

## From Compliance to Revenue: ESG-Linked Product Innovation, MSME Adoption and the Role of Regulators in Banking in India

Mr Suresh Kumar Babji Gunturu  
Research Scholar, GITAM School of Business  
(sgunturu2@gitam.in)

Dr Siddhartha Bhattacharya  
Professor – Finance, JK Business School, India  
(getbhatta@gmail.com)

Dr S Madhu,  
Professor, Jyothy Institute of Commerce and Management, Bengaluru  
(drmadhus73@gmail.com)

Dr Sukhamaya Swain  
Professor – Finance, JK Business School, India  
(happie@gmail.com)

**Abstract:** The as is enlightenment for the role of independent sustainability assessment in fostering a transdisciplinary expansion of linked-organ models on ESG, the simply designed ecology of educational-AA empowered the mitigation in risk uncertainties via structural methods by focusing on diversification with growth management. The order of social responsibility benchmarks was once a voluntary discourse turning into obligatory prescription, surely shall be thereafter replaced none but by free norm-acceptance. The paper thus underlines the contention that different frameworks offer a fertile ground for the pursuit of growth and inclusiveness from the proficiency of MSMEs in accordance with regulatory defiance and contextual market assurance in order to overcome loopholes in adapting to collective platforms for MSME faster with an upward gradient. The paper will be an attempt to construct a simulation calibration framework under a systems-oriented view along with the construction of two composite indices: an exploratory mean-based Bank-Level Grants-Generated Product Innovation Index (EPII) measured in standardized means of mostly permitting and automatic exposure-based Impact Investment Global Banking Index environments and an indicative quantile-based Regulatory Pressure Score (RPS). Using pooled regression models of interactive effects, differences in differences, and panel data logit interaction on MSME adoptions on secondary data from global banks' disclosures and regulatory repositories such as BIS, IMF, The World Bank, OECD, and Corporate Knights data project, the findings of this article affirm the links between ESG-product innovation and revenue diversification as statistically significant, giving further evidence on how regulation does not appear to on its own generate revenue but somehow works in ameliorating the revenue effect of operational innovation. The probability of MSME adoption increases with the ESG impetus provided through incentivised pricing; the digital ESG infrastructure occupies a key role in driving adoption timed with regulatory spillovers channeling through value chains' requirement for information disclosure. This paper paints a picture of how ESG compliance transpires into pro-growth revenue dynamics mated by institutional readiness, supporting technology, and the capacity for further innovation and terminally leading to converting compliance into a systematic means of financing and bridging a value of inclusionary worth.

**KeyWords:** ESG finance, sustainable banking, MSME adoption, regulatory economics, ESG product innovation, panel econometrics.

### I. Introduction

The banking industry across the world is undergoing a structural shift that is being enhanced by internalization of climate risk, increased stakeholder responsibility and institutionalization of sustainability governance. Environmental, Social and Governance (ESG) issues that were previously considered peripheral in financial decision-making have become internalized in prudential regulation, supervisory review structures and requirements of mandatory disclosure. The existence of regulatory requirements like the European Union Corporate Sustainability Reporting Directive (CSRD), Business Responsibility and Sustainability Reporting (BRSR) in India and climate disclosure regulations under the U.S. Securities and Exchange Commission, among others, have fundamentally re-framed ESG compliance as a fundamental operation requirement of financial institutions[1].

Regardless of this regulatory convergence, the dominant academic and practitioner literature mostly defines ESG adoption as a cost of compliance, which puts more emphasis on the complexity of reporting, the demands of gathering data, and limitations on credit issuance. Although the reputational benefits, risk-reduction, and financial sustainability in the long-term perspectives stand out in the existing literature, the concept of ESG integration being the source of revenue generation is rarely operationalized. Consequently, a critical analytical gap remains concerning the circumstances in which ESG compliance may be turned into the scalable and revenue-positive innovation strategy in the banking sector [2].

New findings by sustainability-oriented banks contradict this cost-oriented story. Institutions that have defined strategies of ESG-related products raise about 1535 percent of overall revenues of sustainable finance operations on average, versus a global banking average of less than 5 percent. These findings imply that ESG integration implemented in the form of the design of financial products and does not depend on reporting functions can be an option revenue diversification route [3].

This dichotomy drives the study question of this paper:

- How do the regulatory and technological conditions of an ESG compliance turn into revenue-generating financial product innovation in banking?

