Do Brown Lending and Greenwashing Pay Off for Banks? International Evidence. ¶

Veda Fatmy[1], Claudio de Moraes[2], Sami Vähämaa[3], Maria Zhukova[4]

University of Vaasa, School of Accounting and Finance

March 2026

Abstract

We examine the relationship between bank's exposure to fossil fuel financing and their financial performance. Using data on the world's 60 largest banks over 2016-2024, we find that fossil fuel financing, measured as the annual flow of capital to companies and subsidiaries that engage directly with fossil fuels or fossil fuel-based activities, is positively associated with bank profitability (ROA), and negatively associated with market valuation (Tobin's Q). Specifically, a standard deviation increase in fossil financing scaled by total assets corresponds to roughly a 0.08% increase in ROA and a 0.4% decrease in Tobin's Q. The effect on value is stronger in lagged specifications. Further, we discover a larger valuation penalty for "green" banks, defined as banks with both high environmental disclosures and high LSEG environmental pillar scores.

JEL classification: G20; G21; G12; Q54; Q56

Keywords: Fossil fuel financing, banking, climate transition risk, bank valuation, bank profitability, sustainable finance, greenwashing, global banks

☆

[1] *Address:* University of Vaasa, School of Accounting and Finance, P.O. Box 700, FI-65101 Vaasa, Finland; *E-mail address:* vfatmy@uwasa.fi

[2] Central Bank of Brazil and COPPEAD Business School, Universidade Federal do Rio de Janeiro, Brazil; *E-mail address:* claudio.moraes@coppead.ufrj.br

[3] *Address:* University of Vaasa, School of Accounting and Finance, P.O. Box 700, FI-65101 Vaasa, Finland; *E-mail address:* sami@uwasa.fi

[4] *Address:* University of Vaasa, School of Accounting and Finance, P.O. Box 700, FI-65101 Vaasa, Finland; *E-mail address:* maria.zhukova@uwasa.fi

1. Introduction

Decarbonization of the economy requires responsible allocation of capital by financial institutions (Sastry, Verner, Marqués Ibáñez, 2024). Banks can materially affect the pace of transition by steering finance away from carbon-intensive activities (Reghezza, Altunbas, Marqués Ibáñez, Rodriguez d'Acri, & Spaggiari, 2022; Giannetti, Jasova, Loumioti, & Mendicino, 2023). As financiers and intermediaries, banks can influence firms' investment capacity and, more broadly, the direction of real economic activity (Battiston, Monasterolo, Riahi, and van Ruijven, 2021).

Stakeholder pressure and regulation have pushed financial institutions to align their policies with climate goals (Garel, Romec, Zhou, 2025). Major banks have adopted ESG-related policies and announced climate targets (Beltran, Bensen, Kvien, McDevitt, Sanz, & Uysal, 2023). At the same time, a growing body of literature suggests that despite climate commitments, banks continue to finance and engage with carbon-intensive industries (Giannetti et al., 2023; Sastry et al., 2024; Galetta et al., 2024). This disconnect might be explained by persisting profits from brown lending or investments in polluting and otherwise unsustainable business activities. However, there is limited academic scrutiny on the matter, and the evidence is mixed (Demetriades and Politsidis, 2025; Bressan, 2025; Lee et al., 2025). In this paper, we address this gap by investigating the effects of direct financial involvement in fossil fuel-based activities on bank profitability and value.

Empirical assessment of banks' role in the sustainable transition is constrained by measurement challenges. Sustainability proxies widely used in academic work, such as corporate GHG emissions and ESG scores, are imperfect, as they depend on the provider and measurement frameworks. Emissions data is subject to reporting gaps and methodological heterogeneity (Bolton and Kacperczyk, 2023; Aswani, Raghunandan & Rajgopal, 2024; Matisoff et al., 2013). In turn, ESG scores significantly vary across rating providers and often reflect differences in constructs and

weights (Gibson et al., 2021; Berg et al., 2021; Berg et al., 2022; Christensen et al., 2022; Kotsantonis and Serafeim, 2019). As a result, these proxies often misrepresent actual lending and investment decisions (Giannetti et al., 2023; Sastry et al., 2024). Following recent literature (Lee et al., 2025; Demetriades and Politsidis, 2025), we address this by studying fossil fuel financing, a transaction-based measure of bank sustainability and fulfilment of environmental commitments which measures annual capital flows to fossil fuel-related activities through syndicated lending and securities underwriting.

We study fossil fuel financing within the world's 60 largest banks over the period 2016-2024. Our sample period coincides with the post-Paris agreement era, defined by stronger regulatory and institutional pressures to align financial flows with a low-emission, climate resilient pathway. The relatively small size of our sample does not compromise the significance of our findings because both the fossil fuel sector and the banking sector can be characterized as highly concentrated, having a disproportionately large effect on climate and the sustainability economy respectively. The Carbon Majors dataset shows that just 100 fossil fuel companies are responsible for 71% of global industrial greenhouse emissions since 1988, with 25 companies accounting for over half of these emissions (CDP Climate Majors Report, 2017). Similarly, a small number of very large banks accounts for a substantial share of total banking sector assets, making them economically decisive for aggregate credit allocation (Beltran et al., 2023). The World Bank Financial Development Database shows that on average the three largest banks hold two-thirds of all banking assets (67.58%) across 136 countries. Concentration is even higher in countries represented in our sample (74.87% on average in 2021) with many economies exceeding 80% (World Bank, 2022). Financing needs in fossil fuel activities are also typically large and often arranged through syndicated lending and capital markets transactions, where major global banks are key players. For example, according to Banking on

Climate Chaos 2025 report, 65 of the world's largest banks provided 869 billion USD to the fossil fuel sector in 2024 alone (Rainforest Action Network et al., 2024).

We empirically examine the link between bank exposure to fossil fuel financing and performance, measured by accounting profitability (ROA) and market valuation (Tobin's Q). We use two alternative measures of the independent variable: fossil fuel financing scaled by total assets, and by total loans. Our regression estimations control for several bank- and country-level variables, and year fixed effects. Results indicate that higher flows to fossil fuel-related activities is generally associated with higher profitability but lower market values. In addition, we examine the role of purported or practiced "greenness" in mediating the relationship between fossil fuel lending and financial performance. While neither greenwashing nor greenness meaningfully affect performance independently, we find that green banks that increase their fossil fuel financing tend to suffer significantly larger losses in value. Overall, our findings point to a profitability-valuation wedge, which identifies contradictory financial incentives for banks to practice environmentally responsible lending, and possibly explain the dissociation between their climate-related commitments and activities.

