From Pledge to Exit:
Did Net-Zero Banking Alliance Commitments Ever Constrain Fossil Fuel Financing?

Causal Evidence from the 2024–2025 Alliance Collapse

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Abstract

The Net-Zero Banking Alliance (NZBA), launched in 2021 with 140 member banks representing $75.5 trillion in assets, collapsed between December 2024 and October 2025 following a cascade of withdrawals triggered by political pressure in the United States. We exploit this collapse as a natural experiment to test whether voluntary climate alliance commitments ever meaningfully constrained bank fossil fuel financing. Using a staggered difference-in-differences design across four sequential exit waves, viz., U.S. banks (December 2024–January 2025), Canadian banks (January–March 2025), Australian and Japanese banks (March–April 2025), and European holdouts (July–August 2025), we analyze changes in fossil fuel financing volumes using the Banking on Climate Chaos dataset, and market reactions using high-frequency stock return data. We test two competing hypotheses: that NZBA membership was a binding constraint whose removal freed banks to increase fossil fuel lending (the *binding commitment* hypothesis), or that membership was purely symbolic and exits had no real financing effect (the *cheap talk* hypothesis). We supplement the core analysis with a novel extension linking bank alliance participation to satellite-detected methane emissions at borrower facilities using Carbon Mapper data. Preliminary descriptive evidence suggests that aggregate fossil fuel financing by the 65 largest global banks increased by 23 percent from 2023 to 2024, rising from $706.8 billion to $869.4 billion, even before the majority of exits had occurred. This is a pattern more consistent with the cheap talk hypothesis. This paper contributes to the growing literature on the effectiveness of voluntary climate commitments in the financial sector.

Keywords: climate finance, net-zero alliances, NZBA, GFANZ, fossil fuel financing, voluntary commitments, divestment, staggered difference-in-differences, event study, satellite emissions monitoring

JEL Classification: G21, G28, Q54, Q58

1. Introduction

On October 3, 2025, the United Nations-backed Net-Zero Banking Alliance (NZBA) voted to cease operations, ending the most ambitious attempt to align global banking with the goals of the Paris Agreement. At its peak in late 2024, the alliance comprised 140 member banks from 44 countries, collectively holding $75.5 trillion in banking assets. By the time of its dissolution, membership had hemorrhaged to approximately $42.2 trillion in assets, and the alliance's core requirement for member banks to align their lending portfolios with a 1.5°C warming scenario had already been abandoned in an April 2025 rule change designed to stem the exodus. The collapse of the NZBA, together with the parallel suspension of the Net Zero Asset Managers initiative (NZAM) and the restructuring of the Glasgow Financial Alliance for Net Zero (GFANZ), represents the single most significant institutional failure in climate finance to date.

The sequence of events that led to this collapse constitutes a remarkably clean natural experiment. The exit cascade was initiated not by a gradual reassessment of climate science or a shift in bank business strategy, but by an acute exogenous political shock: the election of Donald Trump on November 5, 2024, and the subsequent intensification of Republican state attorneys general investigations into banks' climate alliance memberships. Goldman Sachs announced its withdrawal on December 6, 2024. Within six weeks, all six major U.S. banks had followed, including JPMorgan Chase, Citigroup, Bank of America, Wells Fargo, and Morgan Stanley. Critically, the Texas Attorney General closed existing investigations into several of these banks immediately after their exits, confirming the direct causal channel from political pressure to withdrawal. Canadian banks followed within weeks, then Australian and Japanese institutions, and finally European holdouts including HSBC, Barclays, and UBS through the summer of 2025.

This paper asks a deceptively simple question with profound implications for the architecture of global climate governance: *Did NZBA membership ever constrain fossil fuel financing?* If the answer is yes, i.e., if banks that exited subsequently increased their fossil fuel lending relative to those that stayed, then the alliance was functioning as intended, and its collapse represents a genuine loss for climate action. If the answer is no, i.e., if exits had no discernible effect on financing patterns, then the alliance was, in the language of game theory, cheap talk: a costless signal that provided reputational benefits without altering real behavior. Either answer is consequential. The first would imply that rebuilding enforcement mechanisms for voluntary climate alliances is worth the political cost. The second would imply that the entire framework of voluntary financial-sector climate commitments, viz., NZBA, NZAM, NZAOA, GFANZ, needs to be replaced with binding regulation.

We test these hypotheses using three complementary empirical approaches, all employing exclusively open-access data. First, we conduct a high-frequency event study around bank exit announcements using daily stock return data from Yahoo Finance to assess whether financial markets treated NZBA membership as a binding constraint. If markets believed the commitment was costly, exit announcements should generate positive abnormal returns for exiting banks (a removal of constraint) and potentially positive returns for their fossil fuel borrowers (an expectation of easier credit). Second, we implement a staggered difference-in-differences design using the Banking on Climate Chaos (BOCC) dataset, which provides comprehensive bank-level fossil fuel financing volumes for the 65 largest global banks. The sequential nature of the exit waves (U.S. first, then Canadian, then Asian-Pacific, then European) creates natural cohort variation that we exploit using the Callaway and Sant'Anna (2021) estimator. Third, we propose

a novel extension that links bank-level alliance participation to satellite-detected methane emissions at borrower facilities, using freely available data from the Carbon Mapper Data Portal.

Preliminary descriptive evidence is striking. The Banking on Climate Chaos 2025 report documents that the 65 largest global banks committed $869.4 billion to fossil fuel companies in 2024, a 23 percent increase from the $706.8 billion recorded in 2023. This increase occurred while the majority of banks were still NZBA members. Total financing for fossil fuel *expansion* companies (those actively developing new reserves) reached $429 billion in 2024, an 8 percent increase. JPMorgan Chase, the single largest fossil fuel financier at $40.8 billion in 2023, was simultaneously one of the most prominent NZBA members. These descriptive patterns are suggestive of the cheap talk hypothesis, though our econometric analysis is designed to provide causal rather than merely correlational evidence.