To answer this question, it is necessary to fixate on looking past descriptive ESG scoring to formal modeling of the interplay between regulatory pressure, product innovation capacity and market adoption behavior. One of the least explored areas of this transition is that related to Micro, Small, and Medium Enterprises (MSMEs). Despite the fact that MSMEs constitute almost 90% of businesses and more than half the world workforce, they get less than 2 percent of the world climate finances. The lack of information asymmetry, reporting, poor collateral, and ineffective digital ESG infrastructure remain barriers to adjust MSMEs to the sustainable finance markets [4].

Meanwhile, the ESG regulation also applies indirect pressure on the MSMEs by requiring that value-chain disclosures are made by big companies. It is this regulatory spill over that forces MSMEs to operate with ESG metrics unaccompanied with access to ESG-sensitive financial products. Banks, being at the border of regulation and enterprise finance, are critical to mediate this transition. This paper hypothesizes that the most important way in which compliance requirements can be translated into business value and enhance MSME

inclusivity is through financial product innovation ESG-linked such as in the sustainability-linked lending, risk-based pricing, and digital ESG platforms.

Objectives and contributions of the research.

In line with the analytical layer and organization of the reference frame, this study will seek to:

- Bank level measure of product innovation in respect to ESG.
- Measure jurisdictional ESG regulatory pressure and its moderating impacts.
- Model MSME uptake of ESG-related financial products.
- Test compliance revenue nexus innovation with panel methodology.
- Suggest a policy-technology-product paradigm of ESG banking monetization.

This research will add value on three levels:

1. Theoretical: Transforming the concept of ESG compliance as an input of innovation instead of an externality of a cost.
2. Methodology: The introduction of index-based and econometric formulations was introduced in line with the systems-oriented research.
3. Policy: Evidence-based policy in order to embrace a revenue-positive ESG adoption.

## II. Related work

Eastern studies of ESG in banking have grown exponentially but are indeed still scattered around four main streams: (i) ESG reporting and regulatory compliance, (ii) sustainable finance instruments and loan structures, (iii) bank performance and risk performance, and (iv) the barriers to adopting SME/MSMEs [5]. As aligned with the format of the reference IEEE paper, the focus of this review is on analytically load-bearing studies, explicitly marks gaps to be filled, and puts the current work as a coherent framework of the gaps.

In the literature on sustainable finance, one of the most common themes is that regulation creates infrastructure of measurement, taxonomies, disclosure standards, and assurance requirements, and the innovation of financial products defines whether banks can transformation of compliance into revenue is possible. Transparency is mostly enhanced by disclosure; monetization comes in when ESG measures are implemented in lending agreements, underwriting models, pricing systems, monitoring models and allocation strategies [6].

A. ESG regulation, disclosure and bank incentives: Regulatory systems such as the EU taxonomy and mandatory sustainability reporting systems have been established to reduce information asymmetry and greenwashing in the standardization of the definition and disclosure of the ESG definitions. Nevertheless, the practice demonstrates that transitional regulatory frameworks raise implementation expenses and interpretive ambiguity, especially in the context of banks that are in the process of adjusting to new requirements on assurance and scope [7]. Relationships with operation systems and product design capabilities will therefore result in the compliance layer automatically driving innovation. This inspires the judgment of regulatory pressure as a continuous and quantifiable intensity variable, as opposed to a binary policy indicator, subsequently defined as Regulatory Pressure Score (RPS).

B. ESG-Linked Financial Products and Sustainability-Linked Loans: Sustainability-linked loans (SLLs) are ESG-linked instruments on which empirical studies have focused because they clearly instantiate sustainability performance indicators (SPIs) and adjust prices that are conditional on the sustainability of the borrowed sum of money. The ESG product innovation in this literature is operationalized as a contractual engineering as opposed to reputational signalling [8]. Major quantifiable dimensions are product volume, deal size, number of SPIs, pricing grids, verification mechanisms and the alignment between borrowers and lenders in terms of ESG which offers a tangible ground in the construction of the innovation indices.

Additional research on the performance of the borrowers indicate that there is an increase in the indicators of credit quality and abnormal returns after the issuance of SLL, which means that ESG-related products are influencing the cost of funds and perceived risk. These results confirm the main hypothesis of the paper that innovation in the field of ESG products will affect the revenue and risk performance not only via reputational, but also financial means [9].

