Is It Good to Be Bad? – The Quest for Understanding Sin vs. ESG Investing

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INTRODUCTION

ESG investing is a dynamic trend in portfolio management that centers on a company's Environmental, Social, and Governance (ESG) scores, reflecting their commitments to environmental responsibility, social practices, and governance attributes. As ESG investing gains popularity, it transforms from a niche strategy to a mainstream investment approach, profoundly influencing capital allocation and corporate practices. This evolution signifies a broader shift towards recognizing the comprehensive impacts of investments and aligning them with sustainable and responsible principles. As detailed in our blog post titled 'Backtesting ESG Factor Investing Strategies,'[1] the utilization of ESG scores as indicators draws upon multiple motivations ranging from religious or non-financial concerns to a growing interest in socially responsible and environmentally friendly investments, and the recognition that high ESG scores often align with better financial performance.

The ascent of ESG investing is unmistakable. However, a substantial challenge lies in the absence of a standardized ESG scoring framework. Despite numerous companies providing ESG data, the lack of comparability among scores persists. This challenge is further compounded by a lack of transparency from ESG data providers regarding their rating methodologies. In the blog post titled 'ESG Ratings Disagreement in 2023,'[2] we bring attention to the issue of dissimilarities in ESG ratings among various agencies, with reference to the paper authored by Ehling, Lundeby, and Sørensen (2023). These authors delve into the implications of portfolio selection arising from recognized disparities in ESG scores. From a risk assessment perspective, optimized ESG portfolios exhibit more pronounced variations among themselves than compared to the benchmark, suggesting that distinct scores from various rating agencies lead to diverse portfolio compositions. For a more comprehensive analysis of the measurement of ESG scores and a deeper exploration of prevalent issues within ESG data, we recommend a blog post 'Quant's Look on ESG Investing Strategies.'[3]

Numerous researchers have investigated the complex relationship between ESG and financial performance, yet a consensus on this matter continues to remain elusive. Some studies suggest positive associations, affirming the benefits of responsible practices[4], while others report neutral or mixed results. According to Statman and Glushkov (2008)[5], the return advantage gained from including stocks of companies with strong social responsibility characteristics is balanced out by the return disadvantage resulting from excluding stocks of companies in industries that are often avoided by socially responsible portfolios.

The primary objective of this paper is to identify which, if any, approach is the most accurate. In other words, we aim to determine if there is a statistically significant difference in the

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[1] Hanicova, Daniela and Vojtko, Radovan, Backtesting ESG Factor Investing Strategies (June 22, 2020). Available at SSRN: https://ssrn.com/abstract=3633303 or http://dx.doi.org/10.2139/ssrn.3633303

[2] https://quantpedia.com/esg-ratings-disagreement-in-2023/

[3] Vojtko, Radovan and Padyšák, Matúš, Quant's Look on ESG Investing Strategies (December 16, 2019). Available at SSRN: https://ssrn.com/abstract=3504767 or http://dx.doi.org/10.2139/ssrn.3504767

[4] See see Huppé (2011); Clark, Feiner & Viehs (2015)

[5] STATMAN, Meir; GLUSHKOV, Denys. The wages of social responsibility. *Financial Analysts Journal*, 2009, 65.4: 33-46.

performance of Sinner and Saints investments. To achieve this, we will initially construct sector factors, based on a selection of Exchange-Traded Funds (ETFs) representing diverse sectors, alongside style factors, notably size and value. These factors will serve as independent variables in Ordinary Least Squares (OLS) regression. We will conduct two separate regressions, one with Saints vs Sinners spread portfolio as the dependent variable and another with Broad ESG vs SPY spread portfolio. Afterward, we will analyze the factor loadings within these spread portfolios and search for any "Saints minus Sinners" or "ESG minus SPY" alpha in these portfolios. Additionally, we will investigate whether the performance of these spread portfolios can be attributed to factors that we can explain, such as exposure to specific sectors or investment styles.

We develop a trading strategy involving adopting long positions on value-based investments leaders and short positions on ESG laggards. As previously mentioned, the essence of ESG metrics varies among data providers, resulting in divergent scores for the same firm. This discrepancy is further amplified by the utilization of distinct measurement techniques, weighting methods, and composition rules across different providers. Consequently, the precise evaluation and comparison of ESG scores become challenging, impeding the accurate assessment of a company's sustainability performance. To address these challenges, we have chosen to work with already diversified ETFs instead of focusing solely on individual stocks. This approach allows us to create an investment universe consisting of already diversified 'Sinners ETFs' and 'Saints ETFs', as we term them.

