

Green Finance Regulations and Disclosure Effectiveness: The Role of Governance and Enforcement Capacity

Ataullah Daud

Lahore School of Accountancy and Finance, University of Lahore

Atif Khan Jadoon

School of Economics, University of the Punjab, Pakistan

Amjad Ali

Lahore School of Accountancy and Finance, University of Lahore

ABSTRACT

Green finance frameworks such as taxonomies, mandatory disclosure requirements, external verification mechanisms, and supervisory monitoring systems continue to expand, concerns regarding regulatory effectiveness, enforcement quality, and compliance-related constraints have got significant attention among policymakers. This study examines the relationship among regulatory design frameworks, enforcement capacity, and compliance-coordination frictions in shaping post-issuance green finance disclosure outcomes in developing economies. The study adopts a mixed-method research design comprising two empirical stages. The first stage utilizes a perception-based survey of green finance market participants to evaluate the influence of regulatory structures and institutional coordination mechanisms on disclosure practices. The second stage employs a cross-jurisdictional panel dataset to examine both the direct and moderating effects of governance quality as a proxy for enforcement capacity. The empirical analysis was conducted using regression-based estimation techniques to assess the relationships among the study variables. The findings indicate that well-structured regulatory design frameworks significantly improve post-issuance green finance disclosure outcomes, while stronger governance quality and institutional enforcement capacity further enhance regulatory effectiveness. However, the interaction between regulatory design and governance quality explains that stronger institutional environments may partially substitute for extensive regulatory complexity rather than merely reinforcing it. In addition, compliance and coordination frictions negatively affect disclosure quality and implementation efficiency across green finance systems. The results emphasize the importance of balanced regulatory structures, institutional

effectiveness, and coordinated implementation mechanisms in strengthening green finance disclosure practices within developing economies.

Keywords: Green Finance, Regulatory Design, Enforcement Capacity, Post-Issuance Disclosure, Quality of Governance

Introduction

The accelerating pace of climate change and the substantial financing requirements associated with global decarbonization have positioned sustainable and green finance at the center of contemporary academic and policy discourse (Jia, 2023; Fu et al., 2024; Shah et al., 2025; Ahmed & Hu, 2025). Developing economies are expected to require trillions of United States dollars in additional climate-related investment over the coming decades to support low-carbon transitions, climate adaptation, and environmental resilience. A growing proportion of this financing is anticipated to be mobilized through green-labelled financial instruments, particularly green bonds, sustainability-linked loans, and green credit facilities (Marc & Yu, 2024; Mehdi et al., 2025; Chowdhury & Hassan, 2025; Cicchiello & Perdichizzi, 2026). Despite this rapid expansion, the global green finance market remains heavily concentrated in advanced economies characterized by mature institutional systems, stronger governance structures, and well-established regulatory frameworks. In contrast, many developing economies, although highly exposed to climate-related risks and financing vulnerabilities, continue to account for only a limited share of global green finance activity due to weak institutional credibility, fragmented standards, and limited enforcement capabilities. The widening imbalance between climate financing requirements and the actual availability of credible green finance in developing economies has transformed regulation from a peripheral compliance mechanism into a fundamental market-building instrument (Abbasi et al., 2025; Lee & Zhuang, 2025; Arshi et al., 2025; Bogdanov et al., 2026). Regulatory frameworks involving green taxonomies, mandatory disclosure requirements, external verification systems, supervisory oversight, and enforcement mechanisms are increasingly viewed as essential tools for strengthening transparency, improving investor confidence, and enhancing informational integrity within emerging green finance markets (Jamel & Zhang, 2024; Nipper et al., 2025; Batool et al., 2025). The underlying assumption is that stronger and more coherent regulatory systems can improve market credibility and facilitate the expansion of sustainable financial activities. However, the effectiveness of these regulatory mechanisms remains highly dependent on the institutional and governance conditions within which they operate.

Prior studies have also examined the institutional foundations of environmental disclosure regulation and sustainable finance governance, particularly within advanced and large emerging economies (Adu, 2022; Krueger et al., 2024; Naeem et al., 2025; Al-Masri & Ibrahim, 2025). Similarly, empirical evidence regarding the capital market implications of environmental, social, and governance disclosure requirements and green finance interventions has predominantly focused on developed financial systems characterized by relatively strong regulatory institutions and higher governance quality. Although institutional quality and governance effectiveness are frequently acknowledged as important determinants of regulatory success, enforcement capacity has rarely been examined as a measurable

