ESG AND FINANCIAL PERFORMANCE:

Uncovering the Relationship by Aggregating Evidence from 1,000 Plus Studies Published between 2015 – 2020

By Tensie Whelan, Ulrich Atz, Tracy Van Holt and Casey Clark, CFA

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Executive Summary

Meta-studies examining the relationship between ESG and financial performance have a decades-long history. Almost all the articles they cover, however, were written before 2015. Those analyses found positive correlations between ESG performance and operational efficiencies, stock performance and lower cost of capital. Five years later, we have seen an exponential growth in ESG and impact investing – due in large part to increasing evidence that business strategy focused on material ESG issues is synonymous with high quality management teams and improved returns. A case in point: A recent study looked at the initial stock market reaction to the COVID-19 crisis (up to March 23) and found that companies scoring high on a "crisis response" measure (based on Human Capital, Supply Chain, and Products and Services ESG sentiment) were associated with 1.4-2.7% higher stock returns (Cheema-Fox et al., 2020). Nevertheless, the topic continues to be debated, with some arguing that companies and investors should stick to managing for stock price and that ESG is, at best, a distraction from the real business of making money.

The authors of this report, NYU Stern Center for Sustainable Business and Rockefeller Asset Management, collaborated to examine the relationship between ESG and financial performance in more than 1,000 research papers from 2015 – 2020. Because of the varying research frameworks, metrics and definitions, we decided to take a different approach than previous meta-analyses. We divided the articles into those focused on corporate financial performance (e.g. operating metrics such as ROE or ROA or stock performance for a company or group of companies) and those focused on investment performance (from the perspective of an investor, generally measures of alpha or metrics such as the Sharpe ratio on a portfolio of stocks), to determine if there was a difference in the findings. We also separately reviewed papers and articles focused on low carbon strategies tied to financial performance in order to understand financial performance implications through the lens of a single thematic issue.

We found a positive relationship between ESG and financial performance for 58% of the "corporate" studies focused on operational metrics such as ROE, ROA, or stock price with 13% showing neutral impact, 21% mixed results (the same study finding a positive, neutral or negative results) and only 8% showing a negative relationship. For investment studies typically focused on risk-adjusted attributes such as alpha or the Sharpe ratio on a portfolio of stocks, 59% showed similar or better performance relative to conventional investment approaches while only 14% found negative results. We also found positive results when we reviewed 59 climate change, or low carbon, studies related to financial performance. On the corporate side, 57% arrived at a positive conclusion, 29% a neutral impact, 9% mixed and, 6% negative. Looking at investor studies, 65% showed positive or neutral performance compared to conventional investments with only 13% indicating negative findings. A detailed breakdown can be found in Figure 1.

These findings were supported by an additional meta-meta-analysis (a study of existing meta-studies) we undertook. We found 13 corporate meta-analysis studies published (covering 1,272 unique studies) with a quantitative approach and 2 investor meta-analysis studies (covering 107 unique studies) published since 2015. The former found consistent positive correlations between ESG and corporate financial performance; the latter found that ESG investing returns were generally indistinguishable from conventional investing returns. (Figure 2). We concluded that these two findings are robust across time and space.

We drew six conclusions about the relationship between ESG and financial performance after examining the 1000 plus individual studies.

1. Improved financial performance due to ESG becomes more marked over longer time horizons.

2. ESG integration, broadly speaking as an investment strategy, seems to perform better than negative screening approaches. A recently released Rockefeller Asset Management study finds that ESG integration will increasingly be demarcated between "Leaders" and "Improvers" with the latter showing uncorrelated alpha-enhancing potential over the long-term (Clark & Lalit, 2020).

3. ESG investing appears to provide downside protection, especially during a social or economic crisis.

4. Sustainability initiatives at corporations appear to drive better financial performance due to mediating factors such as improved risk management and more innovation.

5. Studies indicate that managing for a low carbon future improves financial performance.

6. ESG disclosure on its own does not drive financial performance.

Research over the last five years appears to be producing more conclusive results, but it is worth acknowledging the challenges with inconsistent terminology, insufficient emphasis on "material" ESG issues, ESG data shortcomings, and confusion regarding different ESG investing strategies.

- Research covering ESG and financial performance often suffers from inconsistent terminology and nomenclature. Meuer et al. (2019) found 33 definitions of corporate sustainability in usage. For corporations, embedded sustainability (ESG is part of the business strategy) may have different performance implications than traditional Corporate Social Responsibility (CSR) efforts that emphasize community relations and philanthropy, yet there has been insufficient review of those differences, creating noise in the findings (Douglas et al., 2017). We see some of that confusion in a study by Manchiraju and Rajgopal (2017) which assessed the (poor) financial performance of companies required to spend 2% of their profits on CSR by the Indian government. In this case, CSR was philanthropy and community relations, not sustainability related to the material ESG issues that could enhance long-term performance.
- Research often fails to distinguish between material and immaterial ESG issues as well as ESG leaders versus improvers. For example, Khan et al. (2016) demonstrate the alpha potential when incorporating "material" ESG issues, with the stock performance of companies focused on material issues outperforming those that focuses on immaterial ESG issues or no ESG issues at all. Rockefeller Asset Management's research shows similar results: one study emphasizes that ESG integration will increasingly be demarcated between "Leaders" and "Improvers" and finds long-term alpha enhancing potential when focusing on material ESG issue improvement (Clark & Lalit, 2020).
- The results are also complicated by the lack of standardization with ESG data. Studies use different scores for different companies by different data providers. Eccles et al. (2017), for example, reviewed a global survey of institutional investors and concluded that "the biggest barrier is the lack of high quality data about the performance of companies on their material ESG factors." Plenty of technical evidence also points to the shortcomings of accounting metrics and ESG data (Berg et al., 2019). We found that at least 40% of studies relied on an overall, third-party ESG score.
- ESG integration, ESG momentum, decarbonizing, socially responsible investing (SRI), negative screening, and impact investing are just a few of the varied approaches referenced in the research. They are often merged together, even though each has different risk-reward implications. A common research approach is to query Bloomberg for funds labeled ESG – those funds are self-designated, and may lack a robust ESG investing framework. Studies can also confuse the outcome by failing to distinguish between performance of a strategy seeking market rate or excess returns versus a strategy prioritizing positive environmental and social impact while accepting concessionary

