Bank Regulation and the Cost of Clean-Energy Capital: Evidence from Expected-Credit-Loss Adoption

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Motivation

Solar and wind generation is capital-intensive: the great majority of a project's lifetime cost is incurred before it produces a kilowatt-hour. The discount rate applied to that upfront capital, rather than the price of the hardware, therefore increasingly determines whether a project is built. Module and turbine costs have converged globally as manufacturing has scaled. Financing costs have not. The same equipment, installed in an emerging or developing economy, is commonly financed at a multiple of the advanced-economy rate.

This gap has direct consequences for questions under active debate in Washington. Most future growth in global emissions will occur outside the advanced economies, so the returns to US contributions to multilateral climate finance, the capitalisation debate at the multilateral development banks, and the incidence of carbon border measures all depend on how cheaply clean energy can be financed elsewhere. Border carbon adjustments, in particular, price the embodied carbon of imports from precisely those economies whose decarbonisation is most constrained by the cost of capital.

The policy change under study

Between 2018 and 2023, most major economies replaced incurred-loss loan-loss accounting with expected-credit-loss (ECL) provisioning: IFRS 9 internationally from 2018, and the Current Expected Credit Loss (CECL) standard in the United States from 2020. The reform requires banks to recognise lifetime expected losses at origination, which falls most heavily on long-dated exposures. Renewable-energy project debt is among the longest-dated lending that banks undertake.

The reform was not designed as climate policy, and its consequences for clean-energy finance have not been evaluated. Because adoption was staggered across countries and hand-datable, it offers a credible source of variation in bank appetite for long-duration lending. This paper uses it to ask how much of the international gap in clean-energy financing costs is attributable to conditions in the domestic banking system that intermediates project debt, as distinct from sovereign, currency and policy risk.

Data

The analysis covers roughly 80–100 countries, including the United States, from 2010 to 2024. The central regressors are institutional and individually interpretable: hand-coded ECL and CECL adoption dates, verified against two independent sources per country; non-performing loan ratios; and regulatory capital ratios. Financing outcomes are drawn from renewable-energy auction and tariff results, published cost-of-capital estimates, and investment and capacity-addition data. The analysis controls for sovereign spreads, exchange-rate volatility,

macroeconomic conditions and energy-policy stringency. A constrained benefit-of-the-doubt composite of banking-system soundness is reported in robustness analysis as a summary measure, not as the primary regressor.

Empirical strategy

The strategy has three parts:

(1) Measurement. Winning auction bids are decomposed into a hardware component, a resource-quality component and a residual financing wedge, giving a comparable cross-country measure of what capital costs add to the price of clean electricity.

(2) Policy evaluation. Staggered difference-in-differences (Callaway–Sant'Anna) around ECL and CECL adoption, with renewable investment, capacity additions and auction prices as outcomes, and pre-trend diagnostics reported in full.

(3) Pass-through. The common global decline in hardware costs is interacted with pre-period bank balance-sheet conditions, testing whether economies with impaired banking systems passed less of that decline through into installed capacity.

Heterogeneity analysis distinguishes projects financed principally by domestic banks from those financed by foreign or multilateral lenders, which is the margin on which concessional capital and guarantees operate.

Distributional focus

The financing wedge is treated throughout as a distributional outcome rather than a technical parameter. Identical technology, installed in two countries with comparable sunlight or wind, delivers electricity at materially different cost because of the financial system standing between the project and its capital. The paper quantifies how that wedge is distributed across income groups, and estimates the clean-energy capacity that finance-constrained economies would have added had they faced the median advanced-economy cost of capital, benchmarked against the United States.

Contribution

The paper makes three contributions accessible to a policy audience. It provides the first estimates of how loan-loss accounting reform affected clean-energy investment. It supplies a comparable cross-country measure of the financing component of clean-electricity costs. And it identifies the domestic banking system as a distinct and measurable channel behind unequal access to low-cost clean energy, separable from sovereign risk. Consistent with NBER protocol, the paper discusses what the findings imply for multilateral development bank reform, concessional finance and carbon border measures without making policy recommendations.

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