

Sustainable investing in extreme market conditions: doing well while doing good

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Abstract

Purpose – The aim of this study is to identify environmental, social and governance (ESG)-focused funds that can effectively uphold ethical principles while also delivering competitive financial returns by evaluating the performance of 24 well-established exchange-traded funds (ETFs). The study also compares the performance of four widely recognized ETFs representing NASDAQ (ticker: QQQ), S&P500 (SPY), Dow Jones (DIA) and Russell 2000 (IWM) with the sample of 24 ESG funds.

Design/methodology/approach – This paper utilizes four complementary measures, namely Sharpe, Sortino, Omega and Calmar ratios, to assess the risk-adjusted return performance of ETFs, with a particular emphasis on extreme downside risk.

Findings – The findings indicate that ESG-focused ETFs can predominantly outperform DIA and IWM in the last five years (1 November 2018–22 March 2023). However, when compared to QQQ and SPY, only ICLN, SUSA and DSI consistently delivered competitive risk-adjusted returns. The performance of DSI and SUSA is almost equivalent to QQQ and SPY even during the last ten years.

Practical implications – The paper conducts a risk-return analysis of alternative ESG investment funds, suggesting that not all ETFs are created equal and that careful selection is vital for achieving different investment objectives. It is imperative to recognize that past performance is not a reliable indicator of future outcomes, requiring consideration of other factors in the post-evaluation phase.

Social implications – The study provides evidence to support the “doing well while doing good” hypothesis, indicating that competitive returns are achievable while also engaging in socially responsible investment.

Originality/value – This study fills a vital gap in the literature on ESG investment by highlighting that the choice of funds stands as the primary factor responsible for the conflicting findings by previous studies.

Keywords Sustainable investing, Exchange-traded funds, Environmental, social and governance, Socially responsible funds

Paper type Research paper

1. Introduction

Environmental, social and governance (ESG) investing has witnessed a significant surge in popularity in recent years, driven by growing concerns about environmental degradation, social inequality, and corporate governance challenges. Investors are increasingly inclined towards investment opportunities that not only align with their ethical values but also yield satisfactory financial returns. With the rising demand for socially responsible investments, the US has seen a notable increase in the number of ESG-focused funds, making it imperative to conduct a thorough assessment of their performance. This study aims to identify ESG-focused funds that can effectively uphold ethical principles while also delivering competitive financial returns.

JEL Classification — E22, G11, G32, Q56

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This paper makes a significant contribution to the existing literature on the risk-adjusted return performance of ESG funds listed in the US, with a specific emphasis on their downside risk. [Folger-Laronde et al. \(2022\)](#) argue that even when ETFs exhibit superior sustainability performance, they do not shield investments from financial losses during a severe market downturn. For this reason, we use five and ten-year intervals and performance measures (i.e. the Sharpe, Sortino, Omega and Calmar ratios) to ascertain the robustness of the ranking results concerning the risk-adjusted return performance of different funds. The study's findings offer insights for investors and fund managers aiming to diversify and enhance their portfolio strategies as passive investors.

This study is different from previous studies in the literature in three aspects. Firstly, most studies on ESG investing have predominantly used different variants of the capital asset pricing model (CAPM) betas without distinguishing between upside rewards and downside risk (see *inter alia* [Fan and Michalski, 2020](#); [Auer and Schuhmacher, 2016](#); [Omura et al., 2021](#); [Rompotis, 2022](#); [Dreyer et al., 2023](#)). Striving for higher returns is the goal of most investors, provided that the fundamental principle of capital preservation is equally prioritized. Therefore, expanding upon the concept of "safety first," which was first highlighted by [Roy \(1952\)](#) over seven decades ago, the present study focuses on the importance of extreme downside risk to investors in scenarios where the return distribution exhibits a high degree of skewness. To the best of our knowledge, prior research on the risk-return trade-off in sustainable investing has incorporated the Sortino and Omega ratios in the work of [Sherwood and Pollard \(2018\)](#) and the Sortino ratio in the study by [Kuang \(2021\)](#) however, none have utilized the Calmar ratio.

Secondly, this study compares the performance of a large number of companies and their stocks when they are consolidated into twenty-four exchange-traded funds (ETFs). This is vital because aggregating companies into ETFs minimizes firm-specific idiosyncrasies arising from market overreactions to news, mergers, and acquisitions over time. By offering impartial information about the overall performance of the ESG market segment, this approach also reduces bias within a specific sectoral index.

Finally, to the best of our knowledge, this study is the first to identify the top-performing common constituents among all ESG-focused funds in the US. This is an important issue in the literature on ESG investing because it pinpoints the companies that have consistently performed well over time and have a high potential for sustained success in the future. Against this background this study addresses the following three research questions:

- RQ1. How do ESG funds listed in the US perform in terms of risk-adjusted returns, particularly with a focus on extreme downside risk?
- RQ2. Which common constituents among all ESG-focused funds have consistently performed well over time?
- RQ3. How do ESG-focused ETFs perform compared to the broad-based market indices such as the S&P 500, Dow Jones, and NASDAQ, and Russell 2000, particularly in extreme market conditions?

By answering these questions, the study makes a significant contribution to the downside risk of major ESG funds in the US. The findings also support the argument that it is possible to achieve higher risk-adjusted returns while also contributing to societal well-being, provided that the right funds are chosen.