returns. Hernaus (2019) is an exception: she found that financial performance differed based on the sustainable investing strategy employed by European fund managers. She writes, "previous studies have predominantly treated SRI as homogeneous (Schroeder, 2007; Rathner, 2013) and have not distinguished between particular, different SRI strategies available, whose number and diversity (European Sustainable Investment Forum – Eurosif, 2012; US SIF, 2012; European Fund and Asset Management Association, 2016) reflect the great heterogeneity of this financial phenomenon (Sandberg et al., 2009)." Investors seem to be making a distinction; Eurosif found that ESG integration grew at a compound annual growth rate (CAGR) of 27%, while negative screening fell 3% (Eurosif, 2018).

Some of the earlier short-comings in the corporate research have been addressed in the last five years, which may be why we have more clear positive findings. However, academic researchers continue to be challenged by the variability of ESG data and the lack of distinction between different investment strategies, creating an opportunity for investors and researchers who can overcome this challenge. Judging from the fact that the volume of research produced since 2015 is comparable to all papers published before 2015, this is clearly an area where we should expect to see increased and improved research in coming years.

Figure 1. Positive and/or neutral results for investing in sustainability dominate. Very few studies found a negative correlation between ESG and financial performance (based on 245 studies published between 2016 and 2020) .

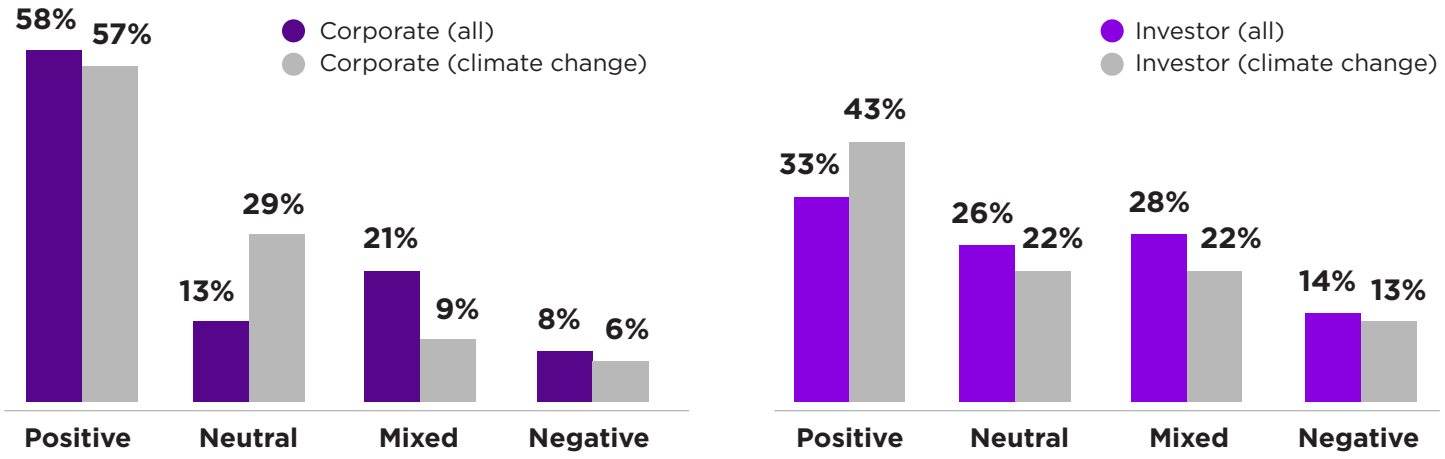
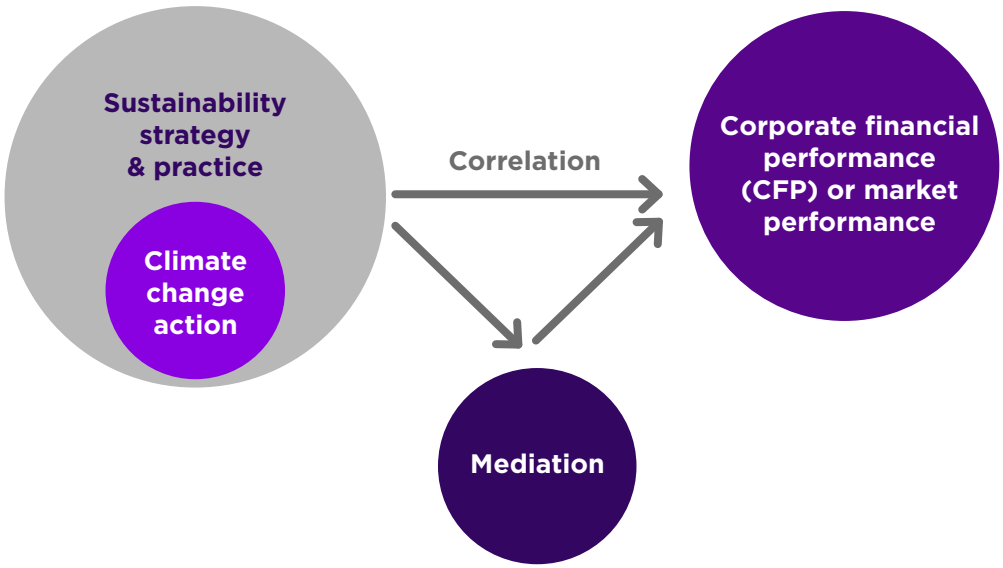


Figure 2. Conceptual overview of how investing in sustainability/ESG drives financial performance: We reviewed and categorized relevant academic studies and analyzed them through correlations, mediating factors, and a specific theme – climate change.