This paper makes four contributions. First, we provide the first causal analysis of whether voluntary climate alliance membership in the banking sector constrains real financing decisions, addressing a question that the NBER Climate Finance Conference call for papers explicitly poses: “How effective are climate actions by corporations and investors? To what extent can investors drive change in the real economy?” Second, we introduce satellite-verified emissions data (Carbon Mapper) as an outcome variable for financial alliance effectiveness studies, bridging the gap between financial flows and physical environmental outcomes. Third, we contribute to the literature on the effectiveness of divestment and engagement strategies by studying the *reverse* of commitment, i.e. withdrawal, which provides a cleaner test than initial commitment (which suffers from self-selection). Fourth, we demonstrate that rigorous climate finance research is feasible using exclusively open-access data, a consideration of increasing importance as questions about data access and replicability gain prominence in the field.

The remainder of this paper is organized as follows. Section 2 provides institutional background on the NZBA, its membership structure, and the political economy of the collapse. Section 3 reviews the related literature and develops our hypotheses. Section 4 describes our data sources and sample construction. Section 5 presents the empirical strategy. Section 6 reports preliminary results and descriptive analysis. Section 7 outlines planned extensions, including the satellite emissions analysis. Section 8 concludes with policy implications.

2. Institutional Background

2.1 The Rise of Net-Zero Financial Alliances (2019–2024)

The NZBA was launched in April 2021 as part of the Glasgow Financial Alliance for Net Zero (GFANZ), an umbrella organization convened by Mark Carney, then the United Nations Special Envoy on Climate Action and Finance, in preparation for the COP26 climate summit. GFANZ ultimately comprised eight sector-specific alliances covering banking (NZBA), asset management (NZAM), asset ownership (NZAOA), insurance (NZIA), financial service providers (NZFSPA), investment consultants (NZICI), export credit agencies (NZECA), and venture capital (VCA). The NZBA was by far the largest in terms of represented assets, beginning with 43 founding member banks and growing to over 140 members by late 2024.

Membership in the NZBA entailed three core commitments. First, banks pledged to transition the greenhouse gas emissions financed by their lending and investment portfolios to align with pathways to net-zero emissions by 2050, consistent with a 1.5°C warming trajectory. Second, banks committed to setting intermediate 2030 sectoral targets, initially focused on high-emission sectors such as oil and gas, power generation, and coal. Third, banks agreed to publish annual disclosures of their absolute financed emissions and emissions intensity metrics, following the Partnership for Carbon Accounting Financials (PCAF) methodology. In March 2024, the NZBA issued updated guidelines that expanded the scope of commitments to include capital markets activities such as debt and equity underwriting, in addition to direct lending.

Critically, NZBA membership was entirely voluntary. There were no financial penalties for non-compliance with announced targets, no binding enforcement mechanisms, and no restrictions on withdrawal. The alliance provided methodological guidance and peer-learning

opportunities but relied fundamentally on reputational incentives for compliance. This institutional design makes the NZBA an ideal setting for testing theories of voluntary commitment in the presence of collective action problems: if membership was costless to maintain and costless to exit, the prediction from standard economic theory is that it should have had no effect on behavior (Stigler, 1974; Ostrom, 1990).

2.2 The Collapse: A Timeline of the 2024–2025 Exit Cascade

The dissolution of the NZBA occurred in four distinct waves, each driven by partially different mechanisms, creating valuable cross-sectional variation for empirical analysis:

Wave 1 — U.S. Banks (December 2024 – January 2025). Goldman Sachs announced its withdrawal from the NZBA on December 6, 2024, approximately one month after Donald Trump's electoral victory on November 5, 2024. Wells Fargo, Bank of America, and Citigroup followed before the end of December. Morgan Stanley and JPMorgan Chase exited in early January 2025, before Trump's inauguration on January 20. All six banks had been targets of Republican state attorneys general investigations for their climate alliance memberships. Texas Attorney General Ken Paxton publicly ended investigations into Bank of America, Morgan Stanley, JPMorgan, and Wells Fargo following their exits, establishing a direct link between political pressure and withdrawal decisions. This political channel provides a plausible instrument for identification: the exits were driven by the regulatory and legal environment rather than by changes in the banks' fossil fuel business strategies.

Wave 2 — Canadian Banks (January – March 2025). Six major Canadian banks, including the Royal Bank of Canada (RBC), Scotiabank, Toronto-Dominion Bank (TD), Bank of Montreal (BMO), CIBC, and National Bank of Canada, exited in rapid succession. These institutions cited heavy exposure to fossil fuel financing (particularly Canadian oil sands) and

concern about competitive disadvantage relative to their recently exited U.S. peers. The Canadian exits were less directly driven by political pressure than the U.S. exits, though the proximity of Canadian and U.S. banking markets and cross-border competitive dynamics played a significant role.

Wave 3 — Australian and Japanese Banks (March – April 2025). Six banks from the Asia-Pacific region, including Japan's three megabanks (Mitsubishi UFJ Financial Group, Sumitomo Mitsui Financial Group, and Mizuho Financial Group), withdrew from the NZBA. These exits coincided with the NZBA's April 2025 decision to loosen its core requirements, abandoning the mandatory 1.5°C alignment target and converting the binding guidelines into voluntary guidance. The timing suggests that these banks may have been waiting for a face-saving exit opportunity.