2. Literature review

Socially responsible investments (SRI) have increased significantly in popularity over the past few decades, with the US market seeing investments grow from US\$638bn to over US\$17tn between 1995 and 2020 ([Forum for Sustainable and Responsible Investment, 2023](#)). According

to [Meziani \(2016\)](#), the integration of ESG factors into the ETF market is a significant development that serves as validation of the popularity of ETFs and has the potential to boost liquidity in ESG investing. This growing trend can be attributed to an increased awareness among investors of the social importance of responsible investing ([Dreyer et al., 2023](#)).

As more investors become socially aware, the demand for ESG assets as responsible investments may be influenced by factors beyond their risk-return relation. However, due to the higher demand for such assets with a given level of systematic risk, the prices of responsible investments should increase, and their expected returns should decrease. A number of studies demonstrate why ESG assets underperform in the market ([Renneboog et al., 2008](#); [Luo and Subrahmanyam, 2019](#); [Ibikunle and Steffen, 2017](#); [Apergis et al., 2019](#); [Rompotis, 2022](#); [Dreyer et al., 2023](#)). For example, [Apergis et al. \(2019\)](#) investigate whether socially responsible investment indices, such as the U.S. Dow Jones Sustainability Index, are connected with conventional equity indices. They find an asymmetric long-term relationship between these indices, raising uncertainties about the diversification benefits of socially responsible investments. [Rompotis \(2022\)](#) evaluates the performance of 49 ESG ETFs on the London Stock Exchange, against benchmarks and the FTSE 100 Index. These funds, on average, do not outperform their benchmarks, and some evidence of underperformance is observed. [Rompotis \(2022\)](#) finds a negative correlation between ESG metrics and performance, suggesting that higher ESG scores may result in lower financial gains.

In contrast, there are a number of studies that argue that investors can “do well while doing good” ([Hamilton et al., 1993](#); [Sherwood and Pollard, 2018](#); [Borokova and Wu, 2020](#); [Fan and Michalski, 2020](#); [Broadstock et al., 2021](#); [Omura et al., 2021](#); [Neves et al., 2024](#); [Atz et al., 2023](#)). For example, [Sherwood and Pollard \(2018\)](#) examine the integration of ESG strategies into emerging market investments and its potential for risk diversification. They analyze real data from ESG and non-ESG integrated emerging market indices, considering various financial metrics. Their results show that ESG integration significantly outperforms non-ESG investments, suggesting that institutional investors could benefit from higher returns and lower downside risk by incorporating ESG strategies into their portfolios. [Borokova and Wu \(2020\)](#) found that U.S. companies with low ESG scores had a 50% lower return during the COVID-19 outbreak, while high ESG score companies performed better. Similarly, [Omura et al. \(2021\)](#) investigate the performance of ESG investments compared to conventional investments during the COVID-19 pandemic. Using asset-pricing models, the analysis includes ESG ETFs in the US and MSCI SRI indices globally, as well as specifically for the US, Japan, and Europe, both before and during the pandemic. The findings suggest that SRI indices demonstrated greater outperformance compared to conventional investments throughout the pandemic period ([Omura et al., 2021](#)).

[Atz et al. \(2023\)](#) analyzed 1,141 primary peer-reviewed papers and 27 meta-reviews (comprising around 1,400 studies) published from 2015 to 2020 and found that, on average, ESG investing’s financial performance aligns with conventional investing, with one in three studies showing superior performance. They highlight three key points in their study: (a) ESG integration as a strategy tends to perform better than screening or divestment; (b) ESG investing offers asymmetric benefits, especially during social or economic crises; and (c) decarbonization strategies may capture a climate risk premium.

While some studies find that responsible investments outperform conventional investments during economic downturns, others find mixed or opposing results ([Renneboog et al., 2008](#); [Lean and Pizzutilo, 2021](#); [Albuquerque et al., 2020](#); [Whieldon and Clark, 2021](#); [Pavlova and de Boyrie, 2022](#)). For example, [Pavlova and de Boyrie \(2022\)](#) examined the performance of 62 sustainable ETFs during the period surrounding the February 20, 2020 market crash. They categorized ESG-focused ETFs based on Morningstar Sustainability Globes and MSCI ESG ratings, using five-factor models. Despite higher sustainability ratings, ESG ETFs did not shield from losses during the downturn, although

they did not underperform the market either (Pavlova and de Boyrie, 2022). The three recent studies (Pavlova and de Boyrie, 2022; Ropotis, 2022; Omura *et al.*, 2021) primarily focus on specific ESG-focused ETFs or their groupings. These studies compare ESG-focused ETFs to aggregated market or SRI indices. In contrast, our study goes beyond this comparison. We delve deeper into how these funds perform, evaluating their performance not only against each other but also in comparison to four major ETFs (QQQ, SPY, DIA and IWM) commonly held by many investors.

In summary, the literature presents three contrasting viewpoints. First, the “doing good while doing well” perspective suggests a positive relationship between ESG considerations and financial performance and implies that selecting stocks with high ESG ratings may lead to superior returns. This outcome can be observed if the so-called “available fund hypothesis” or the “good management hypothesis” holds true. Second, the “doing good but not well” perspective suggests a negative relationship that is linked to the “managerial opportunism hypothesis” or the “trade-off theory”. The former asserts that managers may tend to maximize private gains in prosperous times and placate weak financial performance by increasing shareholders’ welfare through social activities (Posner and Schmidt, 1992). The latter hypothesis suggests that socially responsible activities may siphon off resources from a firm, putting it at a relative disadvantage to less socially active firms (Aupperle *et al.*, 1985). Finally, a last perspective is that SRI neither adds nor destroys portfolio value because CSR is not priced, and investors do not reduce the relative cost of capital to socially responsible companies by favoring their stocks (Hamilton *et al.*, 1993).

