



Perspectives on ESG Integration in Equity Investing:

An opportunity to enhance long-term,
risk-adjusted investment performance

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Abstract

There is growing acknowledgement within the investment community that environmental, social, and governance (ESG) factors have the potential to materially impact corporate financial performance and security prices. Rather than risking shocks to their business models or discord from key stakeholders, companies are increasingly trying to mitigate potential ESG risks as a way to protect their brand value and ensure stable demand for their products. Companies are also responding to a wide range of global sustainability challenges with new business solutions that could boost financial performance and provide long-term competitive advantages. For investors who recognize the importance of considering non-financial information when making investment decisions, there is an opportunity to generate excess returns and better manage risk in investment portfolios by using ESG factors. This paper uses comprehensive historical analysis over various time periods from June 2000 to December 2014 to evaluate different methods for introducing ESG factors into the investment process. We first assess the impact of exclusionary ESG screens on investment performance after accounting for sector and style biases implicit in the screened universe. Next, we examine if ESG factors can add value as stand-alone inputs in stock selection, and whether results are consistent across geographic regions. Our third approach considers whether combining traditional financial factors with ESG information produces better investment performance. We find empirical evidence across each of these approaches that incorporating ESG factors into investment decisions improves the investment selection process and enhances risk-adjusted returns.

1. Introduction

There is growing acknowledgement within the investment community that environmental, social, and governance (ESG) factors¹ have the potential to materially impact corporate financial performance and security prices. The role these factors play in financial markets is only intensifying as ESG risks and opportunities become more pronounced in the modern global economy. With greater and timelier access to information about corporate policies and their impact on society, it has become much easier for consumers to “vote with their feet” when ESG issues tarnish a global brand, such that a sudden backlash can affect demand and revenue almost overnight.²

Companies with poor track records on ESG issues are susceptible to financial risks—they carry the very real prospect of future litigation,³ can incur higher regulatory and remediation costs,⁴ are more prone to environmental disasters, and stand to lose competitive advantage to more innovative counterparts.⁵ On the other hand, good corporate citizenship often leads to lower employee turnover, more productive workforces, better brand reputation, and customer loyalty, which in turn can enhance financial performance.⁶

Rather than risking shocks to their business models or discord from consumers, regulators, and investors alike, companies are increasingly trying to mitigate potential ESG risks as a way to protect their brand value and ensure stable demand for their products. Companies are also developing new solutions to address global sustainability challenges across a wide range of sectors, which could boost their financial performance and provide competitive advantages over the long-term. For investors who recognize the importance of considering non-financial information when making investment decisions, there is an opportunity to generate excess returns and better manage risk in investment portfolios by using ESG factors.

As part of an ongoing research series, we will be examining the use of ESG factors in investment decision-making across different

asset classes, starting with equities. The goal is to address the central question of whether ESG considerations can have a positive impact on investment performance within a portfolio management context. This paper uses comprehensive historical analysis over various time periods from June 2000 to December 2014 to evaluate different methods for introducing ESG factors into the investment process.

We first assess the impact of exclusionary ESG screens on investment performance after accounting for sector and style biases implicit in the screened universe. Next, we examine whether ESG factors can add value as stand-alone inputs in stock selection, and if results are consistent across geographic regions. Our third approach considers whether combining traditional financial factors with ESG information produces better investment performance.

We find empirical evidence across each of these approaches that incorporating ESG factors into investment decisions improves the investment selection process and enhances risk-adjusted returns. We explain our findings by arguing that proactive management of ESG issues is a good proxy for high management quality and effective capital stewardship. Strong management and productive capital allocation should lead to superior corporate financial performance over time and contribute to the long-term sustainability of a business.

The remainder of the paper is organized in several sections, outlined as follows. Section two provides an overview of the historical treatment of ESG factors in the investment industry. This helps frame our findings against the backdrop of changing societal and investor attitudes toward corporate social responsibility and examines how shifting attitudes have influenced the materiality of ESG factors. We introduce the concept of responsible investing (RI) and discuss major trends around ESG integration in the asset management industry. This is followed by a brief look at the relationship between ESG factors and fiduciary duty. We then review some of the common critiques against ESG-based investing from a theoretical perspective. Section three describes our research methodology and data sources, while section four presents the empirical findings. We conclude by revisiting the paper’s objective and offering our perspectives on the continued evolution of ESG integration.

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1. ESG factors span a wide range of corporate non-financial activities; examples include energy management, water use, employee relations, and board structure.
 2. See Sen, Gurhan-Canli, and Morwitz (2001); Hoffmann and Hutter (2012); King and Soule (2012).
 3. See Lantos (2001).
 4. See Karpoff, Lott, Wehrly (2005); Orlitzky and Benjamin (2001).
 5. See McWilliams and Siegel (2001).
 6. A growing body of research indicates corporate ESG performance influences relationships with key stakeholders, such as employees and customers, which can impact financial performance. See, for example, Porter and Kramer (2011); Backhaus, Stone, and Heiner (2002); Bartel (2001); Schnietz and Epstein (2005); Fombrun, Gardberg, and Barnett (2000); Greening and Turban (2000); Eccles, Ioannou, and Serafeim (2012); Barnett (2005).

2. Historical Overview of ESG Integration

2.1 RESPONSIBLE INVESTING—BACKGROUND AND CURRENT TRENDS

For the purposes of this paper, many of the terms associated with strategies that apply ESG criteria—*socially responsible investing (SRI)*, *sustainable and responsible investing (also SRI)*, *ESG investing*, *extra-financial analysis*, *corporate social responsibility*, *non-financial considerations*, and *ESG integration*—are used interchangeably. We group all of them together under the heading *Responsible Investing (RI)*, which we define as an investment process that integrates traditional financial analysis with non-financial ESG factors in an attempt to enhance long-term returns and manage risk in investment portfolios.⁷

There are, however, some frequently cited differences between ESG investment approaches worth highlighting given their prevalence in existing literature. In many cases, socially responsible investing and sustainable and responsible investing (SRI) commonly refer to a process that applies ESG criteria in investment portfolios primarily through exclusionary screening; whereas the terms ESG investing and ESG integration were developed more recently and tend to describe an enhanced approach for incorporating this criteria into investment decisions by identifying both the financial risks and opportunities related to ESG issues. This transition marks a major shift in investors' perspectives toward ESG factors, both for clients and investment managers.

Historically, externalities such as water and air contamination, corrupt business practices, poor working conditions, and other ESG issues rarely impacted company operations and stock prices, except in extreme cases. As a result, they were not widely considered in mainstream investment valuation approaches and methodologies. Externalities similarly did little to influence the behavior of corporate management teams because there was not a tangible feedback loop that prompted companies to respond to non-financial issues and related business risks and opportunities. Instead, responsibility for addressing negative externalities was typically ceded to regulators and NGOs.⁸

This dynamic has changed dramatically over the last two decades, driven in large part by the velocity of information sharing via the internet and social media. The globalization and expansion

of company supply chains into emerging and frontier markets has also brought ESG issues and externalities into greater focus as companies become exposed to a growing number of geographies, regulatory regimes, and geopolitical contexts. The legal and regulatory frameworks in developing countries tend to be weaker than those in developed countries, which can make it harder to guard against ESG controversies and creates an additional layer of risk for companies operating in these areas. Since developing markets represent a key source of earnings growth for multi-national companies, failing to properly address ESG concerns at the local level could potentially result in supply chain disruptions or lost market opportunities, and significantly impact a firm's business operations.

Companies are responding to the evolving global economic landscape by taking steps to address ESG risks and opportunities that may influence their financial performance, and investors are taking notice. As of 2014, roughly \$21.4 trillion of professionally managed assets across the globe were reported to be applying ESG criteria to their investment analysis and portfolio construction.⁹ Corresponding regional data finds that \$6.57 trillion of assets under management (AUM) in the United States explicitly incorporate ESG factors in their investment process and decision-making, an increase of 76 percent from 2012 levels.¹⁰ In Europe, investment strategies considering ESG in a comparable fashion account for nearly €10 trillion, marking a 46 percent increase over the same time period.¹¹ Although these figures should be treated with some skepticism since much of the data are self-reported by asset managers and there is not a clear definition of what constitutes ESG criteria, AUM data are helpful in illustrating directional growth and providing context for the market opportunity in responsible investing.

A similar trend is evident when looking at the number of signatories to the United Nations Principles for Responsible Investment (UN PRI). Formalized in 2006 as a framework for incorporating ESG issues into investment practices across asset classes, UN PRI membership has grown to 1,300 asset management firms with aggregate AUM surpassing \$45 trillion, more than doubling since 2009.¹² The voluntary nature of reporting and absence of a strict definition for ESG criteria are challenges in determining the extent to which ESG data are being used in signatories'

7. Community-based or impact investing does not fall under the purview of our RI definition because there is an explicit recognition that social considerations can potentially outweigh financial performance. However, interest in impact investing has accelerated in recent years and is gaining appeal due to its private equity and venture capital structure, and ability to directly impact companies, ESG issues, and communities through targeted investments.

8. See Porter and Kramer (2011).

9. Global Sustainable Investment Alliance (GSIA): 2014 Global Sustainable Investment Review.

10. US SIF Foundation: 2014 Report on US Sustainable, Responsible, and Impact Investing Trends.

11. Eurosif: 2014 European SRI Study.

12. UN Principles for Responsible Investment: 2014 Report on Progress.

portfolios, but the growth in the number of signatories suggests the investment community's interest in ESG factors has become more significant over the last decade.

