



The Green Investment Paradox: Toward a Contingency Framework of Financing Constraints and Corporate Financial Flexibility

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ABSTRACT

Purpose: Financing-constraint theory predicts that informationally opaque, long-horizon investments should be starved of external capital, yet instruments designed to relieve this constraint for green investment show mixed results – the "Green Investment Paradox" this paper conceptualises.

Design/methodology/approach: An integrative theory-synthesis method combines financing-constraints theory, corporate financial flexibility, and green investment/greenwashing research into testable propositions and an integrated contingency framework.

Findings: Financing constraints negatively affect green investment; green financing instruments have an ambivalent effect, as greenwashing-risk scrutiny can reproduce the constraint; financial flexibility moderates both relationships; this moderation is contingent on institutional environment, life cycle, ownership, and reputational history.

Originality/value: The contingency framework reconciles conflicting green-finance findings, extends financing-constraints theory into green investment, and offers a testable research agenda.

INTRODUCTION

Corporate investment in environmentally sustainable assets and technologies has moved from a discretionary corporate-social-responsibility activity to a strategic imperative tied directly to firm valuation, regulatory compliance, and access to capital. Capital markets have responded with an expanding menu of dedicated green financing instruments. Green investment, almost by construction, has the characteristics this theory identifies as most exposed to such frictions: long payback horizons, technological uncertainty, partial irreversibility and, critically, a quality dimension (genuine environmental benefit) that is unusually hard for outside capital providers to verify directly.

This creates a tension that motivates the present paper. Financing-constraint logic predicts that green investment should be disproportionately starved of external capital, precisely because it is harder to certify; yet policymakers, banks, and capital markets have spent a decade building instruments whose explicit purpose is to relax this exact constraint (Yeow and Ng, 2021; Wang and Li, 2022; Han et al., 2024). The empirical evidence does not resolve the tension cleanly: green-bond issuance raises firm value in China, but the effect weakens over time (Jiang et al., 2022); repeated, credible issuance lowers financing costs through a reputation channel.

This paper labels this tension the Green Investment Paradox: the observation that financing mechanisms built to solve the constraint problem for green investment can, under identifiable conditions, reproduce or relocate that same problem rather than resolving it. The term "paradox" has a separate, well-established meaning in environmental economics, where anticipated future carbon restrictions can induce resource owners to accelerate near-term extraction, worsening the very outcome the policy intended to prevent; that logic continues to appear in corporate-level work on digital-technology and emissions trade-offs (Song et al., 2025) and on carbon pricing and carbon performance (Feng and Lei, 2025).

The financing-constraints and corporate-financial-flexibility literatures offer complementary but under-integrated resources for making sense of this paradox. Financing-constraints research documents how environmental uncertainty, financing frictions, and information asymmetry jointly depress corporate investment (Li et al., 2021; Naeem and Li, 2019; Gupta and Mahakud, 2019; Abdeljawad et al., 2024), including investment directed at environmental objectives (Wang et al., 2025; Zhang et al., 2024). Separately, a substantial literature on corporate financial flexibility, the firm's preserved capacity to raise funds on short notice without disrupting operations, typically proxied through spare debt capacity, cash reserves, or low leverage, finds that flexibility shapes investment efficiency, risk-taking, and firm performance (Ma and Jin, 2016; Cherkasova and Kuzmin, 2018; Wu et al., 2024; Mahmood et al., 2022; Bagh et al., 2024).

The paper proceeds as follows. Section 2 reviews the theoretical background on financing constraints, corporate financial flexibility, and the characteristics of green investment that give rise to the paradox. Section 3 sets out the integrative synthesis methodology. Section 4 reports the results as an

integrated contingency framework with testable propositions. Section 5 discusses theoretical and practical implications, and Section 6 concludes with limitations and a future research agenda.

LITERATURE REVIEW

Financing constraints and corporate investment

The financing-constraints literature begins from the observation that internal and external capital are not perfect substitutes once information asymmetry and agency costs are admitted into the analysis. Firms facing this wedge acutely are financially constrained: they under-invest relative to firms with ready capital-market access, the gap widens under environmental and policy uncertainty (Li et al., 2021), and it narrows where financial-sector development improves the flow of external capital to firms with sound projects (Khan et al., 2017; Gupta and Mahakud, 2019). Sustainability engagement itself is linked to firm performance partly through the alleviation of financial constraints, consistent with treating information quality about non-financial conduct as a lever outside financiers' price directly (Zhang and Lucey, 2022).