DATA

We sourced our data from ETF Global, an independent provider of comprehensive data on exchange-traded products. The Expanded ETF Taxonomy offered by ETF Global categorizes U.S. Listed Exchange-Traded Products by Asset and Geographic segments, along with attributes related to Product Structure, Strategy, Style, and Exposure. This robust dataset enabled us to thoroughly screen the investment universe and identify ETFs relevant to our analysis. We specifically targeted the oldest funds in terms of inception date within the U.S. market. The usage of ETF taxonomy data helped us to build this ESG analysis on ETFs, we could directly study diversified portfolios of stocks with needed thematic exposure, and we didn't have to rely on ESG grading data and face problems with inconsistent grading from different providers of ESG data, that are traditionally encountered when researcher use stocks as the investment universe and asset of the study.

From the pool of ETFs, we identified three Contrarian ESG ETFs: B.A.D. ETF (BAD), AdvisorShares Vice ETF (VICE), and Constrained Capital ESG Orphans ETF (ORFN). These ETFs invest in sectors that are often associated with morally or socially controversial activities, including tobacco, alcohol, gambling, firearms, and fossil fuels. VICE, with an inception date of 12.12.2017, is the most recent among them.

There exists one more potential candidate for inclusion into the “Sinner ETFs” – the DRLL. However, even though the co-founder Vivek Ramaswamy likes to frame this ETF as an “anti-woke”, and “anti-ESG” investment, it’s in reality a concentrated energy sector ETF (that is even investing a significant part of the portfolio into the hydroelectric power, solar, wind, geothermal and biomass companies, that are traditionally considered strongly pro-ESG investments). For this reason, plus for the reason of a very short history (DRLL started in 2022), we decided not to include this ETF in the “Sinners”, or “Saints” group.We also considered three Catholic Values ETFs: Global X S&P 500 Catholic Values ETF (CATH), Global X S&P Catholic Values Developed ex-U.S. ETF (CEFA), FIS Knights of Columbus Global Belief ETF (KOCG), all of

which concentrate on companies aligned with Catholic values encompassing social responsibility, human rights, and environmental sustainability. Our selection further extended to seven Biblical Values ETFs: Inspire 100 ETF (BIBL), Inspire Global Hope ETF (BLES), Inspire Fidelis Multi Factor ETF (FDLS), Inspire Faithward Mid Cap Momentum ETF (GLRY), Inspire Corporate Bond ETF (IBD), Inspire Small/Mid Cap ETF (ISMD), Inspire International ETF (WWJD), investing in companies reflecting biblical teachings and values, such as ethical business practices and responsible resource stewardship. Among these, CATH, initiated on 18.4.2016, has the earliest inception date.

Lastly, we assessed ten Broad ESG ETFs: iShares MSCI USA ESG Select ETF (SUSA), iShares MSCI KLD 400 Social ETF (DSI), WisdomTree U.S. ESG Fund (RESP), Etho Climate Leadership U.S. ETF (ETHO), WisdomTree Emerging Markets ESG Fund (RESE), iShares MSCI Global Sustainable Development Goals ETF (SDG), Columbia International ESG Equity Income ETF (ESGN), Columbia U.S. ESG Equity Income ETF (ESGS), iShares ESG Aware MSCI EAFE ETF (ESGD) and iShares ESG Aware MSCI EM ETF (ESGE). 'Broad ESG Equity' ETFs invest in diversified range of equities adhering to Environmental, Social, and Governance (ESG) criteria. These ETFs aim to provide exposure to a diverse set of companies demonstrating robust ESG practices while striving for returns in line with the broader market. SUSA, commencing on 03.01.2011, is the oldest among this category.

METHODOLOGY

We sourced price data from Yahoo Finance, utilizing the Adjusted Close Price for each ETF. This metric reflects a stock's price adjusted to consider various corporate actions or events that could impact its value. These actions may encompass stock splits, dividends, rights offerings, and other relevant events. Based on this data, we computed the daily performance of each ETF, commencing on December 31, 2010.

