Risk Management and Investment
Volume 4, Number 2, 2025

ESG Risk Integration in Institutional Portfolio Management

Cicih Mintarsih[1*]

[1] Institut Bisnis dan Informatika Kesatuan, Bogor, Indonesia

Abstract

Institutional investors increasingly treat environmental, social, and governance (ESG) issues as financially material risks, yet evidence on whether integration improves portfolio outcomes remains mixed. This study conducts a systematic literature review to synthesize peer-reviewed findings on ESG risk integration in institutional portfolio management, emphasizing measurement, implementation tools, and risk outcomes. Across reviewed studies, results concentrate on downside protection and stress sensitivity: carbon and climate-related exposures are repeatedly linked to tail risk, while governance and stakeholder weaknesses can amplify drawdowns in periods of uncertainty. The synthesis indicates that effects depend strongly on design. Benchmark-aware tilts, optimization constraints, and risk budgeting yield more consistent risk-adjusted outcomes than aggressive exclusions because they reduce unintended sector and factor bets and align with mandate limits. The review also identifies ratings disagreement and disclosure heterogeneity as key drivers of conflicting results, underscoring the need for data governance and methodological transparency. Overall, ESG integration is most effective as channel-specific risk management complemented by targeted stewardship.

Article history:
Received: August 24, 2025
Revised: September 8, 2025
Accepted: October 13, 2025
Published: December 30, 2025

Keywords:
ESG Integration, Institutional Investors, Portfolio Optimization, Risk, Stewardship.

Identifier:
Zera Open
Page: 127-140
https://zeraopen.com/journal/rmi

*Corresponding author:
(Cicih Mintarsih)

1. Introduction

Institutional investors increasingly treat environmental, social, and governance considerations as financially material sources of risk that can alter expected cash flows, discount rates, and downside outcomes across diversified portfolios. Climate transition and physical risks, labor and supply-chain disruptions, and governance failures can propagate quickly through correlated exposures, amplifying drawdowns and reputational costs. Survey evidence from asset owners and managers suggests that many institutions now view ESG not only as a values-based overlay but as a component of prudent risk management and long-horizon portfolio resilience, with engagement often preferred over blanket divestment when risks are judged to be manageable or influenceable (Krueger et al., 2020).

At the same time, integrating ESG risk into institutional portfolio management remains conceptually and operationally contested. Modern asset pricing research highlights that "green" attributes can be priced when investors derive non-pecuniary benefits from holding sustainable assets and when sustainability characteristics hedge states of the world tied to climate and stakeholder preferences (Pástor et al., 2021). Portfolio theory likewise formalizes a trade-off between sustainability characteristics and risk-adjusted performance, implying that ESG preferences and perceived financial materiality jointly shape optimal allocations rather than acting as a simple constraint (Pedersen et al., 2021). This framing motivates institutions to move from broad exclusions toward explicit portfolio construction approaches such as ESG tilts, optimization with ESG objectives, and risk budgeting that treats ESG as a measurable exposure (Chen et al., 2021).

Empirical evidence further strengthens the risk-based rationale by linking environmental intensity to left-tail risk and the cost of downside protection. For example, carbon exposure has been associated with crash risk and option-implied tail outcomes, indicating that ESG risk can appear most clearly in extreme states rather than in average returns (Ilhan et al., 2021). Related work shows that carbon risk is priced in equities, suggesting that climate-related externalities and regulation can translate into systematic compensation demanded by investors (Bolton & Kacperczyk, 2021). Yet evidence is also nuanced: sustainability tastes can affect tail behavior during market stress, complicating simple claims that ESG always reduces downside risk (Lashkaripour, 2023). Beyond security selection, stewardship is increasingly positioned as a portfolio risk tool, with engagement linked to reductions in downside risk measures for targeted firms, implying that active ownership can be part of institutional risk integration rather than a separate ethical activity (Hoepner et al., 2024).

A major obstacle is measurement. ESG ratings often diverge due to differences in scope, measurement choices, and weighting schemes, creating "signal disagreement" that can materially change portfolio exposures, constraints, and reported outcomes (Berg et al., 2022). Institutional behavior also reflects these frictions, with evidence that portfolio weights and ownership patterns respond differently across the E, S, and G pillars and across rating providers, complicating implementation and evaluation (Lopez-de-Silanes et al., 2024). As a result, the practical question is no longer whether ESG matters, but how institutions translate

heterogeneous ESG information into repeatable portfolio decisions that are consistent with mandates, fiduciary constraints, and risk objectives.

This article addresses that challenge by conducting a systematic literature review on ESG risk integration in institutional portfolio management. It synthesizes how prior studies conceptualize ESG risk, operationalize measurement, and evaluate integration mechanisms across portfolio construction, risk management, and stewardship, with the aim of clarifying what is known, where findings conflict, and which design choices most influence reported risk-return and downside outcomes.