moderating factor capable of conditioning the relationship between regulatory design and market development outcomes (Wasike, 2017; Bary & Hakim, 2025; Ali et al., 2025; Wang et al., 2025). This issue is especially important in developing economies where institutional constraints, administrative fragmentation, and coordination weaknesses may reduce the effectiveness of otherwise well-designed regulatory frameworks. Moreover, debates regarding the potential trade-off between regulatory stringency and financial inclusion remain largely theoretical, with limited empirical validation in the context of green finance systems (Dias et al., 2024; Socol et al., 2025; Longston et al., 2025). Excessively complex compliance requirements may unintentionally increase participation costs, restrict access to green financing instruments, and weaken market inclusiveness, particularly for smaller issuers and financially constrained institutions. The policy relevance of these concerns has become increasingly significant as regulators in developing economies are required to formulate green finance frameworks under conditions of institutional uncertainty and limited enforcement resources. In many jurisdictions, regulatory reforms are introduced in real time despite insufficient empirical evidence regarding which combinations of regulatory structures and enforcement mechanisms generate the most effective market outcomes.

The growing importance of post-issuance disclosure practices further reinforces the need for effective regulatory coordination within green finance markets. Post-issuance disclosure has become a critical mechanism for ensuring transparency, monitoring environmental performance, and maintaining investor confidence after the issuance of green-labelled financial instruments. Weak disclosure quality may reduce market credibility, increase informational asymmetries, and undermine the long-term legitimacy of sustainable finance initiatives (Abeysekera et al., 2021; Dempere et al., 2024; Ali et al., 2025; Arhinful et al., 2025; Arshad et al., 2025). Accordingly, disclosure effectiveness increasingly depends not only on the existence of formal regulations but also on the institutional capacity required to supervise implementation, coordinate stakeholders, and enforce compliance standards consistently across financial systems. Against this background, the present study examines the relationship among regulatory design frameworks, enforcement capacity, compliance-related frictions, and post-issuance disclosure outcomes within developing economies. The study specifically evaluates whether enforcement capacity moderates the effectiveness of regulatory design in shaping green finance market development and whether compliance burdens and financial exclusion pressures negatively influence disclosure outcomes. To address these objectives, the study develops four research questions concerning the direct effects of regulatory design and enforcement capacity, the moderating role of institutional effectiveness, and the influence of compliance-related frictions on green finance market development.

1. Literature Review

The growing importance of sustainable finance within emerging markets has increasingly positioned regulation as a market-building mechanism rather than merely a supplementary compliance instrument. Existing evidence documents the rapid expansion of sustainable debt issuance across emerging economies while simultaneously emphasizing that market growth continues to be constrained by

fragmented green definitions, weak disclosure comparability, insufficient verification capacity, and uneven oversight of greenwashing practices (Goel et al., 2022; Ali et al., 2025). Policy instruments such as national taxonomies, disclosure regulations, credible external review systems, and supervisory monitoring are widely recognized as essential mechanisms for reducing information asymmetries and strengthening investor confidence in green financial products. Stronger regulatory environments are also considered important for increasing investor participation and reducing reputational risks for issuers, particularly in jurisdictions characterized by weak data systems and institutional limitations (Johnson et al., 2010; Anus et al., 2025). Disclosure-based green financial regulation has also received substantial scholarly attention due to its role in promoting market discipline over environmentally harmful activities. Existing studies indicate that mandatory disclosure requirements can reduce information asymmetries that prevent investors from accurately pricing climate-related risks and environmental performance (Steuer & Troger, 2022; Marc & Al Masri, 2024). The effectiveness of disclosure regulation is strongly influenced by regulatory design characteristics, including enforcement quality, monitoring structures, and market incentives. Nevertheless, disclosure requirements alone may not generate socially optimal environmental outcomes because environmentally harmful activities may persist in the absence of effective enforcement mechanisms and credible market penalties. From a policy perspective, these findings explain that disclosure systems must be complemented by stronger institutional monitoring and enforcement arrangements to achieve meaningful green finance market credibility.

Global assessments of mandatory environmental, social, and governance disclosure regulations further demonstrate that disclosure obligations can improve stock liquidity and market transparency, particularly when enforcement mechanisms are stronger, and disclosure requirements are mandatory rather than voluntary or “comply-or-explain” in nature (Krueger et al., 2024). Regulatory design characteristics are therefore central to disclosure effectiveness and broader market functioning. Such findings reinforce the argument that well-structured regulation can strengthen information quality and improve financial market operations, both of which are essential conditions for scaling sustainable finance in environments characterized by weak disclosure quality. However, existing empirical evidence remains heavily concentrated on liquidity and informational outcomes rather than broader green finance market development indicators. In addition, limited evidence exists regarding how disclosure regulations interact with other sustainable finance policy instruments within developing economies operating under constrained institutional capacity.