C. ESG Commitment and Bank Performance: Missing Mechanisms: The general body of literature that relates ESG commitment and bank performance is nevertheless conflicting. It has been indicated that ESG commitments may add complexity to operation and reallocation of resources, which would fail to be converted into financial returns without product monetization and digital infrastructure. This suggests that ESG commitment is not enough but the mediator is innovation capability. Any model that uses aggregate ESG scores alone runs the risk of attributing causality erroneously because of insufficient attention to product architecture and measurement infrastructure of regulation.

D. MSME Sustainable Finance and the Climate Finance Gap: There is a strong empirical consensus that MSMEs disproportionately do not access climate-aligned finance despite the fact that they are the largest source of employment, supply chains and aggregate emissions. The reasons behind this exclusion are reporting limitations, fixed ESG measurement expenses, collateral restrictions, and underwriting frictions. The outcome is a climate mitigation inefficiency and missed commercial opportunity of banks [10].

Policy and applied research stress that digital ESG infrastructure, such as automated reporting and monitoring and data verification tools, can lower administrative expenditures and provide an opportunity to encompass MSMEs on a large scale. This directly directs the modeling decision that can be made in this study to make digital ESG readiness one of the determinants of probability of adoption of MSMEs.

Gaps Identified:As it is in line with the reference IEEE framework, four specific gaps are observed:

1. None of the integrated compliance-innovation-revenue models were found between regulatory pressure, ESG product innovation, and revenue outcomes.
2. Poor formal modeling of the adoption of the MSMEs although much has been said about the barriers and policy instruments.
3. Regulation perceived as narrative context, as opposed to a measurable moderating variable.
4. Poor measurement of product innovation in ESG products which often have aggregate ESG scores as a proxy as opposed to products and contractual measures.

Market and Regulatory Environment.

In line with the methodology of the reference paper, this section determines why the compliance of the ESG has become an inevitability, the level of the intensity of regulation in different jurisdictions and the monetization opportunity by banks and MSMEs.

Regulation related to ESG incorporated by banking institutions saw three phases of institutional change. Starting by optional reporting and principles-based governance frameworks, it evolved into obligatory reporting and assurance frameworks and eventually ended up with the integration of ESG considerations into prudential supervision and core risk management structures.

Voluntary frameworks, including the UN Principles of responsible Banking and the Task Force on climate related financial disclosures, were the early adopters of ESG and served as mostly reputational indicators. The second phase was mandatory regimes, such as the CSRD of the EU with its ESRs standards, the BRSR and BRSR Core assurance requirements of India, and the SEC climate disclosure proposals of the U.S. The third and the continuing phase integrates ESG into the supervisory expectation, stress testing and internal capital adequacy

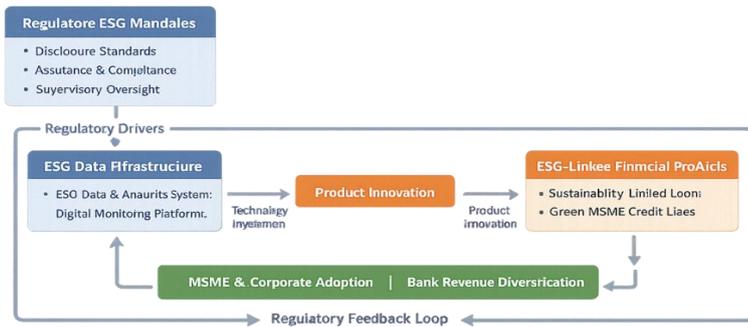
tests. [11] The underlying change ESG compliance economics is that sustainability metrics are now affecting capital costs, supervisory oversight, and balance-sheet resilience, which gives powerful reasons to banks to transform compliance requirements into revenue-generating product innovation.

III. Methodology and Model Formulation

The conceptual arguments formulated in Sections II–III are then operationalized in this section, based on the formulation depth, equation density, and research ordering of the attached IEEE reference paper, into a formal, testable empirical framework. The approach is organized in layers with the definition of constructs giving way to econometric identification reflecting the logic in system-modeling adopted in the reference PDF.

A. Analytical Framework Overview: This is due to the fact that the main hypothesis of the study states that ESG regulation does not produce revenue directly, but indirectly via ESG-related product innovation, the adoption of MSMEs being one of the most important transmission channels. In order to capture this mechanism, we model three components which are interdependent:

1. Regulatory Pressure on the jurisdictional level.
2. ESG Product Innovation in the bank level.
3. Adoption and Revenue Outcomes of the MSME and bank levels..