This paper makes several contributions. First, we add to the nascent literature that uses transaction-based fossil-financing data to measure bank-specific environmental activity, instead of relying on emissions or ESG ratings (Lee et al., 2025; Delis et al., 2024). Second, we relate fossil financing to both accounting profitability and market valuation, capturing the trade-off between income generation and transition-risk pricing. Third, we study whether the relation between fossil exposure and bank performance depends on environmental positioning by identifying independent and moderated effects on performance for green banks and greenwashing banks.

2. Related literature and hypotheses development

Prior literature shows that financial institutions can affect firms' environmental outcomes by shaping incentives, monitoring, and access to external finance (Hrazdil, Anginer, & Zhang, 2024). Large institutional investors have been shown to influence corporate carbon emissions, illustrating that capital providers can affect firms' climate-related behaviour (Azar et al., 2021; Martini et al., 2024). Banks have a particularly direct channel because their lending and underwriting decisions influence whether carbon-intensive activities are continued, expanded, or constrained (Reghezza et al., 2022).

In the post-Paris agreement period, banks face heightened expectations to align their strategies with climate goals and to demonstrate credible progress toward decarbonization (Maio et al., 2023). Growing regulatory and stakeholder pressure contribute to the rapid proliferation of bank-level climate commitments, including net-zero pledges, climate targets, and participation in international climate initiatives (Beltran et al., 2023). Yet a central question in the emerging banking-and-climate literature is whether such commitments translate into materially different capital allocation decisions.

A growing body of evidence suggests that stated climate ambitions do not necessarily lead to divestment from carbon-intensive activities or to a reallocation toward "green" finance (Sastry et al., 2024; Beltran et al., 2023). The disparity between banks' pledges and their actual conduct has increasingly garnered attention in literature (Reghezza et al., 2022; Garel, Romec, and Zhou, 2025; Cregan, Kelly and Clinch, 2024). Giannetti, Jasova, Loumioti, and Mendicino (2023) document a disconnect between "green" narratives and lending choices: banks that emphasize environmental themes more strongly in their disclosures extend more credit to "brown" borrowers, showing the reluctance to sever relationships with underperforming carbon-intensive clients. This suggests that

climate commitments may be an imperfect predictor of financing behaviour, leading to a "commitment-action gap" in banking.

This disparity between public commitments and financial practices is closely linked to the broader concept of greenwashing, commonly understood as a gap between symbolic communication and substantive performance, motivated by legitimacy concerns and stakeholder scrutiny (Seele and Gatti, 2017), and often discussed through the lens of signalling and legitimacy. Specifically, from the stakeholder and legitimacy perspectives, communicating commitments to climate change mitigation can reduce external pressure and protect organizational legitimacy, but they can also be superficial and misleading when substantive changes in financing are costly. Relationship lending and portfolio inertia can rationalize continued fossil-related exposures. Evidence suggests that banks emphasizing environmental disclosures may nonetheless extend more credit to carbon-intensive borrowers without tightening price or maturity terms, consistent with reluctance to sever ties with incumbent "brown" clients (Giannetti et al., 2023).

This implies that banks can face a trade-off: fossil financing can support near-term income, while increasing exposure to transition risk that may be priced by investors - especially when policies are stringent (Lee, Kim, and Bae; 2025) or when banks position themselves as environmentally responsible. This trade-off between profitability and valuation is important for assessing banks' incentives to engage in fossil-related financing. However, evidence remains limited on how fossil-fuel financing jointly relates to both profitability and valuation within the same empirical framework, and on whether these effects are amplified when fossil financing conflicts with a bank's environmental positioning. While fossil fuel financing may generate revenues and increase profitability through interest margins and fee income, fossil exposure embeds transition risk (Bolton and Kacperczyk, 2023). Evidence at the bank level supports the importance of transition risk as a

priced exposure. As climate policy tightens and low-carbon technologies diffuse, carbon-intensive assets may face higher costs, demand shifts, and a greater likelihood of becoming stranded, affecting borrower credit quality and increasing downside risks for intermediaries (Martini, Sautner, Steffen, and Theunisz, 2025).

Based on these arguments, we formulate the following testable hypotheses about profitability, valuation, and heterogeneity by environmental positioning:

H1: Banks' fossil-fuel financing is positively associated with accounting profitability (ROA).

H2: Banks' fossil-fuel financing is negatively associated with market valuation (Tobin's Q).

H3: The negative association between fossil-fuel financing and market valuation is stronger for "green" banks (i.e., banks with higher environmental disclosure and higher environmental pillar scores), because inconsistency between a green profile and continued fossil financing increases reputational and credibility concerns.

3. Data description

Our sample consists of an international panel of 60 largest banks by asset size, studied over the period 2016-2024. Fossil fuel financing data is obtained from the Banking on Climate Chaos: Fossil Fuel Finance Report (2024, 2025). Bank financials and Environmental pillar scores are obtained from LSEG (formerly Refinitiv) and Fitch Ratings Pro, while environmental disclosure data is obtained from Bloomberg. Country-level macroeconomic controls are obtained from the World Bank (GDP growth and CPI) and IMF (Financial Development Index). Systemically important financial institutions (G-SIFI) indicator is obtained from the Financial Stability Board website.

Our final sample comprises 476 bank-year observations. Selected variables are winsorized at the 1st and 99th percentiles based on their distribution.

3.1 Explanatory variables

Empirical work on banking and climate finance is affected by measurement challenges. A large share of the literature relies on ESG ratings, which offer standardized, broad coverage but often reflect heterogeneous constructs and methodologies. Systematic evidence shows substantial divergence across ESG rating providers, driven by differences in scope, measurement, and weighting (Christensen, Serafeim, and Sikochi, 2022; Berg, Kölbel, Rigobon, 2022). Rating disagreements can also be associated with higher risk premia and returns, primarily driven by disagreement about the environmental dimension (Gibson Brandon, Krueger, and Schmidt, 2021). Furthermore, Berg, Fabisik, & Sautner (2021) argue that the ongoing process of retroactively rewriting ESG ratings by some providers calls into question the credibility of these proxies for sustainability.

