitments cause greener practices or whether already-green banks select into these commitments. However, even under the most conservative interpretation, where the correlations are driven entirely by selection, our findings demonstrate that climate commitments serve as credible signals of environmental orientation, which is inconsistent with the greenwashing hypothesis. This is particularly important in the context of low- and middle-income countries, where governments must balance development needs with climate goals, often lacking the regulatory capacity and market infrastructure of advanced economies. The consistent patterns across multiple levels of analysis (from banks' internal organization to borrower investments to geographic credit access) suggest that voluntary climate commitments by emerging market banks represent more than cheap talk.

Our results also highlight important heterogeneity in the adoption of green banking. The significance of bank size points to potential barriers for smaller institutions in developing environmental capabilities, possibly due to fixed costs in establishing climate risk frameworks or limited technical expertise. The role of bank culture suggests that strategic orientation matters as well: banks already focused on innovation and long-term value creation find it easier to integrate environmental

[12] Our local-level findings complement the international evidence on green-meets-green matching. Degryse et al. (2023) document similar assortative matching patterns in global syndicated loan markets, where green banks provide loans to green firms at lower spreads. Although they focus on large, publicly traded firms accessing international credit markets, our results demonstrate that this matching pattern extends to smaller firms in low- and middle-income countries where geographic proximity remains important.

[13] To the extent that distance matters less for larger firms, which may establish banking relationships over greater distances, our estimates represent a conservative measure of the role of geographic proximity, particularly for the SMEs that dominate our sample. See also De Haas et al. (2023) and the references therein.

[14] This captures the extensive margin of green investment; data on the scale of individual investments are not available in the BEEPS survey.

Table 3
Spatial matching between green banks and green firms.

Dependent variable: Firm i has a loan from bank j in its locality	(1)	(2)	(3)	(4)
Panel A: Climate signatory banks				
Climate signatory bank	0.016*	0.002	0.004	0.012
	(0.009)	(0.010)	(0.009)	(0.009)
Climate signatory bank × Green-managed firm	0.011			
	(0.007)			
Climate signatory bank × Green investment		0.023***		
		(0.006)		
Climate signatory bank × Climate investment			0.022***	
			(0.005)	
Climate signatory bank × Green machinery investment				0.013**
				(0.006)
Distance	−0.020***	−0.020***	−0.020***	−0.020***
	(0.003)	(0.003)	(0.003)	(0.003)
Constant	0.100***	0.100***	0.100***	0.100***
	(0.004)	(0.004)	(0.004)	(0.004)
R-squared	0.096	0.096	0.096	0.096
Panel B: Green-managed banks				
Green-managed bank	0.040***	0.028*	0.025*	0.030**
	(0.013)	(0.015)	(0.014)	(0.014)
Green-managed bank × Green-managed firm	0.001			
	(0.007)			
Green-managed bank × Green investment		0.017**		
		(0.007)		
Green-managed bank × Climate investment			0.022***	
			(0.006)	
Green-managed bank × Green machinery investment				0.018***
				(0.006)
Distance	−0.020***	−0.020***	−0.020***	−0.020***
	(0.003)	(0.003)	(0.003)	(0.003)
Constant	0.087***	0.087***	0.086***	0.086***
	(0.006)	(0.006)	(0.006)	(0.006)
R-squared	0.100	0.100	0.100	0.100
Panel C: Green-lending banks				
Green-lending bank	0.025**	0.025*	0.025**	0.025**
	(0.012)	(0.013)	(0.012)	(0.012)
Green-lending bank × Green-managed firm	−0.001			
	(0.009)			
Green-lending bank × Green investment		0.000		
		(0.008)		
Green-lending bank × Climate investment			−0.000	
			(0.008)	
Green-lending bank × Green machinery investment				−0.001
				(0.007)
Distance	−0.021***	−0.021***	−0.021***	−0.021***
	(0.003)	(0.003)	(0.003)	(0.003)
Constant	0.094***	0.094***	0.094***	0.094***
	(0.006)	(0.006)	(0.006)	(0.006)
R-squared	0.097	0.097	0.097	0.097
Observations	46,839	46,839	46,839	46,839
Firm FE	Y	Y	Y	Y

Notes: This table examines assortative matching between environmentally-oriented banks and firms within local credit markets. The dependent variable equals 1 if firm i has a loan from bank j within a 5 km radius. Sample includes all potential firm–bank pairs where the bank has a branch within a 5 km radius (46,839 pairs). Panel A: climate signatory banks; Panel B: banks with above-average green management (GMI>0); Panel C: banks with above-average green lending (GLI>0). Green-managed firm equals 1 if the firm's GMI>0. Green, climate, and green machinery investments equal 1 if firm made respective investments in past three years. Distance measures kilometers between firm and bank branch. All specifications include firm FE. Standard errors clustered by country.

* Denote 10% significance.

** Denote 5% significance.

*** Denote 1% significance.

considerations than those primarily emphasizing short-term efficiency and profitability.

The concentration of green banking among certain types of banks raises concerns about whether voluntary initiatives alone can achieve the comprehensive financial sector transformation needed to meet the goals of the Paris Agreement. While our evidence that voluntary commitments correlate with meaningful operational differences suggests these initiatives play a useful role even without formal enforcement,

their uneven adoption indicates that complementary policies (such as stricter regulation or support for smaller banks to develop green capabilities) may be called for.

Our analysis also points to several directions for future research. First, do climate commitments change how banks lend, or do already-green banks select into these commitments? Answering this question requires panel data or quasi-experimental methods. As credit registries in emerging Europe and Central Asia expand, it may become feasible to merge organizational bank data with loan-level information, enabling researchers to disentangle selection from treatment effects. Additionally, while our structured survey design mitigates concerns about reporting bias, future research using administrative or supervisory data could further validate the patterns we document.