Archival work, much of it using China's institutional setting, traces how financing constraints interact with specific investment channels and with instruments intended to correct market frictions: they mediate the link between environmental protection taxation and ESG performance (Liu et al., 2023a), condition how digital transformation affects inefficient investment (Xu et al., 2023), and shape whether accounting information quality improves innovation-investment outcomes (Lei et al., 2022); FinTech and digital finance ease constraints for small and micro enterprises (Huang, 2022; Lin et al., 2022); financialisation improves investment efficiency once constraint effects are accounted for (Gong et al., 2023); bank competition reallocates who is constrained and by how much (Jiang et al., 2023); and stock-pledge restrictions curb the overinvestment of unconstrained, poorly monitored firms (Huang et al., 2022).

Two implications follow for the present framework. First, financing-constraints theory is well established as a first-order determinant of the level and efficiency of corporate investment. Second, the strength of the financing-constraints effect is not uniform: it depends on digital capacity, ownership type, policy environment, and firm-specific buffers. This layered, conditional structure is the theoretical opening that Section 4 develops.

Corporate financial flexibility

Corporate financial flexibility refers to a firm's preserved capacity to access funds, whether through unused debt capacity, cash reserves, or untapped equity capacity, without disrupting ongoing operations or signalling distress. Unlike financing constraints, which describe a friction a firm face, financial flexibility describes a buffer a firm has deliberately built to absorb or pre-empt that friction. The construct has most commonly been operationalised through the "spare debt capacity" method, which measures flexibility as the gap between a firm's current leverage and an estimated target or industry-typical leverage level (Cherkasova and Kuzmin, 2018; Mahmood et al., 2022).

The value of financial flexibility rises specifically under uncertainty, which

links the construct directly to real-options logic. Financial flexibility shapes investment responses to firm-specific uncertainty, and the bindingness of financing constraints itself depends on how much flexibility a firm has preserved (Chortareas and Noikokyris, 2021). This is consistent with a broader real-options view of corporate investment in which irreversibility and uncertainty jointly determine the value of waiting and the value of preserving the capacity to act (Lambrecht, 2017): firms facing more irreversible investment opportunities or greater market power cut investment more sharply in response to geopolitical-risk shocks (Wang et al., 2024), and similar logic has been formalised for environmentally motivated capital projects such as emission-abatement technology adoption (Atari et al., 2019) and agroforestry investment (Abdul-Salam et al., 2022). Financial flexibility, in this light, is the resource that lets a firm exercise the option value that uncertainty and irreversibility create, rather than being forced to invest, or forgo investing, on someone else's timetable.

The nature of green investment and the emergence of a paradox

Green investment, capital expenditure directed at reducing environmental impact, adopting cleaner production technology, or supporting the transition to lower-carbon operations, combines several characteristics that financing-constraints theory identifies as high-risk from a capital provider's perspective: long horizons, reliance on technology whose commercial performance is not yet fully proven, and a central "quality" dimension, whether the investment delivers genuine environmental benefit rather than only the appearance of one, that is unusually difficult for an outside financier to verify. This sits against the backdrop of a well-established finding that ESG engagement is, on average, positively associated with corporate financial performance across industries (Chen et al., 2023), which is precisely why the financing-constraints question matters: if ESG and green engagement pay off on average, the puzzle is why access to the capital needed to fund that engagement remains so uneven across firms. Part of the answer lies in financing constraints acting as an explicit mechanism: under China's dual-carbon policy goals, ESG performance raises enterprise value partly by easing financing constraints and partly by stimulating green innovation (Qian, 2024). Environmental legislation shifts the quality as well as the quantity of green-innovation output (Huang et al., 2023a), and its relationship with export product quality runs partly through green innovation and partly through the greenwashing risk the regulation itself creates (Zhang, 2022), a first direct signal that green-oriented regulation and greenwashing risk are connected phenomena. Green investment and green innovation are also mutually reinforcing at the firm level (Zhang et al., 2023).