These measurement and incentive issues motivate the use of transaction-based measures capturing actual financing decisions. Following recent studies, we use one such such activity measures, specifically financial flows through syndicated lending and securities underwriting, which directly reflect capital allocation to fossil-fuel activities (Cregan et al., 2024; Lee, Kim, & Bae, 2025; Cosma et al., 2024). We obtain fossil fuel financing data from Banking on Climate Chaos reports (2024, 2025), which are published by a coalition of non-profit climate advocacy groups, and track newly originated flows of financing (syndicated lending, underwriting and project financing). We scale fossil fuel financing volumes to make them economically comparable across banks of different sizes. Our two main independent variables measure banks' fossil fuel financing intensity, and are

calculated as i) the amount of fossil fuel financing by a bank in a given year scaled by total assets and ii) by gross loans in alternative specifications.

3.2 Dependent variables

We study two complementary performance measures for banks: accounting profitability and market valuation. Our first dependent variable is return on assets (ROA), calculated as net income scaled by average total assets. Our second dependent variable is the natural logarithm of Tobin's Q, calculated as the ratio of the sum of market capitalization and total liabilities to the book value of total assets, in line with Bolton and Kacperczyk, 2023.

3.3 Controls

We include a standard set of bank-specific and macroeconomic controls commonly used in bank performance regressions (Caby, Ziane & Lamarque, 2022; Lee, Kim, & Bae, 2025). Bank control variables include: Size (the natural logarithm of the bank's total assets); Capital ratio (equity to total assets); Deposits (total deposits to total assets); Net interest income[1] (logarithm of the ratio of net interest income to adjusted net income); Impaired loans (impaired loans to gross loans); Liquidity (liquid assets to total assets); Loan growth (growth in gross loans). We additionally control for G-SIFI (Global Systemically Important Financial Institutions), indicated by a dummy variable, because the designation captures time-varying differences in regulatory scrutiny and risk-management constraints among the largest banks (Lee, Kim & Bae, 2025; Behn and Schramm, 2021).

[1] For the Net interest income-to-net income ratio, we apply a constant shift to ensure positive values before taking logarithm, as net income is negative for some bank-years.

Macroeconomic controls include: GDP growth; Inflation (CPI, 2010=100); and the Financial Development Index (FDI). We additionally control for banks' environmental standing using the Environmental Pillar Score.

3.4 Greenwashing and Green bank indicators

To distinguish sustainability signalling from measurable environmental performance, we construct two indicator variables: Green Bank and Greenwashing Bank. We classify banks based on the alignment between their environmental disclosures and environmental scores. We define Green Bank as a dummy equal to one for bank-years with above-median environmental disclosure scores and above-median environmental pillar scores, and zero otherwise; and Greenwashing Bank as a dummy equal to one for bank-years with at- or above-median environmental disclosures but below-median environmental pillar scores′. We test whether markets or profitability respond differently to fossil exposures when banks position themselves as environmentally transparent ("green") and when disclosures appear misaligned with environmental performance ("greenwashing").

Variable definitions are provided in Appendix A.

3.5 Descriptive statistics

Descriptive statistics of the variables are presented in Table 1. Bank profitability, measured by ROA, has a mean of 0.6% and varies substantially across the sample. Market valuation, measured by the natural logarithm of Tobin's Q, is centred around zero (-0.008), indicating Q values close to one on average. Turning to our explanatory variables, fossil fuel financing scaled by total assets averages 1.1% (median 0.8%, maximum 4.3%), while fossil fuel financing scaled by gross loans averages

2.9% (median 1.6%, maximum 24.9%). This dispersion suggests sufficient heterogeneity in banks' exposure to fossil fuel activities even within the largest global institutions.

(Insert Table 1 about here)

Table 1 shows considerable variation in bank characteristics. Despite consisting of the world's largest banks, our sample displays heterogeneity in terms of bank size. Total assets range from 238 billion to 6689 billion. In addition, large banks in the sample differ in funding structure, asset quality, and liquidity metrics. The mean ratio of impaired loans is about 2%, and liquidity averages roughly 21% of total assets. The average Capital Ratio (equity to assets) is around 6%, consistent with well-capitalized large institutions (Lee, Kim & Bae, 2025). In terms of sustainability positioning, the average Environmental Pillar Score is relatively high (mean around 84.6), but there is notable cross-sectional dispersion. Using pooled median cutoffs for environmental disclosures and Environmental Pillar scores, we classify 31.3% of the sample as Green Banks and 18.8% as Greenwashing Banks, demonstrating that a sizeable share of observations exhibits either a strong disclosure-performance alignment or a disclosure-performance mismatch.

3.6 Correlations

Table 2 presents pairwise correlations. In bivariate comparisons, both fossil financing measures are positively correlated with bank profitability and market valuation. Fossil financing scaled by total assets correlates positively with ROA (0.191) and Tobin's Q (0.345), while fossil financing scaled by gross loans has a weaker, positive correlation with ROA (0.123) and Tobin's Q

(0.211). As expected, fossil exposure measures are strongly correlated with each other (0.740). Most correlations coefficients among explanatory variables are moderate in magnitude.

(Insert Table 2 about here)

4. Empirical design

4.1 Baseline regressions

We estimate panel regressions to measure the association between bank performance and fossil fuel financing intensity using the following specification:

$$Performance_{i,t} = \alpha + \beta_1 FossilExposure_{i,t} + \beta_2 X_{i,t} + \beta_3 Z_{c,t} + fixed\ effects + \varepsilon_{i,t},$$

where $Performance_{i,t}$ is either ROA or Tobin's Q for bank *i* in year *t*. $FossilExposure_{i,t}$ denotes fossil fuel financing intensity measured as fossil fuel financing scaled by total assets or by gross loans. $X_{i,t}$ is a vector of bank-specific controls (Size, Capital ratio, Deposits, Net interest income, Impaired loans, Liquidity, Loan growth, and the G-SIFI dummy), and $Z_{c,t}$ is a vector of country-level macro controls for the bank's home country *c* (GDP growth; Inflation (CPI); and Financial Development Index (FDI)). All specifications include year fixed effects. We alternatively estimate the regressions including either bank fixed effects or country fixed effects. Robust standard errors are clustered at the bank level.