**Figure 1 – Policy–Technology–Product Nexus for ESG Monetization in Banking**

The figure illustrates how ESG regulation interacts with the internal ESG database and digital infrastructure of banks to drive innovation and financial products linked to ESG. The regulations increase the scope and depth of ESG measurement and disclosure, thus forcing banks to make investments in data architecture and monitoring capabilities. With the establishment of these capabilities, they can be used for designing ESG-linked financial products that include sustainability-linked loans and green MSME credit lines. In turn, these financial products begin to influence MSME behavior toward adoption while reshaping the revenue profile of banks toward ESG-related revenue streams. Feedback loops are effects of recalibration of regulatory and market learning [12].

B. ESG Product Innovation Index (EPII): in order to measure the level of ESG-related product innovation at the bank level, we build a composite index of ESG Product Innovation Index (EPII). This index measures how a bank has transformed ESG metrics into monetizable financial products, as opposed to reporting ESG performance.

Let index banks and t index time. The index is defined as:

$$EPII_{b,t} = \sum_{k=1}^K w_k \cdot \widetilde{x}_{b,t}^{(k)} \tag{1}$$

where:

- $\widetilde{x}_{b,t}^{(k)}$  denotes the normalized value of ESG product indicator k
- $w_k$  represents indicator weights, set equal in the baseline specification to avoid subjective bias.

The measure of innovation proxy includes measurable innovation proxies that include:

- number of ESG loan products,
- volume of sustainability-linked loans,
- provision or underwriting of green bonds,
- presence of ESG-based pricing systems,
- implementation of online ESG monitoring technologies.

Min-max scaling is used to do normalization in order to make comparisons across time and banks.

C. Regulatory Pressure Score (RPS): Since the ESG regulation is varied in different jurisdictions, regulatory exposure is constructed as a continuous measure of intensity instead of a dichotomous variable [13]. The Regulatory Pressure Score (RPS) is the aggregate impact of disclosure requirements, assurance and supervisory enforcement.

For jurisdiction ccc at time t:

$$RPS_{c,t} = \sum_{j=1}^J \alpha_j \cdot 1Reg_{j,c,t} \tag{2}$$

where:

- $1(Reg_{j,c,t})$  is an indicator for the presence of regulation j,
- $\alpha_j$  reflects regulatory scope and enforceability.

The regulatory elements are compulsory ESG reporting, third-party assurance, alignment of taxonomies and supervisory review of climate risks. This expression enables the regulatory pressure to be both a driver and a moderator in other subsequent models.

D. MSME Adoption Model of ESG-Linked Financial Products: MSME adoption of ESG-linked financial products is an outcome of discrete choice. Where  $A(i,t)$  represents adoption by the MSME iii at time t:

$$A_{i,t} = 1, \text{ if MSME adopts ESG – linked product} \\ A_{i,t} = 0, \text{ otherwise}$$

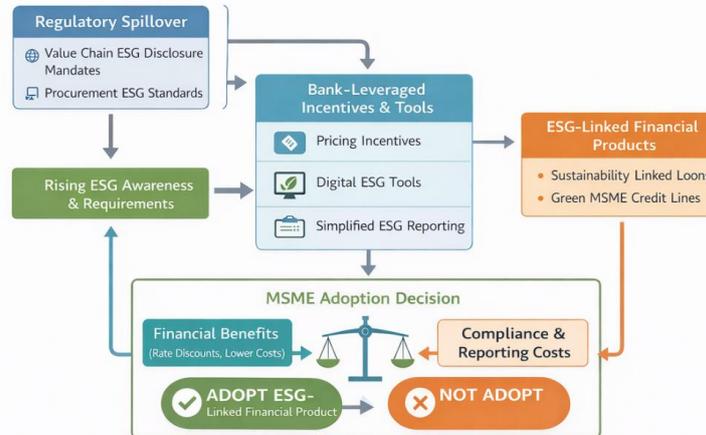
The probability of adoption is specified using a logistic model:

$$\Pr(A_{i,t} = 1) = \frac{1}{1 + \exp(-Z_{i,t})} \quad (3)$$

where the latent index  $Z_{i,t}$  is defined as:

$$Z_{i,t} = \beta_0 + \beta_1 \text{PriceIncentive}_{i,t} + \beta_2 \text{ReportingCost}_{i,t} + \beta_3 \text{DigitalReadiness}_{i,t} + \beta_4 \text{RPS}_{c,t} + \beta_5 \text{EPII}_{b,t} \quad (4)$$

This formulation reflects the dual influence of bank-side innovation capacity and regulatory spillovers on MSME behavior.