Corporate-level evidence is consistent with the view that green investment is not uniformly rewarded. The green investment-financial performance relationship is positive in some settings, such as China's energy sector (Chen and Ma, 2021), and in others depends heavily on firm heterogeneity, sustainable-growth positioning, and country context (Siedschlag and Yan, 2023; Masongweni and Simo-Kengne, 2024), while environmental investment's contribution to firm value flips from value-destroying in calm periods to value-enhancing during crises such as the Russia-Ukraine war and public-health

emergencies (Shen et al., 2023), a signal that the market's willingness to fund green investment is conditional rather than constant.

Perceived policy uncertainty around green-credit programmes raises greenwashing risk by increasing the financial risk firms perceive themselves to face (Sun et al., 2024), and greenwashing interacts with family ownership, technological innovation capacity, and economic policy uncertainty to shape both financial performance and investment efficiency (Kiran et al., 2024). Most tellingly, green credit policy itself induces greenwashing in some firms, with the effect depending on digital-transformation capacity, R&D incentives, and the financing constraints the firm already faces (Tao et al., 2026). This is the crux of the Green Investment Paradox: the same mechanisms built to relax financing constraints on green investment introduce a second information problem, credibility risk around the "green" label itself, that can reproduce financing frictions for exactly the firms that lack the resources to resolve that credibility problem convincingly. Section 4 develops this observation into a formal set of propositions.

METHODOLOGY

Research design

This is a conceptual paper that develops theory through an integrative literature review combined with theory synthesis (Torraco, 2016; Snyder, 2019; Jaakkola, 2020). This design fits the problem for three reasons: the phenomenon spans three literatures that have developed largely in parallel; the empirical findings in green finance are systematically contradictory, which is precisely the condition under which integrative synthesis generates theoretical value; and the intended output is an integrated, testable framework, the characteristic product of theory-synthesis work (Jaakkola, 2020).

Literature search and corpus

Searches were conducted in Scopus and Web of Science (2016-2026) using combinations of "financing constraint*", "financial flexibility", "debt capacity", "cash holding*", "green investment", "green bond*", "green credit", "green finance", and "greenwashing". Inclusion criteria were peer-reviewed articles in English reporting firm-level evidence, formal theory, or measurement guidance relevant to at least one focal construct, with priority given to studies documenting conditional, moderated, or heterogeneous effects. Backward and forward citation tracing supplemented the searches. The resulting corpus comprises the more than eighty articles cited in this paper.

Analytical procedure

The synthesis proceeded in three stages. First, construct identification: each source was coded for its definition and operationalisation of financing constraints, financial flexibility, green investment, green financing instruments, and greenwashing risk. Second, relationship mapping: documented relationships were classified as convergent, divergent, or conditional; the central anomaly surfaced is that instruments designed to relax financing constraints show both relieving and constraining effects across and within studies. Third,

abductive proposition development: candidate mechanisms (signalling-cost, real-options, and investment-efficiency logic) were iterated against the mapped evidence, retaining the mechanism set that subsumes both findings; propositions were formulated to be falsifiable and traceable to at least one documented empirical pattern (Cornelissen, 2017).

Scope conditions

The framework is scoped to publicly listed non-financial firms making capital-expenditure-level green investments financed through debt-based and hybrid instruments; household and sovereign green finance fall outside its scope. The evidence base is weighted toward Chinese-listed-firm settings, a limitation addressed in Section 6.

RESULTS

The synthesis yields four results: a baseline relationship between financing constraints and green investment (Proposition 1); a mechanism explaining why dedicated green financing instruments can reproduce the constraint they were designed to relax (Proposition 2); corporate financial flexibility as the firm-level resource determining which effect dominates (Propositions 3 and 3a); and four second-order boundary conditions on that moderation (Proposition 4). Table 1 summarises the propositions, their mechanisms, and representative evidence; Figure 1 integrates them into a single model.