First, we conducted a factor analysis and subsequently assembled the 'Factor Index.' Our focus encompassed nine primary sectors: Energy (XLE), Utilities (XLU), Technology (XLK), Materials (XLB), Consumer Staples (XLP), Consumer Discretionary (XLY), Industrial (XLI), Health Care (XLV), and Financials (XLF). We excluded Real Estate (XLRE) and Communication Services (XLC). Regarding the derivation of sector factors, we initially computed the daily performance of each sector ETF. Subsequently, we calculated the differential daily performance between each sector ETF and the daily performance of the market. For instance, the Energy factor was determined by subtracting the daily performance of the SPY (S&P 500 Index) from the daily performance of the XLE (Energy ETF). Additionally, we incorporated the three style factors introduced by Fama and French (1992)[6]: Size, Value, and Market Beta Factors. The Size factor was determined by computing the daily performance differential between the iShares Russell 2000 ETF, comprised of small-capitalization U.S. equities (IWM), and the S&P 500 Index (SPY). The Value factor was determined by calculating the daily performance differential between the iShares S&P 500 Value ETF, which includes large-capitalization U.S. equities (IVE), and the iShares S&P 500 Growth ETF (IVW). Lastly, the Market Beta factor was established by computing the daily performance differential between the S&P 500 Index (SPY) and the SPDR Bloomberg 1-3 Month T-Bill ETF (BIL). We obtained 12 factors in total.

[6] FAMA, Eugene F.; FRENCH, Kenneth R. The cross-section of expected stock returns. *the Journal of Finance*, 1992, 47.2: 427-465.

Second, we established the 'Sinners Index,' which comprises three Contrarian ESG ETFs: BAD, VICE, and ORFN. Due to variations in their inception dates, we constructed an equally-weighted index using the following approach: we began by computing the daily performance average of VICE. After including BAD, we calculated the average performance of both VICE and BAD. Lastly, incorporating ORFN, we determined the daily performance average of all three ETFs. The construction of the 'Saints Index' (Broad ESG Equity Index) followed a similar pattern. We computed the daily performance average of the Saints (Broad ESG Equity) ETFs, with their number increasing progressively over the observation period.

We formulated spread portfolios by adopting a long position in the 'Broad ESG Index' while concurrently assuming a short position in the S&P 500 index. Additionally, we established another spread portfolio by going long on the 'Saints Index' and concurrently taking a short position in the 'Sinners Index'. Subsequently, we conducted an Ordinary Least Squares (OLS) regression analysis, in which the spread portfolios acted as dependent variables, while sector and style factors served as independent variables. This analysis can help identify which sectors or style factors are driving the performance differences between the 'Broad ESG Index' and the S&P 500 index.