Because issued financing may be reflected in the bank's income statement with a delay, our profitability specifications use lagged right-hand side variables. Lagging the regressors also

mitigates concerns about reverse causality. Accordingly, in all ROA specifications, fossil exposure and all bank-level and macroeconomic controls are used with one-year lag:

$$ROA_{i,t} = \alpha + \beta_1 FossilExposure_{i,t-1} + \beta_2 X_{i,t-1} + \beta_3 Z_{c,t-1} + fixed\ effects + \varepsilon_{i,t}.$$

Since markets reflect the entirety of existing information instantly, we estimate baseline specifications using contemporaneous regressors and the full set of controls:

$$\ln (Q)_{i,t} = \alpha + \beta_1 FossilExposure_{i,t} + \beta_2 X_{i,t} + \beta_3 Z_{c,t} + fixed\ effects + \varepsilon_{i,t},$$

As a robustness check for valuation regressions, we also estimate specifications in which all right-hand-side variables are lagged for one year to assess whether fossil exposure predicts subsequent valuation.

4.2 Interaction models

To test whether market valuation or profitability respond differently to fossil exposure depending on banks' environmental positioning, we estimate the following interaction model:

$$Performance_{i,t} = \alpha + \beta_1 FossilExposure_{i,t} + \beta_2 \Gamma_{i,t} + \beta_3 (FossilExposure_{i,t} \times \Gamma_{i,t})$$

$$+\beta_2 X_{i,t-1} + \beta_3 Z_{c,t-1} + fixed\ effects + \varepsilon_{i,t},$$

where $\Gamma_{i,t}$ is either the Green Bank dummy or the Greenwashing Bank dummy. The interaction coefficient captures whether the relation between fossil exposure and performance differs for banks with high disclosures and strong environmental scores, or for banks with high disclosures and low environmental scores.

5. Results

Table 3 reports results for the baseline fixed-effect regressions. Panel A of Table 3 presents the results of regressions of ROA on fossil fuel financing, where all right-hand-side variables are lagged by one year. In specifications including year fixed effects the association is positive and significant (Models 1-3, 5-6), indicating that higher fossil fuel exposure is associated with higher ROA. Although fossil financing is a relatively small share of bank total assets in our sample (mean 1.1% of total assets; max 4.3%), the estimated effect is sizable relative to the sample mean ROA (0.6%). A one standard deviation increase in fossil financing scaled by total assets is associated with an approximately 8-9 basis point increase in ROA.

(Insert Table 3 about here)

When fossil financing is scaled by gross loans (Models 5-8), the coefficients of the main independent variable are again positive and significant in Models 5-6. However, when controlling for bank fixed effects (Models 4 and 8), the coefficients become negative and statistically insignificant. This suggests that the positive association with profitability is largely driven by persistent cross-sectional differences across banks rather than within-bank changes in fossil financing over time.

Panel B of Table 3 shows that fossil fuel financing is negatively associated with market valuation (Tobin's Q) once controls and fixed effects are included. For fossil financing scaled by total assets the coefficient is consistently negative and statistically significant across Models 1-4. A standard deviation increase in fossil financing intensity is associated with approximately 0.4-0.5%

lower Tobin's Q. For fossil financing scaled by gross loans, the negative effect is even stronger in magnitude and highly significant, based on coefficients reported in Models 6-8. This effect remains robust in specifications with bank fixed effects. The negative association with valuation is consistent with the market pricing carbon-transition risk (Bolton and Kacperczyk, 2023).

We perform alternative regressions for Tobin's Q, in which we lag all independent variables and controls by one year, similar to the regression specification for profitability. The (untabulated) results remain statistically significant and the coefficients are similar or moderately larger in magnitude than those reported in Panel B of Table 3. For fossil financing scaled by total assets, the coefficients range from -0.589 ($p<0.05$) to -0.875 ($p<0.01$) in specifications with bank fixed effects. For fossil financing to gross loans, the coefficients also remain negative and strongly significant. This suggests that that fossil exposure predicts valuation discounts in the subsequent year.

5.1 Heterogeneity by environmental positioning

Next, we examine whether the relation between fossil exposure and performance varies depending on bank environmental positioning. We construct two indicators based on pooled median cutoffs: Green Bank (high environmental disclosure and high environmental pillar score) and Greenwashing Bank (high environmental disclosure and low environmental pillar score). We interact fossil financing intensity with these indicators to determine whether they moderate the link between fossil fuel financing and bank performance. The results of the regressions are presented in Table 4.

(Insert Table 4 about here)

In regressions for ROA (Table 4, Panel A) the coefficients for fossil financing intensity remain positive and significant across both scaling approaches (fossil financing to total assets and fossil financing to gross loans). The Greenwashing Bank indicator is weakly negative (significant at 10% level), suggesting slightly lower profitability for Greenwashing banks, but the size of the coefficient is not economically meaningful, and therefore we conclude that the main profitability pattern is still primarily driven by fossil exposure and is not moderated by the extent of greenwashing.

In regressions for Tobin's Q (Table 4, Panel B), the results provide additional context. The interaction between fossil financing and the Green Bank indicator is negative and statistically significant, both when fossil financing is scaled by total assets (-0.858, $p < 0.05$) and when it is scaled by gross loans (-0.156, $p < 0.10$). Meanwhile, the interaction with the Greenwashing indicator is not statistically significant in any specification. These results suggest that the loss in value associated with fossil fuel exposure is larger for banks that position themselves as environmentally conscious, consistent with a stronger penalty when fossil financing conflicts with a "green" profile.

6. Discussion and Conclusions

This study examines whether fossil fuel financing pays off for banks by examining the relationship between fossil financing activity to bank performance. We measure fossil exposure using annual flows of fossil fuel financing provided through lending and securities underwriting - an activity-based measure that reflects financing decisions directly controlled by banks. Two metrics of bank performance are studied: bank profitability (ROA) and market value (Tobin's Q). In addition, we

also investigate whether the link between fossil fuel financing and performance is moderated by alignment between the bank's environmental disclosures and Environmental Pillar scores.

We find that fossil fuel financing is positively associated with ROA in specifications that control for bank characteristics, macroeconomic conditions, and year fixed effects, but the association disappears once bank fixed effects are included. This suggests that the effects of fossil financing on profitability are linked to differences across banks rather than to within-bank increases in fossil fuel financing over time. In contrast, fossil fuel exposure is consistently associated with lower market valuation. The negative relationship with Tobin's Q is robust to extensive controls, alternative scaling of fossil financing intensity (by total assets or gross loans), and fixed effects. Additionally, the valuation penalty is larger for banks classified as green (with high environmental disclosures and high Environmental pillar scores), indicating that fossil exposure is priced more adversely when it conflicts with a "green" positioning.