Investor-focused studies tend to look at a direct relationship between ESG and performance based on benchmarks and a portfolio-level view of themes such as materiality or governance structure. Meta-analytical effects are Hedges' *g* or *d*.

Corporate-focused studies may include mediating factors such as innovation, operational efficiency, or risk management for a better understanding of how sustainability initiatives lead to CFP. Meta-analytical effects are partial correlations from regression models.

The Results Indicate an Encouraging Relationship between ESG and Financial Performance

In reviewing over 1,000 studies published between 2015 – 2020, we found a positive relationship between ESG and financial performance for 58% of the "corporate" studies focused on operational metric such as ROE, ROA, or stock price with 13% showing neutral impact, 21% mixed results (the same study finding a positive, neutral or negative results) and only 8% showing a negative relationship. For investment studies typically focused on risk-adjusted attributes such as alpha or the Sharpe ratio on a portfolio of stocks, 33% found positive performance 26% found neutral impacts (in other words, performed similar to conventional investments), 28% had mixed results (positive, neutral, or negative, generally because they examined a variety of variables and time periods as well as multiple samples in one study) and 14% found negative results. In other words, 59% showed similar or better performance relative to conventional investment approaches while only 14% found negative results. We also found positive results when we reviewed 59 climate change, or low carbon, studies related to financial performance. On the corporate side, 57% arrived at a positive conclusion, 29% a neutral impact, 9% mixed and, 6% negative. Looking at investor studies, 65% showed positive or neutral performance compared to conventional investments with only 13% indicating negative findings. A detailed breakdown is found in Figure 1.

These findings were supported by an additional meta-meta-analysis (a study of existing meta-studies) we undertook. We found 13 corporate meta-analysis studies published (covering 1,272 unique studies) with a quantitative approach and 2 investor meta-analysis studies (covering 107 unique studies) published since 2015. The former found consistent positive correlations between ESG and corporate financial performance; the latter found that ESG investing returns were generally indistinguishable from conventional investing returns. (Figure 2). We concluded that these two findings are robust across time and space.

Many of the studies reviewed described a finding and tried to explain it through the lens of a social science derived model of the world. Several social science theories dominate the research:

> **Stakeholder theory** (successful companies need to manage for a wide variety of stakeholders such as employees, civil society, suppliers and investors),
>
> **Shared value** (companies that create shared value for all stakeholders do better financially),
>
> **Legitimacy theory** (a social contract between the corporation and society, which, if broken, leads to consumers reducing demand or governments imposing regulatory restrictions),
>
> **Resource-based view** (emphasizing internal resources such as employees and intangible assets for achieving a competitive advantage).

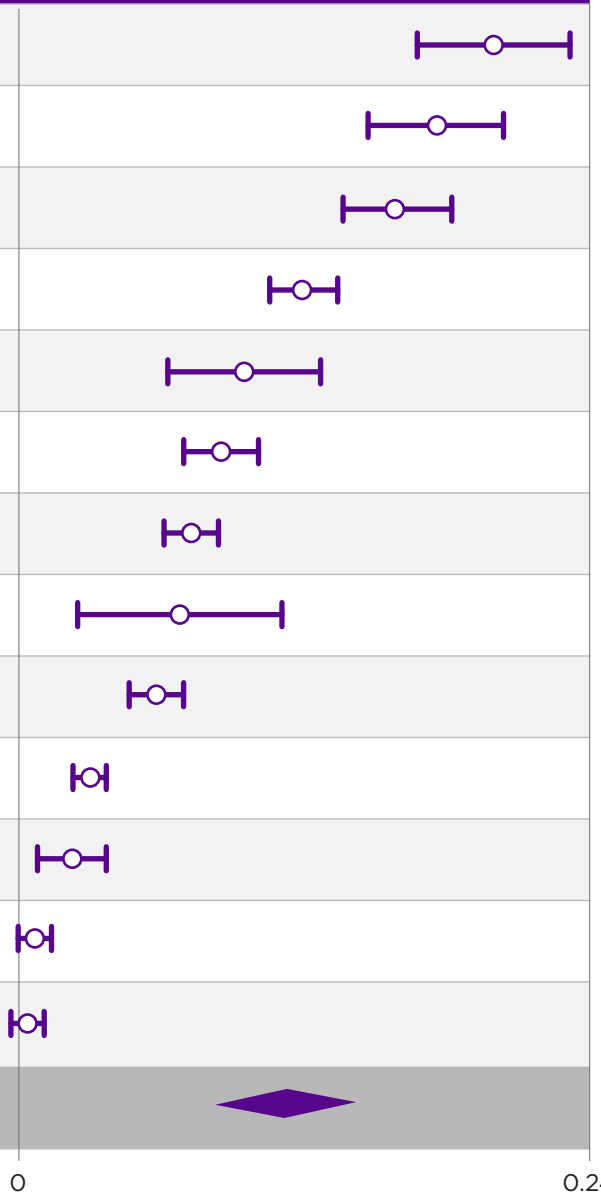
Studies most often invoked stakeholder theory (N=80), but shared value, legitimacy theory and the resource-based view appeared in a sizeable share of studies (16% - 25%).

Notably, those studies that did not include a social science theory only found a one-in-three positive association with ESG and financial performance, whereas the odds were one-in-two on average for research grounded in social science theories.