RESULTS

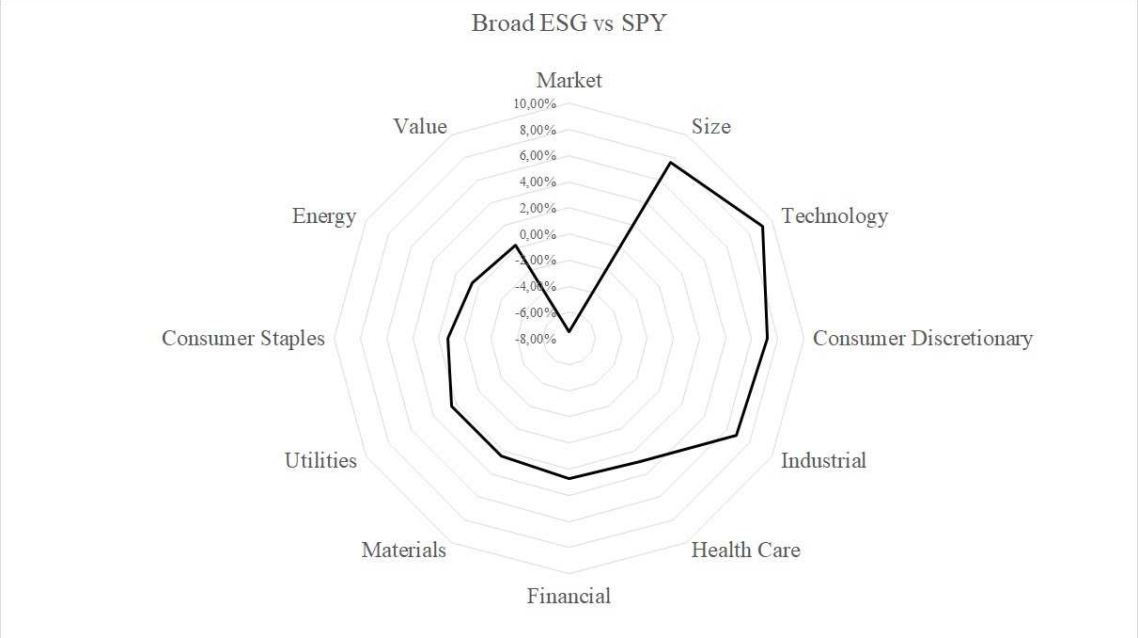
Broad ESG vs SPY

Table 1 presents result of an OLS regression in which the dependent variable was spread portfolio 'Broad ESG vs SPY' and the independent variables were sector and style factors. The analysis revealed that the Broad ESG index did not exhibit a statistically significant alpha (as indicated by the t-statistic of 0.17) when compared to the S&P 500 index (SPY). This suggests that any observed deviations in performance between the two indices are likely due to other factors rather than unique attributes of the Broad ESG index. Among the factors considered, the market factor stands out as particularly influential. The t-statistic of -15.124 indicates its strong impact on the spread portfolio's performance. Notably, the analysis reveals that the Broad ESG index has a lower beta compared to the broader market (SPY), indicating a tendency toward reduced market sensitivity.

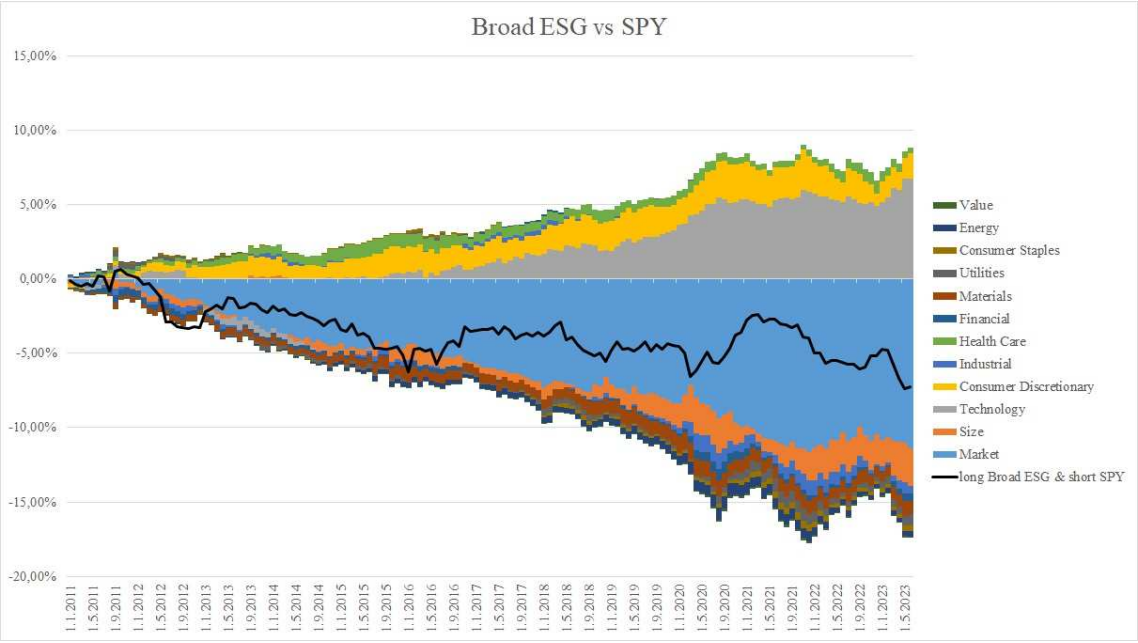
	Coefficients	*Standard Error*	*t Stat*
Intercept	7,17E-06	4,22E-05	0,169908
Market	-0,07499	0,004958	-15,1239
Size	0,075545	0,00784	9,636091
Technology	0,091139	0,01533	5,945142
Consumer Discretionary	0,072029	0,010703	6,729916
Industrial	0,068017	0,010913	6,232693
Health Care	0,028554	0,009873	2,892158
Financial	0,027129	0,010542	2,573436
Materials	0,024167	0,007928	3,048301
Utilities	0,023733	0,00577	4,11324
Consumer Staples	0,013323	0,010087	1,320853
Energy	0,005993	0,004525	1,324562
Value	0,002505	0,016115	0,155448

Table 1 Broad ESG vs SPY OLS regression results

To illustrate the sector and style factors that influenced the performance disparities between the 'Broad ESG' index and the SPY index, we present Chart 1. Positive values along the x-axis signify the 'Broad ESG' index's outperformance, whereas negative values indicate its underperformance across different sectors. Notably, it exhibited underperformance solely within the Market Sector.