Wave 4 — European Holdouts (July – August 2025). HSBC became the first major European bank to leave in July 2025, followed by UBS and Barclays in August. Barclays explicitly stated that "with the departure of most of the global banks, the organisation no longer has the membership to support our transition." These exits were driven not by direct political pressure but by a tipping-point dynamic: once critical mass was lost, continued membership carried reputational costs (association with a failing initiative) without reputational benefits.

Final Dissolution (October 3, 2025). Remaining members voted to cease operations, transitioning the NZBA's guidance documents into a standalone framework without membership requirements. The Net-Zero Insurance Alliance had already disbanded in April 2024, and NZAM suspended its primary activities in early 2025 after BlackRock's departure. By late 2025, the entire GFANZ architecture had effectively collapsed.

2.3 The Political Economy Channel

The role of U.S. political dynamics in precipitating the NZBA collapse is central to our identification strategy. Beginning in 2022, Republican state attorneys general and state treasurers in Texas, Florida, West Virginia, Louisiana, and other states initiated investigations and legislative actions targeting financial institutions participating in climate alliances. Texas Senate Bill 13 (enacted September 2021) and SB 19 (enacted September 2023) prohibited state entities from contracting with financial firms that "boycott" fossil fuels, while multiple states placed asset managers on "restricted" lists for ESG-related investment practices. By 2025, 21 states had enacted 52 anti-ESG bills across 42 states, with 11 new bills enacted in 2025 alone. The Congressional dimension was equally significant: Republican-led House committees launched investigations into GFANZ member institutions for potential antitrust violations in coordinating fossil fuel financing restrictions.

The Trump election intensified these pressures dramatically. The incoming administration signaled hostility to ESG frameworks, the SEC withdrew its defense of climate disclosure rules on March 27, 2025, and the Department of Justice reportedly opened preliminary inquiries into whether climate alliance coordination constituted antitrust violations. For U.S. banks, the calculus shifted from "membership provides reputational benefits" to "membership creates regulatory and legal risk." This shift was exogenous to individual bank fossil fuel strategies and provides the identifying variation we exploit.

3. Related Literature and Hypotheses

3.1 Voluntary Environmental Commitments and Real Effects

Our paper relates to a substantial literature on whether voluntary environmental commitments by firms and financial institutions translate into real behavioral change. Lyon and Maxwell (2008) develop a theoretical framework for "greenwash," in which firms make environmental claims to forestall regulation without changing behavior. Marquis, Toffel, and Zhou (2016) document "selective disclosure" in which firms highlight favorable environmental metrics while obscuring unfavorable ones. In the financial sector, Flammer (2021) finds that green bond issuers improve environmental performance post-issuance, suggesting that at least some voluntary climate instruments are binding. However, Ehlers, Mojon, and Packer (2020) show that green bond proceeds are sometimes allocated to projects that would have been financed regardless, questioning additionality.

The specific question of whether financial sector climate alliances alter lending behavior has received less attention than the broader ESG commitment literature, largely because the alliances are recent and clean identification opportunities have been scarce. Our paper fills this gap by exploiting the NZBA collapse as a setting where the removal of commitment creates a natural experiment. This inverts the standard identification problem: rather than asking whether joining an alliance causes behavioral change (confounded by self-selection), we ask whether leaving an alliance causes behavioral change (identified by the exogenous political shock).

3.2 Divestment, Engagement, and Asset-Market Effects

A second relevant strand examines whether investor divestment from fossil fuels affects firm behavior and asset prices. Berk and van Binsbergen (2021) demonstrate theoretically that divestment by a small fraction of investors has negligible effects on firms' cost of capital. Hartzmark and Shue (2023) find that ESG-motivated investors often fail to achieve real environmental improvements. In contrast, Broccardo, Hart, and Zingales (2022) argue that exit (divestment) can be more effective than voice (engagement) when firms are sufficiently unresponsive to shareholder pressure. Atta-Darkua, Glossner, Krueger, and Steffen (2024) find that institutional investor divestment from fossil fuels is associated with reduced investment by targeted firms, suggesting real effects.

The NZBA exit wave is conceptually related to but distinct from the divestment literature. NZBA members did not commit to divesting from fossil fuel holdings; they committed to reducing the emissions intensity of their lending portfolios. Exit from the alliance releases this commitment, potentially allowing banks to increase fossil fuel lending. Our analysis tests whether this release of commitment affects lending volumes, borrower-side behavior, and ultimately environmental outcomes.

3.3 Climate Risk Pricing and Information Efficiency

Our event study component relates to the literature on how financial markets process climate-related information. Giglio, Kelly, and Stroebel (2021) provide a comprehensive survey. Engle, Giglio, Kelly, Lee, and Stroebel (2020) construct hedge portfolios based on climate news exposure. Bolton and Kacperczyk (2021, 2023) document a carbon premium in equity returns. Acharya, Giglio, Pastore, Stroebel, Tan, and Yong (2025) examine climate transition risks in the energy sector. Our event study contributes to this literature by testing whether markets price a

specific climate governance mechanism (alliance membership) as a real constraint on bank profitability.

3.4 Hypotheses

We formalize two competing hypotheses:

Hypothesis 1 (Binding Commitment): NZBA membership imposed real constraints on member banks' fossil fuel financing. Under H1, we predict: (a) exiting banks increase fossil fuel financing relative to non-exiting banks post-exit; (b) exit announcements generate positive abnormal stock returns for exiting banks, reflecting removal of a costly constraint; (c) fossil fuel companies with high pre-exit exposure to exiting banks' credit experience positive abnormal returns, reflecting expected easing of financing conditions.

Hypothesis 2 (Cheap Talk): NZBA membership was symbolic and did not constrain financing behavior. Under H2, we predict: (a) no differential change in fossil fuel financing between exiting and non-exiting banks; (b) no significant abnormal returns around exit announcements, because markets never priced NZBA membership as a binding obligation; (c) no change in borrower-side equity valuations.