A second question concerns loan pricing. Green banks may not only select greener borrowers but also use interest rate differentials to incentivize environmental improvements or price in the climate risk exposure of brown borrowers. Our data do not contain consistent information on loan pricing, but examining this intensive margin alongside the credit allocation patterns we document is a promising avenue for future research.

Third, a more systematic analysis of how regulatory pressure (particularly from central banks and financial supervisors increasingly attuned to climate-related systemic risk) interacts with voluntary commitments in shaping banks' climate risk management practices would be a natural extension of our work.

CRediT authorship contribution statement

Mariana Bernad: Writing – original draft, Validation, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Ralph De Haas:** Writing – review & editing, Writing – original draft, Validation, Supervision, Project administration, Methodology, Conceptualization. **Juan Pablo Rud:** Writing – review & editing, Validation, Supervision, Methodology, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgments

We thank Lukas Buchheim (discussant), Hans Degryse, Roman Goncharenko, Annina Kaltenbrunner (discussant), Steven Ongena, Carola Theunisz, Andrew Foster (the Editor), three anonymous referees, and seminar participants at EBRD, Royal Holloway, University of Duisburg–Essen, SOAS, ASPEC, EAERE Summer School, Laboratoire d'Économie et de Management Nantes-Atlantique (LEMNA)'s Workshop on Climate Economics, the CEPR Workshop on "Fostering Sustainable Finance and Investment for Just and Resilient Transitions in the Global South", and the IAERE Annual Conference (Trento) for helpful comments. Victoria Marino provided excellent research assistance. The views expressed are the authors' and not necessarily those of the EBRD.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.jdeveco.2026.103760.

Data availability

The BEPS III branch data can be made available upon signing a confidentiality agreement. The BEPS III survey data are confidential. The BEEPS data are available from commercial vendors.

References

Beck, T., Degryse, H., De Haas, R., Van Horen, N., 2018. When arm's length is too far: Relationship banking over the credit cycle. J. Financ. Econ. 127 (1), 174–196.
Berg, T., Döttling, R., Hut, X., Wagner, W., 2025. Do voluntary initiatives make loans greener? Evidence from project finance. Working Paper.
Cameron, K.S., Quinn, R.E., 2011. Diagnosing and Changing Organizational Culture: Based on the Competing Values Framework, third ed. Jossey-Bass, San Francisco, CA.
Carney, M., 2021. Clean and green finance. Financ. Dev. 58 (3), 20–22.
Claessens, S., Demirgüç-Kunt, A., Huizinga, H., 2001. How does foreign entry affect domestic banking markets? J. Bank. Financ. 25 (5), 891–911.
De Haas, R., 2025. Sustainable banking. In: Berger, A.N., Molyneux, P., Wilson, J.O. (Eds.), The Oxford Handbook of Banking, fourth ed. Oxford University Press.
De Haas, R., Lu, L., Ongena, S., 2023. Close competitors? Bilateral bank competition and spatial variation in firms' access to credit. J. Econ. Geogr. 23 (6), 1237–1271.
De Haas, R., Martin, R., Muûls, M., Schweiger, H., 2025. Managerial and financial barriers to the green transition. Manag. Sci. 71 (4), 2890–2921.
Degryse, H., Goncharenko, R., Theunisz, C., Vadasz, T., 2023. When green meets green. J. Corp. Financ. 78, 102355.
Delis, M., de Greiff, K., Iosifidi, M., Ongena, S., 2024. Being stranded with fossil fuel reserves? Climate policy risk and the pricing of bank loans. Financ. Mark. Institutions Instruments 33 (3), 239–265.
EBRD, 2024. Business environment and enterprise performance survey (BEEPS) methodology. URL https://www.ebrd.com/home/what-we-do/office-of-the-chief-economist/beeps/business-environment-enterprise-performance-survey-data/2018-2020.html. (Accessed 22 May 2024).
Fan, H., Peng, Y., Wang, H., Xu, Z., 2021. Greening through finance? J. Dev. Econ. 152, 102683.
Foster, A.D., Gutierrez, E., 2013. The informational role of voluntary certification: Evidence from the Mexican clean industry program. Am. Econ. Rev.: Pap. Proc. 103 (3), 303–308.
Giannetti, M., Jasova, M., Loumioti, M., Mendicino, C., 2026. "Glossy green" banks: The disconnect between environmental disclosures and lending activities. Manag. Sci. forthcoming.
Glasgow Financial Alliance for Net Zero, 2021. Amount of finance committed to achieving 1.5° C now at scale needed to deliver the transition. URL https://www.gfanzero.com/press/amount-of-finance-committed-to-achieving-1-5c-now-at-scale-needed-to-deliver-the-transition/, Press Release, COP26, Glasgow.
Green, D., Vallée, B., 2025. Measurement and effects of bank exit policies. J. Financ. Econ. 172, 104129.
Kacperczyk, M.T., Peydró, J.-L., 2022. Carbon emissions and the bank-lending channel. SSRN Electron. J..
Martin, R., Muûls, M., de Preux, L., Wagner, U.J., 2012. Anatomy of a paradox: Management practices, organizational structure and energy efficiency. J. Environ. Econ. Manag. 63 (2), 208–223.
Martini, F., Sautner, Z., Steffen, S., Theunisz, C., 2023. Climate Transition Risks of Banks: Evidence from Syndicated Loan Books. Technical report, Swiss Finance Institute, Research Paper No. 23-66.
Sastry, P., Verner, E., Marques-Ibanez, D., 2024. Business as usual: Bank net zero commitments, lending, and engagement. NBER Working Paper No. 32402.