To enhance the clarity of how various sectors and styles contribute to the overall returns of a portfolio, we provide Cumulative Factor Contribution Chart 1. The cumulative contribution graph clearly illustrates that the primary reason contributing to underperformance is the lower beta of the Broad ESG portfolio in comparison to the SPY ETF. The graph highlights that the spread portfolio's negative market beta has a significant negative impact, accounting for over a -10% reduction in the overall spread portfolio performance.



Cumulative Factor Contribution Chart 1 Broad ESG vs SPY

Additionally, we provide a representation of the spread portfolio's performance through Figure 1, which displays an equity curve downsloping over time.



Figure 1- Equity curve for Broad ESG vs SPY

In the financial market, it is widely believed that companies with high volatility and high beta tend to be smaller and of lower quality, resulting in significant underperformance compared to low volatility and low beta stocks. This phenomenon is frequently discussed in financial literature.[7] Moreover, stocks with strong ESG (Environmental, Social, and Governance) ratings are often associated with lower volatility and beta. Dunn et al. [8] provide empirical support for this concept and demonstrate that stocks with the lowest ESG exposures exhibit total and stock-specific volatility levels that are 10-15% higher, along with betas up to 3% higher, in comparison to stocks with the highest ESG exposures. Additionally, Avramov et al. [9], while primarily focused on examining how ESG uncertainty can influence the risk-return trade-off, also support this notion and confirm that stocks with higher ESG ratings tend to have lower beta. According to Albuquerque et al.[10] companies with higher CSR (Corporate Social Responsibility) scores exhibit statistically and economically significant reductions in volatility exposure. Specifically, a one-standard-deviation increase in a firm's CSR score is linked to a 1% decrease in the firm's beta compared to the sample mean beta.

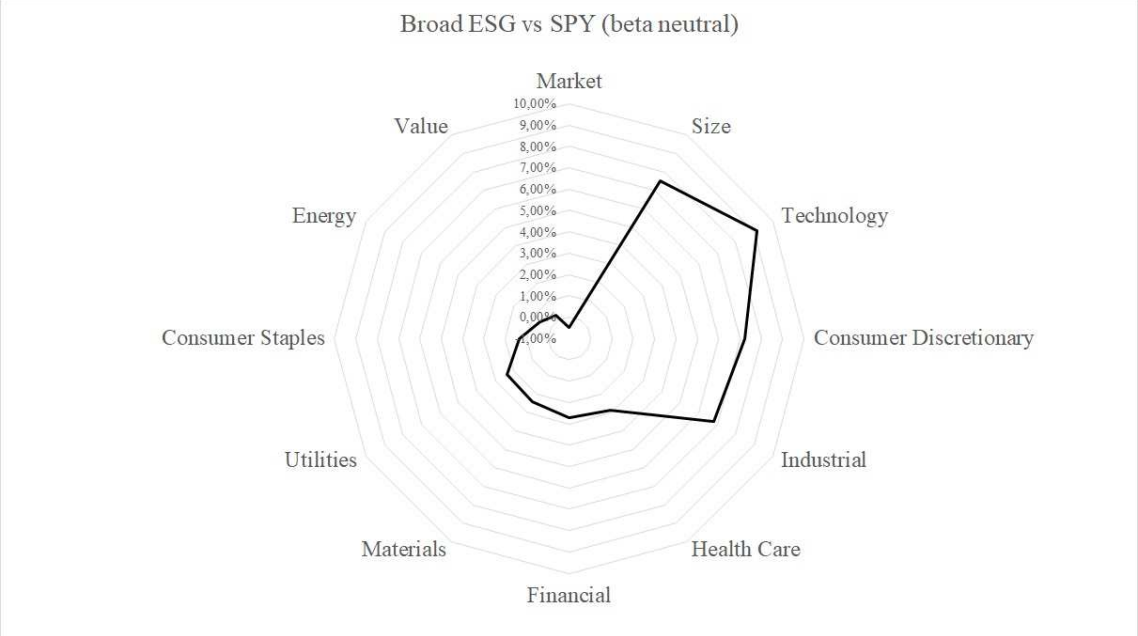
[7] see Jensen et al. (1972), Baker et al. (2011), Novy-Marx (2014)
[8] DUNN, Jeff; FITZGIBBONS, Shaun; POMORSKI, Lukasz. Assessing risk through environmental, social and governance exposures. *Journal of Investment Management*, 2018, 16.1: 4-17.
[9] AVRAMOV, Doron, et al. Sustainable investing with ESG rating uncertainty. *Journal of Financial Economics*, 2022, 145.2: 642-664.
[10] ALBUQUERQUE, Rui; KOSKINEN, Yrjö; ZHANG, Chendi. Corporate social responsibility and firm risk: Theory and empirical evidence. *Management Science*, 2019, 65.10: 4451-4469.