A third possibility, which we term the *signaling equilibrium* interpretation, lies between these extremes: NZBA membership was not binding in the strong sense of H1, but exit nonetheless conveyed information about a bank's strategic direction. Under this interpretation, exit announcements might generate positive returns for banks (signaling a pro-fossil-fuel strategic pivot) even if the alliance itself was not constraining. We design our empirical tests to distinguish among these three interpretations.

4. Data and Sample Construction

A distinctive feature of this study is its exclusive reliance on open-access data sources. We demonstrate that rigorous empirical climate finance research is feasible without proprietary database subscriptions, an important consideration for broadening participation in this field.

4.1 Banking on Climate Chaos (BOCC) Dataset

Our primary measure of fossil fuel financing is drawn from the Banking on Climate Chaos (BOCC) reports, published annually since 2010 by a coalition of research and campaign organizations including Rainforest Action Network, BankTrack, Oil Change International, Reclaim Finance, Urgewald, and others. The BOCC dataset provides comprehensive bank-level data on lending and underwriting to fossil fuel companies for the 65 largest global banks. The underlying deal-level data is derived from Bloomberg LP and is aggregated to the bank-by-year and bank-by-company-by-year levels.

The BOCC dataset has several advantages for our purposes. First, it provides consistent coverage across all major NZBA members (and many non-members) over a multi-year period (2016–2024 in the most recent release). Second, it classifies fossil fuel companies using Urgewald's Global Oil and Gas Exit List (GOGEL) and Global Coal Exit List (GCEL), which identify companies actively expanding fossil fuel production — a classification directly relevant to our research question. Third, the dataset is freely downloadable in its entirety from the BOCC website. The BOCC data has been cited in publications by the European Central Bank, the Bank for International Settlements, and in peer-reviewed academic journals, establishing its credibility for research purposes.

A limitation of the BOCC data is its annual frequency. We observe total fossil fuel financing per bank per year, not individual deals with precise transaction dates. This constrains our difference-in-differences analysis to annual comparisons and prevents us from conducting high-frequency financing event studies. We address this limitation by supplementing the BOCC data with bank-level financed emissions disclosures from individual sustainability reports, which sometimes provide semi-annual or quarterly breakdowns.

4.2 NZBA Membership and Exit Dates

We construct a comprehensive dataset of NZBA membership and exit dates using the BankTrack archive, which maintained a continuously updated tracker of NZBA membership from the alliance's founding in April 2021 through its dissolution in October 2025. We supplement this with contemporaneous reporting from ESG Today, ESG Dive, FinTech Magazine, and Sustainability Magazine. For each of the approximately 140 banks that were NZBA members at any point, we record: (a) the date of joining; (b) the date of exit announcement, if applicable; (c) the stated rationale for exit; and (d) whether the bank was subject to specific political or legal pressures (e.g., state AG investigations, congressional inquiries).

4.3 Stock Return Data

Daily adjusted closing prices for all banks and fossil fuel companies in our sample are obtained using the yfinance Python library, which accesses Yahoo Finance's publicly available data. For our core event study, we require daily returns for the 25–30 largest NZBA member banks, all of which are publicly listed and highly liquid. We also collect daily returns for a broad portfolio of fossil fuel companies identified in the BOCC dataset. Market returns and risk-free rates are obtained from the Kenneth French Data Library, which provides daily and monthly Fama-French

factor returns for global and regional equity markets. All return data is adjusted for splits and dividends.

We acknowledge that yfinance data may contain occasional errors related to corporate actions (splits, dividends, ticker changes). To mitigate this concern, we cross-validate returns for the largest 20 banks against publicly available price histories on Google Finance and the banks' own investor-relations pages. We exclude any bank-day observations where the absolute daily return exceeds 25 percent, as these typically reflect data errors rather than true price movements.

4.4 Bank Sustainability Reports

We hand-collect financed emissions data from the annual sustainability or ESG reports of all NZBA member banks in our sample. Under PCAF standards and NZBA guidelines, member banks were required to disclose absolute financed emissions (Scope 1, 2, and 3) and emissions intensity for key sectors including energy, power, and mining. These disclosures are published as PDF documents on bank websites and are freely accessible. We extract sector-level financed emissions for 2022, 2023, and 2024 (where available) for each bank. This provides an independent check on the BOCC financing data and allows us to test whether exits were associated with changes in disclosed emissions, separate from changes in financing volumes.

4.5 Carbon Mapper Satellite Data

For our planned extension linking financial alliance participation to physical emissions outcomes, we use the Carbon Mapper Data Portal, which provides free, public access to facility-level methane plume detections from satellite and airborne imaging spectrometers. As of 2026, the portal contains over 9,000 methane plumes attributed to individual facilities across the oil and gas, waste, and mining sectors. Each observation includes: geographic coordinates, plume

detection date, estimated emission rate (in kilograms per hour), sector classification, and associated uncertainty. Carbon Mapper data are released under an open-access non-commercial license and are available via both the web portal and a RESTful API.

To link Carbon Mapper plume detections to bank lending decisions, we propose a two-step matching procedure. First, we match Carbon Mapper facility locations to the EPA Greenhouse Gas Reporting Program (GHGRP) facility database, which provides a crosswalk between facility identifiers and parent company names for approximately 8,000 large U.S. facilities. Second, we match parent company names to the BOCC fossil fuel company list to identify which banks financed each facility's parent company. This matching is restricted to U.S. facilities, where the EPA GHGRP crosswalk is comprehensive. Extension to international facilities is planned but depends on the availability of comparable facility-ownership registries.

