

Investment Strategies for ESG Funds: A Comparative Review of Performance, Risk, and Market Practice

Rajvant Kour^{1*}, Oum Kumari R²

¹FPM Scholar, Jaipuria Institute of Management, Jaipur — ORCID: 0009-0007-1300-4448

²Jaipuria Institute of Management, Jaipur — ORCID: 0000-0003-2688-5161

Corresponding Author: rajvant.kaur7@gmail.com

Abstract: Environmental, Social, and Governance (ESG) investing has grown from a small, values-based idea into a mainstream investment practice that now guides trillions of dollars in capital. Despite this growth, three basic questions remain open: does ESG investing improve or reduce risk-adjusted returns; can investors trust ESG ratings and fund labels; and which ESG strategy negative screening, positive/best-in-class screening, ESG integration, thematic investing, impact investing, or active ownership best fits a given investor's goal? This paper reviews and compares ESG fund strategies using more than thirty peer-reviewed studies, industry reports, and regulatory sources published between 2003 and 2026. It (i) builds a simple comparison framework covering the six main ESG strategies; (ii) summarizes evidence on performance, rating disagreement, and greenwashing; (iii) presents data on the growth and composition of the global sustainable investment market; and (iv) explains how ESG data can be processed using modern information-system, portfolio-optimization, and machine-learning methods, and what this means for investors, fund managers, and policymakers. The review finds that financial-performance evidence is genuinely mixed rather than conclusively positive or negative, that rating disagreement and greenwashing are structural problems rather than occasional errors, and that the right strategy depends on a clear statement of investor goals, financial, ethical, or both, rather than on marketing labels alone.

Keywords: ESG investing; sustainable finance; portfolio strategy; risk-adjusted returns; greenwashing; ESG data systems; portfolio optimization; socially responsible investment

1. Introduction

ESG investing means taking non-financial factors (e.g., sustainability, social impact, and corporate governance) into account when investing. What began in the mid-20th century as a simple exclusion of 'sin stocks' by religious and ethical investors has evolved over the past two decades into a family of strategies that are used by pension funds, sovereign wealth funds, asset managers, and everyday investors. The most recent industry count shows that global sustainable investment assets have topped US\$ 30.3 trillion and may have topped US\$ 35 trillion before the stricter definitions have lowered those numbers in some markets (Global Sustainable Investment Alliance [GSIA], 2021, 2023). This is not a niche interest; surveys show that it is not an obsession. Indeed, the results of a large survey of institutional investors indicate that most use ESG information routinely in their investments, mainly to manage risk and meet client demand, rather than for ethical reasons (Amel-Zadeh & Serafeim, 2018).

Unsurprisingly, this rapid growth has not been matched by agreement on three main issues. First, is ESG investing raising, lowering, or keeping the risk-adjusted returns available to investors? Second, can ESG ratings and ESG-labeled funds be trusted given the disagreement among rating agencies (Berg, Kölbel, & Rigobon, 2022; Chatterji, Durand, Levine, & Touboul, 2016)? Third, of the several ESG strategies, which one better suits a given investor's objectives, and how do these strategies differ in cost structure and outcome?

First, it compiles scattered studies on asset pricing, corporate finance, and fund-flow into one review organized by investment strategy rather than by asset-pricing anomaly. Second, it provides a comparison table (Table 1) for investors to compare the strategy to the goal. Third, it presents summary numbers on market growth, strategy use, disagreement with ratings, and performance in tables and charts so that a large literature can be read quickly. Fourth, it discusses how information systems, data analytics, and machine learning are now used to manage and score ESG data, a topic of increasing prominence both in finance and computing researchers, and what the problems of rating disagreement and



greenwashing mean to investors, fund managers, and regulators.

The rest of the paper is structured as follows. Section 2 presents a literature review on ESG performance, rating divergence, greenwashing, strategy types, portfolio optimization using data and artificial intelligence, resilience to crises, regulation, and emerging markets. Section 3 describes the research gap and goals. Section 4 provides details of the review. Section 5 presents the comparative strategy framework. Section 6 synthesizes the empirical evidence in tables and charts. Section 7 presents the findings, Section 8 discusses implications, Section 9 discusses limitations, and Section 10 recommends directions for future research.