This finding points toward the need to better understand the mechanisms behind the relationship between ESG and financial performance. Ioannou and Serafeim (2019) in *Corporate Sustainability: A Strategy?* took a closer look at whether sustainability might be considered a strategic approach (leading to a competitive advantage) or common practice (a set of standards within an industry that confer legitimacy). They find that both options are relevant and that adoption of sustainability over time is complex and dynamic.

Figure 3. Twelve of thirteen meta-analyses (comprising 1,272 studies) found a positive association between some aspects of sustainability and financial performance (1976-2018).

Study	estimate	95% confidence/credible interval
Lopez-Arceiz et al. 2018	0.199	[0.166, 0.232]
Lu & Taylor 2016	0.174	[0.145, 0.202]
Hou et al. 2016	0.158	[0.134, 0.182]
Busch & Friede 2018	0.119	[0.104, 0.134]
Plewnia & Guenther 2017	0.094	[0.062, 0.126]
Gallardo-Vazquez et al. 2019	0.084	[0.068, 0.100]
Hang et al. 2019	0.072	[0.060, 0.084]
del Mar Miras-Rodgriguez et al. 2015	0.067	[0.023, 0.111]
Wang et al. 2016	0.059	[0.045, 0.072]
Vishwanathan et al. 2019	0.030	[0.022, 0.038]
Hoobler et al. 2018	0.023	[0.007, 0.039]
Jeong & Harrison 2017	0.007	[0.001, 0.013]
Rost & Ehrmann 2017	0.004	[-0.004, 0.012]
Modeled mean estimate	**0.089**	**[0.053, 0.127]**



Six Key Takeaways

1. **Improved financial performance due to ESG becomes more marked over a longer time horizon**

   We found that our proxy for an implied long-term relationship had a coefficient with a positive sign that is statistically significant. The model suggests that, everything else being constant, a study with an implied long-term focus is 76% more likely to find a positive or neutral result. Hang et al. (2019) undertook a meta-analysis (N=142) which found corporate investments in environmental sustainability had no effect on corporate financial performance in the short term, but had positive effects over the longer-term. Some recent papers were optimistic about how markets value long-term commitments. Kotsantonis et al. (2019) found that CEOs communication of "long-term plans" resulted in an abnormal positive reaction by the stock market. A cross-sectional study on firms with strong ESG ratings found returns up to 3.8% higher per standard deviation of ESG score in the mid- and long-term (Dorfleitner et al., 2018).

2. **ESG Integration as a strategy seems to perform better than negative screening approaches and ESG momentum may cause improvers to outperform leaders**

   The sample size of studies on specific portfolio management strategies and asset classes was small, making it challenging to interpret how they would translate into decision-making for an asset manager. The dominant research approach was to find a sample of sustainable funds or indices and compare them to a conventional benchmark. Most of the research focused on equities (N=54, with 33% finding alpha, 54% finding a neutral or mixed effect) rather than fixed income (N=11, with 19% finding alpha and 56% finding a neutral or mixed effect). In addition, most studies focused on active (N=41, with 29% alpha and 56% neutral or mixed) vs passive (N=6) investing.
   We also looked at the explicit or implicit investment strategies that underpin the analysis in the academic studies (they serve as proxy for "real-world" applicability; for example, researchers may define a universe of available ESG funds or use an ESG score in a regression model). We found ESG integration seemed to perform better than negative screening and divesting, with 33% of the (N=17) studies finding alpha and 53% finding neutral or mixed results. The subgroup of papers analyzing pooled investment strategies (combining everything with some type of ESG label) was least convincing in terms of showing a positive association (65% less likely). We speculate it might be because too many different strategies were combined together. For example, this group contains socially responsible investing (SRI) and ethical funds that may not have an ambition to match or outperform a conventional benchmark. Ielasi et al. (2018) compared different sustainable investing strategies with each other and indeed found performance differences between passive and active and ethical versus ESG integration strategies.

   Very few studies emphasized material ESG issues and demarcated between ESG Leaders, or best-in-class firms, and ESG Improvers, or firms showing the greatest improvement in their ESG footprint. One seminal paper titled *Corporate Sustainability: First Evidence on Materiality* published in 2016 by Kahn, Serafeim and Yoon from Harvard Business School showed the outperforming potential of mapping material ESG issues and emphasizing momentum, or ESG improvement (Khan et al., 2016). Rockefeller Asset Management's research further supports these results. In their paper, ESG Improvers: An Alpha Enhancing Factor, they use materiality mapping to differentiate between ESG Leaders and ESG Improvers, and demonstrate the alpha potential of the latter in a study covering US equities from 2010 – 2020.

The key takeaways from the research include:

- A back-tested, hypothetical portfolio of top-quintile ESG Improvers outperformed bottom-quintile ESG "Decliners" by 3.8% annualized in an analysis covering US all cap equities from 2010 – 2020. The signal is monotonic, in that outperformance grew with each quintile.
- An optimized hypothetical ESG Improvers portfolio, which seeks to isolate pure ESG improvement while controlling for sector and factor biases, generated 0.5% annualized excess returns from 2010 – 2020 with 1.3% tracking error relative to the Bloomberg US 3000 Index.
- The ESG Improvers factor enhanced returns when integrated with traditional factors over the back-test period. A hypothetical multi-factor ESG Improvers + Quality + Low Volatility portfolio outperformed a two-factor Quality and Low Volatility portfolio by 0.45% annualized. Over the same time period, an ESG Improvers + Value + Momentum Portfolio outperformed a two-factor Value and Momentum portfolio by 1.1% annualized.