4.6 Additional Data Sources

We supplement the above with several additional open-access datasets. The Pleiades Strategy Statehouse Reports provide a comprehensive inventory of anti-ESG legislation by U.S. state, which we use to code political pressure intensity. The OECD Creditor Reporting System provides climate-tagged official development assistance flows, which we use in the planned emerging-market spillover extension. The Notre Dame Global Adaptation Initiative (ND-GAIN) country index and the FEMA National Risk Index provide climate vulnerability and risk measures for robustness checks.

5. Empirical Strategy

5.1 Event Study: Market Reactions to Exit Announcements

Our first test examines whether financial markets treated NZBA membership as a binding constraint by measuring abnormal stock returns around exit announcements. We estimate abnormal returns using a standard market-model framework:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t}$$

where $R_{i,t}$ is the daily return on bank i's stock on day t, and $R_{m,t}$ is the return on the relevant market index (S&P 500 for U.S. banks, TSX for Canadian banks, STOXX Europe 600 for European banks, etc.). We estimate the model over a 120-trading-day estimation window ending 10 days before the exit announcement and compute cumulative abnormal returns (CARs) over event windows of [−1, +1], [−2, +2], and [−5, +5] trading days around the announcement date.

We conduct this analysis for: (a) each exiting bank individually; (b) portfolios of exiting banks by cohort (U.S., Canadian, Asia-Pacific, European); and (c) portfolios of fossil fuel companies with high financial dependence on exiting banks. Statistical inference uses both parametric t-tests and the nonparametric sign test. We cluster standard errors by exit cohort to account for the fact that banks within each wave exited in close temporal proximity.

5.2 Staggered Difference-in-Differences: Fossil Fuel Financing

Our main test of whether NZBA membership constrained fossil fuel financing employs a staggered difference-in-differences design. Let $Y_{i,t}$ denote total fossil fuel financing by bank i in

year t, as reported in the BOCC dataset. Define $Exit_{i,t} = 1$ if bank i has exited the NZBA by year t, and 0 otherwise. Our baseline specification is:

$$ln(Y_{i,t}) = \alpha_i + \gamma_t + \beta \times Exit_{i,t} + X'_{i,t}\delta + \varepsilon_{i,t}$$

where α_i and γ_t are bank and year fixed effects, $X_{i,t}$ is a vector of time-varying bank characteristics (total assets, return on equity, capital ratio), and β is the parameter of interest. Under H1 (binding commitment), $\beta > 0$: exiting banks increase fossil fuel financing. Under H2 (cheap talk), $\beta = 0$.

Because the BOCC data is annual and exits occurred throughout the year, we face a measurement challenge. For the 2024 BOCC data (covering calendar year 2024), most U.S. banks exited only in the final month (December 2024); thus, 2024 financing volumes largely reflect pre-exit behavior. The critical comparison is between 2024 (pre-exit for most banks) and 2025 (post-exit for all waves). For banks that exited in later waves (e.g., European banks in July–August 2025), the 2025 financing data captures a mix of pre- and post-exit behavior within the year. We address this by assigning treatment timing based on the exit announcement date and constructing a cohort indicator that groups banks by exit wave.

To address concerns about staggered treatment timing bias (Goodman-Bacon, 2021; de Chaisemartin and D'Haultfoeuille, 2020), we implement the Callaway and Sant'Anna (2021) estimator, which allows for heterogeneous treatment effects across cohorts and avoids the problematic comparisons inherent in two-way fixed effects estimators with staggered adoption. This estimator is particularly well-suited to our setting, where different exit waves may have different treatment effects (e.g., because the U.S. exits were politically driven while the European exits were strategically driven).

5.3 Identification Concerns

The primary threat to identification is that exit decisions are endogenous to fossil fuel financing strategies. Banks with the largest fossil fuel portfolios may have been most eager to leave because they faced the greatest difficulty meeting emissions targets. In this case, a positive β could reflect reverse causality: banks that planned to increase fossil fuel financing chose to exit, rather than exits causing increased financing.

We address this concern through several strategies. First, we exploit the political pressure channel as a source of plausibly exogenous variation. For U.S. banks, the Trump election and subsequent AG investigations provide a political instrument: the decision to exit was driven by regulatory and legal risk, not by changes in fossil fuel business strategy. We test this by comparing the exit-financing relationship for U.S. banks (where the political channel is strongest) versus European banks (where exits were voluntary). If the political-pressure instrument is valid, we would expect a weaker or different exit-financing relationship for European banks.

Second, we conduct a pre-trends test using BOCC data from 2020–2023 (the period during which all sample banks were NZBA members) to verify that exiting and non-exiting banks were on parallel financing trajectories before the exit cascade began. Violation of the parallel trends assumption would undermine the causal interpretation of our estimates.

Third, we implement a falsification test using non-fossil-fuel lending. If NZBA membership specifically constrained fossil fuel financing (rather than overall lending), exits should affect fossil fuel financing but not lending to non-fossil-fuel sectors such as technology, healthcare, or consumer goods. We construct a placebo outcome variable using banks' total disclosed lending to non-GOGEL sectors from their annual reports.

5.4 Cross-Sectional Heterogeneity Tests

We explore several dimensions of cross-sectional heterogeneity. First, we test whether the financing response to exit differs by bank size, as larger banks may have greater capacity to increase fossil fuel lending and may have faced more intense political pressure. Second, we test whether the response differs by pre-exit fossil fuel financing intensity, distinguishing between banks with high versus low pre-period fossil fuel exposure. Third, we test whether the response differs by exit wave, comparing early exiters (U.S., under political duress) to later exiters (European, voluntary). Fourth, we test whether the borrower-side response varies by fossil fuel sub-sector (oil and gas, coal, expansion companies versus non-expansion).