Table 1. Summary of synthesis results: propositions, mechanisms, and representative evidence

Prop.	Statement (summary)	Core mechanism	Representative evidence
P1	Financing constraints ↓ green investment	Internal-external cost wedge; unverifiable "green quality"	Li et al. (2021); Wang et al. (2025); Barabanov et al. (2021)
P2	Green financing instruments have an ambivalent effect on constraint relief	Greenwashing-risk scrutiny re-tightens the constraint	Jiang et al. (2022); Petreski et al. (2025); Tao et al. (2026); Jatmiko et al. (2025)
P3/P3a	Financial flexibility determines which side of the paradox dominates	Signalling-cost absorption; real options; investment-efficiency channel	Ma and Jin (2016); Wu et al. (2024); Chortareas and Noikokyrakis (2021); Wang and Zhu (2025)
P4	Moderation strength is context-contingent	Contingency: environment conditions buffer usability and scrutiny	Graham and Sathye (2018); Qureshi et al. (2024); Ye et al. (2021); Ho et al. (2024)

Baseline proposition: financing constraints and green investment

Before the paradox mechanism can be modelled, a baseline relationship needs to be stated. Green investment inherits the standard financing-constraints logic described in Section 2.1, and if anything the information problems it carries

are more severe than those of conventional capital expenditure, because the "quality" dimension outside financiers must assess includes unverifiable environmental performance as well as project profitability. Consistent with this logic, environmental uncertainty and financing constraints jointly restrain corporate investment in China, with financing constraints acting as a channel through which environmental uncertainty depresses investment (Li et al., 2021). Environmental investment specifically responds to the financing-constraints and information-transparency environment a firm faces (Wang et al., 2025), and corporate environmental investment decisions are shaped by strategic posture interacting with ESG considerations (Zhang et al., 2024). Firm- and country-level determinants of green investment also include firm size and resource availability (Barabanov et al., 2021), precisely what a financing-constraints account would predict: larger, better-resourced firms invest more in green assets not necessarily because they value sustainability more, but because they face a lower effective cost of capital for doing so.

Proposition 1: Financing constraints are negatively associated with the level of corporate green investment.

The paradox mechanism: the ambivalent effect of green financing instruments

If Proposition 1 were the whole story, the policy response would be straightforward: expand dedicated green financing supply and the constraint would ease. The evidence reviewed in Section 2.3 suggests this response is necessary but not sufficient, because green financing instruments carry a second-order information problem alongside their first-order relief. Green bond issuance raises firm value, but the effect in the Chinese market weakens over time rather than persisting (Jiang et al., 2022), a pattern more consistent with a credibility discount re-emerging after the initial signalling benefit fades than with a clean, one-time relaxation of financing constraints. Reputation formation appears to require repetition: it is specifically repeated, sustained green-bond issuance that lowers the cost of capital through reputation-building, implying that a single green issuance does not by itself resolve the credibility problem (Petreski et al., 2025). Meanwhile, the same institutional channel meant to relax constraints, green credit policy, induces greenwashing behaviour in some firms, with the strength of this effect depending on the firm's digital-transformation capacity, R&D incentive structure, and pre-existing financing constraints (Tao et al., 2026): firms already constrained appear less able to convert green-credit access into credible green innovation and more likely to be pushed toward symbolic compliance. This non-monotonic shape also appears in the data: across nineteen emerging countries, the relationship between ESG performance and firm value is U-shaped rather than linear, with a "transient penalty zone" in which partial or ambiguous ESG commitment is punished before fuller commitment is rewarded (Jatmiko et al., 2025), directly consistent with a paradox in which the early, partial, or poorly certified stage of green engagement can leave a firm worse off than either no engagement or fully credible engagement.

Proposition 2: The relationship between access to dedicated green financing instruments (green bonds, green credit) and the effective easing of

financing constraints on green investment is ambivalent rather than uniformly positive, because such instruments introduce greenwashing-risk scrutiny that can re-tighten the constraint they were designed to relax.

Corporate financial flexibility as the primary contingency

The central theoretical move of this paper is to argue that corporate financial flexibility is the firm-level resource that determines which side of the paradox in Proposition 2 a given firm experiences. Three complementary mechanisms support this claim. The first is a signalling-cost mechanism. Converting a green-financing opportunity into a credible, non-greenwashed claim typically requires costly upfront investment in third-party certification, verification, and sustained disclosure, costs that a financially flexible firm can absorb without disrupting its operating budget while a constrained firm cannot, leaving it more exposed to the credibility discount described in Proposition 2. This is consistent with the finding that it is specifically repeated, sustained signalling that builds the reputational asset needed to lower financing costs (Petreski et al., 2025); sustaining a signal over multiple periods is itself a function of having the financial slack to keep investing in it. The second is a real-options mechanism. Green investment is frequently more irreversible and more uncertain than routine capital expenditure, and financial flexibility is precisely the resource that lets a firm time an investment optimally under such conditions rather than being forced into premature commitment or indefinite delay (Chortareas and Noikokyris, 2021; Lambrecht, 2017). Firms with more irreversible investment opportunities react more sharply to uncertainty shocks (Wang et al., 2024), and this reaction is a function of how much flexibility the firm has to defer or accelerate rather than of the uncertainty alone. The third is a general investment-efficiency mechanism carried over directly from the non-green financial-flexibility literature: financial flexibility repeatedly improves firm performance mainly through its effect on investment efficiency (Ma and Jin, 2016; Wu et al., 2024; Wu et al., 2025b), and there is no theoretical reason to expect this efficiency channel to switch off specifically for green capital expenditure; if anything, the higher information intensity of green projects should make the disciplining effect of flexibility-enabled efficient investment more, not less, consequential.