Qualitative evidence from developing economies further highlights the importance of credibility conditions in supporting green finance market growth. Existing studies consistently identify clear regulatory guidelines, standardized disclosure practices, and confidence in the integrity of green labels as critical determinants of investor participation and issuance growth (Nguyen et al., 2022). Recurring barriers include inconsistent reporting requirements, weak verification procedures, inadequate standardization, and uncertainty regarding project eligibility criteria. Such institutional weaknesses increase transaction costs, discourage investors, and create uncertainty among issuers. Although these findings provide valuable insights into the operational realities of green finance regulation within developing markets, the

available evidence remains largely descriptive and does not estimate the causal effects of specific regulatory instruments such as mandatory taxonomies, disclosure templates, external review requirements, or supervisory monitoring systems on measurable market outcomes.

Research examining the emergence of green finance policies across multiple jurisdictions demonstrates that political economy conditions and market structures strongly influence policy adoption processes (Cojoianu et al., 2025). Exposure to fossil fuel financing, institutional conditions, and broader climate-related pressures significantly shape the probability of adopting green finance regulations. These findings indicate that green finance policy development is highly context-dependent and influenced by national governance structures and economic incentives. Evidence from developing economies further identifies regulatory and policy architecture as central determinants of green bond market development. Existing analyses highlight the importance of institutional infrastructure, legal frameworks, fiscal support, and monetary policy conditions in facilitating sustainable finance expansion within resource-constrained environments (Hasan et al., 2024). These findings reinforce the argument that regulation operates as a foundational determinant of market confidence and sustainable investment activity.

Cross-jurisdictional analyses indicate that sovereign green bond issuance is associated with subsequent increases in both the number and volume of corporate green bond issuances, particularly in jurisdictions characterized by stronger climate-related policy environments (Cheng et al., 2024). Additional improvements in market conditions include enhanced verification practices, stronger liquidity conditions, and narrower yield spreads following sovereign issuance. These findings are particularly important for developing economies where sovereign issuance may function as a signaling mechanism capable of attracting private capital and strengthening market credibility. Studies examining barriers to green bond issuance within developing economies consistently identify weak regulatory infrastructure, insufficient issuance guidelines, poor alignment with international standards, limited incentives, and low investor confidence as major constraints on market expansion (Nguyen et al., 2022). Such findings demonstrate that regulation is not merely a background institutional factor but a primary determinant of market participation and investor trust within emerging sustainable finance systems. Additional evidence from Indonesia demonstrates that sovereign and corporate green bond issuances respond differently to bond characteristics and macro-financial variables during the early stages of market development (Endri et al., 2025). Variables such as credit ratings and green equity indicators significantly influence issuance patterns, while the effects of exchange rates, coupon structures, maturities, and interest rates vary across issuer categories. Such findings highlight the importance of targeted regulatory approaches capable of accommodating differences across market segments. Empirical evidence regarding policy support mechanisms further demonstrates that green bond grants, fiscal incentives, and policy signaling measures significantly increase the likelihood of private-sector green bond issuance, particularly within Asian jurisdictions (Azhgaliyeva et al., 2021). Regional cooperation and regulatory standardization are also found to strengthen policy effectiveness in certain institutional environments.

Research examining banking-sector green finance regulation demonstrates that

regulatory interventions can substantially redirect credit allocation and influence environmental performance outcomes. Evidence from China's Green Credit Guidelines indicates that green lending expanded significantly following regulatory implementation, although the effects were concentrated primarily within state-controlled banking institutions (Li et al., 2026). Stronger implementation intensity was also associated with improved environmental performance and reduced pollution emissions. Similarly, evidence examining the relationship between green lending and bank credit risk reveals that regulatory effects vary substantially across institutional structures, with large state-controlled banks benefiting more than smaller regional institutions due to differences in information capacity and expertise (Zhou et al., 2022). These findings highlight the importance of institutional capacity-building and differentiated regulatory implementation within green finance systems. The credibility of sovereign green bonds and sustainable finance instruments has also become an increasingly important area of investigation. Existing evidence demonstrates strong investor demand for sovereign green bonds and explains that transparent reporting standards and credible disclosure systems are essential for maintaining investor confidence and supporting future issuances (Demski et al., 2025). Similarly, evidence examining sovereign sustainability bonds indicates that credible green labeling can reduce borrowing costs and alleviate information asymmetries, particularly within higher-risk emerging markets (Nevatia, 2026). These findings reinforce the importance of transparency, disclosure quality, and regulatory credibility in supporting sustainable finance market expansion. Evidence relating to external reviews and verification systems further demonstrates that credibility mechanisms operate differently across institutional environments. Existing studies find limited evidence of a consistent pricing premium associated with voluntary external reviews, although stronger effects are observed in jurisdictions characterized by stronger legal institutions and among issuers employing highly reputable reviewers (Allman & Lock, 2024). The findings also reveal that the external review market remains characterized by limited standardization and transparency. These institutional inconsistencies reduce the ability of investors to price green credentials uniformly across markets.