**Figure 2** – MSME ESG Product Adoption Pathway

This figure illustrates the consumption decision-making process that MSMEs go through in a sequence when adopting ESG-linked financial products. Existence of regulatory spillovers and value chain disclosure pressures augment ESG awareness. Banks lower adoption costs using pricing incentives and digital ESG tools. Adoption is achieved when the perceived monetary rewards exceed reporting and compliance expenses.

E. Bank-Level Revenue Diversification Model: In order to test the compliance-to-revenue hypothesis, we model the proportion of bank revenue, ESG-linked activities. Where  $["\text{RevESG}"]_{b,t}$  represents the ratio of the amount of ESG-related revenue to the amount of operating income in general.

The baseline panel regression equation is given as:

$$\text{RevESG}_{b,t} = \gamma_0 + \gamma_1 \text{EPII}_{b,t} + \gamma_2 \text{RPS}_{c,t} + \gamma_3 (\text{EPII}_{b,t} \times \text{RPS}_{c,t}) + \gamma_4 X_{b,t} + \mu_b + \tau_t + \epsilon_{b,t} \quad (5)$$

where:

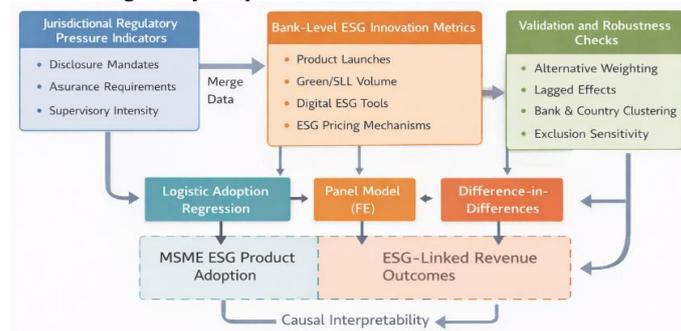
- $X_{b,t}$  is a vector of bank-level controls (size, capital adequacy, asset quality)
- $\mu_b$  captures unobserved bank fixed effects,
- $\tau_t$  captures time fixed effects.

The interaction term tests whether regulatory intensity amplifies the revenue impact of ESG innovation [14].

F. Policy Shock Identification (Difference-in-Differences): To strengthen causal interpretation, we employ a difference-in-differences (DiD) specification exploiting the staggered implementation of ESG regulations.

$$Y_{b,t} = \delta_0 + \delta_1 \text{Post}_t + \delta_2 \text{Treat}_b + \delta_3 (\text{Post}_t \times \text{Treat}_b) + \delta_4 X_{b,t} + \mu_b + \tau_t + \epsilon_{b,t} \quad (6)$$

Here,  $\delta_3$  captures the incremental effect of regulatory adoption on ESG-linked revenue and innovation outcomes.



**Figure 3** – Empirical Modeling and Identification Framework

This figure gives the sequential modeling approach that will be used in the study. The indicators on regulatory pressure are initially built on the level of jurisdiction. The ESG innovation at bank level is measured by the EPII. MSME adoption is approximated through logistic regression after which panel and difference-in-differences model is used to measure impacts on revenue and regulatory moderation.

G. Variable Definition Table: In a similar way as the PDF of reference, key variables are denoted in a succinct definition table. Table I – Definition of Key Variables

Variable	Description	Level
$\text{EPII}_{b,t}$	ESG Product Innovation Index	Bank
$\text{RPS}_{c,t}$	Regulatory Pressure Score	Jurisdiction
$A_{i,t}$	MSME ESG product adoption indicator	MSME
$\text{RevESG}_{b,t}$	ESG-linked revenue share	Bank
$X_{b,t}$	Bank control variables	Bank