2. Literature Review

2.1 Does ESG Investing Pay Off? A Mixed Picture

A big question in this area is whether ESG is beneficial or detrimental to financial performance. A comprehensive study of this topic (2021, Gillan, Koch, & Starks; 2015, Friede, Busch, & Bassen) analyzed over 2,000 empirical papers from 1970 to 2014, and discovered that the majority of these papers report a neutral to positive relationship between the ESG factors and the financial performance of companies, with some exceptions based on region, asset class, and period.

Fund level performance is not as transparent. Using multi-factor asset-pricing models, Halbritter and Dorfleitner (2015) investigated the U.S. market between 1991 and 2012 and found no consistent return premium for ESG portfolios, with the response varying significantly based on the sample and the time period analysed. A larger study that includes 2,255 U.S. mutual fund portfolios from 2010 to 2021 also concluded that ESG funds didn't outperform traditional funds on a risk-adjusted basis, and a study comparing ESG-oriented exchange-traded funds (ETFs) with those that don't focused on the risk and return characteristics of the ESG funds finds that their performance overall is comparable to conventional funds once fee and tracking differences are considered (Kanuri, 2020). Others, however, see the exact opposite: When they added a top 10 percent best-in-class ESG screen to global stocks, they saw a clear positive impact on risk-adjusted return, and a positive Sharpe ratio for the top ESG names and a negative ratio for the lowest names (Kaiser, 2020, Kumar et al., 2016).

An important take-home message from this literature is that the “ESG advantage” reported in straightforward comparisons is reduced or eliminated when portfolios are risk-adjusted to account for differences in risk using widely used factor models (Bruno, Esakia, & Goltz, 2022). This is an older and more general worry that the ESG-based portfolio constraints are akin to more or less arbitrary constraints that coincidentally decrease the estimation error, but not necessarily a sustainability premium (Jagannathan & Ma, 2003). The second angle is offered by firm-level studies, which often find a positive relationship between environmental and social behavior and financial risk, as well as between environmental behavior and the size of the reputational penalty for environmental offences (Boutin-Dufresne & Savaria, 2004; Brammer, Brooks, & Pavelin, 2006; Karpoff, Lott & Wehrly, 2005). Put another way, the evidence fails to substantiate a straightforward proposition that incorporating ESG into investments results in giving up some return or enhancing return – it all depends on the data, time period, asset class and rating provider.

2.2 ESG Ratings Do Not Agree With Each Other

A second major problem is that ESG rating agencies often disagree sharply when scoring the very same company. Chatterji, Durand, Levine, and Touboul (2016) were the first to document this systematically, finding low agreement across six prominent raters covering the period 2002 to 2010. Berg, Kölbel, and Rigobon (2022) extended this work by comparing six well-known raters: KLD, Sustainalytics, Moody's ESG (Vigeo-Eiris), S&P Global (RobecoSAM), Refinitiv (Asset4), and MSCI and found pairwise correlations of only 0.38 to 0.71. For comparison, credit-rating agencies usually agree above 0.90. The study traced 56 percent of this disagreement to differences in which indicators each rater measures, 38 percent to differences in which categories are covered at all, and only 6 percent to differences in how categories are weighted.

Follow-up research has extended these findings further. Bissoondoyal-Bheenick, Brooks, and Do (2024) confirm a relatively high correlation between Asset4 and Sustainalytics ratings, but a far weaker at times negative, correlation involving MSCI, and show that European firms exhibit lower rating disagreement than firms elsewhere, plausibly reflecting more standardized disclosure regimes. This matters in practice: the same company can be called an ESG leader by one rating agency and a high-risk laggard by another. That makes both fund construction and academic research harder, because “ESG holdings” differ mechanically depending on which data source is used, and studies built on different ESG data providers are not directly comparable to one another.

2.3 Greenwashing: When ESG Labels Do Not Match Reality

The second worry is disagreement about the rating: this opens up the third worry, which is a broad definition of “greenwashing,” which is defined as overrating or underreporting a fund's or a company's actual sustainability footprint or behavior based on what it claims on its website. Fund names are a low-cost and overt marketing tool. In a non-ESG setting, Cooper, Gulen and Rau (2005) found that mutual funds can find sustainable new investors just by altering the names of the fund, without changing the composition of the fund's holdings mechanism that a recent ESG-specific study corroborated in the sustainable fund marketing setting (El Ghoul & Karoui, 2020).