A closely related empirical pattern lends this proposition further plausibility by analogy rather than direct green-context evidence. Financing constraints themselves moderate the relationship between economic policy uncertainty and investment efficiency, such that the negative effect of policy uncertainty on investment efficiency is significantly stronger for firms that are already financially constrained (Wang and Zhu, 2025). This is structurally the same claim as Proposition 3, a firm-level financial buffer determining how strongly an external friction translates into worse investment outcomes, applied to a different pairing of constructs, and it supports treating financial flexibility as a plausible, theoretically consistent moderator in the green-investment setting.

Proposition 3: Corporate financial flexibility moderates the relationship between financing constraints and green investment, such that the negative effect

of financing constraints on green investment is weaker for firms with greater financial flexibility.

Proposition 3a: Corporate financial flexibility moderates the paradox described in Proposition 2, such that financially flexible firms are more able to convert access to dedicated green financing instruments into genuine, credibility-sustaining constraint relief, while financially constrained firms remain exposed to greenwashing-risk scrutiny that offsets or reverses that relief.

Second-order boundary conditions

The strength of financial flexibility's moderating role is unlikely to be constant across all settings, and treating it as such would understate the framework's own logic. Financial flexibility operates within, and is itself partly conditioned by, the institutional, organisational, and reputational context of the firm. Four such second-order boundary conditions can be identified.

The first is the institutional and policy environment. Applying contingency theory directly to capital budgeting practice, a cross-country comparison of Indonesian and Australian firms shows that capital-budgeting systems differ systematically with the institutional and cultural environment in which firms operate (Graham and Sathye, 2018), which supports treating the institutional environment as a first-class contingency variable rather than a background control. Consistent with this, the effects of green credit policy on innovation are heterogeneous across firm types within a single country (Wang and Li, 2022), and green credit availability affects corporate risk-taking differently depending on firm characteristics (Su et al., 2023), suggesting that how strongly financial flexibility can convert green-financing access into real relief depends partly on how credible and well-enforced the surrounding green-finance policy regime is. Climate-policy uncertainty specifically affects ESG performance, carbon-emission intensity, and firm performance jointly among the largest United States firms (Persakis, 2024), and in an Indonesian setting ESG performance raises firm value with profitability and capital structure operating as mediating channels (Rahayu and Sanjaya, 2024). The mechanisms this framework proposes are already visible, in fragments, in exactly the kind of emerging-market setting to which the framework is meant to travel.

The second is firm life cycle. Economic policy uncertainty's effect on sustainability performance depends on where a firm sits in its life cycle (Qureshi et al., 2024), and life-cycle stage plausibly shapes how much flexibility a firm has accumulated and how much signalling credibility it has had time to build: younger firms may have less accumulated reputational capital to draw on even if their balance-sheet flexibility is adequate.

The third is ownership structure. State ownership carries its own policy burden that shapes credit-resource allocation efficiency independently of financing constraints in the conventional sense (Ye et al., 2021), and corporate financialisation's effect on investment efficiency differs between state-owned and non-state-owned firms (Gong et al., 2023). Ownership type is therefore likely to condition both how much financial flexibility a firm can realistically build and how much external scrutiny its green claims attract.

The fourth is the firm's prior reputational and signalling history. Because reputational credibility around green claims depends on repeated rather than one-off signalling (Petreski et al., 2025), a firm's history of ESG-related engagement, for example the extent to which stakeholder engagement and financial constraints have jointly shaped its ESG performance in the past (Ho et al., 2024), is likely to condition how readily the market extends it the benefit of the doubt on new green claims, independent of its current financial flexibility.