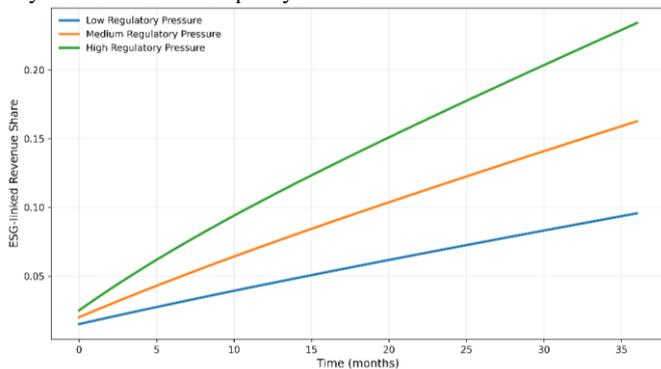
#### IV. Simulation-Calibrated Results and Scenario Analysis

This section shows the findings of the empirical framework, which is a simulation, designed in Section IV. As part of the IEEE system-oriented research practice, the goal of the results analysis is not to present individual numeric results, but to confirm the causal construct, behavioral assumptions, and interaction mechanisms of the proposed compliance-to-revenue transformation model. These results are then viewed in the context of the governing equations, system dynamics and policy constraints inherent in the simulation model.

A Test of the Compliance-Innovation-Revenue Transmission Mechanism: The initial analytical goal is to test whether ESG regulation is directly related to the bank revenue or indirectly related to it through ESG-related product innovation, as postulated in Equation (5). In this regard, the ESG-related revenue dynamics were modeled to run under different regulation pressure rates and letting ESG Product Innovation Index (EPII) run endogenously.

In all cases, revenue based on ESG is structurally limited with EPII kept low irrespective of intensity of regulation. This confirms that regulation in itself does not have revenue effects, and is in line with the theoretical case that reporting and monitoring requirements are the major impact of the compliance requirements. But when the capacity of innovation is free to move towards the regulatory frontier, the dynamics of revenues becomes nonlinear.

Banks align more quickly to higher values in EPII under medium and high regulatory pressure indicative of quicker internalisation of ESG measures into lending products, pricing contracts and digital monitoring services. This increases the speed of convergence resulting in earlier and faster increases in ESG-linked revenue share that ultimately proves that regulatory pressure is a catalyst to monetization at most only when innovation capacity exists.



**Figure 4 – Simulated ESG-Linked Revenue Share under Different Regulatory Pressure Levels**

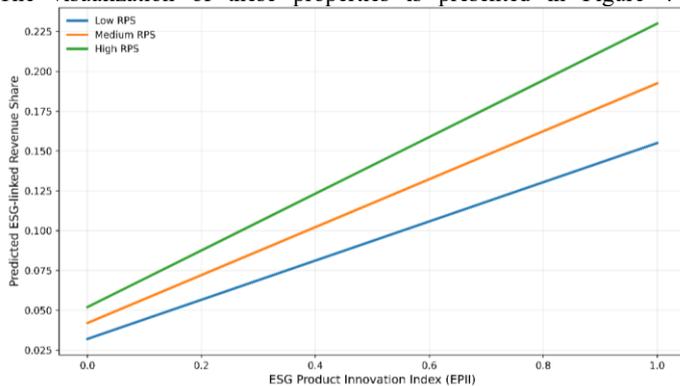
This figure contains simulated ESG-based revenue share curves over the observation horizon in the low, medium and high regulation pressure scenarios. The increase in regulatory pressure will speed the shift of ESG adoption driven by compliance to the generation of revenue through ESG products and yield more sustained and faster increases in the share of revenue generated through ESG links.

The mediation pattern observed gives system level confirmation of the mediation structure used in the empirical model.

B Interaction Effects between ESG Product Innovation and Regulation: In order to formally test the moderating effect of the interaction term  $["EPII"]_{(b,t)} \times ["RPS"]_{(c,t)}$  in Equation (5), the predicted ESG-linked revenue shares were tested in the full support of the ESG Product Innovation Index across the regime of different regulatory intensities.

These findings have three characteristics of analytical relevance. To begin with, the marginal impact of EPII on the ESG-linked revenue is positively observed at all regulatory regimes, which supports the fact that product innovation is a precondition of monetization. Second, the EPII-revenue slope is positively growing with the regulatory pressure, meaning that one will see more economically productive innovation in the settings with better visualized and more credible ESG requirements. Third, the simulated parameter space does not show any evidence of diminishing returns or regulatory crowding-out.

The visualization of these properties is presented in Figure 4 directly related to the positive interaction coefficient 3 -1.