This lack of consensus underscores the need for more accurate and longer data to better understand the relationship between sustainable performance and financial outcomes. Specifically, there is a growing recognition of the importance of examining the downside risk associated with sustainable investments, as this can have significant implications for investor decision-making and portfolio management (Sherwood and Pollard, 2018; Kuang, 2021; Folger-Laronde *et al.*, 2022). Therefore, it is crucial to explore the relationship between sustainable investment and risk-adjusted returns, placing a growing emphasis on the downside risk, in order to provide a more comprehensive understanding of the potential benefits and drawbacks of sustainable investments.

3. Methodology

Previous studies mainly used Sharpe (1964) ratio to analyze the ESG-oriented funds in the literature, which indiscriminately penalize both upside and downside changes in returns. However, the Sortino ratio (Sortino and van der Meer, 1991) does not consider positive changes in stock returns as bad things and as a result it only penalizes returns falling below a pre-specified level. At the other extreme, the Calmar ratio (Young, 1991) considers only the maximum drawdown as a worst case scenario. The Omega (Keating and Shadwick, 2002) ratio falls between the Sortino and Calmar ratios, decomposing the expected returns into weighted gains and weighted losses above and below the expected rate. This section provides a succinct discussion of these four risk-adjusted performance measures which are widely utilized by analysts in practice.

The Sharpe ratio relies on Markowitz’s (1959) mean-variance theory, which suggests that unconditional betas and standard deviations are adequate measures for assessing a portfolio’s return performance. The Sharpe ratio is defined as follows:

$$\text{Sharpe ratio} = \frac{\text{Reward}}{\text{Risk}} \quad (1)$$

Where.

$$\text{Reward} = R_p - R_f,$$

R_p = expected return of a portfolio,

R_f = risk-free rate (e.g. 13-week treasury bill rate), and

$Risk$ = standard deviation of portfolio excess returns.

The Sharpe ratio gauges portfolio performance by assessing the return relative to overall risk, encompassing both positive and negative stock return changes. A Sharpe ratio above one signifies that each unit of total risk, systematic and unsystematic, corresponds to higher excess returns. This metric, considering both risk and return, distinguishes between prudent investments and excessive risk-taking for higher returns, not solely absolute returns. Investors prefer portfolios with higher Sharpe ratios, as they offer greater returns relative to risk. However, investors generally view upside volatility favorably, even though substantial asset price increases may also reduce the Sharpe ratio. Instead, their focus is typically on downside risk, particularly negative returns. This legitimate concern has led to the adoption of semi-variance metrics, such as the Sortino ratio, which measures downside risk as follows:

$$\text{Sortino ratio} = \frac{(R_p - MAR)}{\sqrt{\frac{1}{n} \sum_{t=1}^n \min[(MAR - r_t), 0]^2}} \quad (2)$$

Where:

R_p = expected return of an ETF or portfolio,

n = period length,

r_t = return on day t

MAR = minimum acceptable return, and

$$\sqrt{\frac{1}{n} \sum_{t=1}^n \min[(MAR - r_t), 0]^2} = \text{Downside deviation},$$

This measure was first introduced by [Sortino and van der Meer \(1991\)](#), emphasizing on downward risk below a particular threshold. A higher Sortino ratio indicates a higher risk-adjusted return. [Equation \(2\)](#) penalizes returns that fall below a minimum acceptable rate of return, whereas the Sharpe ratio penalized both upward and downward changes. [Chaudhry and Johnson \(2008\)](#) state that when the distribution of excess returns is skewed, the Sortino ratio outperforms the Sharpe ratio. However, when the distribution of excess returns is symmetrical, both the Sharpe and Sortino ratios tend to yield similar ranking outcomes ([Auer and Schuhmacher, 2013](#)).

The Omega ratio ([Keating and Shadwick, 2002](#)) is also a commonly used performance measure in finance that assesses the risk-adjusted returns of an investment portfolio. It takes into account the shape of the return distribution, including higher-order moments such as skewness and kurtosis. The Omega ratio is defined as follows:

$$\text{Omega ratio} = \frac{(R_p - MAR)}{\frac{1}{n} \sum_{t=1}^n \max[(MAR - r_t), 0]} + 1 \quad (3)$$

Compared to the Sortino ratio, it places greater emphasis on the tail end of the return distribution. An Omega ratio greater than 1 implies an increased likelihood of surpassing

target returns with minimal risk of substantial losses. Investors value the Omega ratio for its consideration of the frequency and severity of weighted negative returns, which is more significant to them than overall volatility.

The Calmar ratio, on the other hand, assigns significantly more weight to the risk of substantial losses than both the Sortino and Omega ratios. The Calmar ratio considers the worst-case scenario by measuring the maximum loss that an investor could have suffered had they invested at the peak and sold at the trough. The Calmar (an acronym for “California Managed Account Reports”) ratio is defined as follows:

$$\text{Calmar ratio} = \frac{\text{Reward}}{\text{Maximum loss}} \quad (4)$$

When we examine the denominator of each of the above four equations, it becomes apparent that the Calmar ratio defines risk as the maximum drawdown, which is the largest decline in value from a peak to a trough, experienced by a portfolio. The concept of the most significant continuous loss is easier to understand than a metric that measures the spread of the distribution of profits and losses. Both the Omega and Calmar ratios are sensitive to outliers, which makes comparing them over different periods challenging.