The importance of taxonomy frameworks has also received substantial attention within the sustainable finance literature. Existing studies demonstrate that taxonomies can accelerate sustainable finance growth by providing investors with clear definitions regarding eligible environmental activities (Ehlers et al., 2021). At the same time, major weaknesses remain evident within many taxonomy systems, including insufficient granularity, inconsistent verification standards, and limited use of quantitative performance indicators. Stronger alignment with sustainability objectives, enhanced verification mechanisms, and more comprehensive impact reporting requirements are therefore viewed as essential design principles for effective taxonomy systems. Existing analytical frameworks demonstrate that disclosure obligations, environmental risk requirements, taxonomies, and sustainable finance standards may unintentionally increase financial exclusion by reducing credit accessibility for vulnerable populations and smaller market participants (Dias et al., 2024). These concerns are particularly relevant for developing economies characterized by weaker institutional capacity and high levels of financial vulnerability. However, the current literature remains largely conceptual and does

not empirically estimate how alternative regulatory configurations influence green finance market expansion while simultaneously accounting for inclusion risks and compliance burdens. As a result, substantial uncertainty remains regarding the optimal balance between regulatory rigor, enforcement intensity, market credibility, and financial accessibility within emerging green finance systems.

2. Theoretical Framework

Financial markets expand more efficiently when information asymmetries are reduced, institutional rules are credible, and market participants possess confidence that regulatory requirements can be monitored and enforced effectively (Leuz & Wysocki, 2008). Within the context of green finance, taxonomy regulations, disclosure requirements, external verification systems, and supervisory enforcement mechanisms function not merely as administrative instruments but as institutional structures that shape market credibility and operational legitimacy (Leuz & Wysocki, 2016). A coherent regulatory environment supported by effective enforcement mechanisms reduces uncertainty for issuers and investors, improves transparency, and enhances the capacity of financial markets to mobilize long-term sustainable capital. Conversely, weak enforcement can undermine even formally strong regulatory systems, while excessively burdensome regulation may discourage participation among smaller firms and financially constrained institutions (Kraakman & Armour, 2017). Accordingly, the regulatory design package within the framework incorporates taxonomy strictness and alignment, mandatory disclosure depth, governance of external review systems, supervisory monitoring intensity, and penalty structures (Tang et al., 2024). Existing evidence explains that these regulatory dimensions operate collectively in shaping market behavior because effective sustainable finance systems require coordination among standards, disclosure mechanisms, verification practices, and enforcement institutions (Ning & Shen, 2024; Gillani et al., 2026).

A stronger regulatory design quality positively contributes to green finance market development by reducing ambiguity in green classifications, improving disclosure comparability, strengthening label credibility, discouraging greenwashing practices, and reducing uncertainty among market participants (Alahmadi, 2024). Green finance market development is therefore conceptualized as the extent to which sustainable finance markets expand in depth, participation, credibility, and operational efficiency (Zhang & Wang, 2021; Chen et al., 2024; Choudhary et al., 2026). Existing studies demonstrate that similar regulatory frameworks often generate different outcomes across jurisdictions because of variation in implementation quality and institutional capacity (Schwartz, 2003). Formal regulations alone do not necessarily create market credibility if regulatory institutions lack the ability to oversee disclosure systems, verify compliance standards, supervise review procedures, or impose penalties in cases of non-compliance or mislabeling (Urpelainen, 2010; Fatima et al., 2026). Consequently, enforcement capacity is positioned within the framework not only as an independent explanatory factor but also as a conditioning mechanism influencing the effectiveness of regulatory design.