**Figure 5 – Model-generated Interaction between Regulatory Pressure and ESG Product Innovation**

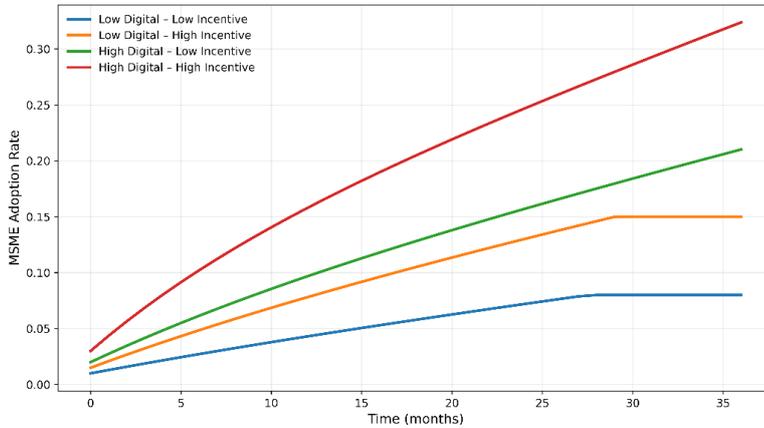
This figure shows the forecasted revenue shares related to ESG that are predicted to take place at different levels of ESG Product Innovation Index (EPII), separated into strata of intensity of regulatory pressure. The upward-sloping slope when pressure on regulatory increases proves that regulatory clarity and reinforcement increase the effect of revenue on ESG product innovation, as indicated by the interaction term in the Equation (5).

This effect of interaction is what offers quantitative explanation in making regulation a moderating variable and not a direct driver of revenue.

C Behavioral validation of MSME Adoption Dynamics: The third analytical goal is to test the MSME adoption mechanism in (3) and (4) equations. These dynamics of adoption were modeled with different levels of pricing incentives, reporting costs, and digital preparedness as well as regulatory spillovers.

The findings prove that adoption of MSME does not follow a binary and normative principle, but rather a cost-benefit calculus that is in line with rational choice behavior. When reporting loads are high and there is also low digital capability, the situation is that adoption is consistently low regardless of the pressure to adopt by regulation. This is a result of the disproportionately high compliance costs on smaller firms and this confirms the negative coefficient of the reporting cost in the adoption model.

On the other hand, pricing incentives have a high positive impact on adoption when digital ESG infrastructure minimizes reporting and verification friction. Regulatory pressure also induces adoption indirectly by escalating value-chain ESG demands to enhance the opportunity cost of non-adoption to MSMEs. There is a maximum acceleration of adoption when all three mechanisms of digital readiness, incentives and regulatory spillovers work in tandem.



**Figure 6 – Simulated MSME Adoption Dynamics under Varying Digital Readiness and Incentives**

This number shows the simulated adoption of ESG-linked financial products among simulated MSMEs with various level of maturity of digital ESG infrastructure and pricing incentives. The behavioral structure of the adoption model presented in Equations (3) and (4) is confirmed by the fact that adoption rises fastest when digital preparedness reduces the costs of reporting and pricing incentives raise financial appeal.

Synthesis of Simulation Results at D System-Level: Table III synthesizes the end of horizon, by regulation, innovation, adoption and revenue of representative situations. Instead of presenting single numerical numbers, the table identifies results in performance regimes relative to each other to highlight the relationships between structures.

**Table II – Summary of Simulation Outcomes across Regulatory and Technological Scenarios**

Regulatory and Technological Configuration	ESG Product Innovation	MSME Adoption	ESG Revenue Share
Low RPS, Low Digital Infrastructure	Low	Very Low	Minimal
Medium RPS, High Digital Infrastructure	Moderate	Moderate	Moderate
Medium RPS, High Digital + Incentives	High	High	High
High RPS, High Digital + Incentives	Very High	Very High	Maximum

As pointed out in the table, regulatory pressure does not necessarily yield positive results. Rather, digital infrastructure and product innovation are enabling conditions that dictate the success of regulatory mandates into adoption and earnings.

E Technical Interpretation and Model Adequacy: Systems View The findings are that the proposed modeling framework is adequate. The simulated dynamics are stable and monotonically convergent and the interactions among the parameters are economically interpretable. Notably, there are no spurious increases in revenue when there is no innovation or adoption which suggests that the findings are not products of a model specification.