2. Literature Review

2.1. ESG Risk as a Priced Exposure in Portfolio Choice

Recent finance theory treats ESG risk integration as a portfolio problem where investors balance expected returns, systematic risk, and sustainability characteristics that may carry both hedging value and preference-driven demand. Equilibrium models show that sustainable attributes can be priced when they load on states of the world related to climate and stakeholder preferences, and when investors derive non-pecuniary utility from holding "green" assets, implying that ESG can affect both discount rates and expected returns (Pástor et al., 2021). From a portfolio-construction perspective, this logic maps into an "ESG-efficient frontier", where the feasible set depends on how constraints, objectives, and tracking-error limits are specified, rather than on a simple assumption that higher ESG mechanically improves performance (Pedersen et al., 2021). In practical terms, institutions therefore integrate ESG risk through allocation tilts, optimization with

ESG objectives, and risk budgeting that recognizes ESG exposures as potentially systematic and time-varying (Chen et al., 2021).

2.2. Measuring ESG Risk Under Data Disagreement and Disclosure Regimes

A central constraint in institutional implementation is measurement quality. ESG ratings often diverge across providers due to different scopes, indicators, and weighting schemes, creating non-trivial variation in estimated factor exposures and reported portfolio outcomes (Berg et al., 2022). This disagreement interacts with institutional decision-making because portfolio weights may respond differently to disclosure-based versus quality-based signals, and because E, S, and G pillars can imply distinct "preferences" or risk sensitivities in holdings (Lopez-de-Silanes et al., 2024). The measurement problem is further shaped by evolving disclosure requirements: reviews of mandatory CSR and sustainability reporting highlight that standardization can improve comparability and information environments, but can also generate compliance heterogeneity and unintended reporting incentives, which matter for how investors translate disclosures into risk controls (Christensen et al., 2021). Taken together, the literature suggests that ESG risk integration is only as robust as the mapping from raw disclosures and ratings into decision-ready portfolio signals.

2.3 Integration Mechanisms: Tail Risk, Optimization, and Stewardship

Empirical work links specific ESG dimensions, especially carbon exposure, to downside risk channels that are salient for long-horizon institutions. Carbon-intensive exposures have been associated with tail risk metrics and option-implied

downside sensitivity, motivating integration approaches that emphasize drawdown control rather than mean return maximization (Ilhan et al., 2021). Consistent with this emphasis, recent portfolio optimization research increasingly incorporates ESG constraints alongside downside-risk frameworks and transaction-cost considerations, reflecting a shift from static screening to implementable, risk-aware allocation design (Abate et al., 2024). Beyond allocation, stewardship is treated as a risk-management instrument: shareholder engagement on ESG issues has been shown to reduce firm-level downside risk measures, with effects varying by engagement topic and success, implying that active ownership can complement portfolio tilts when risks are influenceable (Hoepner et al., 2024). Broader synthesis work also notes that investor expectations and beliefs shape which integration tools are chosen, and why institutions often combine quantitative ESG signals with qualitative engagement and governance processes (Kräussl et al., 2024).

3. Methods

This study applied a systematic literature review (SLR) approach to synthesize peer-reviewed evidence on how institutional investors integrate ESG risk into portfolio management and how such integration is assessed in prior research. A structured search was conducted across major academic databases widely used in finance, accounting, and management research (for example, Scopus, Web of Science, and Google Scholar). Search strings combined keywords related to "ESG risk", "sustainable investing", "institutional investors", "portfolio management", "portfolio optimization", "carbon risk", "climate risk", "stewardship", and

"engagement", including relevant synonyms and Boolean operators. The review was restricted to studies from 2020-2024, and only journal articles published in peer-reviewed outlets and written in English were included.

Screening followed a transparent, staged process. After removing duplicates, titles and abstracts were screened against inclusion criteria (institutional portfolio context; explicit treatment of ESG as a risk-relevant input; and discussion of integration into portfolio construction, risk management, or stewardship processes). Full-text eligibility checks then excluded studies focused primarily on firm-level CSR disclosure without portfolio implications, non-institutional settings where results were not transferable to institutional mandates, and non-article formats (for example, editorials, practitioner notes, or book reviews). For synthesis, key metadata and findings were extracted into a standardized coding template, including institutional setting (asset owners, pension funds, mutual funds, sovereign funds, and asset managers), ESG measurement approach (ratings provider signals, pillar-level metrics, carbon exposure, disclosure-based indicators), integration mechanism (screening, tilting, constraints, optimization, factor tilts, scenario analysis, engagement, and voting), and reported outcomes (risk-adjusted performance, tracking error and costs, volatility and drawdowns, and tail-risk measures). A thematic synthesis was then used to integrate patterns across studies and to develop an evidence-based framework that explains when ESG risk integration is most likely to improve portfolio resilience, and where measurement frictions and mandate constraints limit effectiveness.