The stronger enforcement capacity directly enhances green finance market development by improving implementation quality, strengthening institutional trust,

and increasing the credibility of regulatory commitments. In addition, enforcement capacity is expected to condition the relationship between regulatory design and market outcomes because well-designed regulatory frameworks are likely to produce stronger effects when implemented within jurisdictions characterized by effective governance systems and stronger supervisory institutions. This interaction reflects the broader institutional argument that regulatory effectiveness depends not only on the existence of formal rules but also on the ability of institutions to administer and enforce those rules consistently across financial systems. Compliance requirements associated with disclosure obligations, verification procedures, reporting standards, and institutional monitoring may generate substantial operational costs, particularly in low-capacity developing economies (Collard et al., 2001; Tahir et al., 2026). Consequently, financial exclusion and compliance burden are conceptualized as factors that may negatively influence green finance market development by increasing regulatory costs, reducing participation incentives, and creating barriers to entry within sustainable finance systems. The inclusion of this dimension reflects the broader policy concern that effective green finance regulation must simultaneously achieve market credibility and market accessibility. Excessively stringent regulatory structures may strengthen disclosure quality and reduce greenwashing risks while also unintentionally restricting participation among smaller institutions and financially constrained issuers. Therefore, the framework recognizes that sustainable green finance systems require an appropriate balance between regulatory rigor, enforcement effectiveness, and institutional inclusiveness (Franks et al., 1997; Audi et al., 2026).

Based on the theoretical logic, the study proposes the following general mathematical model:

$$GFMD = f(REG, ENF, EXCL, CV) \quad (1)$$

Where:

- GFMD = Green Finance Market Development
- REG = Regulatory Design Package
- ENF = Enforcement Capacity
- EXCL = Financial Exclusion / Compliance Burden
- CV = Control Variables

The linear form of the model is expressed as:

$$GFMD_i = \beta_0 + \beta_1 REG_i + \beta_2 ENF_i + \beta_3 EXCL_i + \sum_{k=1}^n \beta_k CV_{ki} + \varepsilon_i \quad (2)$$

To capture the conditioning role of enforcement capacity, the interaction model is expressed as:

$$GFMD_i = \beta_0 + \beta_1 REG_i + \beta_2 ENF_i + \beta_3 (REG_i \times ENF_i) + \beta_4 EXCL_i + \sum_{k=1}^n \beta_k CV_{ki} + \varepsilon_i \quad (3)$$

In this specification, β_3 measures whether enforcement capacity strengthens the effect of the regulatory package on green finance market development.

Given the cross-country and time-sensitive nature of the research problem, the econometric structure can be represented in panel-data form as:

$$GFMD_i = \beta_0 + \beta_1 REG_i + \beta_2 ENF_i + \beta_3 (REG_i \times ENF_i) + \beta_4 EXCL_i + \beta_5 X_i + \mu_i + \lambda_t + \varepsilon_i \quad (4)$$

Where:

- i denotes the country
- t denotes time
- GFMD =green finance market development in country i at time t
- REG=the regulatory design package
- ENF =enforcement capacity
- REGXENF=the interaction term
- EXCL =financial exclusion/compliance burden
- X =vector of control variables
- μ =captures country-specific fixed effects
- λ =captures time-specific effects
- ε =the error term

Primary data were collected through a structured perception-based survey administered to green finance market participants, including regulatory professionals, financial analysts, compliance officers, and sustainability specialists operating within developing economies. The final survey sample consisted of 230 valid responses obtained through purposive sampling techniques to ensure respondents possessed relevant institutional and market experience. In addition, secondary panel data comprising 51 country-year observations were compiled from publicly available governance and green finance disclosure sources covering the available reporting period. The empirical analysis was conducted using regression-based estimation techniques. Data management, descriptive analysis, and econometric estimations were performed using Statistical Package for the Social Sciences and Stata software packages.

3. Results and Discussion

Table 1 presents the descriptive statistics of the study variables and provides an overview of the distributional characteristics of the dataset. The results indicate that respondents possess a moderate level of professional experience, explaining that the sample is composed of individuals with sufficient practical exposure and organizational understanding to evaluate internal governance and disclosure-related processes effectively. The relatively balanced distribution of experience levels further reflects diversity in professional backgrounds, which strengthens the representativeness of the sample. The findings also show that internal controls and cross-functional coordination are perceived positively among respondents, indicating the existence of relatively structured governance mechanisms and collaborative organizational practices within the sampled institutions. The observed responses explain that organizations are increasingly emphasizing coordination across departments and strengthening internal monitoring systems to support operational efficiency and disclosure quality. Similarly, post-issuance green finance disclosure demonstrates a moderately strong level, implying that institutions are progressively

improving transparency and reporting practices related to sustainable finance activities. The skewness and kurtosis statistics further indicate that the variables generally follow an approximately normal distribution without substantial deviations from normality assumptions. The absence of extreme asymmetry or excessive peakedness explains that the dataset is statistically suitable for advanced empirical analyses, including regression-based estimation techniques. Overall, the descriptive results provide initial evidence of relatively stable institutional practices and disclosure structures within the sampled framework.