Cochardt et al. (2023) find that funds that change their names with ESG terms also apply negative screens and modestly enhance their portfolio sustainability scores, with around 13 percent abnormal funds inflows following the name change, but that the same funds simultaneously do not boost support for environmental and social shareholder proposals in proxy voting – even when votes count, which the authors view as a substantive difference between naming, portfolio construction, and stewardship behavior. The concern about such practices has grown, and Candelon and Hasse (2021) position ESG-washing in the mutual fund industry as a problem of information asymmetry between the fund manager and the investors that can be addressed through more robust disclosure regulation.

Investor sophistication evidence indicates that the market self-corrects partially. Retail investors are far less able to make this distinction, while institutional investors seem to be able to tell the difference between those funds that truly are dedicated to sustainable practices and those that only claim to have sustainable practices in their name. The earlier, yet more reassuring, finding of Kempf and Osthoff (2008) is that their analysis of KLD data from 1991 to 2004 revealed that sustainable mutual funds on average had higher ethical scores than conventional funds, but, as argued by Wimmer (2013), the initial ESG-score advantage may disappear over time, rather than become permanent, thereby highlighting that the risk of greenwashing is not static and must be continuously monitored, not just labeled once.

2.4 The Six Main ESG Investment Strategies

In the context of comparing the industry practice and research, industry practice is summarised using 6 known ESG strategies as a foundation. Negative or exclusionary screening excludes entire sectors in the investable universe that the fund, for ethical reasons, does not wish to hold (historically the oldest and single largest screening strategy in terms of assets under screening, GSIA, 2019). Positive or “best-in-class” screening chooses the top ESG leaders across each sector, rather than dismissing industries in favor of those that perform well.

The integration of ESG into traditional financial analysis and valuation, not necessarily excluding or over-weighting any security based on only ESG considerations, is the most widely used approach in the industry in terms of asset weighting (GSIA 2021). Thematic investing focuses on particular pillars of sustainability, including renewable energy, water scarcity and gender diversity. Impact investing aims for measurable, extra financial returns in social or environmental benefits, typically in less liquid asset classes.

Finally, active ownership or engagement uses share ownership rights proxy voting and direct dialogue with management to influence corporate ESG conduct, and recent industry reporting identifies corporate engagement and shareholder action as an increasingly predominant strategy globally (GSIA, 2023).

2.5 Classical Portfolio Optimization with ESG Constraints

A parallel quantitative literature extends the classical mean-variance portfolio optimization framework of Markowitz (1952) and the capital market theory of Sharpe (1970) to incorporate sustainability as a third dimension alongside expected return and risk. One family of models imposes a minimum acceptable ESG score as a hard constraint on the classical mean-variance problem, evaluating how the added constraint shifts the efficient frontier and reduces diversification relative to an unconstrained portfolio (Kaiser & Schaller, 2019). A second family instead treats ESG as an explicit third objective in a multi-objective optimization alongside return and a risk measure such as variance or conditional value-at-risk, allowing investors to trade off sustainability against financial efficiency along a three-dimensional frontier rather than through a binary constraint.

Across these approaches, a consistent finding is that imposing ESG constraints or objectives measurably narrows the achievable risk-return frontier relative to an unconstrained Markowitz optimization, formalizing the intuitive trade-off between sustainability preference and financial efficiency that underlies the return-based debate discussed in Section 2.1.

2.6 Information Systems, Data Analytics, and Machine Learning in ESG Investing

A fast-growing and increasingly important stream of work treats ESG investing as a data and computing problem, not only a finance problem a point directly relevant to readers in information systems and artificial intelligence. Because

ESG data is large, messy, and disagrees across providers (Section 2.2), researchers have started applying data-driven and machine-learning methods directly to it. One line of work uses regularization techniques, such as fused LASSO models, to construct sparse, low-turnover multi-period ESG-constrained portfolios that explicitly account for transaction costs, extending the classical Markowitz framework discussed in Section 2.5 into a more realistic, dynamic setting.

A second line of work attempts to directly leverage principal component analysis and other dimensionality-reduction methods to address the rating-divergence problem of Section 2.2, seeking to discover a smaller number of common underlying factors that explain the different ratings awarded by the various ESG rating providers, with varying degrees of success, as described by Berg, Kölbel, and Rigobon (2022). The third line of work uses Bayesian optimization and other heuristic search approaches to solve the combined risk-return maximization problem with a sustainability constraint, which considers the ESG-return relationship as a multi-criteria decision problem, rather than simply a constraint.

These are true methodological advances, but do not remove the measurement and scope divergence that Berg, Kölbel and Rigobon (2022) have identified; they simply choose between alternatives used to construct a specific ESG data source more explicit and more efficiently usable in a portfolio.