There are several drivers underlying this growth—rising demand from asset owners for investment products that consider ESG criteria, greater availability and use of ESG information, and more robust evidence that ESG factors materially impact corporate financial performance and stock prices.¹³ Equally apparent is that a growing number of institutions and individual investors are seeking to allocate their capital in a manner that is consistent with their missions or values. In the United States, 80 percent of asset managers cited increasing client demand as their motivation for incorporating ESG in their strategies.¹⁴ Translating this interest into AUM growth, however, will likely depend on the ability of asset managers to present insights and solutions that meet client ESG objectives and also offer attractive investment performance.

2.2 ESG INVESTING AND FIDUCIARY DUTY

Traditionally, SRI was widely associated with mission-based or values-driven investing where exclusionary screens were used to express personal ethos in investment portfolios. Early SRI investors reinforced this view by expressing their investment approach and objectives in terms of values, with little reference to potential performance advantages. At the time, there was not sufficient evidence or historical data to support such a claim. Instead, the investment rationale focused on enabling investors to align their values, principles, and general outlook on life with their investment portfolios. Not surprisingly, financial education and business school curricula did not treat ESG factors as credible investment considerations and regarded this approach to investing as suboptimal. As a result, many generations of asset allocators and investment managers dismissed ESG considerations as a social dogma that would negatively impact performance if introduced into an investment portfolio.

This view continues to resonate with many institutional investors, particularly in the context of fiduciary duty.¹⁵ Given the magnitude of assets managed by pension funds and other financial trusts, the question of whether considering ESG issues in investment decisions conflicts with fiduciaries' legal duties of care, loyalty, and prudence is central to establishing mainstream acceptance of the RI movement.

The debate around ESG factors and fiduciary duty can be traced back to the 1970s when many universities faced growing pressure to divest from companies conducting business in South Africa due to concerns over apartheid.¹⁶ Opposition to divestment quickly mounted on the grounds that it violated the fiduciary duty of loyalty because the investment decision was not based solely on the interests of beneficiaries. A similar position took hold for pension funds, arguing that even if some beneficiaries attained non-economic value from a social investment, there was no way for pension funds to apply social principles in a way that directly benefited all the beneficiaries of a trust.¹⁷ As a result, fiduciary responsibility was defined in a way that considered ESG investing as being politically and ideologically motivated, which could inhibit trustees' ability to maximize investment returns for beneficiaries.¹⁸

A detailed analysis on the legality of ESG considerations as it relates to fiduciary duty is outside the scope of this paper; however, we think it is important to draw attention to how some of these perceptions have changed over time. In 2005, the United Nations Environment Program Finance Initiative (UNEP FI) issued a report contending that accounting for ESG issues was consistent with fiduciary duty. The widely cited report, commonly referred to as the "Freshfields Report" after its lead author, established a legal framework for the integration of ESG issues into institutional investment strategies, concluding that "integrating ESG considerations into an investment analysis so as to more reliably predict financial performance is clearly permissible and is arguably required in all jurisdictions."¹⁹ Since its release, the report's findings have gained considerable traction internationally, especially in Europe, with many countries using it to advance legislation requiring asset managers to consider ESG issues in their investment processes.²⁰

Institutional investors in the United States have been more reluctant to embrace this perspective, largely due to a strict interpretation of fiduciary standards under the Employee Retirement Investment Security Act (ERISA) that makes it difficult to legally justify inclusion of ESG criteria in investment decisions.²¹ ERISA governs nearly all private-sector pension plans and retirement funds, and is often used as a guide by fiduciaries outside of pension plans. As a result, ERISA standards tend to have

13. A summary of factors driving growth in Responsible Investing can be found in BSR: 2012 Report on Trends in ESG Integration in Investments.

14. US SIF Foundation: 2014 Report on US Sustainable, Responsible, and Impact Investing Trends.

15. Fiduciary duty refers to the legal obligation of asset managers to act in the best interests of the clients whose assets they are managing.

16. See Gary (2011).

17. For an early legal discussion of this issue, see Langbein and Posner (1980).

18. A more detailed explanation of this view can be found in Munnell and Sunden (2005); Rounds (2005).

19. UN Environmental Program Finance Initiative: A legal framework for the integration of environmental, social, and governance issues into institutional investment, Freshfields, Bruckhaus, and Deringer (2005).

20. See Caplan, Griswold, and Jarvis (2013).

21. The Department of Labor (DOL) is responsible for interpretation and enforcement of ERISA. See Kaleda (2009) for a history of DOL guidance on interpreting ERISA's fiduciary duties as they relate to ESG considerations.

far-reaching impact. However, ERISA does not cover plans offered by state and local governments, allowing them greater leeway to consider ESG issues. For example, the investment policies for several large public U.S. pension funds, such as CalPERS²² and the Connecticut Retirement Plans and Trust Funds,²³ explicitly recognize the need to consider ESG factors in investment activities. Additionally, some legal interpretations of fiduciary duty now argue that a fiduciary may consider an organization's mission among other factors that apply to prudent investing.²⁴ Empirical research focusing specifically on the implications of integrating ESG criteria into pension fund investment processes has also attempted to address this issue, finding no evidence of any detrimental financial effect on pension fund performance.²⁵

Despite these developments, compatibility of ESG integration with the fiduciary duties of trustees is far from being universally accepted. The Freshfields Report, while recognized for its conceptual value, is often dismissed due to a lack of practical application.²⁶ Further progress will require greater focus on communicating the financial benefits from incorporating ESG perspectives into investment decisions, and supporting these claims with robust research.

2.3 ESG FACTORS IN THE CONTEXT OF PORTFOLIO THEORY

Qualifying ESG factors as a source of excess returns and improved risk-adjusted performance has been controversial, and remains the subject of intense debate in academic circles as well as the investing community. For years, researchers have explored whether pursuing ESG-compliant investment strategies imposes an opportunity cost on investment returns, drawing mixed conclusions. More recent research tends to support the return enhancement capabilities of ESG information.²⁷ Although the link between ESG factors and financial performance appears to be growing stronger, there is still a widely held belief that using ESG criteria to define the investment universe limits diversification and return opportunities, leading to lower risk-adjusted returns. Another common criticism highlights the unavoidable subjectivity embedded in ESG screens and in the construction of ESG ratings. According to skeptics, this makes it

difficult to prove any perceived relationship between corporate social responsibility and financial performance. We examine some of these arguments in greater detail.

Modern portfolio theory (MPT) is often cited to substantiate claims that limiting investment opportunities through ESG screening imposes a financial cost. However, this view fails to consider any benefits that might be generated by the screening process.²⁸ MPT assesses how different combinations of stocks can shift a portfolio toward or away from the efficient frontier, with the goal of finding the maximum possible expected return for a given level of risk in investment portfolios.²⁹ Since it is based on the assumption of perfectly efficient markets, it does not account for imperfect information regarding the ability of companies to create value. Therefore, while screening based on ESG criteria creates a more limited opportunity set, companies meeting these criteria may be better positioned to address long-term business risks and opportunities by factoring ESG considerations into their management decisions.

As with any screen used to narrow the investment universe, the application of ESG criteria also introduces a distinct commonality among the assets being selected. For investment strategies employing ESG screens, this means securities in the resulting investment universe meet a well-defined set of sustainability and ESG requirements. The extent to which these criteria translate to a reliable source of alpha depends on the ability of financial markets to accurately price their financial implications. We believe that market participants systematically overlook these factors, which provides an opportunity to generate excess returns over long-term horizons. Historically, asset managers have tended to examine the bottom-line impact of ESG issues only after a scandal unfolds that negatively affects portfolio performance. Incorporating ESG criteria at the onset of the investment process can be a valuable source of market-leading information.

Corporate ESG Profile as a Proxy for Management Quality

Removing companies with the worst ESG profiles from the investable universe is not dissimilar to avoiding the most overpriced or most leveraged securities. Consider, for example, value managers who screen out the most expensive stocks from their investment universe under the premise that this subset of companies is not an attractive pool of investments and could introduce risk into portfolios. The same logic applies when using ESG criteria to determine the investment universe. Excluded companies are often engaged in unsustainable business practices that make them more likely to introduce downside risk into a portfolio over time, and thus represent unattractive long-term investment opportunities.

22. CalPERS Total Fund Investment Policy, <http://www.calpers.ca.gov/eip-docs/investments/policies/total-fund-inv-policy.pdf>.

23. Connecticut Retirement Plans and Trust Funds Investment Policy Statement, <http://www.otf.ct.gov/pensiondocs/IPStatement.pdf>.

24. See Gary (2011).

25. See Hoepner, Rezac, and Siegel (2011).

26. An informative critique of the Freshfields Report can be found in Sandberg (2011). Hoepner, Rezac, and Siegel (2011) also highlight important uncertainties left unaddressed.

27. For examples, including a list of relevant studies, see Mercer (2007); Mercer (2009); Fulton, Kahn, and Sharples (2012); Clark, Feiner, and Viehs (2014).

28. A more detailed review of the relationship between MPT, responsible investing, and fiduciary duty can be found in Hawley, Johnson, and Waitzer (2011).

29. See Markowitz (1952).

Companies facing ESG challenges are more prone to large-scale negative events and subject to greater idiosyncratic risk,³⁰ which can be detrimental to stock performance.³¹ In some cases, a major ESG event impacting a single company also affects the returns of its industry peers, a scenario that can create significant negative shocks in portfolios.³² Alternatively, firms with a strong reputation for corporate social responsibility have shown they can better withstand crisis situations and limit the magnitude of major stock price declines.³³

30. Idiosyncratic risk results from events that are unique to a specific company.

31. See Bouslah, Kryzanowski, and Mzali (2011); Orlitzky and Benjamin (2001).

32. See Barnett (2007).

33. See Schnietz and Epstein (2005).

We believe this may be because a firm's ESG practices are one of the key indicators of management quality. Proactively addressing ESG issues is typically a good proxy for the type of forward thinking by management teams that helps their firms avoid fat-tail risks (unusually large negative events) and take advantage of long-term opportunities. In this context, using ESG criteria to define the investment universe may help control downside risk while also providing an opportunity to produce uncorrelated excess returns, which can more than offset the possible incremental loss of portfolio efficiency caused by a more limited investment universe.