Proposition 4: The strength of financial flexibility's moderating effect (Propositions 3 and 3a) is itself contingent on the institutional and policy environment, firm life-cycle stage, ownership structure, and the firm's prior reputational and signalling history.

An integrated conceptual model

Figure 1 summarises Propositions 1 through 4 as an integrated model. Financing constraints exert a direct, negative effect on green investment (Proposition 1, the baseline path). Dedicated green financing instruments intervene on this path through two offsetting channels: a constraint-relieving channel (lower cost of capital, government and market support) and a constraint-reproducing channel operating through greenwashing-risk scrutiny (Proposition 2). The paradox is which channel dominates for a given firm. Corporate financial flexibility moderates both the baseline path and the paradox mechanism (Propositions 3 and 3a), acting as the firm-level resource that converts green-financing access into genuine relief rather than renewed friction. Finally, this moderating role is itself shaped by four second-order boundary conditions, namely the institutional and policy environment, firm life cycle, ownership structure, and reputational history (Proposition 4), which determine how strongly financial flexibility can do the work Propositions 3 and 3a assign to it.

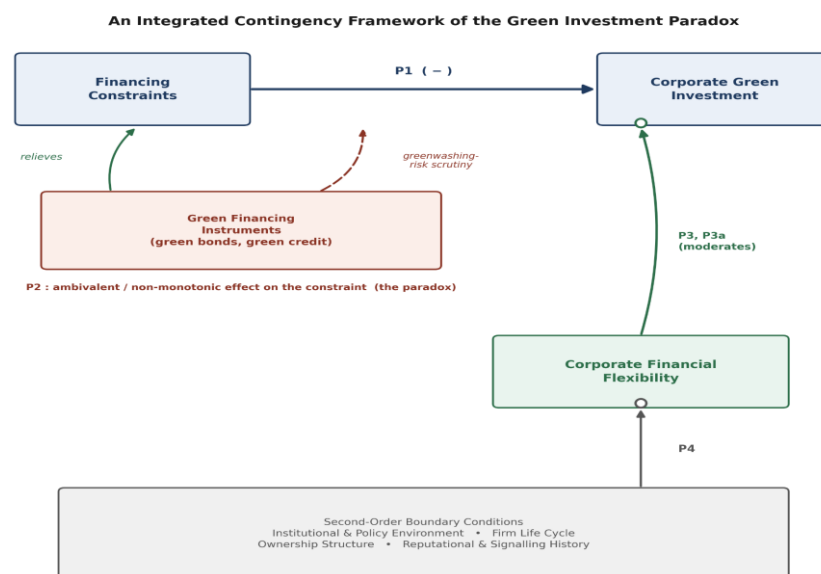


Figure 1. An integrated contingency framework linking financing constraints, green financing instruments, corporate financial flexibility, and second-order boundary conditions to corporate green investment.

DISCUSSION

Theoretical contributions

This framework makes three contributions to the literatures it draws on. First, it extends financing-constraints theory into a domain, green corporate investment, where the theory's standard assumptions (information asymmetry, unverifiable project quality, agency risk) apply with particular force, yet where the theory has typically been applied without differentiating green from conventional capital expenditure (Naeem and Li, 2019; Gupta and Mahakud, 2019). By making the unverifiability of "green quality" itself the source of an additional financing friction, the framework offers a more precise account of why green-investment findings have been so heterogeneous across studies and contexts (Chen and Ma, 2021; Siedschlag and Yan, 2023; Shen et al., 2023).

Second, the framework reconciles what otherwise looks like a contradiction in the green-finance literature. Studies showing that green financing instruments help (Yeow and Ng, 2021; Jiang et al., 2022; Han et al., 2024) sit alongside studies showing that the same instruments and policy environment can induce greenwashing and erode credibility (Todaro and Torelli, 2024; Sun et al., 2024; Tao et al., 2026). The broader ESG-investing literature shows a comparable split between robust value creation from ESG engagement (Chen et al., 2023; Zhang et al., 2022) and studies emphasising how uncertain, contested, or investor-specific ESG's value implications remain, whether in how individual investors weight E, S, and G criteria against one another (Sood et al., 2023) or in how investor confidence rather than ESG performance itself carries much of the value effect (Tang et al., 2024). The framework proposes that both are correct descriptions of different parts of the same firm population, sorted by financial flexibility, turning an apparent inconsistency in the literature into a testable, moderated relationship.