Overall, we show that while fossil financing is associated with high accounting profitability, it is penalized in market valuation. A natural explanation is that investors discount fossil exposure through a transition-risk channel, consistent with broader evidence that carbon transition risk is priced (Bruno and Lombini, 2023; Ge et al., 2024; Bolton and Kacperczyk, 2023), while current accounting returns can still reflect fee and interest income from financing activity. The generally low proportion of fossil fuel financing in banks' loan portfolios also suggests that otherwise profitable banks may have relatively higher fossil financing intensity, consistent with evidence documented by Reghezza et al., 2022. These results are also partially consistent with those of Lee et al. (2025), who report a negative value effect of fossil fuel financing in the presence of strong country-level environmental policies, and those of Mouti et al. (2025), who document a negative relationship between environmental credit risk and market values. Moreover, when it comes to the

significantly larger valuation discounts associated with fossil fuel financing by green banks, our results support prior evidence of the higher premia charged by green banks for such financing (Delis et al., 2024), but suggest that these premia may be insufficient to offset the associated discounts.

Our findings highlight a conflict between short-term incentives and long-term discipline, particularly for banks that engage in fossil fuel financing despite sporting a relatively clean reputation. Taken together, the results of this study underscore the importance of accurately pricing and integrating climate-related risks into policy and decision-making in financial institutions.

References

Aswani, J., Raghunandan, A., & Rajgopal, S. (2024). Are carbon emissions associated with stock returns?. *Review of Finance*, *28*(1), 75-106.

Azar, J., Duro, M., Kadach, I., & Ormazabal, G. (2021). The big three and corporate carbon emissions around the world. *Journal of Financial Economics, 142,* 674–696.

Battiston, S., Monasterolo, I., Riahi, K., and van Ruijven, B. J. (2021). Accounting for finance is key to climate mitigation pathways. Science, 372 (654), 918–920.

Behn, M., and A. Schramm. 2021. "The Impact of G-SIB Identification on Bank Lending: Evidence From Syndicated Loans." Journal of Financial Stability 57: 100930.

Beltran, D. O., Bensen, H., Kvien, A., McDevitt, E., Sanz, M. V., & Uysal, P. (2023). What are large global banks doing about climate change? *International Finance Discussion Papers, No. 1368.*

Berg, F., Fabisik, K., & Sautner, Z. (2021). Rewriting history II: The (un) predictable past of ESG ratings. European Corporate Governance Institute–Finance Working Paper, 708(2020), 10-2139.

Berg, F., Koelbel, J. F., & Rigobon, R. (2022). Aggregate confusion: The divergence of ESG ratings. Review of Finance, 26(6), 1315-1344.

Bolton, P., & Kacperczyk, M. (2023). Global pricing of carbon-transition risk. *The Journal of Finance*, *78*(6), 3677-3754.

Bressan, S. (2025). Does the environmental impact of banks affect their financial performance?. *Journal of Banking Regulation*, 26(2), 261-278.

Bruno, B., & Lombini, S. (2023). Climate transition risk and bank lending. *Journal of Financial Research*, 46, S59-S106.

CDP. (2017, July). *The Carbon Majors Database: CDP Carbon Majors Report 2017.*

Christensen, D.M., Serafeim, G. and Sikochi, A., 2022. Why is corporate virtue in the eye of the beholder? The case of ESG ratings. *The Accounting Review,* 97(1), pp.147-175.

Cosma, S., Galletta, S., Mazzù, S., & Rimo, G. (2024). Banks' fossil fuel divestment and corporate governance: The role of board gender diversity. *Energy Economics*, *139*, 107948.

Cregan, C., Kelly, J. A., & Clinch, J. P. (2024). Do environmental and climate scores for financial institutions reflect lending and underwriting activity? A case study of global banks. *Business Strategy and the Environment*, *33*(7), 6433-6450.

de Bandt, O., Kuntz, L.-C., Pankratz, N., Pegoraro, F., Solheim, H., Sutton, G., Takeyama, A., & Xia, F. D. (2024). The effects of climate change-related risks on banks: A literature review. *Journal of Economic Surveys.*

Delis, M. D., Greiff, K. D., Iosifidi, M., & Ongena, S. (2024). Being stranded with fossil fuel reserves? Climate policy risk and the pricing of bank loans. *Financial Markets, Institutions & Instruments*, 33(3), 239-265.

Demetriades, E., & Politsidis, P. N. (2025). Bank lending to fossil fuel firms. *Journal of Financial Stability*, 76, 101349.

Galletta, S., Mazzù, S., Naciti, V., & Paltrinieri, A. (2024). A PRISMA systematic review of greenwashing in the banking industry: A call for action. *Research in International Business and Finance,* 69, 102262.

Garel, A., Romec, A., & Zhou, F. (2025). Shareholder engagements in banks. *Economics Letters*, 112447.

Ge, Z., Liu, Q., & Wei, Z. (2024). Assessment of bank risk exposure considering climate transition risks. *Finance Research Letters*, 67, 105903.

Giannetti, M., Jasova, M., Loumioti, M., & Mendicino, C. (2023). “Glossy green” banks: the disconnect between environmental disclosures and lending activities. (December, 2023). ECB Working Paper, (2023/2882).

Gibson Brandon, R., Krueger, P. and Schmidt, P.S., 2021. ESG rating disagreement and stock returns. *Financial Analysts Journal*, 77(4), pp.104-127.

Hrazdil, K., Anginer, D., Li, J., & Zhang, R. (2024). Climate reputation and bank loan contracting. *Journal of Business Ethics*, *192*(4), 875-896.

Kotsantonis, S., & Serafeim, G. (2019). Four things no one will tell you about ESG data. *Journal of Applied Corporate Finance*, *31*(2), 50-58.

Lee, A., Kim, J. D., & Bae, S. M. (2025). The Impact of Fossil Fuel Financing on Firm Value and the Role of Climate Policies and Global Climate Initiatives in the Banking Industry. *Business Strategy and the Environment*.