This growing intersection of ESG finance with data engineering, analytics, and machine learning is a natural bridge between the finance literature reviewed above and the information-systems and AI research communities, and is likely to remain an active research area as ESG datasets continue to grow in size and complexity.

2.7 ESG Funds During Market Stress: The COVID-19 Evidence

The COVID-19 market shock of 2020 provided a natural experiment for testing whether ESG characteristics confer resilience during systemic crises, and it produced its own mixed evidence. Several studies using GARCH volatility models and event-study methods on European sustainable equity funds found that higher Morningstar Sustainability ratings were associated with lower volatility, greater resilience, and reduced risk contagion during the pandemic period. Broader evidence on mutual fund flows during the crisis documents that fund performance and flow patterns shifted markedly across the industry during 2020, with some sustainability-oriented funds proving more resilient to redemptions (Pástor & Vorsatz, 2020).

A dedicated study of responsible investing during economic downturns similarly finds a protective effect associated with responsible investment characteristics during the COVID-19 period (Omura, Roca, & Nakai, 2021), and an analysis of ESG-oriented exchange-traded funds during the COVID-19 market crash likewise finds differences in return and volatility behavior between green and conventional ETFs (ElBannan, 2024). Not all studies concur, however: at least one event-study analysis of major COVID-19-related announcements concludes that ESG scores provided minimal explanatory power for individual stock returns around those events, cautioning against assuming that a high ESG rating mechanically implies superior crisis performance. As with the broader performance literature in Section 2.1, the balance of evidence leans toward a modest protective association between strong ESG characteristics and downside resilience, but the effect is neither universal nor mechanically guaranteed.

2.8 Regulatory Developments and ESG Disclosure

In addition to the academic papers, a rapidly evolving regulatory landscape has started to directly tackle the rating-divergence and greenwashing issues highlighted in Sections 2.2 and 2.3. The Sustainable Finance Disclosure Regulation (SFDR) was introduced in the European Union to incentivize asset managers to categorize funds by their level of sustainability ambition based on the sustainability in their investment approach, and to report on the ESG data and methodology used to identify such sustainable funds (GSIA, 2023).

The United Kingdom has been developing its own Sustainability Disclosure Requirements (SDR) and the U.S. regulators have been taking their own steps to enforce their duties to protect investors from alleged failures by asset managers to demonstrate ESG integration in investment practices, thereby further highlighting the practical significance of the literature on greenwashing outlined in Section 2.3. An important complementary view comes from legal scholarship, which contends that trustees and asset managers who see the inclusion of ESG factors as a personal or collective social agenda, not as a legitimate risk-return assessment, may be at conflict with their fiduciary duties to their beneficiaries, a conflict that more robust disclosure requirements are intended to help manage (Schanzenbach & Sitkoff, 2020). The Global Sustainable Investment Alliance has made an explicit call for an international convergence of ESG ratings and benchmarks and for a global baseline of corporate sustainability disclosures (GSIA, 2023).

2.9 ESG Investing in Emerging Markets

The literature review above on the nature of performances and rating differences is largely from the U.S. and European context. However, a smaller body of research has started to explore ESG investing in emerging markets, where disclosure practices and the nature of the stakeholders are markedly different to the developed world. A comparison of the volatility-adjusted and downside-risk metrics for the ESG equity indices versus the conventional equity indices, both in the developed markets (the U.S., Germany, Japan) and emerging markets (India, Brazil, China), shows that the difference in daily returns between the two types of indices is relatively small, with the ESG indices outperforming in several countries on a one-year rolling basis, but the pattern is not consistent across all emerging markets analyzed.

Just as in the developed markets, portfolio-construction research that implements mean-variance optimization, using ESG constraints and a Moroccan equity universe, also confirms that applying a minimum ESG-score constraint leads to a change in the composition of the efficient portfolio compared to the unconstrained version, and to a change in the time-varying correlation structure. In the new literature on emerging markets, the lack of or inconsistencies in corporate ESG disclosure are also highlighted, and this feature exacerbates the rating-divergence issue that was previously mentioned in section 2.2, which mechanically increases the distance between the ESG scores that different ESG rating providers can calculate. This implies that the comparisons of strategies in Table 1 should be used with caution for contexts outside of developed markets, where much of the evidence was drawn.