3. Research Approach and Data Overview

We evaluate the impact of ESG factors on risk-adjusted investment returns using three distinct approaches which were designed to represent practical application of ESG factors in investment strategies:

- Assessing the impact of ESG screens on investment performance once the ESG-screened universe is adjusted for factor and risk biases relative to a broad market benchmark.
- Simulating performance for portfolios of companies ranked highly based on ESG factors and comparing performance to portfolios of companies that rank poorly on ESG factors, and then examining whether performance differs by region.
- Creating “Hybrid” factors by combining traditional financial factors with ESG information and evaluating their performance when an ESG screen is used to determine the investment universe.

Part of our historical analysis uses data from third-party ESG ratings providers. Currently, there are three major providers of ESG ratings: Thomson Reuters (Asset4), MSCI (Intangible Value Assessment, formerly KLD), and Sustainalytics (ESG Indicator). While the MSCI/KLD rating is the most widely used in academic studies, Asset4 and Sustainalytics ratings are gaining in importance in academic literature.³⁴ However, if there are significant differences in how these data providers define and measure ESG performance, then the selection of rating provider used in empirical studies might influence the results.

Increased regulation requiring companies to disclose performance on sustainability issues, and companies voluntarily sharing more information related to their ESG practices, has resulted in greater availability of ESG data. This also increases

the likelihood that ESG ratings providers could interpret some of these data differently. To guard against this outcome and ensure the robustness of our findings, we test the sensitivity of our results to the choice of ratings provider by replicating parts of our analysis with both the Asset4 and MSCI datasets.³⁵ The Asset4 dataset contains annual ESG scores from 2002 to 2014, while MSCI IVA data is available on a monthly basis from 2007 to 2014. For the MSCI IVA dataset, we apply a one-year look-back period to fill in any missing months with the last available ESG score. The number of companies in each dataset increases throughout time. A summary of descriptive statistics can be found in Appendix A.

As part of the data assessment, we believe it is also important to acknowledge some of the limitations inherent in all time-series ESG data. The most significant shortcoming relates to limited availability of historical data.³⁶ Another drawback of ESG datasets pertains to inconsistencies around the frequency of corporate sustainability reporting. It is not uncommon for data history to be backfilled in early periods rather than reflecting data that would have been available at that point-in-time. When conducting historical analysis, this results in a greater possibility that portfolio selection criteria in earlier periods might rely on information that was not actually available, resulting in “look-ahead bias.” To minimize this bias, we impose a conservative 15-month lag on ESG data used in our analysis that is not point-in-time.³⁷

35. We opted not to include Sustainalytics in our analysis because its shorter time history made it difficult to compare historical results across data providers, but we continue to utilize the Sustainalytics dataset in our ongoing research and analysis of ESG factors.

36. This creates several challenges—the smaller sample size makes it more difficult to draw statistically significant conclusions and increases the possibility that outliers could influence empirical results in earlier periods.

37. We tested alternative lag horizons and observed similar results.

34. See Bouten et al (2014).

4. Results from Historical Analysis of ESG Factors

4.1 EXCLUSIONARY SCREENING

Sector-Based Performance Attribution

Comparing performance of ESG-screened funds and indices to performance of conventional benchmarks is a simple, frequently used method for determining the impact of ESG screens. However, conclusions regarding the investment implications of ESG screening derived entirely from measures of relative performance, without considering the underlying drivers of performance, can be misleading. With a considerable track record and an ESG approach that has been consistently applied over time, the Calvert Social Index (CSI) is a good case study. CSI is a free float-adjusted, market capitalization-weighted, passive index that measures the performance of large- and mid-cap U.S. companies meeting Calvert's responsible investment criteria.³⁸

From December 31, 2008 through December 31, 2014, the CSI outperformed the Russell 1000 Index by 142 basis points³⁹ on an annualized basis. Although it is tempting to attribute CSI's superior relative returns during this period to the composition of stocks resulting from the ESG screening process, review of CSI performance over an earlier period suggests that results can be heavily time dependent. From June 30, 2000, the inception date for CSI, to December 31, 2008, the CSI underperformed the Russell 1000 Index by 235 basis points annually. The conflicting results underscore the problem with attributing relative performance entirely to ESG criteria.

A deeper look at CSI's portfolio characteristics relative to the Russell 1000 Index reveals significant differences in sector and style exposures as the underlying source of performance variability across these two time periods. The magnitude of active sector weights, particularly in the Energy and Information Technology sectors, and their consistency throughout time, amplified the impact of both long- and short-term trends in sector performance. Figures 1 and 2 illustrate how this affected CSI's relative performance using a traditional sector-based Brinson attribution model to explain excess returns.⁴⁰

During the first time-period in our analysis (Figure 1), Energy was the best-performing sector in the Russell 1000 Index, yet was considerably underrepresented in the CSI. Furthermore, Information Technology (IT) was the worst-performing sector, coinciding with the onset of the dot-com bubble crash, but represented CSI's largest positive active sector exposure. Relative allocations in these two sectors accounted for more than two-thirds of CSI's underperformance for the period June 30, 2000 to December 31, 2008.

The impact from active sector weights and relative sector performance was more favorable in the second time period we analyzed (Figure 2). CSI benefited from a positive sector allocation effect in most sectors. Only a higher allocation to the Financials sector, which underperformed in the aftermath of the financial crisis, had a material negative impact on CSI's relative performance. In contrast with the first analysis period, Energy was one of the worst-performing sectors in the Russell 1000 Index from the end of 2008 through the end of 2014, while Information Technology was one of the top-performing sectors. Consequently, more than half of CSI's relative outperformance during the period December 31, 2008 to December 31, 2014 can be attributed to its significant underweight in the Energy sector and significant overweight in the Information Technology sector.

Factor-Based Performance Attribution

The pronounced sector allocation effect indicates most of CSI's relative performance can be explained by sector allocations. However, sector-based attribution does not account for other style or industry exposures that may be contributing to portfolio returns. For example, companies in CSI have been smaller, on average, and more growth-oriented than companies in comparable broader-based indices, which is characteristic of many portfolios that employ ESG screens.⁴¹ Therefore, in periods marked by high returns from small-cap stocks or growth stocks, performance of ESG-screened portfolios should be stronger. Conversely, periods in which small-cap and growth styles are out of favor tend to coincide with weaker relative performance from ESG-screened portfolios.

The BARRA factor-based performance attribution system offers a way to capture performance drivers beyond sector allocations by measuring how simultaneous exposures to multiple style and industry factors contribute to excess returns, independent from one another. Factor-based attribution separates returns into a systematic component that is explained by exposure

38. As of June 19, 2015, the Calvert Social Index was renamed the Calvert U.S. Large Cap Core Responsible Index. Construction guidelines for the Index prior to June 19, 2015 can be accessed in the "Rules and Methodology" book available at www.calvert.com/resources/calvert-responsible-index-series/calvert-us-large-cap-core-responsible-index.

39. One basis point is equivalent to 0.01 percentage points, i.e. 1% equals 100 basis points.

40. Brinson-based attribution explains portfolio returns as a function of sector allocations and stock selection within sectors. See "Determinants of Portfolio Performance" by Brinson, Hood, and Beebower (1986).

41. See Jennings and Martin (2007); Guerard (1997).

FIGURE 1: CALVERT SOCIAL INDEX SECTOR-BASED PERFORMANCE ATTRIBUTION (JUNE 2000 TO DECEMBER 2008)

SECTOR	CSI WEIGHT	RUSSELL 1000 WEIGHT	DIFFERENCE (ACTIVE WEIGHT)	CSI TOTAL RETURN (Annualized)	RUSSELL 1000 TOTAL RETURN (Annualized)	DIFFERENCE	ALLOCATION EFFECT	SELECTION + INTERACTION EFFECT	TOTAL EFFECT
Health Care	16.35%	13.68%	2.67%	-1.89%	-1.37%	-0.52%	0.06%	-0.08%	-0.02%
Information Technology	27.64%	16.97%	10.67%	-14.01%	-13.41%	-0.60%	-0.85%	-0.23%	-1.08%
Industrials	6.21%	10.63%	-4.42%	2.45%	0.09%	2.36%	-0.17%	0.12%	-0.05%
Materials	0.95%	3.02%	-2.07%	5.58%	3.87%	1.71%	-0.14%	0.03%	-0.11%
Consumer Staples	6.21%	8.92%	-2.71%	4.67%	5.79%	-1.12%	-0.19%	-0.04%	-0.23%
Energy	1.33%	7.86%	-6.53%	11.35%	8.67%	2.68%	-0.74%	-0.05%	-0.79%
Consumer Discretionary	10.48%	11.44%	-0.96%	-7.25%	-5.37%	-1.88%	0.00%	-0.19%	-0.19%
Financials	25.83%	20.00%	5.83%	-1.60%	-2.98%	1.38%	-0.01%	0.28%	0.27%
Telecommunication Services	4.15%	3.96%	0.19%	-3.73%	-8.05%	4.32%	0.03%	0.16%	0.19%
Utilities	0.85%	3.52%	-2.67%	-8.44%	4.13%	-12.57%	-0.21%	-0.13%	-0.34%
Total	100.00%	100.00%	0.00%	-5.91%	-3.56%	-2.35%	-2.22%	-0.13%	-2.35%