Table 1: Descriptive Statistics

Variable	M	SD	Min	Max	Skewness	Kurtosis
Experience (Years)	7.55	3.10	2	12	-0.154	-1.21
Internal Controls (1–5)	3.67	0.83	1	5	-0.375	0.13
Cross-Functional Coordination (1–5)	3.71	0.81	2	5	-0.173	-0.44
Post-Issuance Green Finance Disclosure (1–5)	3.67	0.78	1	5	-0.451	0.50

Table 2 presents the regression results examining the influence of regulatory coordination factors on post-issuance green finance disclosure practices. The findings reveal that regulatory design structures exert a strong positive and statistically significant influence on post-issuance green finance disclosure. This outcome indicates that stronger disclosure frameworks, clearer reporting requirements, improved verification systems, and more structured governance arrangements enhance the transparency and credibility of green finance reporting practices. The result supports the broader theoretical argument that sustainable finance markets operate more effectively when information asymmetries are reduced, and market participants possess confidence in the integrity of disclosure systems (Leuz & Wysocki, 2008). The findings also reinforce the view that green finance regulation functions as a market-building mechanism capable of strengthening investor confidence and improving the informational quality of sustainable financial products (Goel et al., 2022). The positive relationship between regulatory structures and disclosure outcomes is also consistent with evidence demonstrating that mandatory disclosure frameworks improve market transparency and strengthen institutional credibility when supported by coherent governance arrangements (Krueger et al., 2024). Strong disclosure systems reduce uncertainty among investors and issuers by clarifying environmental reporting expectations and improving comparability across green financial instruments. Such conditions are particularly important in developing economies where sustainable finance markets often face credibility challenges associated with weak institutional oversight and inconsistent reporting practices. The findings explain that stronger regulatory structures can play an essential role in enhancing the legitimacy and operational effectiveness of emerging green finance markets.

In contrast, cross-functional coordination demonstrates a statistically significant negative association with post-issuance disclosure outcomes. This result may initially appear counterintuitive because institutional coordination is generally expected to improve implementation quality and organizational efficiency. However,

within developing economy contexts, increased coordination requirements may also reflect administrative complexity, fragmented institutional responsibilities, overlapping reporting obligations, and delays in decision-making processes. Excessive coordination demands across departments, supervisory agencies, verification entities, and reporting institutions may unintentionally increase operational frictions and weaken the efficiency of disclosure implementation. This interpretation aligns with broader concerns in the literature explaining that complex regulatory structures and compliance requirements can generate institutional burdens that reduce market efficiency and increase participation costs (Dias et al., 2024).

The negative association further supports evidence indicating that developing economies often face implementation constraints due to limited institutional capacity, inconsistent governance structures, and weak operational integration among regulatory actors (Nguyen et al., 2022). In such environments, coordination mechanisms may become administratively burdensome when institutional responsibilities are not clearly defined or when communication systems between regulatory stakeholders remain underdeveloped. The result highlights that institutional coordination alone does not automatically improve disclosure quality unless supported by efficient governance structures, clearly allocated responsibilities, and adequate implementation capacity. The findings reflect the broader argument that regulatory effectiveness depends not only on the existence of formal disclosure requirements but also on the operational feasibility of implementing those requirements within institutional settings characterized by limited administrative resources (Kraakman & Armour, 2017). While stronger regulatory frameworks can improve market credibility and transparency, excessively complex coordination systems may create compliance frictions that weaken implementation efficiency and reduce the effectiveness of disclosure systems. This issue is especially important for developing economies where financial institutions, issuers, and supervisory agencies frequently operate under resource constraints and limited technical expertise.

Table 2: Regression of Post-Issuance Green Finance Disclosure on Regulatory Design and Enforcement Coordination

Predictor	B	SE	t	p	β (std.)
Intercept	2.120	0.250	8.50	< .001	—
Cross-Functional Coordination	−0.241	0.070	−3.47	< .001	−0.235
Post-Issuance Green Finance Disclosure	0.665	0.072	9.24	< .001	0.626
R ²	0.283				
Adjusted R ²	0.277				
F (2, 227)	44.8				
P	< .001				
RMSE	0.700				

Table 3 presents the baseline panel regression results examining the relationship between institutional credibility and regulatory strength and post-issuance green finance disclosure outcomes. The findings reveal that institutional credibility and regulatory strength exert a positive and statistically significant influence on post-issuance green finance disclosure. This result indicates that jurisdictions

characterized by stronger regulatory structures, clearer sustainability standards, and more credible institutional environments tend to achieve higher levels of transparency and reporting quality within green finance systems. The outcome supports the broader theoretical perspective that sustainable finance markets function more effectively when regulatory institutions reduce uncertainty, strengthen information comparability, and improve confidence among investors and issuers (Leuz & Wysocki, 2008).