3. Research Gap and Objectives

Three gaps motivate this review. First, existing studies are typically confined to a single strategy (e.g., negative screening) or a single empirical question (e.g., rating divergence), leaving practitioners without a single point of reference that compares strategies side by side against a common set of criteria. Second, the performance literature is scattered across asset classes, regions, and time periods, making it difficult for a non-specialist reader to gauge the overall weight of evidence. Third, the practical consequences of rating divergence and greenwashing for fund selection are rarely translated into actionable guidance for investors and fund managers.

Accordingly, this paper pursues four objectives: (i) to build a comparative framework of ESG investment strategies against structure, cost, and expected financial trade-off; (ii) to synthesize quantitative evidence on the growth and composition of the sustainable investment market; (iii) to synthesize the risk-adjusted performance and rating-divergence literature into summary tables; and (iv) to translate these findings, including the growing role of data systems and machine learning in ESG scoring, into practical implications for investors, fund managers, and regulators.

4. Research Methodology

This paper adopts a structured narrative literature review and comparative synthesis design, appropriate for a topic where the underlying primary studies use heterogeneous samples, time periods, and ESG data providers that are not amenable to a single meta-analytic effect size. The review draws on peer-reviewed journal articles in finance, accounting, corporate governance, and information systems, working papers from recognized research institutions, and primary industry and regulatory sources, including the biennial Global Sustainable Investment Review published by the Global Sustainable Investment Alliance.

The sources were identified based on a targeted search in 6 thematic clusters which directly relate to Section 2, namely: (a) ESG and risk-adjusted financial performance, (b) ESG rating divergence and aggregation, (c) greenwashing and fund-flow behaviour, (d) typology of sustainable investment strategies and portfolio optimization including data-driven and machine-learning approaches, (e) fund performance during the COVID-19 market shock, and (f) regulation and emerging-market evidence. Studies published in indexed finance, accounting and information-systems journals were favoured, and the latest versions of industry AUM surveys were used, with the supplementary use of seminal older studies (e.g., Markowitz, 1952; Sharpe, 1970; Cooper, Gulen, & Rau, 2005) that continue to act as reference points in the related literature. Findings are aggregated descriptively in Section 6 through comparative tables and charts, as there are no common methods or ESG data sources among the underlying studies.

5. Comparative Framework of ESG Investment Strategies

Table 1 summarizes the six ESG investment strategies identified in Section 2.4 against four practical dimensions relevant to fund selection: the primary decision rule, the typical financial trade-off implied by the literature reviewed in Section 2.1, the strategy's relative exposure to greenwashing risk as discussed in Section 2.3, and how easily an outside investor can verify that the strategy is actually being followed as claimed.

Strategy	Decision Rule	Financial Trade-off	Greenwashing Risk
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Negative / Exclusionary Screening	Exclude sectors/firms failing ethical criteria (tobacco, weapons, fossil fuels)	Lower diversification; return effect modest and sample-dependent	Low–Moderate: exclusion lists are verifiable but criteria vary widely across providers
Positive / Best-in-Class Screening	Select top ESG performers within each sector	Most consistent evidence of neutral-to-positive results	Moderate: relies heavily on the quality of the underlying ESG rating
ESG Integration	Build material ESG factors into standard valuation and risk analysis	Contested; often framed as risk management, not return boost	Moderate–High: least verifiable strategy, as integration can be applied with limited disclosure
Thematic Investing	Concentrate capital in themes (renewables, water, diversity)	Higher concentration risk; tied to theme-specific cycles	Moderate: theme labels can be applied loosely to marginally related holdings
Impact Investing	Seek measurable social/environmental outcomes with return	Often lower liquidity or below-market return for verified impact	Low–Moderate: impact metrics are demanding to fabricate credibly, but "impact washing" is documented
Active Ownership / Engagement	Use voting rights and dialogue to influence conduct	No exclusion needed; effect operates indirectly via governance	High: engagement claims are the hardest for investors to independently verify