4. Results and Discussion

4.1. Downside Risk as the Core ESG Channel

Across the reviewed literature, a consistent result is that ESG integration is increasingly framed as a risk-management problem rather than a purely normative screen. Institutional portfolios tend to operationalize ESG risk where it is most likely to be priced or to materialize as downside outcomes, particularly through climate transition exposure, operational incidents, and governance failures. Evidence on climate-related channels supports this emphasis: investors appear to treat carbon exposure as a financially relevant risk that can affect expected returns and, more importantly, left-tail risk characteristics (Bolton & Kacperczyk, 2021; Ilhan et al., 2021). In this framing, ESG integration becomes less about improving average returns and more about shaping portfolio resilience, drawdown behavior, and tail sensitivity under stress, which aligns with institutional preferences for capital preservation and benchmark-aware implementation.

The literature also indicates that ESG signals can matter most when uncertainty spikes. Crisis-period studies during the COVID-19 shock show that stronger ESG profiles can coincide with improved performance and reduced risk sensitivity, suggesting that markets may treat ESG as an indicator of operational robustness, stakeholder trust, or governance quality when cash-flow visibility deteriorates (Broadstock et al., 2021). However, this "crisis insurance" interpretation is not uniform across asset classes, regions, or ESG definitions, reinforcing that ESG risk integration outcomes depend heavily on how ESG is measured and how portfolios are constrained.

4.2 Integration Design and Benchmark Constraints

Reported outcomes differ sharply between simple screening and optimization-based integration. Theoretical and portfolio-choice work implies that ESG objectives interact with risk-return trade-offs, meaning that performance claims are sensitive to tracking-error limits, sector constraints, and the degree of ESG tilting (Pástor et al., 2021; Pedersen et al., 2021). Empirically, screening studies suggest that the "concentration level" of ESG exclusion matters: stricter screening can reduce portfolio ESG risk but may introduce higher factor tilts and diversification losses, which can either help or hurt risk-adjusted performance depending on market regimes (Jin, 2022). In institutional settings, this translates into a practical design implication: ESG integration is more stable when implemented as controlled tilts, optimized constraints, or risk budgeting rather than as aggressive exclusions that unintentionally create large style and sector bets.

Evidence also indicates that institutions increasingly combine ESG tilts with explicit risk metrics rather than treating ESG as a separate compliance layer. Portfolio optimization approaches that integrate ESG constraints alongside risk controls are typically positioned as a way to "pay" for ESG objectives in a transparent manner through tracking error, turnover, or sector deviations (Chen et al., 2021). The strongest practical takeaway is that ESG integration succeeds when institutions specify which risk they are managing (for example, carbon tail risk, controversy exposure, governance incidents) and then align the integration tool to that risk, rather than expecting a single ESG score to solve multiple objectives at once.

4.3 Measurement Disagreement and Information Frictions

ESG ratings disagreement is not merely noise; it is a determinant of portfolio exposures and reported effectiveness. The divergence of ESG ratings implies that two portfolios labeled "ESG-integrated" can have meaningfully different risk profiles depending on provider choice, pillar weighting, and whether the signal captures impact, risk, or disclosure intensity (Berg et al., 2022). This matters for institutions because mandates, reporting, and stakeholder accountability often require consistency and auditability. Related evidence on institutional ESG preferences shows that institutional portfolios respond differently across E, S, and G components, implying that ESG is rarely one unified dimension in real portfolio decisions (Lopez-de-Silanes et al., 2024). The review therefore supports a core conclusion: a major share of mixed performance evidence in ESG investing can be explained by measurement and classification variation, not only by economic differences in ESG materiality.

Disclosure regimes further shape integration quality. Mandatory sustainability reporting can improve comparability and reduce information gaps, but it can also introduce strategic reporting behavior and uneven compliance, which complicates the translation of disclosures into risk signals (Christensen et al., 2021). For institutional portfolio management, this implies that robust ESG risk integration increasingly requires governance over data pipelines, model validation for ESG scores, and explicit documentation of how ESG measures map to risk controls and investment decisions.

4.4 Stewardship as Risk Mitigation

Finally, the evidence suggests stewardship is not merely reputational, it can function as a portfolio risk tool when engagement is targeted and outcomes are measurable. Engagement-focused research finds that ESG shareholder engagement can reduce downside risk measures, with effectiveness varying by topic and engagement success, indicating that active ownership can complement portfolio construction when institutions believe risks can be mitigated at the issuer level (Hoepner et al., 2024). This helps explain why many institutions increasingly use a hybrid model: modest tilts and constraints for scalable risk exposure management, paired with engagement for concentrated, influenceable risks that are not easily diversified away.