3. ESG investing appears to provide downside protection, especially during social or economic crisis

ESG investing appears to provide asymmetric benefits. As discussed below, investor studies in particular seem to demonstrate a strong correlation between lower risk related to sustainability and better financial performance. Recent events have provided unique datasets for researchers. During the financial crisis (2007-2009) Fernández et al. (2019) found that German green mutual funds delivered risk-adjusted returns slightly better than their peers (during non-crisis they were equal to conventional funds, but better than SRI funds). Similarly, the FTSE4Good, a set of ESG stock market indices, performed better and recovered its value quicker after the 2008 financial crash (Wu et al., 2017). These findings seem to hold in general for economic downturns as high rated ESG mutual funds outperformed low rated funds based on the Sharpe ratio (Chatterjee, 2018; Das et al., 2018). Finally, in the first quarter of 2020 COVID downturn, 24 of 26 ESG index funds outperformed their conventional counterparts, which they credited ESG leading to more resiliency and at the end of the third quarter, 45% of ESG-focused funds outperformed their index (Morningstar, 2020). While virtually all studies, by academics and practitioners alike found this correlation, one outlier, based on ESG scores, did not find such a correlation (Demers et al., 2020)

4. Sustainability initiatives at corporations appear to drive financial performance due to factors such as improved risk management and more innovation

Sustainability strategies implemented at the corporate level can drive better financial performance through *mediating factors*—i.e. the sustainability drivers of better financial performance such as more innovation, higher operational efficiency, better risk management, and others, as defined in the Return on Sustainability Investment (ROSI) framework (Atz et al., 2019). We reviewed the studies through the lens of these mediating factors and found that stakeholder relations, risk, operational efficiency, and innovation were the most common in the literature. For example, Vishwanathan et al. (2019) reviewed 344 studies and identified four mediating factors – enhancing firm reputation, increasing stakeholder reciprocation, mitigating firm risk, and strengthening innovation capacity – which drove financial performance.

Our regression analysis reviewed 17 studies that included some aspect of innovation in their analysis, and all had positive findings regarding related financial performance. However, some of these studies did not exclusively focus on innovation and so the individual effect is hard to separate out. In addition, the small sample size reduces the level of confidence; thus we see this as an exciting area for further research. For operational efficiency, more than half of the 22 studies (59%) found a positive correlation between operational efficiency and financial performance; only three of the 22 had a negative finding.

Regarding risk, we found that investor studies that did not include risk as a mediating factor were only 27% likely to find a positive correlation with financial performance, while 48% of those studies that did include risk were likely to find a positive result. And 52% of the 40 studies across all studies looking at risk found a positive correlation. For example, portfolios with lower ESG risks can maintain risk-adjusted performance (Hübel & Scholz, 2020). Gloßner (2018) concluded that controversial firms with

a known history of ESG incidents exhibit "a four-factor alpha of −3.5% per year, even when controlling for other risk factors, industries, or firm characteristics." In addition, with regards to climate-change related risk, 51% of the studies found a positive correlation between better financial performance and managing for physical and transition risk related to climate change.

Overall, no single mediating factor resulted in a statistically significant effect in our model; partly because the underlying samples are small and partly because the effects are hard to isolate in studies that mostly look very broadly at the relationship between sustainability and financial performance. More research is needed in this area.

5. Studies indicate that managing for a low carbon future improves financial performance

Research on mitigating climate change through decarbonization strategies is fairly recent, but finds strong evidence for better financial performance for both corporates and investors. Unfortunately, none of the three elite finance journals (Journal of Finance, Journal of Financial Economics, and Review of Financial Studies) published a single article related to climate change over their analysis period (Diaz-Rainey et al., 2017; Zhang et al., 2019), which we corroborated. However, 59 studies on the relationship between low carbon strategies and financial performance were published elsewhere in the last five years, and the majority uncovered a positive result. Mitigating risk was the focus on many of the studies, as discussed earlier. For example, Cheema-Fox et al. (2019) examined the construction of decarbonization factors and found that different decarbonization strategies generate different risk-adjusted returns. In particular, they found strategies that lowered carbon emissions more aggressively performed better. In, Park, and Monk (2019) assessed 736 US public firms from 2005 to 2015, and found that a strategy of going long on carbon efficient firms and shorting carbon inefficient firms could earn an annual abnormal return of 3.5%-5.4%. Their research indicates that investing in carbon-efficient firms can be profitable even without government incentives.
Few studies focused on the investment implications of investing in companies producing climate mitigation or adaption solutions, which differs from decarbonizing portfolios. This is a promising area of research. It seems likely that climate change will transform economies and markets through changing regulations, changing consumption patterns, especially from next generation consumers, and technological advancements. As a proof point, FTSE's Opportunities All Share Index - an index that includes companies with involvement in Renewable & Alternative Energy, Energy Efficiency, Water Infrastructure and Technology, Waste Management & Technologies, Pollution Control, Environmental Support Services, and Food, Agriculture & Forestry – outperformed its traditional counterpart, FTSE Global All Cap Index by 4.9% annualized over the five-year period from October 2015 – October 2020.

6. ESG disclosure on its own does not drive financial performance

Just 26% of studies that focused on disclosure alone found a positive correlation with financial performance compared to 53% for performance-based ESG measures (e.g. assessing a firm's performance on issues such as greenhouse gas emission reductions). This result holds in a regression analysis that controls for several factors simultaneously. While what gets measured does matter, measuring ESG metrics without an accompanying strategy seems ineffective. For example, signatories to the UN Principles for Responsible Investment agreed to implement ESG policies, but the focus is on disclosure versus performance and Kim and Yoon (2020) found that the signatories on average improved neither the ESG nor the financial performance of their portfolios. In more general terms, Fatemi et al. (2018) specifically distinguished between ESG disclosures and performance. While high (low) ESG performance increased (decreased) firm value, they also found that ESG disclosures on their own had a negative valuation effect.

Conclusion

Our analysis of more than 1,000 research papers exploring the linkage between ESG and financial performance since 2015 points to a growing consensus that good corporate management of ESG issues typically results in improved operational metrics such as ROE, ROA, or stock price. For investors seeking to construct portfolios that generate alpha, some ESG strategies seem to generate market rate or excess returns when compared to conventional investment strategies, especially for long-term investors, and provide downside protection during economic or social crisis. Notably, very few studies found definitive negative correlations between ESG and financial performance.