The four ratios – Sharpe, Sortino, Omega, and Calmar – offer complementary perspectives on investment performance. Disparities in these measures may increase when the distribution of excess returns becomes heavily skewed to the left. The Sharpe ratio considers overall risk and return, the Sortino ratio focuses on downside risk, the Omega ratio emphasizes achieving returns above a specified minimum, and the Calmar ratio highlights maximum drawdown. Combining these measures provides a comprehensive understanding of the risk-return profile, aiding informed portfolio decisions. It is crucial not to rely on a single measure, especially as return distribution statistics vary. Higher values for these ratios indicate better risk-adjusted performance, making the portfolio more attractive to investors.

4. Data description

In the US, there is a growing number of ESG-focused ETFs, but most of these funds were introduced in the last five years; therefore, they cannot be included in this analysis. Consequently, 24 ESG-focused ETFs will be appraised over a five-year period (i.e. November 2018–March 2023), and four well-established ETFs (i.e. EARTH, SUSA, DSI, ICLN) during a ten-year period (June 2009–April 2023). Daily ETF prices from November 1, 2018, to March 22, 2023 (5 days per week totaling 1109 observations) have been used to generate the four risk-adjusted return measures. The daily data have been obtained from <https://finance.yahoo.com>. Daily data on the 13-week treasury bill rate were obtained from the FRED database provided by the St. Louis Fed (<https://fred.stlouisfed.org/>). Table 1 shows the summary information on the key characteristics of the 24 sample ETFs, such as the issuer, the expense ratio, the average last five-year return, and dividends. Based on the average return, the top five performing ETFs over the past 5 years are ICLN, SUSA, ESG, DSI, and ESGU, while the bottom five performers are ESGE, ESGN, ESGD, KGRN, and SHE. Our ETF selection and time intervals are justified by exclusively considering 24 ESG-focused ETFs listed on www.etf.com with a track record of five years or more, and the criteria and basis for classifying these ETFs as ESG-focused are detailed in Table 2.

ICLN has the highest 5-year return at 16.88%, with a relatively low expense ratio of 0.4%, and a dividend yield of 1.3%. SUSA has the second-best performance with an average 9.16% return followed by ESG and DSI. Based on return only, Table 1 indicates that investors looking for ETFs with strong 5-year returns and reasonable expense ratios may consider ICLN, SUSA, ESG, DSI, and ESGU. On the other hand, ESGE, ESGN, ESGD and KGRN and

Ticker	Name	5 Years return (%)	Expense ratio (%)	Dividend yield (%)
<i>BIBL</i>	Inspire 100 ETF	7.34	0.35	1.2
<i>BLES</i>	Inspire Global Hope ETF	5.91	0.49	2.09
<i>CATH</i>	Global X S&P 500 Catholic Values ETF	8.46	0.29	1.52
<i>CHGX</i>	AXS Change Finance ESG ETF	8.2	0.49	1.46
<i>CRBN</i>	iShares MSCI ACWI Low Carbon Target ETF	5.37	0.2	1.97
<i>DSI</i>	iShares MSCI KLD 400 Social ETF	8.9	0.25	1.54
<i>EBLU</i>	Ecofin Global Water ESG Fund	6.86	0.4	1.69
<i>ERTH</i>	Invesco MSCI Sustainable Future ETF	5.29	0.56	1.49
<i>ESG</i>	FlexShares STOXX U.S. ESG Select Index Fund	9.26	0.32	1.51
<i>ESGD</i>	iShares ESG Aware MSCI EAFE ETF	2.91	0.2	2.75
<i>ESGE</i>	iShares ESG Aware MSCI EM ETF	−1.37	0.25	2.71
<i>ESGG</i>	FlexShares STOXX Global ESG Select Index Fund	7.14	0.42	2.13
<i>ESGN</i>	Columbia International ESG Equity Income ETF	1.58	0.45	3.03
<i>ESGS</i>	Columbia U.S. ESG Equity Income ETF	8.11	0.35	2.69
<i>ESGU</i>	iShares ESG Aware MSCI USA ETF	8.9	0.15	1.6
<i>ETHO</i>	Etho Climate Leadership U.S. ETF	8.89	0.47	1.25
<i>ICLN</i>	iShares Global Clean Energy ETF	16.88	0.4	1.3
<i>ISMD</i>	Inspire Small/Mid Cap ETF	6.26	0.48	1.37
<i>KGRN</i>	KraneShares MSCI China Clean Technology Index ETF	3.6	0.78	1.31
<i>KRMA</i>	Global X Conscious Companies ETF	8.33	0.43	1.56
<i>NZAC</i>	SPDR MSCI ACWI Climate Paris Aligned ETF	5.01	0.12	1.81
<i>SDG</i>	iShares MSCI Global Sustainable Development Goals ETF	6.82	0.49	2.38
<i>SHE</i>	SPDR MSCI USA Gender Diversity ETF	4.54	0.2	1.75
<i>SUSA</i>	iShares MSCI USA ESG Select ETF	9.16	0.25	1.71

Source(s): The information in this table has been sourced from www.etf.com as of 31 March 2023

Table 1.
Key characteristics of
the ESG-oriented ETFs
listed in the US

SHE are the least attractive options for investors seeking a strong return performance over the past 5 years. However, it is important to note that these observations are based on only average returns without taking their risk into account. The next section provides the results of four measures with varying emphasis on downside risk.