Overall, the reviewed evidence supports an integrated interpretation: ESG risk integration is most effective when institutions (i) define ESG in risk terms, (ii) implement integration through benchmark-aware tools that control unintended factor bets, (iii) govern measurement choices and rating disagreement explicitly, and (iv) combine portfolio design with stewardship to address issuer-level risk drivers. The remaining gaps concentrate around causal identification of ESG integration benefits net of style exposures, consistent measurement standards across providers, and the boundary conditions under which ESG acts as a hedge versus a drag on diversification

5. Conclusion

Institutional ESG risk integration is most convincingly supported when it is treated as a portfolio risk problem with explicit channels, not as a generic "good versus bad" screening exercise. Across the reviewed evidence, the strongest and most consistent insights cluster around downside protection and stress sensitivity: carbon and climate-related exposures are repeatedly linked to tail risk, while governance and stakeholder-related weaknesses can amplify drawdowns when uncertainty rises. However, the magnitude and even the direction of reported benefits depend heavily on implementation design. Benchmark-aware tilts, optimization constraints, and risk budgeting tend to deliver more stable outcomes than aggressive exclusions because they manage unintended sector and factor bets, keep tracking error within mandate limits, and make the trade-offs between ESG objectives and traditional risk-return targets transparent.

At the same time, the literature shows that measurement frictions are not peripheral but central to explaining mixed findings. Divergence across ESG ratings and variation in disclosure quality can materially change inferred exposures, portfolio composition, and performance attribution, which makes data governance and methodological transparency essential for credible integration. The review also indicates that stewardship can function as a complementary risk tool when risks are influenceable at the issuer level, allowing institutions to pair scalable portfolio design with targeted engagement to mitigate specific ESG risk drivers. Overall, the evidence supports an integrated framework in which effective ESG risk integration requires (i) channel-specific risk definitions, (ii) constraint-aware portfolio implementation,

(iii) explicit management of ESG data disagreement, and (iv) stewardship linked to measurable risk outcomes, while future research should prioritize stronger identification of ESG risk channels, more comparable downside-focused metrics, and clearer evidence on how engagement translates into portfolio-level risk reduction under real-world mandate constraints.

References

Abate, G., Basile, I., & Ferrari, P. (2024). The integration of environmental, social and governance criteria in portfolio optimization: An empirical analysis. *Corporate Social Responsibility and Environmental Management, 31*(3), 2054-2065.

Berg, F., Koelbel, J. F., & Rigobon, R. (2022). Aggregate confusion: The divergence of ESG ratings. *Review of Finance, 26*(6), 1315-1344.

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

Broadstock, D. C., Chan, K., Cheng, L. T. W., & Wang, X. (2021). The role of ESG performance during times of financial crisis: Evidence from COVID-19 in China. *Finance Research Letters, 38*, 101716.

Chen, L., Zhang, L., Huang, J., Xiao, H., & Zhou, Z. (2021). Social responsibility portfolio optimization incorporating ESG criteria. *Journal of Management Science and Engineering, 6*(1), 75-85.

Christensen, H. B., Hail, L., & Leuz, C. (2021). Mandatory CSR and sustainability reporting: Economic analysis and literature review. *Review of Accounting Studies, 26*(3), 1176-1248.

Hoepner, A. G. F., Oikonomou, I., Sautner, Z., Starks, L. T., & Zhou, X. (2024). ESG shareholder engagement and downside risk. *Review of Finance, 28*(2), 483-510.

Ilhan, E., Sautner, Z., & Vilkov, G. (2021). Carbon tail risk. *The Review of Financial Studies, 34*(3), 1540-1571.

Jin, I. (2022). ESG-screening and factor-risk-adjusted performance: The concentration level of screening does matter. *Journal of Sustainable Finance & Investment, 12*(4), 1103-1126.

Kräussl, R., Oladiran, T., & Stefanova, D. (2024). A review on ESG investing: Investors' expectations, beliefs and perceptions. *Journal of Economic Surveys, 38*(2), 476-502.

Krueger, P., Sautner, Z., & Starks, L. T. (2020). The importance of climate risks for institutional investors. *The Review of Financial Studies, 33*(3), 1067-1111.

Lashkaripour, M. (2023). ESG tail risk: The Covid-19 market crash analysis. *Finance Research Letters, 53*, 103665.

Lopez-de-Silanes, F., McCahery, J. A., & Pudschedl, P. C. (2024). Institutional investors and ESG preferences. *Corporate Governance: An International Review, 32*(6), 1060-1086.

Pástor, Ľ., Stambaugh, R. F., & Taylor, L. A. (2021). Sustainable investing in equilibrium. *Journal of financial economics, 142*(2), 550-571.

Pedersen, L. H., Fitzgibbons, S., & Pomorski, L. (2021). Responsible investing: The ESG-efficient frontier. *Journal of Financial Economics, 142*(2), 572-597.