Maio, C. D., Dimitropoulou, M., Farkas, Z. L., Houben, S., Lialiouti, G., Plavec, K., ... & Maria, E. E. (2023). An Examination of Net-Zero Commitments by the World's Largest Banks. *ECB Occasional Paper*, (2023/334).

Martini, F., Sautner, Z., Steffen, S., & Theunisz, C. (2025). Climate Transition Risks of Banks: Evidence from Syndicated Loan Books. *Swiss Finance Institute Research Paper*, (23-66).

Matisoff, D. C., Noonan, D. S., & O'Brien, J. J. (2013). Convergence in environmental reporting: Assessing the carbon disclosure project. *Business Strategy and the Environment*, *22*(5), 285-305.

Mouti, K., Kilincarslan, E., & Li, J. (2025). Environmental Credit Risk, Climate Change and Bank Performance: Evidence From a Global Panel of Banks. *Business Strategy and the Environment,* 35(2), 1646-1666.

Reghezza, A., Altunbas, Y., Marques-Ibanez, D., Rodriguez d'Acri, C., & Spaggiari, M. (2022). Do banks fuel climate change? *Journal of Financial Stability, 62,* 101049.

Rainforest Action Network, BankTrack, Center for Energy, Ecology and Development, Indigenous Environmental Network, Oil Change International, Reclaim Finance, Sierra Club, & Urgewald. (2025). *Banking on Climate Chaos 2025* Report.

Sastry, P., Verner, E., & Marqués Ibáñez, D. (2024). *Business as usual: bank climate commitments, lending, and engagement* (No. 2921). ECB Working Paper.

Seele, P., & Gatti, L. (2017). Greenwashing revisited: In search of a typology and accusation-based definition incorporating legitimacy strategies. *Business strategy and the environment*, *26*(2), 239-252.

World Bank. (2022). *Global Financial Development Database 2022* [Data set]. World Bank.

Table 1. Descriptive statistics

Variable	N	Mean	Median	Std. Dev.	Min	Max
ROA	588	0.006	0.006	0.004	-0.014	0.016
Tobin's Q	539	-0.008	-0.016	0.032	-0.067	0.106
Fossil finance to total assets	529	0.011	0.008	0.009	0.000	0.043
Fossil finance to gross loans	529	0.029	0.016	0.037	0.000	0.249
Size	588	20.854	20.74	0.633	19.288	22.624
G-SIFI	600	0.453	0.000	0.498	0.000	1.000
Capital ratio	588	0.063	0.061	0.015	0.032	0.119
Deposits to assets	588	0.611	0.605	0.170	0.113	0.925
Net interest income	588	-0.279	-0.267	0.523	-1.705	0.942
Impaired loans	588	0.020	0.015	0.017	0.003	0.111
Liquidity	600	0.233	0.211	0.133	0.026	0.774
Loan growth	593	0.058	0.050	0.071	-0.116	0.351
GDP growth	600	2.667	2.512	3.314	-10.941	9.690
Inflation	600	120.429	117.594	13.485	97.745	217.289
Financial development index	600	0.793	0.817	0.117	0.439	0.98
Environmental score	531	84.630	89.103	12.162	15.447	98.982
Green bank	600	0.313	0.000	0.464	0.000	1.000
Greenwashing bank	600	0.188	0.000	0.391	0.000	1.000

Note: ROA is net income scaled by average total assets. Tobin's Q is the natural logarithm of the valuation ratio (Market cap + Total liabilities)/Total assets. Fossil finance to total assets and Fossil finance to gross loans measure fossil fuel financing intensity scaled by total assets and gross loans. Size is the log of total assets (thousands). G-SIFI equals 1 for global systemically important banks. Controls include equity-to-assets, deposits-to-assets, impaired loans-to-gross loans, liquidity (liquid assets-to-assets), loan growth, GDP growth, CPI (2010=100), and the IMF financial development index. Net interest income is $\ln(\text{NII}/(\text{Net income} + k))$, where k ensures positivity. Environmental score is the Refinitiv environmental pillar score. Green bank equals 1 if disclosure and environmental pillar scores are both above the median; Greenwashing bank equals 1 if disclosure is above the median but the pillar score is below the median.

Table 2. Correlations.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1) ROA	1.000																	
(2) Tobin's Q	0.427*	1.000																
(3) Fossil finance to total assets	0.191*	0.345*	1.000															
(4) Fossil finance to gross loans	0.123*	0.211*	0.740*	1.000														
(5) Size	0.091*	-0.318*	-0.089*	0.018	1.000													
(6) G-SIFI	-0.113*	-0.172*	0.240*	0.373*	0.687*	1.000												
(7) Capital ratio	0.546*	0.133*	0.214*	0.195*	0.073*	0.032	1.000											
(8) Deposits to assets	0.334*	-0.168*	-0.202*	-0.466*	0.090*	-0.284*	0.286*	1.000										
(9) Net interest income	0.040	-0.241*	-0.126*	-0.323*	0.611*	0.259*	0.230*	0.446*	1.000									
(10) Impaired loans	-0.301*	-0.235*	-0.227*	-0.142*	-0.065	0.038	-0.078*	-0.133*	0.061	1.000								
(11) Liquidity	-0.258*	0.02	0.405*	0.702*	0.129*	0.512*	-0.198*	-0.677*	-0.370*	-0.085*	1.000							
(12) Loan growth	0.327*	0.054	0.004	0.137*	0.027	-0.107*	0.043	0.239*	-0.100*	-0.164*	-0.047	1.000						
(13) GDP growth	0.357*	-0.007	-0.090*	-0.095*	0.085*	-0.116*	0.190*	0.392*	0.145*	-0.089*	-0.290*	0.306*	1.000					
(14) Inflation	0.244*	0.015	-0.196*	-0.161*	0.069*	-0.181*	0.058	0.288*	0.223*	-0.069*	-0.264*	0.124*	0.221*	1.000				
(15) Financial development index	-0.013	0.409*	0.504*	0.447*	-0.088*	0.245*	0.119*	-0.497*	-0.204*	-0.192*	0.499*	-0.243*	-0.389*	-0.335*	1.000			
(16) Environmental score	-0.239*	0.172*	0.198*	0.240*	-0.024	0.237*	-0.264*	-0.641*	-0.165*	0.092*	0.444*	-0.315*	-0.413*	-0.150*	0.558*	1.000		
(17) Green bank	-0.120*	0.063	0.034	0.129*	-0.014	0.099*	-0.039	-0.293*	-0.008	0.071*	0.243*	-0.187*	-0.147*	-0.064	0.339*	0.558*	1.000	
(18) Greenwashing	0.043	-0.189*	-0.052	-0.092*	-0.016	-0.105*	0.089*	0.215*	0.028	-0.130*	-0.166*	0.021	0.086*	0.152*	-0.128*	-0.221*	-0.325*	1.000