Source: Factset, MSCI BARRA, Calvert Research

FIGURE 2: CALVERT SOCIAL INDEX SECTOR-BASED PERFORMANCE ATTRIBUTION (DECEMBER 2008 TO DECEMBER 2014)

SECTOR	CSI WEIGHT	RUSSELL 1000 WEIGHT	DIFFERENCE (ACTIVE WEIGHT)	CSI TOTAL RETURN (Annualized)	RUSSELL 1000 TOTAL RETURN (Annualized)	DIFFERENCE	ALLOCATION EFFECT	SELECTION + INTERACTION EFFECT	TOTAL EFFECT
Health Care	13.55%	12.41%	1.14%	19.57%	20.08%	-0.51%	0.05%	-0.09%	-0.04%
Information Technology	29.35%	18.37%	10.98%	21.80%	21.44%	0.36%	0.38%	0.11%	0.49%
Industrials	8.15%	10.88%	-2.73%	19.63%	18.59%	1.04%	-0.01%	0.07%	0.06%
Materials	1.64%	3.88%	-2.24%	20.50%	17.82%	2.68%	0.01%	0.04%	0.05%
Consumer Staples	9.90%	10.03%	-0.13%	14.69%	16.18%	-1.49%	0.06%	-0.15%	-0.09%
Energy	2.60%	10.89%	-8.29%	14.92%	10.05%	4.87%	0.57%	0.15%	0.72%
Consumer Discretionary	12.48%	11.56%	0.92%	27.45%	25.47%	1.98%	0.05%	0.20%	0.25%
Financials	18.07%	15.54%	2.53%	14.19%	14.03%	0.16%	-0.16%	0.01%	-0.15%
Telecommunication Services	3.17%	2.84%	0.33%	11.07%	11.60%	-0.53%	-0.01%	-0.04%	-0.05%
Utilities	1.09%	3.60%	-2.51%	18.89%	13.49%	5.40%	0.12%	0.06%	0.18%
Total	100.00%	100.00%	0.00%	19.09%	17.67%	1.42%	1.06%	0.36%	1.42%

Source: Factset, MSCI BARRA, Calvert Research

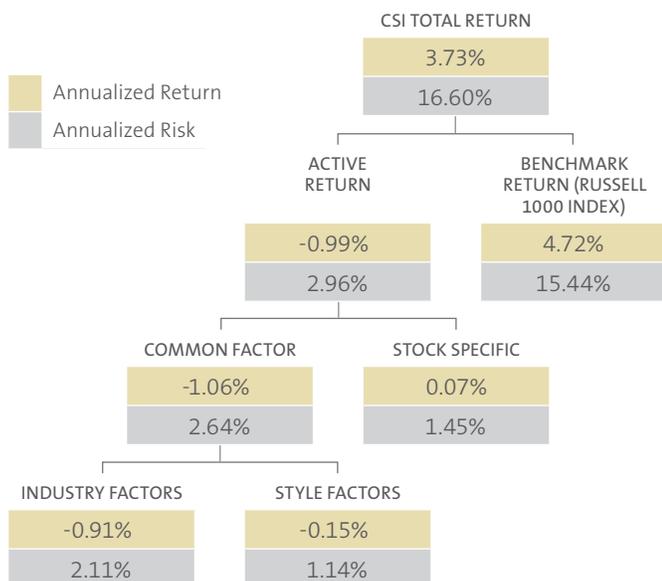
to common factors, and a residual component that is stock-specific (described in Appendix B). The strong explanatory power of the BARRA factor model allows factor-based performance attribution to accurately identify industry and style exposures implicit in the ESG-screened universe. This gives us confidence that the remaining excess returns are from stock selection, or are stock-specific, and can be interpreted as being a function of the ESG criteria used to determine the investment universe.

We run a performance attribution of CSI against the Russell 1000 Index for the full time period—June 30, 2000 to December 31, 2014—and find that stock selection was a positive contributor to excess returns, adding 7 basis points annually as shown in

Figure 3. Industry factors detracted 91 basis points from active returns on an annualized basis, while exposure to fundamental style factors detracted 15 basis points.

Figure 4 breaks down these impacts further, revealing which individual factors had the greatest impact on investment performance during the period. Limited exposure to stocks in the *Oil Refining*, *Energy Reserves*, and *Tobacco* industries, and a higher active exposure to *Bank* and *Computer Hardware* stocks, explained much of the negative industry factor contribution. From a style perspective, lower relative exposure to *Size* and *Dividend Yield* factors made a positive contribution to relative performance, but this was more than offset by CSI's embedded

FIGURE 3: CALVERT SOCIAL INDEX FACTOR-BASED PERFORMANCE ATTRIBUTION (JUNE 2000 TO DECEMBER 2014)



Source: MSCI BARRA, Calvert Research

growth style bias as underexposure to the *Earnings Yield* factor had a significant negative impact on performance.

Factor-Based Performance Attribution of Optimized CSI

Although the performance impact of individual sector and style effects typically vary over time, persistent exposure to industry and style factors can increase volatility and ultimately detract from risk-adjusted returns if not properly managed in the portfolio construction process. Large factor exposures also tend to overwhelm the stock selection effect, masking the stock-specific characteristics of ESG-screened portfolios.

To address this issue, we use the BARRA portfolio optimization algorithm to construct a series of reweighted CSI portfolios on a monthly basis from June 30, 2000 to December 31, 2014. The optimization process reweights individual securities in the screened CSI universe in a way that produces as much style and industry consistency as possible with the selected benchmark index (Russell 1000 Index in this analysis), which limits the impact of common risk factors on investment performance. By minimizing active factor exposures, the resulting investment returns are more reflective of ESG-driven stock selection. The optimization settings used in our analysis are included in Appendix C.

We then take the monthly time series of optimized CSI portfolios and run a factor-based performance attribution analysis for the same time period, which is displayed in Figure 5. The impact from common risk factors is significantly lower, and the positive

FIGURE 4: CALVERT SOCIAL INDEX BEST/WORST FACTOR EXPOSURES (JUNE 2000 TO DECEMBER 2014)

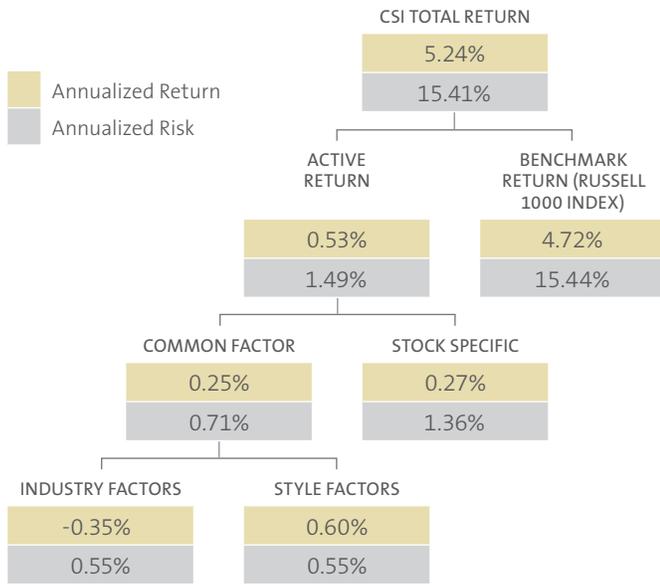
FACTOR	AVERAGE ACTIVE EXPOSURE	CUMULATIVE CONTRIBUTION TO ACTIVE RETURN
Biggest Contributors		
Size	-0.08	5.90%
Dividend Yield	-0.16	3.08%
Biotechnology	0.01	2.77%
Computer Software	0.02	2.68%
Specialty Retail	0.02	2.04%
Home Products	0.01	1.94%
Specific	N/A	1.88%
Electronic Equipment	0.01	1.68%
Medical Products and Supplies	0.01	1.52%
Oil Services	-0.01	1.14%
Biggest Detractors		
Earnings Yield	-0.06	-7.27%
Oil Refining	-0.02	-5.62%
Energy Reserves	-0.04	-5.21%
Tobacco	-0.01	-4.13%
Computer Hardware and Business Machines	0.03	-4.09%
Equity Real Estate Investment Trusts	-0.02	-3.57%
Banks	0.04	-3.51%
Momentum	0.00	-3.05%
Defense and Aerospace	-0.02	-2.61%
Semiconductors	0.02	-2.49%

Source: Factset, MSCI BARRA, Calvert Research

impact from stock selection increases. However, a detailed examination of the resulting optimized portfolios indicates a residual bias toward smaller-capitalization stocks, even after the optimization process was introduced – a byproduct of the largest capitalization stocks being disproportionately excluded from the investment set.⁴² Holding smaller capitalization stocks was a significant contributor to excess returns since small-cap stocks outperformed large-cap stocks over the full analysis period, though the direction of this impact varied over shorter time horizons. To better control the small-cap bias, we re-run the optimization process constraining exposure to the BARRA Size factor to +/-0.05 standard deviations and perform another attribution analysis on the new set of portfolios. As shown in Figure 6, this achieves the desired goal of further reducing

42. The reasons behind this outcome are discussed in Jennings and Martin (2006).

FIGURE 5: OPTIMIZED CALVERT SOCIAL INDEX FACTOR-BASED PERFORMANCE ATTRIBUTION (JUNE 2000 TO DECEMBER 2014)