Based on these findings, we opted to construct a beta-neutral portfolio instead of a dollar-neutral one, aiming to neutralize its exposure to systematic market risk. To achieve this, we implemented a strategy of shorting 7% less SPY. This strategic move unveiled that Broad ESG outperforms SPY as illustrated on Table 2.

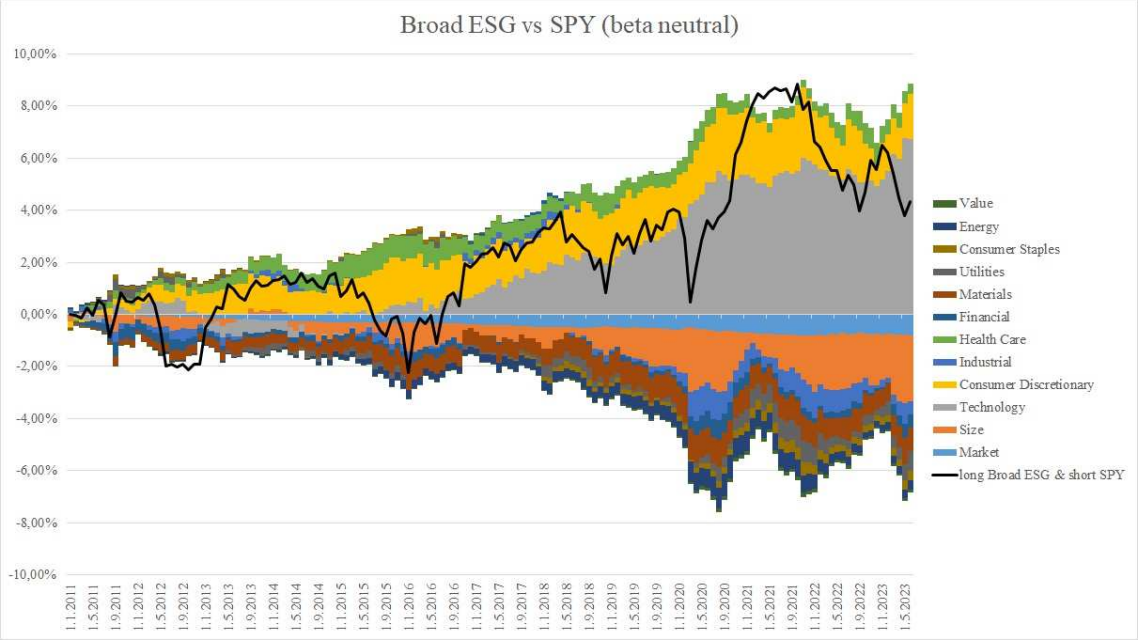
	Coefficients	*Standard Error*	*t Stat*
Intercept	8,95E-06	4,22E-05	0,211905
Market	-0,00502	0,004958	-1,01308
Size	0,075475	0,007839	9,628216
Technology	0,091334	0,015328	5,958511
Consumer Discretionary	0,072094	0,010702	6,736712
Industrial	0,068035	0,010912	6,234973
Health Care	0,028549	0,009872	2,891949
Financial	0,027077	0,010541	2,568846
Materials	0,024149	0,007927	3,046287
Utilities	0,023745	0,005769	4,115741
Consumer Staples	0,013277	0,010086	1,316412
Energy	0,005989	0,004524	1,323854
Value	0,002711	0,016114	0,168226

Table 2 Broad ESG vs SPY OLS regression results, beta neutral

This can be attributed to the inherent characteristic of broad ESG portfolios, which maintain a higher allocation of Technology and Consumer Discretionary stocks compared to the S&P 500 (SPY). These sectors, namely Technology and Consumer Discretionary, have consistently demonstrated superior performance relative to SPY over the past decade. During the process of crafting the beta-neutral portfolio by excluding low beta equities, technology stocks have maintained their presence within the portfolio composition.