The positive relationship further aligns with prior evidence emphasizing the importance of coherent regulatory frameworks in strengthening market credibility and reducing greenwashing risks within sustainable finance markets (Goel et al., 2022). Effective institutional and regulatory systems contribute to greater consistency in reporting practices, stronger disclosure reliability, and improved market confidence, all of which are essential for the long-term development of green finance markets in developing economies. These findings also reinforce the argument that green finance regulation should be viewed not merely as a compliance requirement but as a foundational mechanism for market formation and institutional legitimacy. The results are also consistent with studies demonstrating that stronger environmental, social, and governance disclosure frameworks improve information quality and enhance market functioning when supported by effective governance structures (Krueger et al., 2024). Strong regulatory credibility encourages issuers to comply more consistently with disclosure obligations while simultaneously increasing investor confidence regarding the authenticity and reliability of green-labelled financial instruments. In developing economies, where institutional weaknesses and inconsistent reporting practices frequently undermine sustainable finance credibility, such regulatory improvements become particularly important for attracting long-term investment and supporting market expansion. Moreover, the findings support broader institutional arguments emphasizing that the effectiveness of sustainable finance systems depends heavily on the quality of governance and the operational credibility of regulatory frameworks (Schwartz, 2003). When regulatory systems are perceived as reliable and consistently enforced, market participants are more likely to engage confidently in green finance activities because the risks associated with information asymmetry and mislabeling are reduced. This contributes to stronger disclosure standards, improved market transparency, and greater legitimacy of sustainable finance instruments.

Table 3: Panel Regression — Baseline Model 1
 DV = CPGFD

Predictor	B	SE	t	p	β (std.)
Intercept	0.086	0.146	0.59	.557	—
ICRS	0.801	0.162	4.93	< .001	0.576
R ²		0.332			
Adjusted R ²		0.318			
F (1, 49)		24.3			
P		< .001			

Table 4 presents the moderated panel regression results examining the interaction between institutional credibility, regulatory strength, and country governance quality in explaining post-issuance green finance disclosure outcomes. The findings indicate that institutional credibility and regulatory strength maintain a strong positive and statistically significant relationship with post-issuance green finance disclosure. This result confirms that stronger regulatory frameworks, clearer sustainability standards, and more credible institutional arrangements contribute significantly to improving transparency and disclosure quality within green finance markets. The outcome supports the broader institutional theory that effective regulation enhances market credibility by reducing informational asymmetries, improving reporting consistency, and strengthening investor confidence (Leuz & Wysocki, 2008). These findings are also consistent with evidence emphasizing that sustainable finance markets expand more effectively when supported by coherent disclosure systems, verification mechanisms, and supervisory oversight structures (Goel et al., 2022).

Country governance quality also demonstrates a positive and statistically significant influence on disclosure outcomes, explaining that stronger governance environments improve the implementation and operational effectiveness of sustainable finance regulations. Jurisdictions characterized by stronger institutional quality, administrative effectiveness, and regulatory accountability appear better positioned to enforce disclosure obligations and maintain market confidence. This result aligns with prior literature emphasizing that institutional effectiveness is essential for ensuring that formal regulations translate into credible market practices rather than remaining symbolic policy commitments (Schwartz, 2003). The finding further supports evidence that governance quality strengthens market transparency and improves the credibility of environmental, social, and governance disclosure systems (Krueger et al., 2024). However, the interaction term between institutional credibility and governance quality is negative and statistically significant, indicating that governance quality moderates the effect of regulatory structures in a substitutional rather than complementary manner. This result explains that in jurisdictions characterized by stronger governance environments, the marginal contribution of highly intensive regulatory structures to disclosure outcomes becomes relatively weaker. In other words, strong governance quality may partially compensate for limitations in regulatory complexity because effective institutions are capable of supporting credible disclosure practices even without excessively stringent regulatory frameworks.

This finding provides an important theoretical insight into the relationship between regulation and institutional quality within developing economies. Much of the existing literature implicitly assumes that stronger regulation and stronger governance reinforce one another in a complementary manner. However, the present findings explain that governance quality may substitute for regulatory intensity to some extent because effective institutions improve implementation quality, reduce enforcement uncertainty, and strengthen compliance credibility independently of regulatory complexity. This interpretation is particularly relevant for developing economies where limited institutional resources may constrain the feasibility of implementing highly complex regulatory systems.