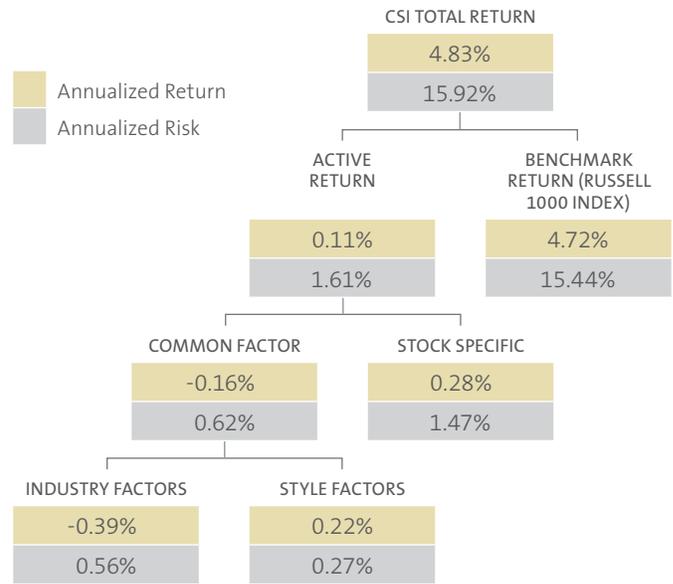
Source: MSCI BARRA, Calvert Research

the contribution to excess returns from style factors, while maintaining the positive stock-specific impact.⁴³

There are certain industry-specific risks that could not be fully diversified away despite using sophisticated portfolio construction techniques. For example, excluding all tobacco companies makes it difficult for the optimized CSI to achieve a benchmark-neutral exposure to the Tobacco industry factor. Although the optimization process is not able to completely eliminate all risk factor exposures, it successfully reduces their impact on performance such that stock selection becomes the primary source of excess returns.

Additional performance data for the CSI, optimized CSI, size-constrained optimized CSI, and Russell 1000 Index are shown in Figure 7, indicating the optimization process resulted in significantly lower tracking error and volatility, and less downside risk, while also improving investment returns. The size-optimized CSI outperformed the Russell 1000 Index by 11 basis points on an annualized basis while exhibiting similar risk characteristics, but less downside risk. Thus, this exercise provides evidence that the stochastic return distribution of a broad market index can be replicated using a restricted set of securities, in this case after excluding companies that fail to meet specific ESG criteria. Even with a strict approach to ESG screening, such as that used by CSI which excludes around 30% of the investable universe on average, as well as entire industries, the resulting opportunity set

FIGURE 6: SIZE-CONSTRAINED OPTIMIZED CALVERT SOCIAL INDEX FACTOR-BASED PERFORMANCE ATTRIBUTION (JUNE 2000 TO DECEMBER 2014)



Source: MSCI BARRA, Calvert Research

does not prevent investment portfolios from achieving a fully diversified set of risk factor exposures.

The superior performance of the factor-adjusted CSI also demonstrates the ability of ESG screens to add value through stock selection once systematic factor biases are removed. Stock selection was the biggest contributor to the size-optimized CSI's strong performance versus the Russell 1000 Index, more than offsetting the negative impact from industry factor exposures. Moreover, stock selection proved to be a consistent source of alpha throughout time. As shown in Figure 8, the cumulative stock-specific contribution to the size-optimized CSI's active returns was positive over nearly the entire 14.5-year period. On a rolling five-year basis, the stock-specific contribution was positive in 109 out of 115 monthly observations (with each month constituting the cumulative stock-specific contribution over the trailing five years), or roughly 95% of the time.

Importantly, ESG screens can add value through stock selection by helping investors avoid "bad actors" as well as by identifying more sustainable companies. Further analysis of the size-optimized CSI stock-specific component shows that a majority of the positive stock selection impact came from securities that were excluded for failing to meet certain ESG criteria, indicating these companies underperformed after accounting for their industry and style exposures. The stock-specific contribution from securities held by CSI was also positive, but not as significant. This means that CSI's outperformance relative to the Russell 1000 Index was primarily due to screening out stocks with the worst performance on ESG issues and most exposed to ESG risks. One reason for asymmetrical contributions might be that negative

43. This exercise was conducted after adding REITs to the available investment universe since they are excluded from CSI for reasons unrelated to ESG criteria. The results were little changed with or without REITs.

FIGURE 7: PORTFOLIO PERFORMANCE COMPARISON (JUNE 2000 TO DECEMBER 2014)

PORTFOLIO	TOTAL RETURN (Annualized)	VOLATILITY (Annualized)	TRACKING ERROR	INFORMATION RATIO	DOWNSIDE DEVIATION	PAIN INDEX
CSI	3.68%	16.66%	2.97	-0.35	11.92%	19.77%
Optimized CSI	5.24%	15.41%	1.50	0.34	10.91%	13.29%
Size-Constrained Optimized CSI	4.83%	15.41%	1.61	0.06	10.94%	14.46%
Russell 1000 Index (Benchmark)	4.72%	15.48%			11.07%	15.27%

Source: Style Advisor, MSCI BARRA, Calvert Research

Volatility: Annualized standard deviation of returns, measures portfolio risk

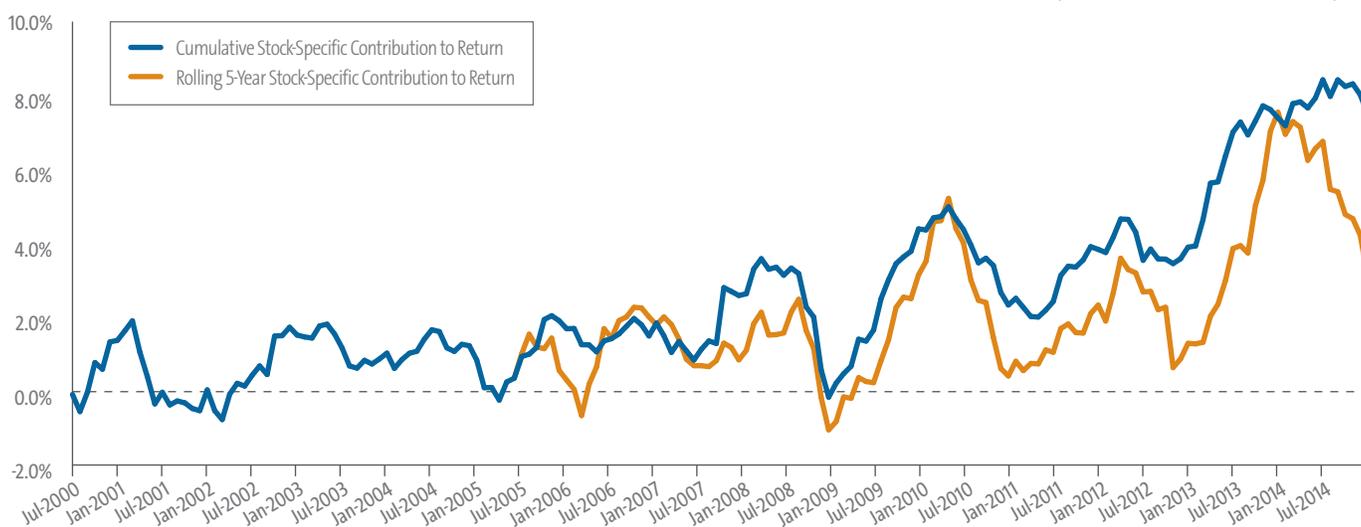
Tracking Error: Annualized standard deviation of excess (active) returns, indicates how closely performance tracks a benchmark

Information Ratio: Ratio of excess returns to the volatility of excess returns (tracking error), measures risk-adjusted performance

Downside Deviation: Annualized standard deviation of negative returns only, measures downside risk

Pain Index: Mean value of drawdowns over the entire analysis period, downside risk measure that captures the depth, duration, and frequency of loss periods (see <http://www.styleadvisor.com/content/pain-index>)

FIGURE 8: SIZE-CONSTRAINED OPTIMIZED CALVERT SOCIAL INDEX: STOCK-SPECIFIC CONTRIBUTION TO ACTIVE RETURN (JULY 2000 TO DECEMBER 2014)



Source: MSCI BARRA, Calvert Research

ESG events have a more immediate impact on corporate financial performance and are more readily apparent to investors.

4.2 ACTIVE STOCK SELECTION

In this section, we extend our analysis beyond negative screening and evaluate the use of ESG factors as inputs for active stock selection. Instead of excluding companies because of their low ESG scores, we consider the entire investable universe and assign companies to portfolios based on their relative ranking across ESG factors. Applying the same selection criteria over an extended period of time allows us to perform historical backtests of investment performance for these portfolios and determine whether portfolios that rank highly on ESG factors can generate superior returns over time.

Our initial backtests of absolute ESG scores did not find conclusive evidence across regions and datasets that portfolios containing companies with the highest ESG ratings outperform portfolios comprised of companies with the lowest ESG ratings. Since turnover among the top-ranked ESG companies is relatively low, there is less informational value in their ESG ratings and current market prices may already reflect some of the expected financial benefits from being a leader in ESG performance. The mixed results can also be partially explained by differences in the coverage universe of each data provider, as well as differences in the methodologies used to construct the ESG scores. However, there appears to be greater convergence across data providers in terms of identifying positive and negative changes in corporate ESG practices, which is one reason we use the 12-month change in ESG score (“ESG momentum factor”) for this analysis rather than absolute ESG scores

Using Factset's Alpha Testing application, we create a series of market capitalization-weighted quintile portfolios on a quarterly basis from March 2004 to December 2014. Each quarter, companies in the specified universe are ranked according to the 12-month change in their Asset4 ESG score, normalized by sector membership and size.⁴⁴ Companies that do not have ESG data available are excluded from the analysis for that period. The same exercise is repeated using MSCI IVA data for the period December 31, 2008 to December 31, 2014. The difference in returns between the top and bottom ranked portfolios can be viewed as an investment strategy which is "long" (or overweight) stocks exhibiting the greatest improvement in their ESG scores, while being "short" (or underweight) stocks with the biggest decline in their ESG scores — higher spreads indicate greater factor efficacy. We performed this analysis on both domestic and international universes of stocks, using Russell 1000 Index and MSCI Europe Index constituents as proxies, respectively, to identify whether there were any differences in performance dynamics across regions.