Note: This table reports pairwise Pearson correlations for the main variables used in the analysis. ROA is net income scaled by average total assets. Tobin's Q is measured as the natural logarithm of (Market cap + Total liabilities)/Total assets. Fossil exposure is captured by fossil fuel financing scaled by total assets and by gross loans. Size is the log of total assets (thousands). G-SIFI equals 1 for global systemically important banks. Environmental score is the Refinitiv environmental pillar score. Green bank equals 1 if environmental disclosure and environmental pillar scores are both above the median; Greenwashing bank equals 1 if disclosure is above the median but the pillar score is below the median. * denotes statistical significance at the 1%, 5%, or 10% levels.

Table 3 Panel A. Dependent variable: ROA

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Fossil finance to total assets	0.092***	0.084***	0.068*	-0.048				
	(0.029)	(0.026)	(0.040)	(0.061)				
Fossil finance to gross loans					0.034***	0.027***	0.012	-0.014
					(0.012)	(0.010)	(0.009)	(0.012)
Size	0.002	0.002*	0.002**	-0.007***	0.001	0.002	0.002**	-0.007***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.002)
Capital ratio	0.108***	0.094***	0.021	-0.013	0.090***	0.079***	0.021	-0.016
	(0.017)	(0.018)	(0.029)	(0.039)	(0.022)	(0.023)	(0.031)	(0.038)
Deposits to assets	0.001	0.001	0.005***	0.001	0.002	0.002	0.006***	-0.001
	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.004)
Net interest income	-0.001	-0.002	-0.002**	0.000	-0.001	-0.001	-0.002**	0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Impaired loans	-0.017	-0.014	-0.034**	-0.029*	-0.024*	-0.018	-0.033**	-0.031**
	(0.014)	(0.016)	(0.015)	(0.015)	(0.014)	(0.016)	(0.016)	(0.015)
Liquidity	-0.004	-0.004	-0.002	0.003	-0.007	-0.007	-0.003	0.004
	(0.004)	(0.004)	(0.003)	(0.004)	(0.005)	(0.005)	(0.003)	(0.004)
Loan growth	0.005*	0.002	-0.001	-0.002	0.002	0.001	-0.002	-0.002
	(0.003)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
G-SIFI	-0.002**	-0.002**	-0.001*	-0.001	-0.001*	-0.001*	-0.001*	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GDP growth		0.000**		0.000		0.000*		0.000
		(0.000)		(0.000)		(0.000)		(0.000)
Inflation		0.000		0.000*		0.000		0.000*
		(0.000)		(0.000)		(0.000)		(0.000)
Financial development index		0.004		-0.006		0.006*		-0.006
		(0.003)		(0.009)		(0.003)		(0.009)
Environmental score				0.000*				0.000*
				(0.000)				(0.000)
Constant	-0.036*	-0.053*	-0.046**	0.139***	-0.025	-0.045*	-0.041**	0.142***
	(0.021)	(0.027)	(0.018)	(0.045)	(0.018)	(0.026)	(0.018)	(0.046)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	No	No	Yes	No	No	No	Yes	No
Bank fixed effects	No	No	No	Yes	No	No	No	Yes
No. of observations	470	470	470	417	470	470	470	417
Adjusted R^2	0.423	0.454	0.547	0.69	0.427	0.45	0.542	0.691

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

Note: This table reports fixed-effects panel regressions of bank profitability (ROA) on fossil fuel financing intensity. ROA is net income scaled by average total assets (Fitch). Fossil exposure is measured as fossil fuel financing scaled by total assets (Models 1–4) or by gross loans (Models 5–8). All right-hand-side variables are lagged by one year. All specifications include year fixed effects; Models 3 and 7 include country fixed effects; Models 4 and 8 include bank fixed effects. Macroeconomic controls (GDP growth, inflation, and financial development index) are included in Models 2–4 and 6–8; environmental pillar score is added in Models 4 and 8. Standard errors are clustered at the bank level and reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 3 Panel B. Dependent variable: ln(Tobin's Q)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Fossil finance to total assets	-0.402**	-0.473**	-0.502**	-0.451**				
	(0.199)	(0.229)	(0.228)	(0.218)				
Fossil finance to gross loans					-0.103	-0.210***	-0.215***	-0.206***
					(0.094)	(0.060)	(0.061)	(0.056)
Size	-0.008	-0.018**	-0.019**	-0.017*	-0.006	-0.021**	-0.022**	-0.021**
	(0.007)	(0.008)	(0.009)	(0.009)	(0.006)	(0.008)	(0.009)	(0.009)
Capital ratio	-0.725***	-0.732***	-0.755***	-0.769***	-0.735***	-0.744***	-0.761***	-0.767***
	(0.135)	(0.201)	(0.213)	(0.221)	(0.133)	(0.194)	(0.208)	(0.215)
ROA	4.496***	2.652***	2.677***	2.709***	4.370***	2.394***	2.390***	2.405***
	(0.919)	(0.567)	(0.654)	(0.665)	(0.908)	(0.533)	(0.611)	(0.617)
Deposits to assets	0.006	0.038	0.035	0.031	-0.002	0.019	0.014	0.012
	(0.019)	(0.023)	(0.024)	(0.022)	(0.024)	(0.020)	(0.020)	(0.020)
Net interest income	0.007	0.019***	0.019***	0.020***	0.004	0.015***	0.015***	0.015***
	(0.007)	(0.006)	(0.006)	(0.006)	(0.008)	(0.004)	(0.004)	(0.004)
Impaired loans	-0.022	-0.046	-0.05	-0.061	-0.046	-0.103	-0.108*	-0.115*
	(0.080)	(0.062)	(0.058)	(0.057)	(0.098)	(0.062)	(0.059)	(0.060)
Liquidity	-0.013	-0.013	-0.013	-0.011	-0.005	0.01	0.01	0.012
	(0.025)	(0.026)	(0.026)	(0.025)	(0.026)	(0.022)	(0.022)	(0.023)
Loan growth	0.006	0.007	0.007	0.005	0.01	0.009	0.01	0.008
	(0.020)	(0.014)	(0.014)	(0.014)	(0.020)	(0.013)	(0.013)	(0.013)
G-SIFI	0.002	(0.001)	(0.001)	(0.001)	0.001	(0.002)	(0.002)	(0.002)
	(0.004)	(0.003)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.004)
GDP growth			0.000	0.000			0.000	0.000
			(0.000)	(0.000)			(0.000)	(0.000)
Inflation			0.000	0.000			0.000	0.000
			(0.000)	(0.000)			(0.000)	(0.000)
Financial development index			0.042	0.048			0.041	0.045
			(0.033)	(0.033)			(0.032)	(0.032)
Environmental score				0.000				0.000
				(0.000)				(0.000)
Constant	1.582***	1.229***	1.119***	1.090***	1.648***	1.198***	1.121***	1.093***
	(0.168)	(0.139)	(0.154)	(0.161)	(0.145)	(0.136)	(0.146)	(0.155)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	No	No	No	Yes	No	No	No
Bank fixed effects	No	Yes	Yes	Yes	No	Yes	Yes	Yes
No. of observations	476	476	476	470	476	476	476	470
Adjusted R^2	0.758	0.882	0.882	0.883	0.757	0.887	0.886	0.888