Table 2 provides a brief overview of 24 ESG-oriented ETFs, primarily launched around five years ago. These funds differ in their holdings, ranging from 35 stocks for EBLU to 1315 holdings for CRBN. Collectively, these funds cover a significant number of global companies listed in the US. As outlined in Table 2, each fund follows socially responsible investing, utilizing diverse ESG criteria to screen out companies involved in controversial activities. They employ various investment strategies, including alignment with specific faith values or other ESG metrics. The funds undergo quarterly or annual rebalancing to maintain a consistent portfolio.

5. Empirical results

To evaluate the 24 ESG-related ETFs, equations (1–4) are used to generate the Sharpe, Sortino, Omega, and Calmar ratios using the 13-week treasury bill rate as a proxy for the risk-free rate where relevant [1]. Figure 1 compares the 24 ESG-focused ETFs with four popular

	Ticker	Number of stocks	Descriptions
	<i>BIBL</i>	101	<i>BIBL</i> ETF invests in US large-cap stocks that align with biblical values and have a positive impact on society, assessed by various ESG criteria that exclude stocks involved in abortion, gambling, alcohol, tobacco, pornography, LGBT lifestyle, or rights violations, with index selection based on a proprietary Impact Score, reviewed semi-annually, and rebalanced annually
	<i>BLES</i>	401	<i>BLES</i> ETF invests in companies that align with biblical values and have a positive impact on society, by screening out stocks involved in activities contrary to these values and selecting companies that provide education, disease fighting, aid for the poor and marginalized, Christian-themed products, good employee treatment, community involvement, and environmental stewardship. The index is equally weighted and rebalanced quarterly, with a portfolio composition of 50% domestic, 40% developed foreign, and 10% emerging market securities
	<i>CATH</i>	445	<i>CATH</i> ETF uses a principles-based approach to divest from companies that conflict with Catholic values according to the U.S. Conference of Catholic Bishops, including those involved in unconventional weapons, contraception, abortion, stem-cell research, and child labor, while maintaining cap-weighted exposure within each sector and the S&P 500 coverage
	<i>CHGX</i>	101	<i>CHGX</i> is a US large-cap ESG fund that uses sustainability metrics from Oekom Research AG to screen for 100 equally-weighted securities with sector weightings matching the Solactive US Large Cap Index. The fund was previously known as Change Finance US Large Cap Fossil Fuel Free ETF
	<i>CRBN</i>	1315	<i>CRBN</i> fund tracks an index of large- and midcap stocks from established and emerging markets with a focus on lower greenhouse gas and carbon emissions relative to sales and market cap, evaluated through MSCI ESG CarbonMetrics data, and is reviewed semi-annually
	<i>DSI</i>	404	<i>DSI</i> is a socially responsible ETF that excludes companies involved in weapons manufacturing, “vice” products, nuclear energy, and genetic modification, and ranks the remaining firms based on their ESG performance. The fund maintains market-like exposure and avoids large sector bets by overweighing technology and underweighting financial and industrials
	<i>EBLU</i>	35	<i>EBLU</i> provides exposure to developed-market water companies that derive at least 40% of gross revenues from either water infrastructure or water equipment and/or services while meeting minimum ESG requirements. The portfolio includes a few dozen names, heavily weighted towards the US
	<i>ERTH</i>	161	<i>ERTH</i> invests in companies worldwide that derive 50% or more of their revenue from six environmental impact themes and screens them based on ESG controversies, business involvement, and sustainable impact metrics, rebalancing quarterly. It was previously known as Invesco Cleantech ETF and tracked the Cleantech Index
	<i>ESG</i>	271	<i>ESG</i> offers exposure to US companies that demonstrate strong environmental, social, and governance attributes, as determined by a proprietary ESG score. The fund excludes companies that don’t adhere to UN Global Compact principles or are involved in controversial weapons or coal mining. It is rebalanced quarterly, with constituents weighted based on their ESG score
	<i>ESGD</i>	427	<i>ESGD</i> seeks to track an index that invests in developed market firms, excluding US and Canada, that display strong ESG characteristics while maintaining risk and return profiles similar to its parent index. Companies are rated based on their ESG performance and certain industries are excluded. An optimization process is used to maximize exposure to highly rated companies while maintaining market-like exposure, performance, and risk

Table 2.
A concise overview of
ESGs-focused equity
ETFs operating for
more than five years

(continued)