Unfortunately, studies to help us understand why these correlations exist were lacking. There were very limited studies on mediating factors such as innovation and operational efficiencies that might drive better corporate performance. And most investment studies did not clearly demarcate the differing risk-reward outcomes of varying ESG integration approaches, nor did they analyze the different performance implications of ESG leaders (best-in-class firms) versus ESG improvers (firms showing the greatest improvement in their ESG footprint). Finally, thematic studies are also relatively limited although climate change studies show promise; research shows a strong relationship between decarbonization strategies and improved performance.

Studies need to better distinguish between different types of investment strategies and asset classes in order to analyze financial performance. Thematic studies on material issues such as climate change provide an intriguing approach as focusing on one issue may lead to more conclusive results. We also recommend that future meta-analyses distinguish between corporate and investor studies as we have done. Finally, an area that has been woefully under researched is the causal factors for improved financial performance by corporates with robust sustainability strategies – we recommend more research into sustainability-driven innovation, employee relations, supplier loyalty, customer demand, risk mitigation, operational efficiency, and so on.

We look forward to reviewing the field of the research in 2025!

Appendix: Methodology

To understand differences in studies in a systematic manner, we disaggregated the research into three types:

1. **Studies that analyzed how corporations with sustainability initiatives performed financially.** These studies typically used a panel of public companies, a commercially available ESG score or an environmental/social performance metric, and may include mediating factors such as innovation, operational efficiency, or risk management for a better understanding of how sustainability initiatives lead to corporate financial performance (Vishwanathan et al., 2019). Here, we relied on our codebook (Supplement 1) and investigated how innovation, operational efficiency, risk management and other mediating factors were present in the academic literature.
2. **Studies that analyzed how ESG funds, portfolios, or indices performed financially.** Most investment-oriented research on ESG and financial performance was at a portfolio level of an asset class using some metric of risk-adjusted return, for example, comparing alpha in conventional and sustainable mutual funds. More recent studies also looked at issues such as materiality (Khan et al., 2016) or investment management strategies such as negative screening. Here, we analyzed the investor-focused research, which ESG investment strategies were considered, and how the investor research compared to the corporate research.
3. **Studies that analyzed a specific theme such as climate change, which can be relevant for managers and investors.** A third type of study focuses on a specific ESG theme. We chose climate change because it is a new and growing area of financial risk for managers and investors that also presents opportunities. Here, we gathered studies and industry reports and examined the role of climate change for asset managers.

We searched ProQuest, Web of Science (WoS), Google Scholar, Social Science Research Network (SSRN), National Bureau of Economic Research (NBER), and other journal databases for two sets of keywords: related to sustainability/ESG and related to financial performance/CFP. Examples of the search queries are shown in Table A1 in the Appendix. We restricted the search for the period of January 2015 to February 2020 to find relevant studies that were published in English. We used various validation strategies to achieve a comprehensive sample.

To develop the final sample (Figure 2), we screened (level 1) academic papers that examined the causal relationship between sustainability and financial performance. The rapid title screening identified relevant studies based on three quick heuristics that screened for results that we hoped generalize the most:

1. Is financial performance a dependent variable (outcome)?
2. Does a "sustainability variable" lead to a quantitative result?
3. Is there more than one company or fund being investigated?

In level 2 screening, we attempted to find the relevant section for the codebook (see Supplement 1) in the full text such as definition of variables or a results table. The full set of eligible articles (1,141) was further reduced, so that we could focus on coding studies for the quantitative synthesis. All quantitative meta-analyses (n = 15) published in the reference frame were coded to achieve a dataset suitable for a second-order meta-analysis (see Supplement 2 for details and data).

The median start and end date for an individual study's data sample was 2007 to 2015. Many studies relied on long time series with 27% having a mid-point year that was before the financial crisis of 2008. Nineteen percent of studies used a sector-specific dataset. Geographically most studies focused on the USA (34%) and Europe (24%) with a sizable share of global (29%) datasets. Over 30% of studies specified a specific country. For the outcome variables we found that 18% analyzed ESG disclosures only and not ESG performance (and of those 40% used a third-party ESG score such as MSCI KLD). Market-based measures of financial performance (in 76% of studies) were vastly more popular than accounting-based measures (27%) with some overlap.

Appendix:
Summary Charts and Exhibits

The full study and supplement 1 and 2 are available on SSRN:
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3708495

The NYU Stern Center for Sustainable Business (CSB) envisions a better world through better business. CSB was founded on the principle that sustainable business is good business, and is proving the value of sustainability for business management and performance at a time when people and the planet need it most. Through education, research, and engagement, CSB prepares individuals and organizations with the knowledge, skills, and tools needed to embed social and environmental sustainability into core business strategy. In doing so, businesses reduce risk; create competitive advantage; develop innovative services, products, and processes; while improving financial performance and creating value for society. For more information, visit CSB's website: https://www.stern.nyu.edu/sustainability

Table 1. Cross-tabulations for the mediating factor risk management and overall study finding. Note how investor studies had fewer positive results (27% vs 48%) when the study did not consider risk.

Indicator variables	Count	Positive	Neutral/mixed	Negative
Mediating factor risk in corporate studies	16	57%	34%	8%
No mediating factor risk in corporate studies	143	69%	31%	0%
Mediating factor risk in investor studies	23	48%	39%	13%
No mediating factor risk in investor studies	63	27%	59%	14%
Mediating factor risk in thematic studies	13	69%	23%	8%
No mediating factor risk in thematic studies	46	54%	35%	11%

Notes. See Supplement 1: Codebook for all definitions.