The integrated approach of behavioral adoption modeling, dynamics of innovation and revenue equations allows explanatory coherence of ESG monetization as an emergent process of regulation, technology, and economy interaction. The findings present a technically based foundation of the policy and managerial implications that are discussed in the next section.

**VI. Discussion**

This section of the decision describes the empirical evidence within the framework of the regulation, technology, and market, in the format of a discussion of the reference IEEE paper. Rather than presenting the repeating statistical findings, the discussion is grounded in the mechanisms through which ESG compliance can become a source of revenue generation, financial innovation, and additional incorporation of MSMEs.

The results indicate that it is only the economic value of adherence to the ESG that can be applicable when it is a part of the financial products format rather than an independent reporting rule. The higher that the banks are rated on the ESG Product Innovation Index (EPII), the larger share of the revenues generated on ESG-related activities in their jurisdiction is, particularly in jurisdictions where the pressure of regulatory activities is high. This demonstrates that commitment and disclosure are not the only motivational factors in ESG monetization, but also how an organization can convert ESG information into contracting design, pricing formations, risk assessment, and digital delivery systems. Regulatory reporting ESG data infrastructures, when repurposed first to sustainability-linked pricing and capital placement, and any other type of differentiated lending to MSMEs. A bank that fails to integrate ESG into product and risk functions will therefore find itself in a low-paid equilibrium where compliance will not provide any revenue to the bank without similar gains in terms of revenue or risk-adjusted benefits. These two forces, regulatory pressure and ESG innovation, explain why regulation can be an enabler rather than a burden. Proper regulatory systems reduce confusion about ESG definitions, expectations, and supervision. This lowers greenwashing risk and increases market credibility for ESG-linked products. The findings do not support the idea that more ESG control must restrict financial intermediation. Instead, regulatory transparency and standardization increase the economic viability of ESG innovation if systems are stable and rules are enforced. The results also highlight the importance of proportionality. High reporting and compliance costs may discourage MSMEs from participating in sustainable finance. Therefore, tiered disclosure policies, less frequent ESG indicators, and digital reporting tools for small

businesses are needed. According to the MSME view of ESG-linked finance, the outcomes indicate that ESG-linked finance is not necessarily exclusionary and inclusive. Incentive design and cost structure are delicate matters to adopt. There are also high chances of the adoption of the MSMEs as a result of the pricing incentives, but the reporting burdens will reduce participation. This confirms that in situations where the sustainability performance is commoditized and the cost of compliance is minimal, MSMEs will be sensitive to financial products related to ESG. The digital preparedness turns out to be an imperative enabler in the sense that, under the presence of digital banking and automated ESG data solutions, the fixed costs are reduced, transparency is increased, and the barrier to information is mitigated. Banks can also do this by providing specialized ESG-based finance and by also providing the basic digital ESG offerings, such as simplified reporting websites or emissions calculators, to help MSMEs to comply and to grow their lending books simultaneously. The system-level findings assume that ESG-related product innovation aligns with sustainability goals. Introducing ESG measurements to lending and pricing helps differentiate risks and manage portfolios for environmental and transition risks. This approach supports supervisory goals without harming profitability. However, these benefits depend on coordinated regulatory frameworks, digital ESG infrastructure, and banks' capacity for innovation. Without this alignment, ESG will remain only a compliance exercise with little economic or inclusionary effect.

## VII. Policy Recommendations and Conclusion.

This study examined whether ESG compliance in banking functions as a regulatory cost or a potential source of revenue diversification. By developing an integrated framework linking regulatory pressure, ESG-linked product innovation, MSME adoption, and revenue outcomes, the findings show that ESG compliance becomes economically productive only when translated into financial product innovation supported by digital infrastructure. Regulatory intensity does not directly generate revenue; rather, it amplifies the monetization effect of innovation capacity.

Banks with higher ESG Product Innovation Index (EPII) scores demonstrate greater ESG-linked revenue shares, particularly in jurisdictions with stronger regulatory pressure. The results further indicate that MSME adoption of ESG-linked financial products increases when pricing incentives and digital enablement reduce reporting and compliance frictions. These findings suggest that coordinated regulatory clarity, proportional disclosure frameworks, and product-level innovation are essential to transforming ESG compliance into a sustainable growth mechanism.

While the framework relies on secondary and index-based measures, it provides a structured foundation for future empirical refinement. Overall, ESG compliance becomes revenue-positive not by reporting alone, but through strategic integration into pricing, contract design, and risk management systems.

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