Ticker	Number of stocks	Descriptions
<i>ESGE</i>	335	<i>ESGE</i> invests in emerging market companies with strong ESG traits while maintaining market-like risk exposure. The fund uses portfolio optimization software to maximize its investment in highly-rated companies while completely rejecting companies involved in values-based controversies and climate change, and excluding those with severe business controversies
<i>ESGG</i>	837	<i>ESGG</i> provides global exposure to companies that display positive environmental, social, and corporate governance attributes, using an ESG score to weight qualifying constituents, and is rebalanced quarterly
<i>ESGN</i>	102	<i>ESGN</i> is comprised of large- and mid-cap stocks from the MSCI EAFE Index, excluding REITs, with a focus on ESGM Ratings of 1 or 2 and forward annualized dividend yield of at least 1%. Companies are scored based on dividend yield, growth, and coverage ratio, with the 100 highest-scoring securities included and rebalanced quarterly. The ESGM ratings draw from the Sustainability Accounting Standards Board (SASB) framework
<i>ESGS</i>	101	<i>ESGS</i> invests in large- and mid-cap US stocks with high ESG scores and forward annualized dividend yields of at least 1%. The 100 highest-scoring securities, based on sector and region-relative factors, are market cap-weighted and undergo quarterly reconstitution, while the Investment Manager's proprietary ESGM Ratings draw on the SASB framework
<i>ESGU</i>	311	<i>ESGU</i> invests in US companies with strong ESG traits while maintaining market-like exposure. The fund excludes companies involved in tobacco, controversial weapons, civilian firearms, thermal coal, and oil sands and removes companies with severe business controversies
<i>ETHO</i>	273	<i>ETHO</i> tracks an index of US equities with high climate efficiency, calculated by dividing greenhouse gas emissions by market capitalization, and excludes companies in specific industries such as energy and tobacco. The top scoring half of each industry is selected and weighted equally, providing a unique selection method for environmentally conscious investors
<i>ICLN</i>	98	<i>ICLN</i> invests in global companies involved in clean energy production and technology, such as biofuels, geothermal, hydroelectric, solar, and wind. The fund is weighted by market capitalization and exposure score, and is reconstituted semi-annually based on criteria determined by the index committee
<i>ISMD</i>	499	<i>ISMD</i> uses a "biblically responsible" investing approach, screening out companies with involvement in activities that contradict evangelical Christian values and scoring remaining firms based on alignment with those values, resulting in an equally-weighted portfolio of the 500 highest-scoring companies
<i>KGRN</i>	50	<i>KGRN</i> follows an index of Chinese companies generating significant revenue from clean technology across five environmental themes. The fund is market-cap-weighted, with each security weight capped at 10% and a maximum combined weight of 40% for securities with a 5% or greater weight
<i>KRMA</i>	178	<i>KRMA</i> tracks an equal-weighted index that considers ESG factors for five stakeholders: customers, employees, suppliers, stock and debt holders, and communities in which the company operates. It screens out companies that haven't exhibited positive ESG characteristics for three consecutive years and has a minimum capitalization of USD 2 billion, with no sector constraints. The index undergoes annual reconstitution in October and quarterly rebalance starting each in January
<i>NZAC</i>	955	<i>NZAC</i> invests in large- and mid-cap companies globally, using a climate-focused approach. The index screens out controversial weapons, tobacco, thermal coal mining, oil and gas, and power generation, and optimizes the portfolio to minimize climate change risks while providing exposure to sustainable opportunities

(continued)

Table 2.

Ticker	Number of stocks	Descriptions
SDG	161	SDG tracks an ESG-focused index of global companies that generate at least 50% of their revenue from products or services aligned with the United Nations' Sustainable Development Goals, focusing on health, energy, and education. The fund uses strict screens to exclude companies involved in alcohol, tobacco, or predatory lending, and weights holdings based on revenue from impact sales, rebalanced annually
SHE	282	SHE tracks an index of US large- and mid-cap companies that promote gender diversity and inclusiveness, using ESG metrics to score companies based on their gender-related policies and practices. Constituents are weighted by market cap and capped at 4.5%, with quarterly rebalancing
SUSA	173	SUSA tracks an index of socially conscious US large- and mid-cap equities with the highest MSCI ESG ratings, while excluding companies with tobacco and civilian firearms involvement and low ESG controversies scores. It weights its holdings by their ESG scores, caps security weights at 5%, and limits sector deviation from the broader MSCI USA index to 3%

Table 2. Source(s): The information in this table has been sourced from www.etf.com as of 10 April 2023

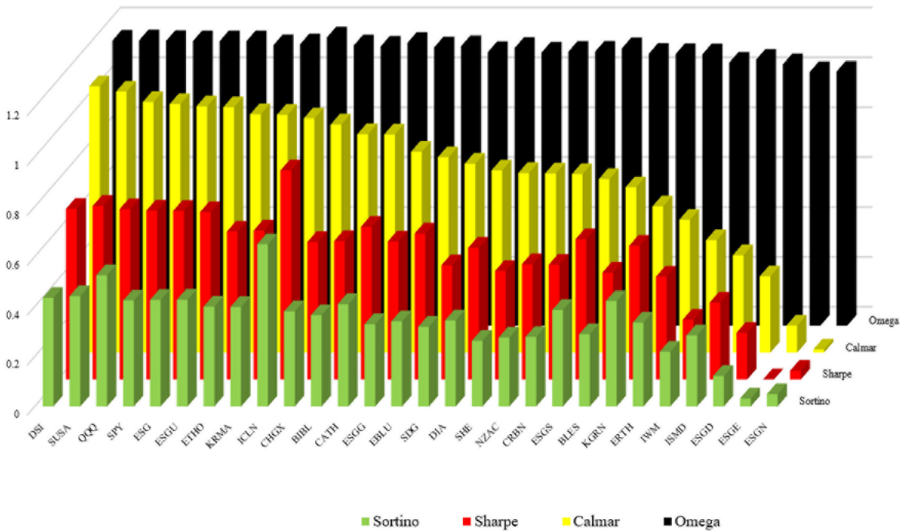


Figure 1. Risk-adjusted return measures over a five-year period (Nov 2018–March 2023)

Source(s): The authors' calculations

ETFs based on the Sharpe, Sortino, Omega, and Calmar ratios: QQQ (a proxy for NASDAQ), SPY (a proxy for S&P500), DIA (a proxy for Dow Jones), and IWM (a proxy for Russell 2000). While QQQ, SPY, and DIA represent large-cap companies, IWM is a well-diversified investment vehicle representing a market-cap-weighted index of 2000 small-cap stocks in the US. These four ETFs are typically found in the portfolios of passive investors.