6. Preliminary Results and Descriptive Analysis

This section presents preliminary descriptive evidence on the relationship between NZBA membership, exits, and fossil fuel financing. The complete econometric analysis, including the staggered DiD estimation and formal event study results, is in progress and will be reported in the completed version of this paper.

(Note to conference organizers: This is an early-stage paper. Full results will be available by late September 2026.)

6.1 Descriptive Overview of the NZBA Collapse

Table 1 (forthcoming) will present the complete timeline of NZBA exits, including bank name, country, total assets, exit announcement date, stated reason for exit, and whether the bank was subject to documented political or legal pressure. Of the approximately 140 banks that were members at the alliance's peak in November 2024, we have identified dated exit announcements for over 50 banks that departed before the October 2025 dissolution. The six U.S. banks that exited in Wave 1 collectively held approximately $14 trillion in total assets; the six Canadian banks in Wave 2 held approximately $5 trillion; and the European holdouts in Wave 4 (HSBC, Barclays, UBS) held approximately $7 trillion.

6.2 Aggregate Fossil Fuel Financing Trends

The Banking on Climate Chaos 2025 report provides the most recent comprehensive data on fossil fuel financing by the world's largest banks. Several aggregate patterns are immediately relevant to our hypotheses:

First, total fossil fuel financing by the 65 largest banks rose from $706.8 billion in 2023 to $869.4 billion in 2024, a 23 percent increase. This increase is notable because it occurred during a year in which the majority of these banks were still NZBA members. The six largest U.S. banks (all NZBA members throughout 2024) collectively provided the largest share of fossil fuel financing, with JPMorgan Chase alone accounting for $40.8 billion.

Second, financing for fossil fuel expansion companies (those actively developing new reserves, as classified by Urgewald's GOGEL) totaled $429 billion in 2024, up 8 percent from 2023. This is directly inconsistent with the NZBA's stated goal of aligning lending portfolios with a 1.5°C pathway, which requires no new fossil fuel supply development.

Third, lending was the largest category of fossil fuel financing at $467 billion (up from $422 billion in 2023), while bond underwriting increased dramatically to $401 billion (from $284 billion in 2023). The rise in underwriting is particularly significant because the NZBA's March 2024 guideline update had explicitly extended commitments to cover capital markets activities including underwriting.

These aggregate patterns are more consistent with the cheap talk hypothesis (H2) than with the binding commitment hypothesis (H1). If NZBA membership were constraining fossil fuel financing, we would expect financing volumes to be flat or declining during the period of membership, not rising sharply. However, aggregate trends cannot identify causal effects, as they are confounded by changes in energy prices, global investment demand, and other macroeconomic factors. Our econometric analysis is designed to isolate the causal effect of alliance membership by exploiting cross-sectional variation in exit timing.

6.3 Preliminary Bank-Level Patterns

Figure 1 (forthcoming) will present bank-level fossil fuel financing trends for the period 2020–2024 (the available BOCC coverage period), separately for banks by exit cohort. The key visual diagnostic is whether pre-exit trends in fossil fuel financing are parallel across cohorts (validating the parallel trends assumption) and whether trends diverge after exit.

Preliminary inspection of the BOCC interactive data tool suggests the following patterns, which we will formalize in the completed analysis. Among U.S. banks, fossil fuel financing was high and relatively stable or increasing throughout the 2021–2024 period, with no visible decline following NZBA entry in 2021. Among European banks, financing levels were lower but also showed no clear downward trend during the membership period. These visual patterns are consistent with the cheap talk hypothesis, though formal testing is required.

6.4 Planned Event Study Preview

Table 2 (forthcoming) will report cumulative abnormal returns around exit announcement dates for each bank and for cohort portfolios. Our preliminary assessment of the announcement timeline identifies the following key event dates: Goldman Sachs (December 6, 2024), Wells Fargo (December 20, 2024), Bank of America (December 20, 2024), Citigroup (December 31, 2024), Morgan Stanley (January 2, 2025), JPMorgan Chase (January 8, 2025). The clustering of U.S. exits around the holiday period introduces a challenge for the event study, as market liquidity is typically lower during this period and confounding news events (end-of-year portfolio rebalancing, macroeconomic data releases) may complicate the attribution of abnormal returns to NZBA exits.

The European exit announcements (HSBC, July 2025; Barclays and UBS, August 2025) are in some ways cleaner event-study candidates, as they occurred during normal market

conditions and were less clustered in time. We will analyze these separately and compare the market reaction across cohorts.

7. Planned Extensions

7.1 Satellite-Detected Emissions and Alliance Effectiveness

A key limitation of the existing literature on financial sector climate commitments is the reliance on self-reported emissions data. Banks report financed emissions in their sustainability reports, but these disclosures are unaudited, rely on estimated emission factors rather than direct measurement, and may be subject to strategic reporting. To bridge the gap between financial flows and physical environmental outcomes, we propose a novel extension using satellite-detected methane emissions data.

The Carbon Mapper Data Portal provides independently verified, facility-level methane plume detections from imaging spectrometers aboard satellites and aircraft. These detections are geocoded, time-stamped, and attributed to specific sectors (oil and gas, waste, mining). We plan to match Carbon Mapper methane plumes to fossil fuel companies in the BOCC dataset via the EPA Greenhouse Gas Reporting Program (GHGRP) facility-to-parent-company crosswalk. This allows us to test whether fossil fuel companies that received financing from NZBA-exiting banks experienced changes in satellite-detected methane emissions after their financiers exited the alliance.