Third, the paper brings the corporate-financial-flexibility literature, which has developed almost entirely around conventional investment efficiency and firm performance outcomes (Ma and Jin, 2016; Wu et al., 2024; Cherkasova and Kuzmin, 2018; Bagh et al., 2024; Bagh et al., 2025), into direct theoretical contact with the green-investment and greenwashing-risk literatures for the first time in this integrated form, using real-options logic (Lambrecht, 2017; Chortareas and Noikokyris, 2021; Wang et al., 2024) as the connective mechanism between the two.

Practical and policy implications

For corporate managers, the framework implies that pursuing green financing instruments without first securing adequate financial flexibility is a strategy exposed to the paradox described in Proposition 2. Firms that issue green bonds or draw on green credit lines while already financially constrained are, on this account, the firms least able to sustain the repeated, credible signalling that converts green financing access into real cost-of-capital relief (Petreski et al., 2025), and most exposed to a subsequent credibility discount if their claims are perceived as symbolic (Jiang et al., 2022; Kiran et al., 2024). Firms considering large green capital commitments should therefore treat the build-up

of spare debt capacity, cash reserves, or other flexibility buffers as a precondition for a credible green-investment strategy rather than a by-product of one.

For policymakers and green-credit programme designers, expanding the supply of green financing instruments alone is unlikely to be sufficient. Green credit policy induces greenwashing in firms with weaker digital-transformation capacity and tighter pre-existing constraints (Tao et al., 2026), and credibility depends on sustained rather than one-off signalling (Petreski et al., 2025), so programmes may achieve more by pairing capital access with independent verification support or phased eligibility criteria targeted at the financially constrained firms otherwise pushed toward symbolic compliance.

For emerging markets specifically, where the institutional and enforcement environment around green-finance verification is often less mature than in the largest capital markets studied in much of the literature reviewed here, the contingency logic in Proposition 4 is likely to bind particularly tightly. Cross-country evidence that capital-budgeting practice itself varies with institutional context (Graham and Sathye, 2018).

CONCLUSIONS AND RECOMMENDATIONS

This paper has argued that the tension between financing-constraints theory and the observed effects of green financing instruments is better understood as a contingent, moderated relationship than as a set of inconsistent findings to be resolved in favour of one camp or the other. The Green Investment Paradox, the possibility that instruments designed to relax financing constraints on green investment can, for some firms, reproduce those constraints through greenwashing-risk scrutiny, is proposed to be resolved at the firm level by corporate financial flexibility, and the strength of that resolution is itself shaped by the institutional environment, firm life cycle, ownership structure, and reputational history.

As a conceptual paper, this framework has not been tested empirically, and its propositions should be read as a research agenda rather than as established findings. The literature synthesised here is also unevenly distributed: a large share of the underlying evidence comes from Chinese-listed firms and a small number of advanced-economy settings, which limits confidence that the specific magnitudes and mechanisms described will generalise without modification to other institutional contexts, including emerging Southeast Asian markets in which capital-budgeting practice diverges from developed-market norms (Graham and Sathye, 2018).

Several extensions follow from the propositions developed here. Proposition 1 can be tested with investment-cash-flow-sensitivity or investment-efficiency specifications applied to disclosed green rather than total capital expenditure, drawing on the measurement traditions synthesised by Gao and Yu (2020). Propositions 2 and 3a require a greenwashing-risk or ESG-disclosure/performance-divergence measure interacted with a flexibility proxy such as spare debt capacity (Cherkasova and Kuzmin, 2018); panel data around green-bond issuance events, in the spirit of event-study designs used for long-run post-issuance performance (Makpotche et al., 2024) and issuer reputation

effects (Petreski et al., 2025), are well suited to isolating the paradox mechanism from baseline relief. Proposition 4 suggests cross-country or cross-ownership comparative designs, potentially extending the ASEAN-5 evidence on monetary policy and ESG practice as joint moderators (Tran and Nguyen, 2026) to green investment and financing constraints in emerging Southeast Asian markets, including Indonesia. Future conceptual work might also examine whether the paradox structure generalises to other investment categories whose quality is similarly hard for outside financiers to verify.

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