We find that portfolios consisting of companies showing the greatest improvement in their ESG profiles outperform both comparable broad market indices and portfolios made up of companies with deteriorating ESG profiles. This finding is consistent across datasets and regions, as shown in Figure 9. The strong performance by companies with the largest improvement in their ESG scores may reflect investors' willingness to reward companies showing progress in managing ESG risks and opportunities. Companies with lower ESG scores have the most opportunity for improvement, which has the ability to potentially yield a greater incremental impact on financial performance. Additionally, markets may not fully value corporate investments in non-financial activities, represented by change in ESG score, because they can take a longer time to impact business operations.

Regional Comparison

Performing regional backtests lets us explore whether ESG factors may be a more reliable source of alpha in countries and regions where they are more recognized by the society, consumers, regulators and investors. Specifically, it is well known that European countries have a long-standing acceptance of the importance of corporate ESG issues and are more sensitive to their impacts. This heightened awareness may benefit strategies that use ESG factors because the non-financial behaviors of companies are likely to be more significantly rewarded or punished by stakeholders compared to other regions.

Our findings indicate that the ESG momentum factor works more consistently in Europe, especially during earlier periods. However, ESG factor efficacy has been increasing in the U.S., which could be a sign that ESG factors are gaining greater acceptance in the marketplace and having a greater impact on corporate financial performance. This trend is coinciding with more transparent ESG data on companies becoming available to investors and other stakeholders, allowing for better assessment of investment risks and opportunities related to ESG issues.

4.3 HYBRID INVESTMENT FACTORS

The first two approaches for integrating ESG factors into investment portfolios demonstrate the ability of these factors to enhance risk-adjusted investment results. The next step in our analysis combines these methods with traditional investment factors. This approach takes a portfolio manager's perspective in evaluating whether ESG factors can be used to improve portfolio performance as part of a realistic investment strategy. Evaluating ESG factors in combination with other investment factors also allows us to verify whether ESG factors represent a unique source of alpha that is additive to risk-adjusted returns, and aren't proxies for other traditional financial factors, such as quality of earnings.

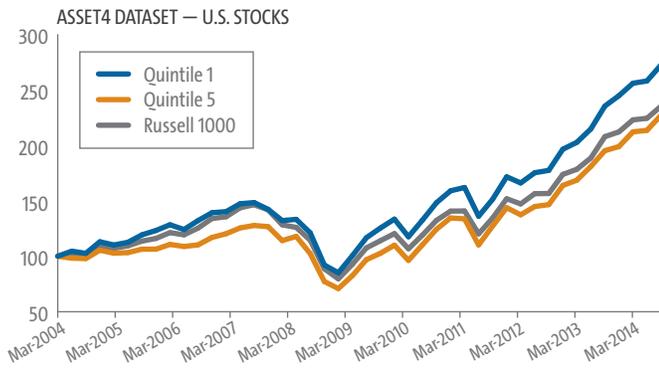
Since ESG factors can be reflective of the quality of management teams running a company, they provide an indication of a company's ability to compete successfully in the long-term. Therefore, when combined with a company's financial prospects, and its ability to generate self-sustained growth, ESG factors may provide a better overall picture of a company's growth potential, and ultimately stock performance. As a result, we expect this process to select companies showing improvement from an ESG perspective that also have attractive investment characteristics.

To confirm the benefits of a combined approach, we use historical analysis to evaluate the performance of commonly used financial factors and then incorporate ESG factors into the analysis. An ESG screen is also employed that eliminates companies falling in the bottom quintile of absolute ESG scores (worst 20%). We begin by performing historical backtests on selected financial factors using the same backtest parameters as those used to evaluate the ESG momentum factor in the prior section. We then construct paired, or "hybrid" factors by combining the financial factors with the ESG momentum factor, applying an equal weight to each factor's quintile ranking.⁴⁵ Both the individual factor components and combined factors are ranked on a sector

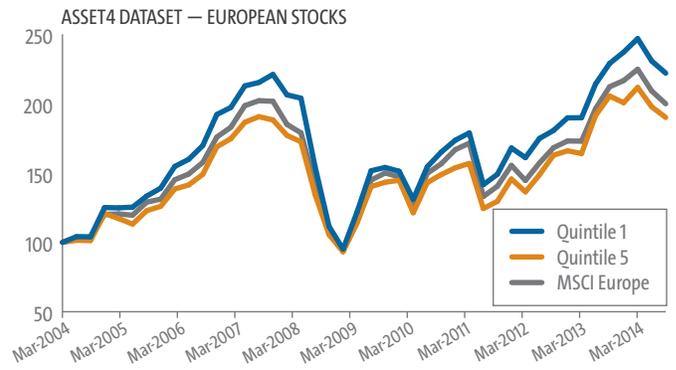
44. Controlling ESG scores for sector and market capitalization is also an effective way to neutralize the impacts of many other biases, such as market beta. The process used to control for sector and market capitalization is outlined in Appendix D.

45. For example, a company in the bottom quintile for the financial factor and second quintile for ESG-momentum factor would receive a hybrid factor score of 3.5 ($0.5 \times 5 + 0.5 \times 2$), with a lower score being more attractive.

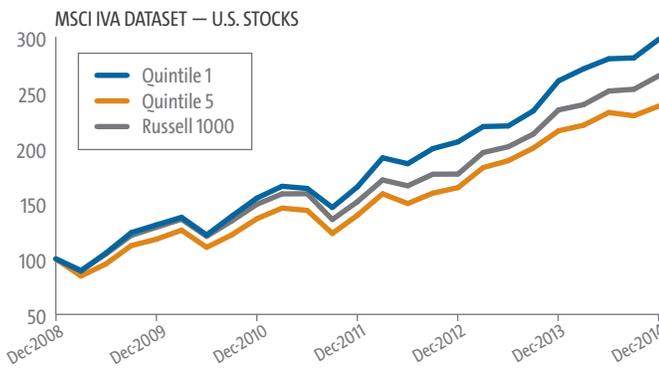
FIGURE 9: SIMULATED PERFORMANCE OF ESG MOMENTUM FACTOR



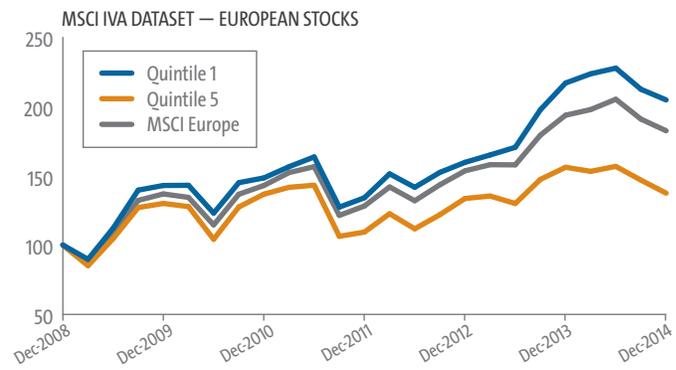
PORTFOLIO (ASSET4, U.S. STOCKS)	CUMULATIVE TOTAL RETURN	ANNUALIZED TOTAL RETURN
Quintile 1 (Improving ESG score)	172.26%	9.76%
Quintile 5 (Deteriorating ESG score)	126.96%	7.92%
Russell 1000 Index	135.16%	8.28%



PORTFOLIO (ASSET4, EUROPEAN STOCKS)	CUMULATIVE TOTAL RETURN	ANNUALIZED TOTAL RETURN
Quintile 1 (Improving ESG score)	121.92%	7.70%
Quintile 5 (Deteriorating ESG score)	89.99%	6.15%
MSCI Europe Index	99.86%	6.65%



PORTFOLIO (MSCI IVA, U.S. BACKTEST)	CUMULATIVE TOTAL RETURN	ANNUALIZED TOTAL RETURN
Quintile 1 (Improving ESG score)	198.00%	19.96%
Quintile 5 (Deteriorating ESG score)	137.75%	15.53%
Russell 1000 Index	165.11%	17.64%



PORTFOLIO (MSCI IVA, EUROPE BACKTEST)	CUMULATIVE TOTAL RETURN	ANNUALIZED TOTAL RETURN
Quintile 1 (Improving ESG score)	104.57%	12.67%
Quintile 5 (Deteriorating ESG score)	37.40%	5.44%
MSCI Europe Index	82.35%	10.53%