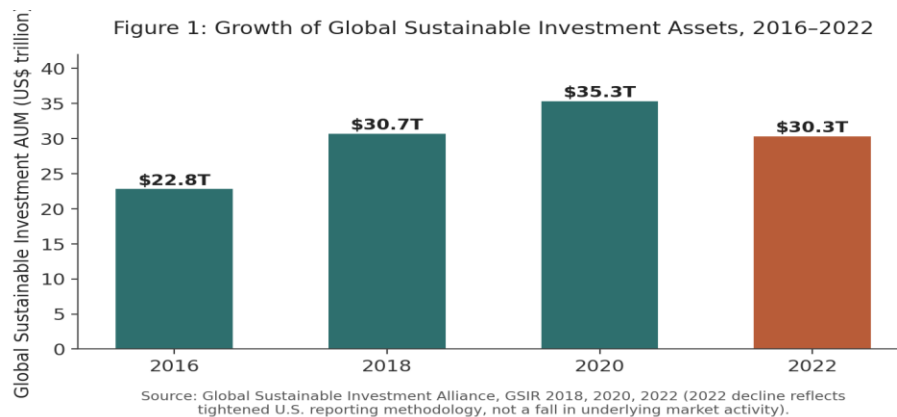
Table 1. *Comparative Framework of ESG Investment Strategies. Source: Author's synthesis based on Section 2 (GSIA, 2019, 2021; Kaiser, 2020; Cocharde, Heller, & Orlov, 2023).*

Reading Table 1 across rows rather than down columns is useful for fund selection: a strategy with a favourable financial trade-off but high greenwashing risk (such as active ownership) still requires substantial independent verification effort, while a strategy with a less favourable trade-off but low greenwashing risk (such as negative screening) may be more suitable for an investor who is willing to accept the trade-off in exchange for easier verification.

6. Empirical Landscape: Growth, Structure, and Performance

6.1 Market Growth

Figure 1 traces the growth of global sustainable investment assets under management as reported across four successive editions of the Global Sustainable Investment Review. The market grew from US\$22.8 trillion in 2016 to a peak of US\$35.3 trillion in 2020, before the 2022 review recorded a decline to US\$30.3 trillion. This decline is attributable primarily to a change in measurement methodology adopted by the U.S. Sustainable Investment Forum in response to greenwashing concerns which alone reduced reported U.S. sustainable AUM from roughly US\$17 trillion to US\$8.4 trillion rather than to a genuine contraction in underlying sustainable investment activity; non-U.S. markets (Europe, Canada, Japan, Australia, and New Zealand) in fact grew a further 20 percent over the same period (GSIA, 2023).



6.2 Strategy Adoption

Figure 2 shows the assets under management for the three largest sustainable investment strategies reported in the latest Global Sustainable Investment Review (GSIR), which has been consistent at the strategy level across regions. Negative/exclusionary screening accounted for the largest AUM of the three strategies, at US\$ 19.8 trillion, followed by ESG (US\$17.5 trillion) and corporate involvement/shareholder action (US\$9.8 trillion). Subsequent reviews confirm the continuing prominence of ESG integration and note a shift toward corporate engagement and shareholder action, which the 2022 review identifies as having become, for the first time, the predominant sustainable investing strategy globally, reflecting a broader industry shift from divestment-based approaches toward active stewardship (GSIA, 2019, 2023).



6.3 Synthesis of Risk-Adjusted Performance Findings

Table 2 synthesizes the direction and conditions of the risk-adjusted performance findings reviewed in Section 2.1, organized to show that the literature does not point unanimously in one direction.

Study	Sample / Period	Method	Reported Finding
Halbritter & Dorfleitner (2015)	U.S. market, 1991–2012	Multi-factor asset-pricing models	No significant, robust return premium; highly sample-dependent
El Ghouli, Karoui, Patel, & Ramani (2023)	2,255 U.S. mutual fund portfolios, 2010–2021	Risk-adjusted return and Sharpe-ratio comparison	No superior risk-adjusted performance for ESG portfolios
Kaiser (2020); Kumar et al. (2016)	Global / European equities	10% best-in-class screening; Sharpe ratio and factor models	Unambiguously positive contribution from best-in-class screening
Bruno, Esakia, & Goltz	Multi-region equity portfolios	Risk-adjustment of raw ESG portfolio returns	Apparent "ESG alpha" shrinks substantially once properly risk-adjusted

(2022)			
Friede, Busch, & Bassen (2015)	>2,000 studies, 1970–2014 (meta-analysis)	Vote-count and correlational aggregation	Majority of underlying studies report a non-negative relationship

Table 2. *Synthesis of Risk-Adjusted ESG Performance Findings. Source: Author's synthesis of studies cited in Section 2.1.*

6.4 Synthesis of ESG Rating Divergence Evidence

Table 3 summarizes the magnitude of ESG rating disagreement reported across the studies reviewed in Section 2.2, illustrating why fund construction and academic inference are both complicated by the choice of data provider.