All graphs in Figure 1 are arranged in descending order based on the Calmar ratio, indicating a positive but weak correlation between the four measures. Beginning with the Sharpe ratio, ICLN exhibits the highest ratio in the last five years, closely followed by SUSA and DSI. This suggests that these funds have delivered similar or superior risk-adjusted

returns compared to QQQ, SPY, DIA and IWM. A similar pattern emerges based on the Sortino ratio, with ICLN having the highest ratio, followed by QQQ, SUSA and DSI. This indicates that these funds not only deliver better risk-adjusted returns but also effectively limit downside risk. Examining the Omega ratio, ICLN, SUSA, and DSI once again have the highest ratios, signaling strong risk-adjusted returns over the sample period (November 2018–March 2023). The Calmar ratio in Figure 1 also reveals outstanding performance, especially for DSI, SUSA, and QQQ, even in relation to their maximum drawdown.

Overall, ICLN, SUSA, DSI, QQQ, and SPY emerge as top performers across all four ratios. However, focusing on ESG-focused ETFs specifically, they consistently outperform DIA and IWM across all four metrics. Table 3 illustrates the pairwise overlapping matrix (using market caps as weights) among the top five performing funds. Notably, ICLN shows minimal overlap with the other four top-performing ETFs (SUSA, DSI, ESG, and ESGU). In contrast, there is a significant degree of pairwise overlapping among SUSA, DSI, ESG, and ESGU, reflecting their similar top 10 holdings. Table 4 further reveals that Microsoft is a common top 10 holding in all five ETFs, with weightings ranging from 5.5% to 10.57%. Apple is also a shared holding in four out of five ETFs, with weightings ranging from 5.21% to 6.98%. Tesla and Alphabet appear as common holdings in three out of five ETFs.

The presence of mega-cap companies such as Apple, Microsoft, Alphabet, Amazon, and Tesla significantly influences the top-performing ESG funds, enhancing their overall returns and potentially aligning with ESG goals due to their financial strength. Analyzing the four complementary ratios, all ESG-focused ETFs consistently outperform IWM, except for ESGD, ESGN, and ESGE. This suggests that sustainable investing might be more effective for generating returns than investing in a diversified portfolio of small-cap stocks. The consistent outperformance of ESG-focused ETFs compared to IWM across all four metrics underscores the ability of companies with strong ESG credentials to deliver superior risk-adjusted returns. Approximately half of the ESG-focused ETFs also outperformed DIA, representing Dow Jones, emphasizing the importance of carefully selecting ESG-focused ETFs to align with specific investment goals and objectives.

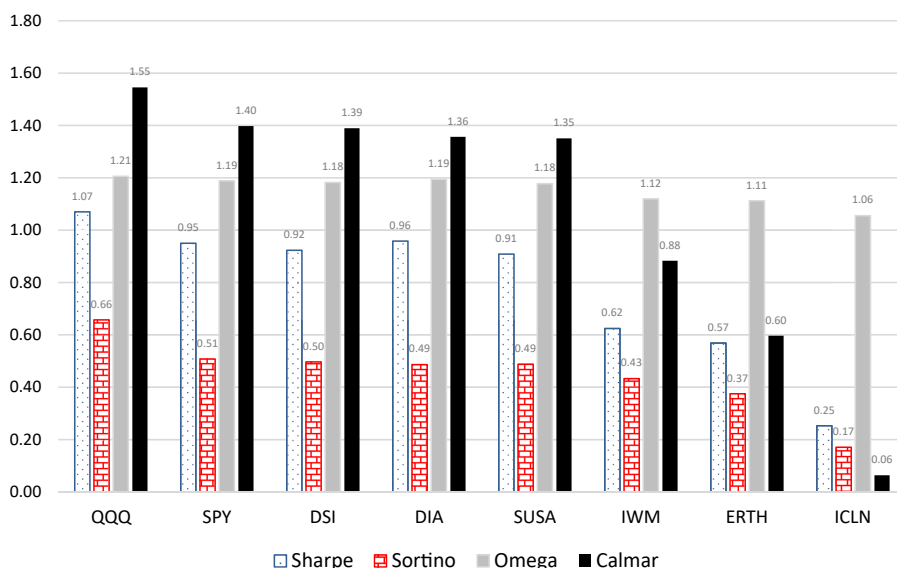
It could be argued that a five-year evaluation period is insufficient to assess the long-term performance of an investment fund. Among the 24 ETFs in the sample, only four (ICLN, DSI, SUSA, and EARTH) have a history of operation exceeding ten years. Notably, the inception dates of operation for ICLN, DSI, SUSA, and EARTH are June 2008, November 2006, January 2005, and October 2006, respectively. The first three of these funds have demonstrated superior performance in the last five years regardless of the performance measure considered (see Figure 1). In response to the assessment time span, Figure 2 provides a comparative analysis of these four ESG funds alongside four benchmark ETFs (QQQ, SPY, DIA, and IWM) over a common ten-year period (June 2009–April 2023) in which all four ESG funds

Ticker	ICLN	SUSA	DSI	ESG	ESGU	DIA	IWM	QQQ	SPY
ICLN	100								
SUSA	0	100							
DSI	0	54	100						
ESG	0	44	45	100					
ESGU	0	62	56	58	100				
DIA	0	21	23	31	25	100			
IWM	1	0	1	0	0	0	100		
QQQ	0	37	38	39	45	14	0	100	
SPY	0	46	54	62	74	25	0	46	100

Table 3.
Overlap matrix by
market capitalization
weight (%)