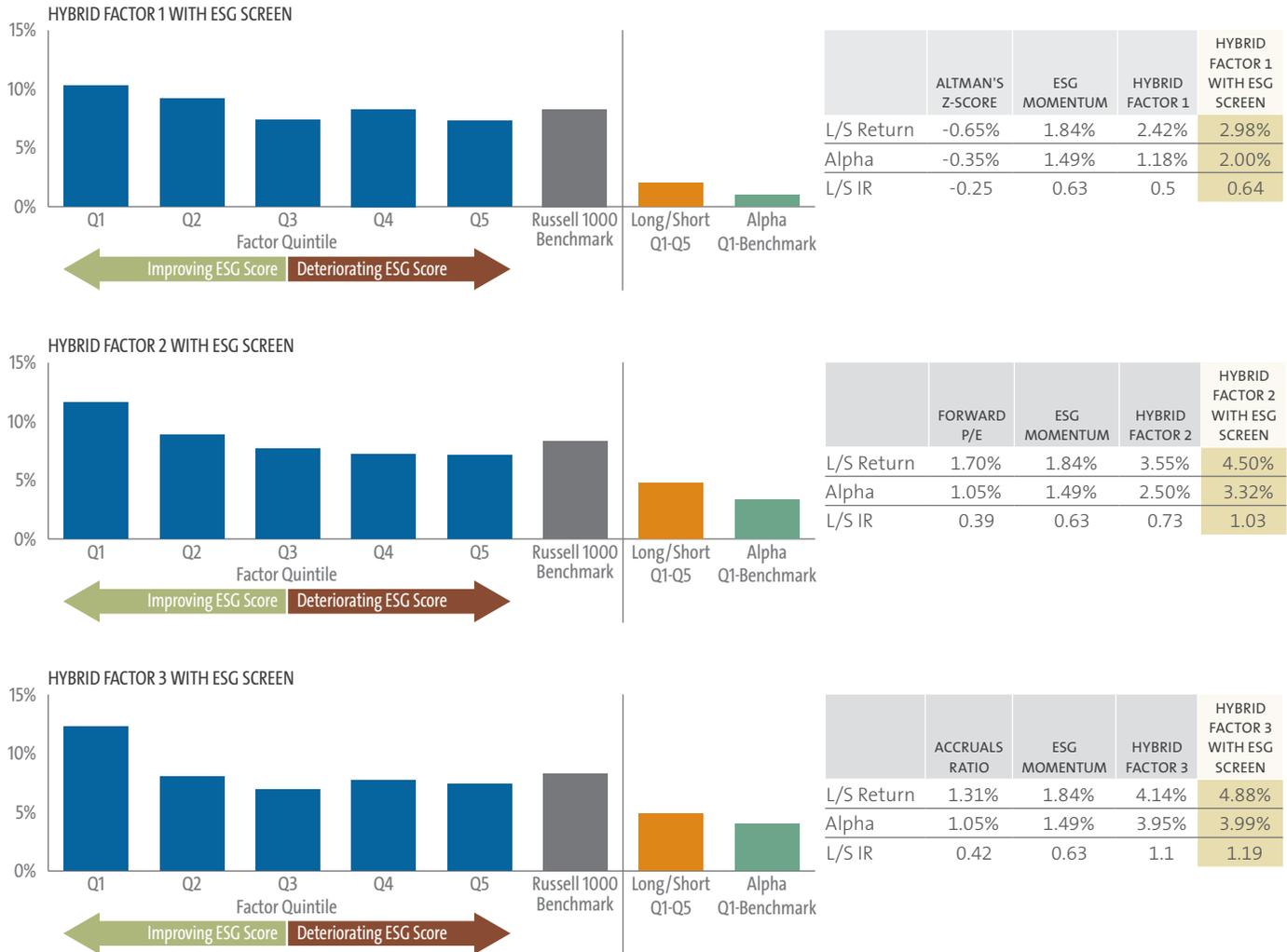
Source: Thomson Reuters, MSCI, Factset, Calvert Research

and market-cap neutral basis. Lastly, we remove the bottom quintile of ESG companies from the universe, and conduct the hybrid factor backtest again with the new universe. This portion of the analysis is limited to the U.S. universe and Asset4 dataset because of the greater availability of historical data.

Our research finds that a wide range of factors across the environmental, social, and governance spectrum can be used to enhance performance of many traditional financial factors. The hybrid factor pairs used in this paper, which combine Altman’s Z-score, forward P/E ratio, and accruals ratio factors with ESG momentum, represent just a few examples.

The results from our historical analysis for these hybrid factors are shown in Figure 10. We find that combining traditional valuation factors with ESG factors enhances factor efficacy and increases portfolio risk-adjusted performance. Using ESG criteria to limit the investment universe further improves performance of the hybrid factors (highlighted column in Figure 10). When combined with financial factors, ESG information tends to not only increase investment performance in an absolute sense, but the “hybrid,” or paired factors within the screened universe seem to better identify companies that produce good performance results more consistently over time, as evidenced in the improved information ratio spread between the top and bottom quintiles. Importantly, the hybrid factors included in our analysis were developed with economic intuition, as described below:

FIGURE 10: SIMULATED PERFORMANCE OF INDIVIDUAL AND HYBRID FACTORS (ANNUALIZED) (MARCH 2004 TO DECEMBER 2014)



Source: Thomson Reuters, Factset, Calvert Research

Long/Short (L/S) Return: Difference in returns between the top quintile portfolio and bottom quintile portfolio.

Alpha: Difference in returns between the top quintile portfolio and the benchmark.

Long/Short Information Ratio (IR): Difference in information ratios between the top quintile portfolio and bottom quintile portfolio

Hybrid Factor 1: Altman's Z-score and ESG Momentum

Altman's Z-score is a weighted sum of five financial ratios used to measure a company's likelihood of bankruptcy.⁴⁶ The lower the score, the higher the probability of bankruptcy.

While Altman's Z-score does not distinguish itself as a lucrative investment strategy in the long run (simply because a firm has the lowest probability of going bankrupt doesn't mean it's a good investment), it does quite well when combined with the selection of firms that are also improving their ESG profiles. This may be an indication that stronger management teams, which put greater emphasis on long-term performance, are also better able to steer

their companies from financial troubles. Alternatively, companies with a high probability of bankruptcy as well as a deteriorating ESG profile may find themselves less likely to escape this outcome.

Hybrid Factor 2: Forward Price to Earnings (P/E) Ratio and ESG Momentum

Forward price to earnings ratio is the ratio of a company's current share price to consensus estimates of earnings per share over the next four quarters. Stocks with lower P/E ratios may be undervalued.

Companies with underappreciated future business opportunities (as reflected in their lower forward-looking P/E ratios) tend to have market values below their intrinsic value, which is determined by management's ability to create shareholder wealth in the long run. The strong performance generated by evaluating P/E ratios in conjunction with a firm's ESG momentum similarly suggests

46. Altman's Z-Score = 1.2*Working Capital to Total Assets + 1.4*Retained Earnings to Total Assets + 3.3*EBIT to Total Assets + 0.6*Market Value of Equity to Total Liabilities + 0.99*Sales to Total Assets.

that companies with undervalued growth prospects, but also stronger management teams (as measured by an improving ESG profile), may be more likely to successfully execute their long-term growth strategies. Additionally, it may indicate that management teams are reinvesting in product and workplace systems instead of projects that may not be as accretive in the long-term. Productive capital allocation, while sometimes having the negative short-term effect of lowering a stock's price versus its earnings potential, ultimately accrues to earnings and rewards patient investors.

Hybrid Factor 3: Accruals Ratio and ESG Momentum

Accruals ratio measures total accruals as the difference between net income and cash flows from operating and investing, scaled by average net operating assets to control for differences in company size. A smaller accruals ratio indicates a greater portion

of earnings are considered “cash earnings” and are more likely to be sustainable and persistent (of higher quality).

Good management teams manage their businesses, including non-financial risks and opportunities, with a long-term perspective and are less preoccupied with quarter-to-quarter results compared to some of their peers. Short-term orientation and focus on the next quarter's earnings is what gets management teams into trouble if they attempt to manage earnings to appeal to investors and prop up the stock price. In extreme cases, earnings management can border on, or result in, outright fraud. It is not surprising, therefore, that quality of management as reflected in a company's ESG profile, and quality of earnings (a measure of conservativeness with which earnings are reported on financial statements), work well in concert over long time periods. Pairing earnings quality, proxied by an accruals ratio, with other ESG factors also produces strong investment performance.

5. Conclusion

The evolution of ESG information and its application in investment decisions is largely a result of major changes occurring in the broader global economy. Greater data availability on corporate ESG behaviors and their financial and social implications has also led to greater public awareness and investor concern about these issues. With the regulatory environment and information feedback loop evolving with unprecedented speed over the past decade, it's becoming apparent that companies' financial success will increasingly depend on their non-financial activities. Risks and opportunities related to ESG issues have the potential to significantly impact firms' business operations, even if they take a long time to unfold, which ultimately impacts stock price performance. We find empirical evidence across multiple approaches that ESG factors can enhance risk-adjusted investment performance in a portfolio management context. Our analysis suggests that incorporating companies' non-financial behaviors into investment decisions allows for a more holistic approach to investing, which can improve risk management and the investment selection process.

In our evaluation of exclusionary ESG screens, we found a consistently positive stock-specific impact in the Calvert Social Index after removing significant sector and risk factor biases through an optimization process. This supports the use of ESG factors as an effective way to create a more attractive investment universe for constructing fully diversified investment portfolios and managing risk. Strong performance from the optimized CSI also represents a particularly attractive opportunity for institutional investors to implement passive ESG mandates on

a large scale without sacrificing returns or incurring additional portfolio risk.

The second phase of our historical analysis moved beyond negative screening to determine whether ESG factors can be used to generate alpha in an active investment strategy. Our results revealed that companies with a commitment to improving their ESG profile tend to produce better risk-adjusted stock returns than companies with declining ESG scores. This finding was consistent across regions, datasets, and throughout various time periods. We also observed an increase in ESG factor efficacy more recently, indicating a possible market inefficiency in pricing publicly available sustainability information.

We then merged the first two approaches with traditional financial factors by creating “hybrid” factors, and excluded the worst performing ESG companies from the investment universe, providing an example of how ESG integration can be applied in the context of a more typical investment strategy. Evaluating the return potential of this approach demonstrates how ESG information can be used to enhance the performance of traditional financial factors. Strong performance from the screened hybrid factors provides additional evidence that using ESG criteria to determine the investment universe can be a source of excess returns, and also aligns with our view that ESG practices help assess the quality of management teams. Proactive, longer-term focused company management teams are not only better able to manage ESG-related risks, but are also better positioned to take advantage of solutions to ESG and

regulatory issues through product innovation. Combining this insight with a financial and valuation perspective on companies can produce superior investment performance.