Study	Raters Compared	Key Finding
Chatterji, Durand, Levine, & Touboul (2016)	Six major ESG raters	First systematic documentation of low cross-rater agreement, 2002–2010
Berg, Kölbel, & Rigobon (2022)	KLD, Sustainalytics, Moody's ESG, S&P Global, Refinitiv, MSCI	Pairwise correlations range from 0.38 to 0.71; 56% of divergence from measurement, 38% from scope, 6% from weighting
Bissoondoyal-Bheenick, Brooks, & Do (2024)	Asset4, Sustainalytics, MSCI	High Asset4–Sustainalytics correlation; weak or negative MSCI correlation; lower disagreement among European firms

Table 3. *Synthesis of ESG Rating Divergence Findings. Source: Author's synthesis of studies cited in Section 2.2. Compare with credit-rating agency agreement, typically above 0.90.*

6.5 Regulatory Landscape Snapshot

Table 4 summarizes the principal regulatory regimes discussed in Section 2.8 that directly shape how ESG funds must classify and disclose their strategies, and therefore how comparable future performance and rating-divergence studies conducted after their adoption are likely to be relative to the pre-regulation studies synthesized in Tables 2 and 3.

Regime	Jurisdiction	Core Requirement
Sustainable Finance Disclosure Regulation (SFDR)	European Union	Requires funds to classify sustainability ambition (Article 8/9) and disclose the ESG methodology behind it
Sustainability Disclosure Requirements (SDR)	United Kingdom	Introduces labelling categories for sustainable investment products and anti-greenwashing rules
ESG Fund Naming / Disclosure Enforcement	United States	Enforcement actions addressing funds whose ESG marketing claims are not supported by underlying processes
TCFD-aligned Climate Disclosure	Global (adopted variably)	Encourages standardized climate-risk disclosure that narrows ESG rating measurement divergence

Table 4. *Snapshot of Major ESG Fund Disclosure Regimes. Source: Author's synthesis based on Section 2.8 (GSIA, 2023, and related regulatory sources).*

7. Discussion

Four points emerge from the synthesis in Section 6. First, the performance debate is not converging toward a single answer, and it is unlikely to do so as long as studies continue to rely on different ESG data providers whose underlying ratings correlate only moderately (Table 3). A finding of ESG outperformance in one dataset and underperformance in another may simply reflect which rating agency's scores were used to build the ESG and non-ESG comparison groups, rather than a genuine disagreement about the underlying economics. Future performance studies should ideally report results across multiple ESG data providers as a robustness check, a practice that remains uncommon in the literature reviewed here.

Second, the choice of strategy affects both the expected financial trade-off and greenwashing risk (Table 1). Best-in-class and positive screening strategies showed the strongest consistency in showing neutral-to-positive risk-adjusted performance across the studies evaluated, while blanket negative screening and loosely defined ESG integration had mixed results, and integration was more susceptible to superficial adoption. Therefore, investors who seek to achieve neutral or improve financial performance with environmental responsibility may be better served by best-in-class screening than by broad exclusionary screening, and investors motivated by aligned values may prefer exclusionary screening despite its generally higher diversification cost.

Third, as shown in the data on market growth and strategy adoption (Sections 6.1, 6.2), the industry is self-correcting rather than shrinking. The apparent slowdown in reported global AUM between 2020 and 2022 appears to be driven more by the tightening of U.S. definitions than by falling demand, and the shift toward corporate involvement and shareholder action as the most important strategy suggests that the market is moving from passive exclusion to active stewardship, which is also one of the hardest things to verify by outside investors (see Table 1). This creates a policy tension, as the industry matures toward stewardship, the disclosure and verification requirements may need to become more, not less, stringent, so to address the need for such data systems and verification tools discussed in Section 2.6.

Fourth, as discussed in Sections 2.8 and 2.9, the regulatory and emerging-market observations suggested in Section 6 should not be read as describing a homogeneous set of performance and rating divergence measures. Regimes such as the EU's SFDR are currently defining what constitutes a qualifying sustainable fund in real time, so that comparisons between performance before and after these changes may not be remarkably comparable. The thin disclosure infrastructure in several emerging markets may also raise the potential for wider variations in rating divergence than those in Table 3. These observations suggest that we should consider our quantitative benchmarks to be treated as time- and country-specific rather than a universal measure, and update our comparative framework accordingly as disclosure and data providers continue to change.

8. Practical Implications and Due-Diligence Checklist

For individual and institutional investors, three practical steps follow directly from this review.