The hypothesis is that NZBA membership may have created indirect environmental pressure on borrowers: member banks may have required (or encouraged) borrowers to invest in leak detection and repair (LDAR) programs, methane monitoring, or other emissions-reduction measures as a condition of lending. If so, the removal of alliance-associated pressure following bank exits could lead to relaxation of borrower-side emissions controls, which would be visible in satellite data as increased methane plume frequency or magnitude.

This extension is particularly significant because it connects two data streams - financial (BOCC bank-company lending relationships) and physical (Carbon Mapper satellite detections), both of which have never been jointly analyzed in the academic literature. If successful, this methodology could be applied broadly to evaluate the environmental effectiveness of other financial commitments, disclosure requirements, and regulatory interventions. We note, however, that this matching exercise is labor-intensive, and the completed results will be available only in the final version of the paper.

7.2 Emerging Market Spillover Effects

A second planned extension examines whether the NZBA collapse affected cross-border climate finance flows to emerging markets and developing countries. This question is motivated by the conference call's interest in "how public and private policies, including financial market regulations, affect the flow of capital to innovative solutions in climate tech, renewable energy, and nature-based solutions, especially in lower-income countries."

Several NZBA member banks were major providers of climate-labeled cross-border lending and green bond underwriting for emerging market issuers. The exit of these banks from the NZBA may have reduced their incentive to maintain climate-labeled lending programs, particularly if such programs were maintained partly to fulfill alliance commitments. We plan to test this using OECD Creditor Reporting System data on climate-tagged bilateral finance flows and Climate Bonds Initiative data on green bond underwriting, comparing pre- and post-exit flows from exiting versus non-exiting banks to emerging market borrowers.

7.3 The Borrower-Side Response: Substitution to Non-Alliance Lenders

A third extension examines the general equilibrium implications of the NZBA collapse. If exiting banks increase fossil fuel financing, does the total supply of fossil fuel credit increase, or do fossil fuel companies simply substitute between lenders? The concern is that even if NZBA membership constrained individual banks, the presence of non-member lenders (particularly Chinese, Middle Eastern, and other banks that never joined the alliance) may have provided substitute financing. We plan to test this by examining whether fossil fuel companies with high pre-exit dependence on NZBA banks' credit experienced changes in total financing, combining BOCC data with the Urgewald GOGEL company-level database.

8. Discussion and Conclusion

The collapse of the Net-Zero Banking Alliance between December 2024 and October 2025 presents the single most important natural experiment in climate finance since the Paris Agreement. This paper exploits that collapse to answer a foundational question: do voluntary climate commitments by financial institutions affect real economic activity, or are they cheap talk?

Preliminary descriptive evidence suggests that the answer may be closer to cheap talk than policymakers would hope. Fossil fuel financing by the world's largest banks rose by 23 percent in 2024 while the vast majority of those banks were active NZBA members. Total financing for fossil fuel expansion companies reached $429 billion, incompatible with the 1.5°C pathway that NZBA members had pledged to support. These aggregate patterns do not prove that the alliance was ineffective but they shift the burden of proof onto those who claim that voluntary commitments were binding.

Our causal identification strategy, exploiting the exogenous political shock of the 2024 U.S. election as an instrument for the timing of bank exits, is designed to move beyond these aggregate patterns to establish whether the removal of alliance commitment causally affected financing decisions. The staggered nature of the exits (U.S. banks first, then Canadian, then Asia-Pacific, then European) provides natural cohort variation that is well-suited to modern difference-in-differences methods. The event study component reveals whether markets themselves believed the commitments were costly, providing a complementary test of the commitment mechanism through a revealed-preference lens.

The policy implications of this paper's findings, once completed, are substantial regardless of which hypothesis prevails. If NZBA commitments were binding, the collapse

represents a significant setback for climate action, and policymakers should consider how to rebuild alliance structures with stronger enforcement mechanisms, perhaps modeled on the binding commitments of the EU Sustainable Finance Disclosure Regulation or the UK Transition Plan Taskforce. If commitments were cheap talk, the implication is more radical: voluntary alliances in the financial sector are insufficient, and binding regulation, such as mandatory financed-emissions targets, supervisory incorporation of climate risk into capital requirements, or direct restrictions on fossil fuel lending is necessary to achieve Paris-aligned financial flows.

The novel methodological contribution of linking financial alliance participation to satellite-verified physical emissions, if successful, opens a broader research agenda. As satellite monitoring capabilities expand through Carbon Mapper, MethaneSAT, and the EU's Copernicus system, researchers will increasingly be able to connect financial flows to independently measured environmental outcomes, moving climate finance research from the domain of self-reported disclosures to that of scientifically verified measurement. This paper represents an early step in that direction.

References

Acharya, V. V., Giglio, S., Pastore, S., Stroebel, J., Tan, Z., & Yong, T. (2025). Climate transition risks and the energy sector. CESifo Working Paper No. 11646.

Atta-Darkua, V., Glossner, S., Krueger, P., & Steffen, S. (2024). Decarbonizing institutional investor portfolios. Working Paper.

Berk, J. B., & van Binsbergen, J. H. (2021). The impact of impact investing. Stanford GSB Working Paper.

Bolton, P., & Kacperczyk, M. (2021). Do investors care about carbon risk? Journal of Financial Economics, 142(2), 517–549.

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

Broccardo, E., Hart, O., & Zingales, L. (2022). Exit versus voice. Journal of Political Economy, 130(12), 3101–3145.

Callaway, B., & Sant'Anna, P. H. C. (2021). Difference-in-differences with multiple time periods. Journal of Econometrics, 225(2), 200–230.

de Chaisemartin, C., & D'Haultfoeuille, X. (2020). Two-way fixed effects estimators with heterogeneous treatment effects. American Economic Review, 110(9), 2964–2996.

Ehlers, T., Mojon, B., & Packer, F. (2020). Green bonds and carbon emissions: Exploring the case for a rating system at the firm level. BIS Quarterly Review, September, 31–47.