Table 2. Selected codes for all studies across overall finding. Interpret rows with low counts with caution.

Indicator variables	Count	Positive	Neutral/mixed	Negative
Study design				
Disclosure only	50	26%	60%	14%
Performance only	159	53%	39%	8%
Accounting-based measure	67	46%	42%	12%
Market-based measure	186	46%	44%	11%
Aggregate ESG score	48	52%	40%	8%
Casualty proxies				
Implied long-term relationship	94	50%	40%	10%
Lagged dependent variable	51	51%	35%	14%
Fixed effects / matching methods / instrumental variables	66	41%	53%	6%
Mediating factors				
Risk	40	52%	40%	8%
Operational efficiency	22	59%	27%	14%
Innovation	17	76%	24%	0%

Indicator variables	Count	Positive	Neutral/mixed	Negative
Social science theories				
Stakeholder theory	80	57%	34%	9%
Legitimacy theory	40	45%	40%	15%
Porter's hypothesis	40	57%	28%	15%
Resource-based view	64	55%	36%	9%
None	74	32%	57%	11%

Notes. See Supplement 1: Codebook for all definitions.

Table 3. Selected codes for studies of the investor type across overall finding. Interpret rows with low counts with caution.

Indicator variables	Count	Positive	Neutral/mixed	Negative
Asset class				
Equities	54	33%	54%	13%
Fixed income	11	19%	56%	25%
Management style				
Active	41	29%	56%	15%
Passive	6	50%	50%	0%
Portfolio management strategy				
Negative screening & divesting	16	19%	69%	12%
Pooled strategies created by researchers	30	10%	73%	17%
ESG integration created by researchers	17	33%	53%	14%

Notes. See Supplement 1: Codebook for further details. Portfolio management strategy: Investors describe practical portfolio management strategies in many ways, sometimes inconsistent. We broadly follow Matos (2020): "ESG and Responsible Institutional Investing Around the World: A Critical Review from the CFA Institute Research Foundation." Existing literature explores several ESG investing strategies in portfolio management. Oftentimes the strategies are used interchangeably without clear distinctions. Negative screening & divesting is an investing strategy where companies that do not comply with pre-established ESG principles are excluded from the portfolio. If the paper focuses on the so-called "sin" industries alone, investing (or not) in the tobacco industry or staying away from oil and gas companies, it is coded as negative screening, also. For an example see Richey (2016). Pooled strategies as created by researchers: Instead of excluding companies, investors analyze and select firms and assets that exemplify sustainable business practices. If a paper compares ESG investing versus conventional investing, such as comparing ESG mutual funds vs. conventional mutual funds, or SRI mutual funds versus conventional mutual funds, or ESG index vs a benchmark conventional index, the strategy is coded as pooled strategies. For an example see Pereira et al. (2019). ESG integration as created by researchers incorporates ESG analysis into fundamental research and portfolio construction beyond screening or pooled strategies. We allowed for two subcodes in this category: 'best-in-class' and 'improvers'. 1) If the paper specifically discusses "best-in-class" or "improver", then the paper is coded accordingly. The strategy is coded as best-in-class or improver when the strategy is the subject of study in the paper, or the paper employs the strategy in portfolio construction. In this case, we code the paper accordingly. 2) If the paper does not distinguish best-in-class and improver but rather using "ESG integration" as a generic strategy, then both strategies are selected. 3) If the paper discusses ESG momentum strategy or the impact of ESG on momentum portfolios without distinguishing between best-in-class or improvers, the strategy is coded as both (Kaiser & Welters, 2019; Yen et al., 2019).

Table 4. Selected codes for studies of the climate change issue type across overall finding. Interpret rows with low counts with caution.

Indicator variables	Count	Positive	Neutral/mixed	Negative
Risk management				
Physical risk	41	51%	39%	10%
Transitional risk	35	51%	40%	9%
Dynamic materiality / scenario	9	67%	11%	22%

Notes. See Supplement 1: Codebook for all definitions.

Table 5. Ordered logit regression model for all studies

	Dependent variable				
	Overall finding (negative, neutral/mixed, positive)				
	1	2	3	4	5
Investor perspective (vs corporate)	-0.976***	-1.103***	-0.882***	-0.992***	-1.129***
	(0.263)	(0.316)	(0.346)	(0.286)	(0.381)
Climate change issue (vs not)	0.21	0.252	-0.006	0.153	0.09
	(0.297)	(0.31)	(0.384)	(0.304)	(0.395)
ESG disclosure (vs performance)		-0.767**			-0.751**
		(0.347)			(0.37)
Accounting-based (vs market)		-0.856***			-0.842**
		(0.322)			(0.331)
ESG score (vs E/S/G/other)		0.36			0.451
		(0.36)			(0.381)
Implied long-term relationship (vs short term)			0.381		0.568
			(0.315)		(0.327)
Lagged dependent variable (vs concurrent)			-0.226		-0.54
			(0.389)		(0.412)
Fixed effects / matching methods / instrumental variables			-0.252		-0.262
			(0.342)		(0.353)
No social science theory			-0.371		-0.214
			(0.359)		(0.388)
Mediating factor: Risk				0.711*	0.536
				(0.394)	(0.413)
Mediating factor: Operational efficiency				-0.046	0.148
				(0.5)	(0.539)
Mediating factor: Innovation				1.132*	1.212*
				(0.678)	(0.689)
Region controls?	No	Yes	Yes	Yes	Yes
Observations	241	239	241	241	239