This underscores the resilience of technology stocks as contributors to the portfolio's performance despite the focus on achieving beta neutrality, as depicted in the Chart 2 and Cumulative Factor Contribution Chart 2. Figure 2 shows ascending trend of beta neutral portfolio's performance indicating its growth over time.



Cumulative Factor Contribution Chart 2 Broad ESG vs SPY, beta neutral



Figure 2- Equity curve for Broad ESG vs SPY, beta neutral

But does it mean that ESG investing is superior after all? Unlikely. It seems to say that Tech and Consumer Discretionary stocks outperform, and ESG happens to benefit by artifact of favoring those sectors - which might be a fickle value-based decision, which could change at any time.

Sinners vs Saints

Opinions on the impact of sinners/saints stocks differ, but many ETFs operate under the assumption that sin stocks deliver superior performance. For example, work of Fabozzi et al.[11] reveals significant returns associated with vice or sin stocks, which consistently outperformed standard benchmarks. Hong and Kacperczyk's research[12] shows that sin stocks often yield higher expected returns compared to similar stocks. This observation aligns with the notion that investors who adhere to social norms and are exposed to increased legal risks due to societal expectations tend to overlook these stocks. To address the question of whether 'Sinner Stocks' outperform 'Saints,' or it's the other way, let's thoroughly examine the results of our analysis. Here we have a regression analysis of spread portfolio that is going long on the 'Saints Index' and concurrently taking a short position in the 'Sinners Index'.

	Coefficients	*Standard Error*	*t Stat*
Intercept	3,06E-05	0,000179	0,171261
Market	-0,03141	0,018511	-1,69706
Size	-0,29989	0,029368	-10,2116
Consumer Staples	-0,12976	0,037409	-3,4688
Health Care	-0,04204	0,039637	-1,06058
Energy	-0,00206	0,01503	-0,13694
Consumer Discretionary	0,00083	0,039075	0,021247
Materials	0,039511	0,030187	1,308872
Utilities	0,062185	0,021407	2,904883
Industrial	0,098213	0,041484	2,36751
Financial	0,110269	0,038481	2,86553
Technology	0,261501	0,061115	4,278818
Value	0,145834	0,056071	2,600883

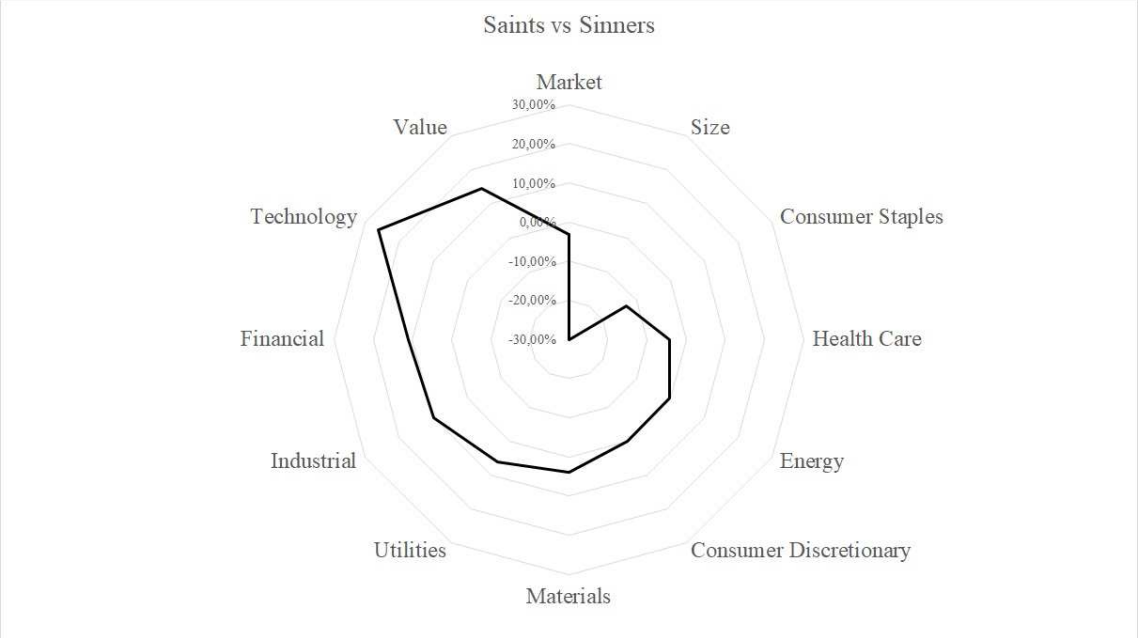
Table 3 Saints vs. Sinners portfolio, regression results