Although our historical analysis confirms ESG factors can be a potential source of alpha, using these inputs in security selection and portfolio construction needs to be part of a careful and methodical process. The ability to create a more focused investable universe by any intuitive method, including ESG factors, lays the groundwork for successful long-term investing. However, major risk factor biases can creep into ESG-driven approaches, as they often do with most traditional investment approaches. If not checked and managed properly, these biases can render the strategy ineffective by overwhelming the stock selection benefits of the approach.

In the post-financial crisis world, differentiated sources of alpha came into focus. As newly minted MBAs and CFAs become more aware of sustainability and ESG issues through academic work and studies, and investors become more educated on the materiality of ESG factors in corporate financial performance, investment management practices will adjust accordingly.

Investor use of ESG information has progressed from its early focus on divestiture and restricting investments to one that now incorporates ESG issues as non-financial inputs when evaluating the risk and return potential of companies.

It is likely that investment strategies incorporating non-financial information, such as ESG criteria, into their investment process will continue to evolve. The only academic study to-date that differentiates between ESG strategies managed by firms who specialize in ESG analysis and ESG strategies managed by generalist companies, finds that the strategies run by firms with greater ESG focus and expertise significantly outperform their peers.⁴⁷ Hence, experience and expertise are as crucial for ESG investment processes as they are for active mainstream approaches. This paper shows how using sophisticated, well-developed techniques to incorporate ESG factors into investment strategies can enhance risk-adjusted returns. Our forthcoming research builds off these findings and explores how ESG factors can be integrated into company-specific analysis.

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Appendix A. Summary of Datasets

ASSET4 ESG DATA AVAILABILITY BY YEAR

YEAR	NUMBER OF COMPANIES IN RUSSELL 1000 INDEX WITH ESG DATA	PERCENTAGE OF COMPANIES IN RUSSELL 1000 INDEX WITH ESG DATA	NUMBER OF COMPANIES IN MSCI EUROPE INDEX WITH ESG DATA	PERCENTAGE OF COMPANIES IN MSCI EUROPE INDEX WITH ESG DATA
2002	412	42%	325	59%
2003	415	42%	347	65%
2004	551	55%	397	72%
2005	627	63%	529	91%
2006	632	64%	555	93%
2007	656	66%	536	91%
2008	838	84%	521	92%
2009	914	94%	441	92%
2010	915	94%	432	94%
2011	923	94%	435	94%
2012	925	94%	421	94%
2013	916	92%	409	94%
2014	883	86%	407	94%

Source: Thomson Reuters, Factset, Calvert Research

Additional information on Thomson Reuter's Asset4 database can be found at: <http://financial.thomsonreuters.com/en/products/data-analytics/company-data/esg-research-data.html>

MSCI IVA ESG DATA AVAILABILITY BY YEAR

YEAR	NUMBER OF COMPANIES IN RUSSELL 1000 INDEX WITH ESG DATA	PERCENTAGE OF COMPANIES IN RUSSELL 1000 INDEX WITH ESG DATA	NUMBER OF COMPANIES IN MSCI EUROPE INDEX WITH ESG DATA	PERCENTAGE OF COMPANIES IN MSCI EUROPE INDEX WITH ESG DATA
2007	575	58%	460	78%
2008	613	61%	473	84%
2009	600	62%	418	88%
2010	574	59%	416	90%
2011	574	59%	428	92%
2012	582	59%	420	94%
2013	936	94%	414	95%
2014	969	95%	415	95%

Source: MSCI, Factset, Calvert Research

Additional information on MSCI's IVA database can be found at: <https://www.msci.com/esg-integration> and https://www.msci.com/resources/factsheets/IVA_Methodology_SUMMARY.pdf

Appendix B. Description of Factor-Based Attribution

Factor models decompose asset returns into a systematic component that is explained by factors, and a residual component that is not,

$$r_n = \sum_k X_{nk} f_k + u_n.$$

Here, X_{nk} is the exposure of stock n to factor k , f_k is the factor return, and u_n is the residual return of the stock. Stock exposures are known at the start of the period, and factor returns are estimated by cross-sectional regression at the end of the period. Factor returns can be written in the following general form

$$f_k = \sum_n \Omega_{kn} r_n,$$

where Ω_{kn} is the weight of stock n in pure factor portfolio k . Factor-replicating portfolios have unit exposure to the factor in question and zero exposure to other factors. For example, industry factor portfolios are style neutral, and style factor portfolios have net zero weight in every industry.

Active return can be attributed by rolling up contributions from the asset level,

$$R^A = \sum_k X_k^A f_k + \sum_n w_n^A u_n,$$

where w_n^A is the active weight of asset n , and X_k^A is the active exposure to factor k ,

$$X_k^A = \sum_n w_n^A X_{nk}.$$

Positive contributions to active return are earned through positive exposure to factors with positive returns and by overweighting assets with positive residual returns.

Source: Davis, Ben and Menchero, Jose, "Beyond Brinson: Establishing the Link Between Sector and Factor Models." MSCI Barra Research Paper No. 2010-14. Available at SSRN: <http://ssrn.com/abstract=1601929>

Appendix C. Optimization Settings

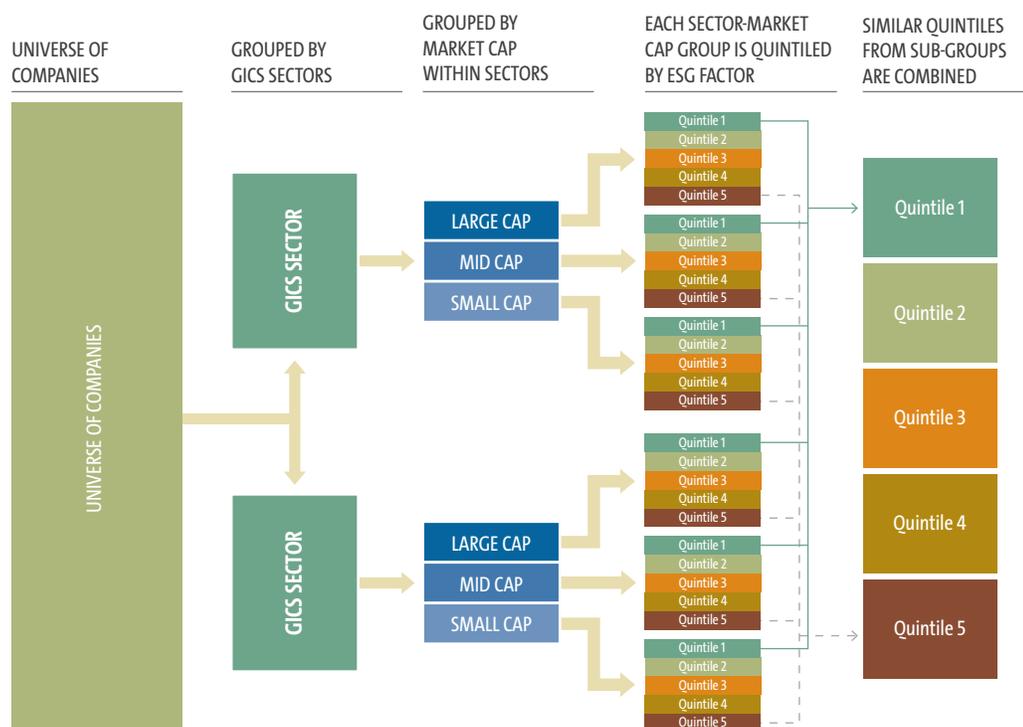
WE USE THE FOLLOWING SPECIFICATIONS IN OUR BARRA OPTIMIZATION:

- Universe defined as Calvert Social Index constituents
- Benchmark set to Russell 1000 Index
- Market set as cash
- Common Factor Risk Aversion value of 0.0075 (default setting)
- Asset Specific Risk Aversion Ratio of 1 (default setting)
- Monthly rebalancing
- No transaction costs or management fees included
- Based on BARRA multi-factor risk model USE3-L
- Holdings constraint requires all securities in the universe at each rebalancing period to be held
- Size factor constraint of +/- 0.05 relative to benchmark (size-constrained optimization only)

For additional background information on the BARRA optimization, see “Barra Introduction to Risk Modeling” accessible at https://www.msci.com/resources/research/intro_risk_modeling.pdf; and “The Fundamentals of Fundamental Factor Models” by Nielsen and Bender (2010) accessible at <http://ssrn.com/abstract=1707661>.

Appendix D. Controlling for Sector and Market Capitalization (size)

- 1) Divide the universe into groups based on GICS sector classification.
- 2) Divide each sector into three fractiles based on market capitalization.
- 3) Divide each sector-market cap group into quintiles based on ESG factor.
- 4) Take the top quintile within each sector-market cap group and combine them to generate the first ESG factor quintile.
- 5) Repeat step 4 to form the remaining quintiles, resulting in an equal number of securities assigned to each quintile.





About Calvert Investments

A global leader in responsible investing, Calvert Investments is a diversified investment management firm that provides mutual funds and separate accounts to institutional investors, retirement plans, financial intermediaries and their clients. We offer a broad array of equity, fixed income, and multi-asset investment strategies that feature integrated environmental, social, and governance research and corporate engagement. Founded in 1976 and based in Bethesda, Maryland, Calvert Investments managed assets of more than \$13.0 billion as of June 30, 2015.

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