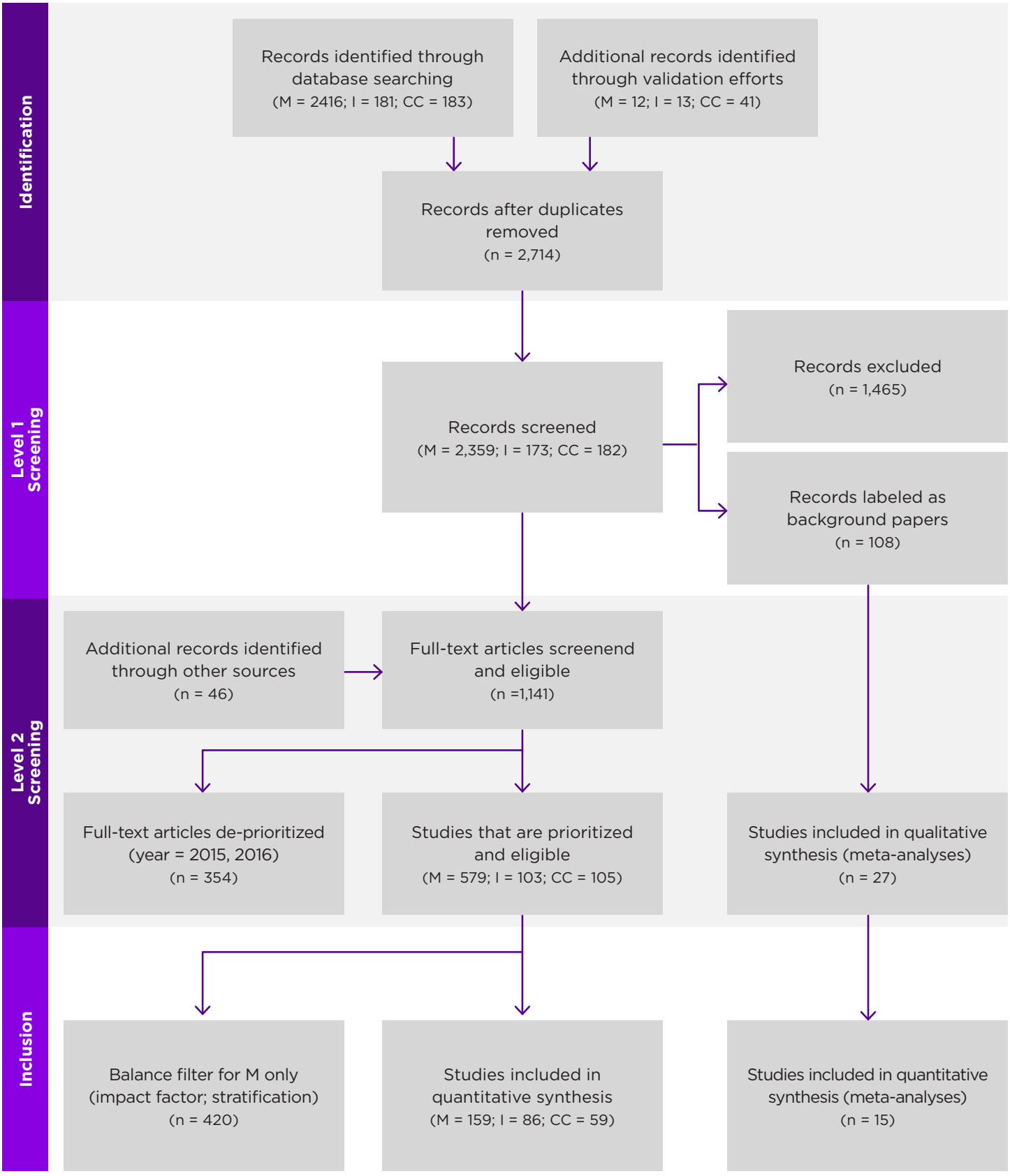
*Notes. This table shows the result of an ordered logit regression model for all studies with five model specifications. The largest statistically significant coefficient appeared from the investor indicator suggesting that the type of research is one of the main explanatory variables for positive or negative results. Study design factors were important but proxies for causality or specific mediating factors were not. The indicator variables for the three mediating factors are proxies and are based on few studies, and they should hence be interpreted with caution. See Supplement 1: Codebook for the definitions of codes and variables. Standard errors in parentheses; *p<0.1; **p<0.05; ***p<0.01.*

Table 6. Ordered logit regression model for investor-focused studies

	Dependent variable				
	Overall finding (negative, neutral/mixed, positive)				
	1	2	3	4	5
Climate change issue (vs not)	0.534	0.356	0.289	0.591	0.206
	(0.478)	(0.546)	(0.508)	(0.502)	(0.588)
ESG disclosure (vs performance)		-1.334**			-1.120*
		(0.568)			(0.622)
Accounting-based (vs market)		0.144			0.154
		(0.923)			(0.965)
ESG score (vs E/S/G/other)		-0.082			-0.231
		(0.594)			(0.623)
Negative screening or divesting			-0.004		-0.028
			(0.575)		(0.597)
Pooled strategies			-1.146**		-1.041
			(0.523)		(0.559)
ESG integration			0.865*		0.450
			(0.520)		(0.557)
Active management				0.075	0.451
				(0.437)	(0.484)
Equities				0.313	-0.083
				(0.443)	(0.486)
Observations	86	86	86	86	86

*Notes. This table shows the result of an ordered logit regression model for investor-focused studies with five model specifications. The smaller sample size suppressed the power of the statistical tests, but some coefficients were comparable in magnitude to the models in Table 5. Coefficients for pooled strategies as defined by researchers were largest among portfolio management strategies suggesting that papers that relied on that ESG portfolio management selection were more likely to find negative or neutral results. The difference between the pooled strategies and ESG integration was statistically significant. See Supplement 1: Codebook for the definitions of codes and variables. Standard errors in parentheses; *p<0.1; **p<0.05; ***p<0.01.*

Figure 4. Study selection based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. M = corporate/manager type; I = investor/asset manager type; CC = climate change; n = count



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