Engle, R. F., Giglio, S., Kelly, B., Lee, H., & Stroebel, J. (2020). Hedging climate change news. Review of Financial Studies, 33(3), 1184–1216.

Flammer, C. (2021). Corporate green bonds. Journal of Financial Economics, 142(2), 499–516.

Flammer, C., Giroux, T., & Heal, G. M. (2025). Biodiversity finance. Journal of Financial Economics, forthcoming.

Flammer, C., Giroux, T., & Heal, G. M. (2024). Financing climate action: The role of development finance institutions. ECGI Working Paper No. 973.

Giglio, S., Kelly, B., & Stroebel, J. (2021). Climate finance. Annual Review of Financial Economics, 13, 15–36.

Goodman-Bacon, A. (2021). Difference-in-differences with variation in treatment timing. Journal of Econometrics, 225(2), 254–277.

Hartzmark, S. M., & Shue, K. (2023). Counterproductive sustainable investing: The impact elasticity of brown and green firms. Journal of Finance, 78(5), 2543–2592.

Lyon, T. P., & Maxwell, J. W. (2008). Corporate social responsibility and the environment: A theoretical perspective. Review of Environmental Economics and Policy, 2(2), 240–260.

Marquis, C., Toffel, M. W., & Zhou, Y. (2016). Scrutiny, norms, and selective disclosure: A global study of greenwashing. Organization Science, 27(2), 483–504.

Ostrom, E. (1990). Governing the Commons: The Evolution of Institutions for Collective Action. Cambridge University Press.

Rainforest Action Network, BankTrack, Oil Change International, Reclaim Finance, Sierra Club, & Urgewald. (2025). Banking on Climate Chaos 2025: Fossil Fuel Finance Report.

Rainforest Action Network, BankTrack, Oil Change International, Reclaim Finance, Sierra Club, & Urgewald. (2024). Banking on Climate Chaos 2024: Fossil Fuel Finance Report.

Stigler, G. J. (1974). Free riders and collective action: An appendix to theories of economic regulation. Bell Journal of Economics and Management Science, 5(2), 359–365.

Tables and Figures

Table 1: Timeline of NZBA Exit Announcements

Bank	Country	Exit Date	Total Assets ($T)	Wave	Political Pressure
Goldman Sachs	US	Dec 6, 2024	1.7	1	TX AG probe
Wells Fargo	US	Dec 20, 2024	1.9	1	TX AG probe
Bank of America	US	Dec 20, 2024	3.3	1	TX AG probe
Citigroup	US	Dec 31, 2024	2.4	1	TX AG probe
Morgan Stanley	US	Jan 2, 2025	1.2	1	TX AG probe
JPMorgan Chase	US	Jan 8, 2025	3.9	1	House inquiry
RBC	CA	Jan 2025	1.3	2	Competitive
Scotiabank	CA	Jan 2025	1.0	2	Competitive
HSBC	UK	Jul 2025	3.0	4	Voluntary
Barclays	UK	Aug 2025	1.6	4	Voluntary
UBS	CH	Aug 2025	1.7	4	Voluntary
[Additional banks]	...	...	...	...	...

Note: This table presents a partial list of NZBA exits. The complete table will include all identified exits with exact dates. Total assets are approximate, based on 2024 annual reports. Wave classification: 1 = U.S. (Dec 2024–Jan 2025), 2 = Canada (Jan–Mar 2025), 3 = Asia-Pacific (Mar–Apr 2025), 4 = Europe (Jul–Aug 2025). Political pressure categorization: TX AG = Texas Attorney General investigation; House = U.S. House Committee inquiry; Competitive = competitive response to peer exits; Voluntary = strategic decision without documented external pressure.

Table 2: Aggregate Fossil Fuel Financing by the 65 Largest Global Banks, 2020–2024

Year	Total FF Financing ($B)	FF Expansion ($B)	Lending ($B)	Underwriting ($B)
2020	742	—	—	—
2021	742	—	—	—
2022	673	—	—	—
2023	706.8	397	422	284
2024	869.4	429	467	401

Source: Banking on Climate Chaos Reports (2021–2025). Figures are in billions of U.S. dollars. FF = fossil fuel. The "Expansion" column refers to financing for companies on Urgewald's Global Oil and Gas Exit List (GOGEL) or Global Coal Exit List (GCEL) that are actively expanding fossil fuel production capacity. Lending includes direct loans and revolving credit facilities. Underwriting includes debt and equity underwriting. Dashes indicate that

detailed breakdowns are not available in the earlier reports or use a different methodology that prevents direct comparison.

Table 3: Event Study — Cumulative Abnormal Returns Around Exit Announcements

[TO BE COMPLETED — Results will be reported for individual banks and cohort portfolios over [−1,+1], [−2,+2], and [−5,+5] event windows. Market model estimated over [–130, –11] trading days relative to exit announcement.]

Figure 1: Bank-Level Fossil Fuel Financing Trends by Exit Cohort, 2020–2024

[TO BE COMPLETED — Panel figure showing mean fossil fuel financing (in billions USD) for each exit cohort (U.S., Canadian, Asia-Pacific, European, Never-Exited) over the 2020–2024 period. Pre-trends diagnostic: parallel trends in the 2020–2023 period are necessary for the validity of the DiD design.]

Figure 2: Carbon Mapper Methane Plume Detections at Borrower Facilities

[TO BE COMPLETED — Map showing Carbon Mapper plume detections at U.S. oil and gas facilities that have been matched to BOCC fossil fuel companies, with color coding by the parent company's financing bank's NZBA exit status. This figure will demonstrate the feasibility and geographic coverage of the satellite-emissions extension.]