Source(s): The information was sourced from www.etfrc.com as of 16 February 2024

ICLN	Weight (%)	SUSA	Weight (%)	DSI	Weight (%)	ESG	Weight (%)	ESGU	Weight (%)
First Solar Enphase Energy Aberdrola SA	8.68	Microsoft	5.5	Microsoft	10.57	Microsoft	5.43	Apple	6.98
	7.47	Apple	5.25	NVIDIA	3.54	Apple	5.21	Microsoft	5.94
	6.88	NVIDIA	2.64	Alphabet Class A	3.17	Amazon	5.06	Amazon	2.58
SolarEdge Technologies	6.63	Coca-Cola	1.94	Alphabet Class C2	2.92	Meta Platforms	3.03	NVIDIA	1.99
Consolidated Edison	6.33	PepsiCo	1.67	Tesla	2.75	Exxon Mobil	2.91	Alphabet Class C	1.54
Vestas Wind Systems A	4.24	Home Depot	1.68	Visa Inc. Class A	1.9	Johnson and Johnson	2.59	Alphabet Class A	1.53
Orsted	2.87	Texas Instruments	1.65	Procter and Gamble	1.84	Berkshire Hathaway	2.57	Tesla	1.46
EDP-Energias de Portugal	2.65	Alphabet Class A1	1.6	Mastercard	1.62	JPMorgan	2.45	UnitedHealth Group	1.35
Centrais Elétricas Brasileiras	2.51	Tesla	1.46	Home Depot	1.53	Chevron	1.87	Coca-Cola	1.17
Plug Power	2.35	ONEOK	1.45	AbbVie	1.47	Tesla	1.74	Exxon Mobil	1.09
Total	50.61	Total	24.84	Total	31.31	Total	32.86	Total	25.63



Source(s): The authors' calculations

Figure 2.
Average measures
over a ten-year period
(June 2009–April 2023)

were in existence. The graph presents a sorting of all eight ETFs based on the magnitude of the Calmar ratio. While QQQ performs slightly better than the nine remaining ETFs, the differences in performance between SPY, DSI, DIA, and SUSA were scarcely distinguishable, regardless of the performance measure considered. Therefore, the conclusion can be drawn that DSI and SUSA, even a decade ago when sustainable investing was not as prevalent as it is today, performed comparably to the S&P 500 and Dow Jones indices.

With regard to the first question, the results suggest that some ESG-focused funds have exhibited higher risk-adjusted returns compared to popular broad-based ETFs, namely QQQ, SPY, DIA, and IWM, particularly with respect to downside risk. In particular, ICLN (in the five years) and SUSA and DSI (during the last five or ten years) have emerged as the top performers across all four ratios. Furthermore, nearly half of the ESG funds in this study outperformed DIA in the past five years, and almost all surpassed the Russell 2000 index in terms of risk-adjusted returns. These findings imply that investing in sustainable enterprises may be a more effective way of generating lower risk returns compared to other investment portfolios.

As for the final research question, the findings suggest that some ESG funds have persistently delivered better risk-adjusted returns in comparison to IWM and DIA. The mega-cap companies are among the most profitable in the world, and their presence in the ETFs has boosted their overall returns. However, one may argue that such large companies are naturally in better financial standing to pursue and afford ESG goals. Nevertheless, with growing awareness of the importance of ESG factors in investing, it is probable that more investors will view ESG funds as a viable investment option.

In summary, this study provides evidence-based findings that not all ESG-focused ETFs are created equal, and investors need to be cautious in their portfolio compilation. Investing in well-established ESG-focused ETFs can align with the literature's views that "doing well can also include doing good", or it is possible for investors to "do well while doing good". Put another way, investors can potentially achieve both financial success and social/environmental benefits by investing in well-ranked ESG funds.

6. Conclusion

Most ESG studies primarily use the Sharpe ratio without distinguishing between upside and downside markets. A limited number of studies have utilized Sortino and Omega ratios, but none have employed the Calmar ratio. In this study, we analyze 24 ESG-focused ETFs, employing four evaluation metrics (i.e. the Sharpe, Sortino, Omega, and Calmar ratios). We compare these ESG-focused funds to popular ETFs such as QQQ, SPY, DIA, and IWM, typically found in the portfolios of most passive investors. This study identifies ICLN, SUSL, and DSI as top performers across all four metrics, while most ESG-focused ETFs consistently outperform IWM. In addition, out of the 24 ESG-focused ETFs, 12 outperformed DIA. One should recognize that not all ESG funds are equal, and careful selection is essential to ensure that they meet investment goals and objectives. Mega-cap companies like Microsoft, Apple, Tesla, and Alphabet are common holdings in most of the top-performing ETFs, which can pursue and afford the implementation of ESG goals. These findings are not surprising because before the *dot-com* bust in 2000, the S&P500 was primarily dominated by financial and energy companies, with IBM as the sole representative of the tech sector. However, today, the top seven largest companies in the S&P500 all belong to the tech sector, including Apple, Microsoft, Alphabet, Amazon, Tesla, and Meta Platforms (Valadkhani and Moradi-Motlagh, 2023). This transformation underscores the tech industry's increasing significance as a "productivity enhancer" and its growing dominance in the equity market. This transformation has led to increased productivity, enhanced efficiency, flexible work arrangements, and innovation across diverse industries. It goes without saying that past performance is not a guarantee of future results, and investors should conduct their due diligence before making investment decisions. Fund managers must ensure that their investment decisions align with their clients' financial goals, investment horizon, risk tolerance, and ethical values as part of their fiduciary duty.

Note

1. Alternatively, one can compute these measures using an online portfolio lab provided by Shevchenko (2023).

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