- Clarify the objective first. Decide whether the primary goal is financial performance, values alignment, or a deliberate blend of both, since Table 1 shows that different strategies trade off these objectives differently.
- Check more than one rating provider. Given the documented correlation of only 0.38 to 0.71 among major raters (Berg, Kölbel, & Rigobon, 2022), relying on a single provider's score risks anchoring a decision to that provider's particular methodology rather than to a fund's actual sustainability characteristics.
- Treat labels as a starting point, not proof. Examine underlying holdings, historical proxy-voting records, and portfolio turnover around the time of any ESG-related rebranding, consistent with the pattern of abnormal inflows following ESG name changes documented by Cochardt, Heller, and Orlov (2023).

For managers, the review suggests that it is not just ESG branding, but action, engagement, voting, and transparency about methods that can be used to differentiate fund performance which should matter more, as institutional investors are now rewarded by evidence of substantial and verified sustainability commitment with higher return on assets than the labels claim.

For regulators and standardsetters, the persistence of rating divergence and greenwashing after more than a decade of academic literature indicates that voluntary industry convergence is unlikely without stronger disclosure mandates such as those proposed in recent GSIA policy recommendations. These include calls for a global baseline for corporate sustainability disclosure and greater alignment of ESG ratings and benchmarks (GSIA, 2023). The fiduciary duty concerns of Schanzenbach and Sitkoff (2020) suggest regulators need to clarify, rather than leave ambiguous, where ESG considerations are consistent with a manager's duty to beneficiaries.

Table 5 condenses the practical implications above into a short due-diligence checklist that translates the review's

findings into concrete questions an investor can put to a fund manager or a fund's published documentation before allocating capital.

Dimension	Question to Ask	Basis in This Review
Objective	Is the goal financial performance, values alignment, or both, and does the chosen strategy match that objective?	Table 1; Section 8
Rating source	Which ESG rating provider(s) does the fund rely on, and has performance been checked against more than one provider?	Section 2.2; Table 3
Label verification	Do fund holdings, turnover, and proxy-voting history support the sustainability claims in the fund name and marketing?	Section 2.3
Cost of constraint	How much diversification or expected return is being given up relative to an unconstrained benchmark?	Section 2.5; Table 2
Regulatory classification	Under which regulatory category is the fund classified, and what disclosure does that require?	Section 2.8; Table 4

Table 5. Practical Due-Diligence Checklist for ESG Fund Selection. Source: Author's synthesis.

9. Limitations

This review is limited in that it is a narrative and comparative synthesis and not a quantitative meta-analysis, and does not provide a single pooled effect size on ESG performance. This is a trade-off because the samples, time period, and ESG data provider varied between the studies, but it means that the strength of the evidence supporting each of these claims should be judged against the individual studies cited rather than against a statistical summarization.

This review also contains a focus on studies of developed market (U.S. and European) funds and companies; although the literature on ESG fund strategies in emerging markets has remained growing, it is likely to be less standardized and may have different dynamics given less standard ESG disclosure requirements. Finally, because ESG data providers, regulatory definitions, and reported AUM figures continue to change rapidly, the quantitative figures reported in Section 6 should be understood as a snapshot as of the most recent GSIA review cited rather than as a permanently fixed baseline.

10. Conclusion and Future Research Directions

The focus of this paper was to review and synthesize the research on ESG fund investment strategies on the topics of financial performance, rating divergence, greenwashing, strategy type, portfolio optimization, data-driven and AI methods, resilience to crises, regulation, and emerging markets. The conclusion is that ESG investing is not one, uniform practice with a single answer to performance; it is a family of diverse strategies negative screening, positive/best-in-class screening, ESG integration, thematic investing, impact investing, and ownership which differ in their financial risk and greenwashing exposure, and sit on an ESG rating system only moderately consistent across providers. Investors, fund managers, and regulators would be well served by considering the choice of strategy, rating providers, and label verification as three separate and equally important decisions, rather than accepting that the label makes any of these decisions automatically.

Future research would benefit from three developments raised in this review. First, studies that report a composite score over multiple ESG rating providers would be a good robustness check to separate real effects from data provider artifacts. Second, more empirical research on ESG fund strategies and rating infrastructure in emerging markets is necessary to establish if the developed-market findings summarized here can be generalized to markets with different disclosure regimes and ownership structures. Third, as machine-learning and alternative data methods for ESG scoring and portfolio construction are rapidly maturing, comparative work comparing whether these new emergence problems reduce or just conceal the problem of rating disparity discussed in Section 2.2 would be useful both academics and practitioners.

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