The negative interaction effect also supports broader concerns regarding excessive

regulatory complexity and compliance burdens within emerging financial systems. Existing literature explains that highly stringent regulatory arrangements may create operational inefficiencies, increase administrative costs, and generate participation barriers when institutional capacity remains limited (Dias et al., 2024). In such environments, governance quality becomes increasingly important because efficient institutions can achieve credible market outcomes through effective implementation and oversight without requiring excessively burdensome regulatory structures. The findings imply that stronger governance systems may reduce the need for highly complex disclosure frameworks by improving enforcement effectiveness and institutional coordination. The moderated relationship additionally reflects evidence from developing economy contexts indicating that institutional effectiveness, operational coordination, and regulatory enforcement capacity significantly shape sustainable finance outcomes (Nguyen et al., 2022). Where governance quality is poor, more structured and stringent regulatory systems may be necessary to compensate for institutional deficiencies and maintain market credibility. Conversely, jurisdictions with stronger governance structures may achieve similar disclosure outcomes through more balanced and administratively feasible regulatory approaches.

Table 4: Panel Regression — Moderation Model 2
 DV = CPGFD

Predictor	B	SE	t	p	β (std.)
Intercept	0.774	0.021	36.14	< .001	—
ICRS_c	1.091	0.145	7.52	< .001	0.785
CGQ_c	0.788	0.168	4.69	< .001	0.502
ICRS $\times$ CGQ	-4.487	1.220	-3.68	< .001	-0.394
R ²			0.569		
Adjusted R ²			0.542		
F (3, 47)			20.7		
P			< .001		
RMSE			0.141		

4. Conclusions

The present study examined the relationship among regulatory design frameworks, enforcement capacity, governance quality, and compliance-related frictions in shaping post-issuance green finance disclosure outcomes within developing economies. The analysis was conducted using a mixed-method approach that combined a perception-based survey of green finance market participants with cross-jurisdictional panel regression analysis based on country-level observations collected over the available post-issuance disclosure reporting period. The empirical findings provide strong evidence that the quality of regulatory design constitutes the most consistent and influential determinant of post-issuance green finance disclosure performance across developing economy settings. The results demonstrate that stronger regulatory structures significantly improve disclosure quality, transparency, and institutional credibility within green finance markets. Regulatory components

such as taxonomy alignment, disclosure requirements, supervisory oversight, verification mechanisms, and enforcement structures collectively contribute to reducing information asymmetries and strengthening investor confidence. These findings reinforce the broader institutional argument that sustainable finance markets develop more effectively when supported by credible and coherent regulatory environments capable of enhancing disclosure reliability and discouraging greenwashing practices. The findings further indicate that enforcement capacity and governance quality play a substantial role in improving the effectiveness of green finance regulation. Jurisdictions characterized by stronger institutional governance and more effective enforcement environments demonstrate higher levels of disclosure quality and implementation effectiveness. However, the interaction analysis reveals that the relationship between regulatory design and governance quality follows a substitutional rather than a complementary pattern. Specifically, stronger governance environments reduce the marginal dependence on increasingly complex regulatory structures because effective institutions are capable of supporting credible disclosure systems through stronger implementation quality and institutional accountability. Conversely, in jurisdictions characterized by weaker governance systems, stronger and more structured regulatory frameworks become increasingly important for maintaining market credibility and improving disclosure outcomes. The study also identifies the importance of compliance-related frictions and operational coordination challenges within developing economies. The findings suggest that excessive coordination complexity and burdensome compliance structures may negatively affect disclosure implementation efficiency, particularly within institutional environments characterized by limited administrative capacity and fragmented governance systems. This outcome highlights the importance of balancing regulatory rigor with institutional feasibility in the design of sustainable finance frameworks.

From a policy perspective, the findings suggest that developing economies do not necessarily need to achieve fully mature governance systems before meaningful improvements in green finance disclosure can occur. Well-designed and coherent regulatory frameworks can independently generate substantial improvements in market transparency and disclosure credibility even under conditions of institutional constraint. At the same time, the results indicate that jurisdictions characterized by stronger governance environments may achieve effective disclosure outcomes without relying upon excessively complex or highly burdensome regulatory systems. Accordingly, policymakers should prioritize balanced regulatory reforms that strengthen disclosure quality, institutional accountability, supervisory effectiveness, and implementation feasibility simultaneously. The findings emphasize that sustainable green finance systems require a calibrated policy approach capable of balancing market credibility, institutional practicality, and financial accessibility. Regulatory reforms should focus not only on increasing disclosure obligations and enforcement intensity but also on ensuring that compliance structures remain operationally feasible and inclusive within developing economy contexts.

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