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

Note: This table reports fixed-effects panel regressions of bank market valuation, measured as the natural logarithm of Tobin's Q, on fossil fuel financing intensity. Tobin's Q is constructed using market capitalization and total liabilities relative to total assets (Refinitiv/LSEG). Fossil exposure is measured as fossil fuel financing scaled by total assets (Models 1–4) or by gross loans (Models 5–8). All specifications include year fixed effects and control for bank characteristics; ROA is included as a control to account for contemporaneous profitability. Models 1 and 5 include country fixed effects, while Models 2–4 and 6–8 include bank fixed effects. Macroeconomic controls (GDP growth, inflation, and financial development index) are included in Models 3–4 and 7–8; environmental pillar score is added in Models 4 and 8. Standard errors are clustered at the bank level and reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 4 Panel A. Dependent variable: ROA.

	Model 1	Model 2	Model 3	Model 4
Fossil finance to total assets	0.085***	0.096***	0.084***	0.098***
	(0.026)	(0.029)	(0.026)	(0.026)
Green bank	0	0.001		
	0.000	(0.001)		
Greenwashing bank			-0.001*	0
			0.000	(0.001)
Fossil lending × Green bank		-0.032		
		(0.033)		
Fossil lending × Greenwashing bank				-0.111
				(0.067)
Control variables	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	No	No	No	No
No. of observations	470	470	470	470
Adjusted R^2	0.453	0.453	0.457	0.465

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

Table 4 Panel B. Dependent variable: ln(Tobin's Q)

	Model 1	Model 2	Model 3	Model 4
Fossil finance to total assets	0.022	0.36	0.015	-0.057
	(0.350)	(0.376)	(0.335)	(0.354)
Green bank	0.001	0.012		
	(0.004)	(0.007)		
Greenwashing bank			-0.006	-0.009
			(0.004)	(0.008)
Fossil lending × Green bank		-0.858**		
		(0.405)		
Fossil lending × Greenwashing bank				0.336
				(0.478)
Control variables	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	No	No	No	No
No. of observations	476	476	476	476
Adjusted R^2	0.606	0.618	0.611	0.611

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

Note: Table 4 reports panel regressions with interaction terms testing whether the association between fossil fuel financing and bank outcomes differs by banks' environmental positioning. Panel A uses ROA as the dependent variable and Panel B uses the natural logarithm of Tobin's Q. Fossil exposure is measured as fossil fuel financing scaled by total assets. In Panel A (ROA), all right-hand-side variables are lagged by one year; in Panel B (ln(Tobin's Q)), the specifications use contemporaneous right-hand-side variables (no lags). *Green bank* is an indicator equal to one for bank-years with both environmental disclosure and environmental pillar score above the pooled median; *Greenwashing bank* equals one for bank-years with disclosure above the median but environmental pillar score below the median. Models 2 and 4 include interactions between fossil exposure and these indicators. All models include the full set of control variables and year fixed effects. Standard errors are clustered at the bank level and reported in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Appendix A. Variable definitions

Variable	Definition / construction	Source
ROA	Net income / average total assets	Fitch Ratings Pro
ln(Tobin's Q)	ln((Market capitalization + Total liabilities) / Total assets)	Refinitiv/LSEG
Fossil financing / total assets	Annual fossil fuel financing flows / total assets (winsorized 1/99)	Banking on Climate Chaos (BOCC); Fitch (assets)
Fossil financing / gross loans	Annual fossil fuel financing flows / gross loans (winsorized 1/99)	Banking on Climate Chaos (BOCC); Fitch (gross loans)
Size	ln(Total assets, thousands)	Fitch Ratings Pro
G-SIFI	Dummy = 1 if bank is classified as a global systemically important financial institution	Financial Stability Board
Capital ratio	Total equity / total assets	Fitch Ratings Pro
Deposits	Total deposits / total assets	Fitch Ratings Pro
Net interest income	ln(Net interest income / (Net income + k)), where k =|min(Net income)| + 1 ensures positivity (winsorized 1/99)	Fitch Ratings Pro
Impaired loans	Impaired loans / gross loans (winsorized 1/99)	Fitch Ratings Pro
Liquidity	Liquid assets / total assets	Fitch Ratings Pro
Loan growth	Growth in gross loans (winsorized 1/99)	Fitch Ratings Pro
GDP growth	Annual GDP growth rate	World Bank
Inflation (CPI)	Consumer Price Index (2010=100)	World Bank
Financial Development Index	Financial Development Index	IMF
Environmental pillar score	Environmental Pillar Score	Refinitiv/LSEG
Environmental disclosure score	Environmental disclosure score	Bloomberg
Green bank	Dummy = 1 if environmental disclosure ≥ pooled median AND environmental pillar score ≥ pooled median; 0 otherwise	Constructed (Bloomberg; Refinitiv/LSEG)
Greenwashing bank	Dummy = 1 if environmental disclosure ≥ pooled median AND environmental pillar score < pooled median; 0 otherwise	Constructed (Bloomberg; Refinitiv/LSEG)