As shown in Table 3, the size factor displays a significantly negative loading with strong statistical significance (t-statistic of -10.212), highlighting a distinct difference in the sizes of saint stocks in comparison to sinners. This observation is in line with the understanding that companies aligning with saint attributes often tend to be substantially larger in scale. Larger enterprises possess enhanced resources to fulfill rigorous ESG criteria, leading to favorable performance outcomes. Conversely, the underperformance of sinners predominantly stems from their relatively smaller size.

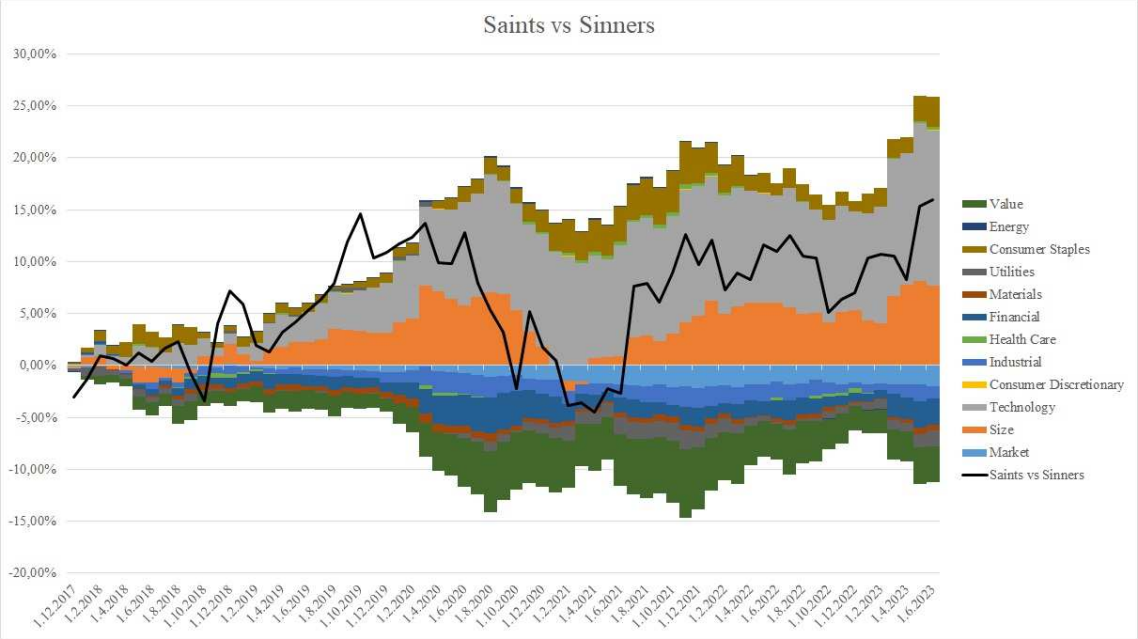
So, what's the quick takeaway from our results? Our analysis suggests that Sinners do not outperform Saints; rather, it's the Saints that outperform the Sinners. Although the bigger point seems to be that what appears to be ESG is actually just the Fama-French SIZE factor at work (plus exposure to a few individual sectors), if we look beyond the cover (as the Intercept of the regression is technically 0).

[11] FABOZZI, Frank J.; MA, K. C.; OLIPHANT, Becky J. Sin stock returns. *The Journal of Portfolio Management*, 2008, 35.1: 82-94.

[12] HONG, Harrison; KACPERCZYK, Marcin. The price of sin: The effects of social norms on markets. *Journal of financial economics*, 2009, 93.1: 15-36.



These dynamics are clearly illustrated in the Cumulative Factor Contribution Chart 3.



Cumulative Factor Contribution Chart 3 – Saints vs Sinners

The performance of Saints vs Sinners portfolio illustrates Figure 3.

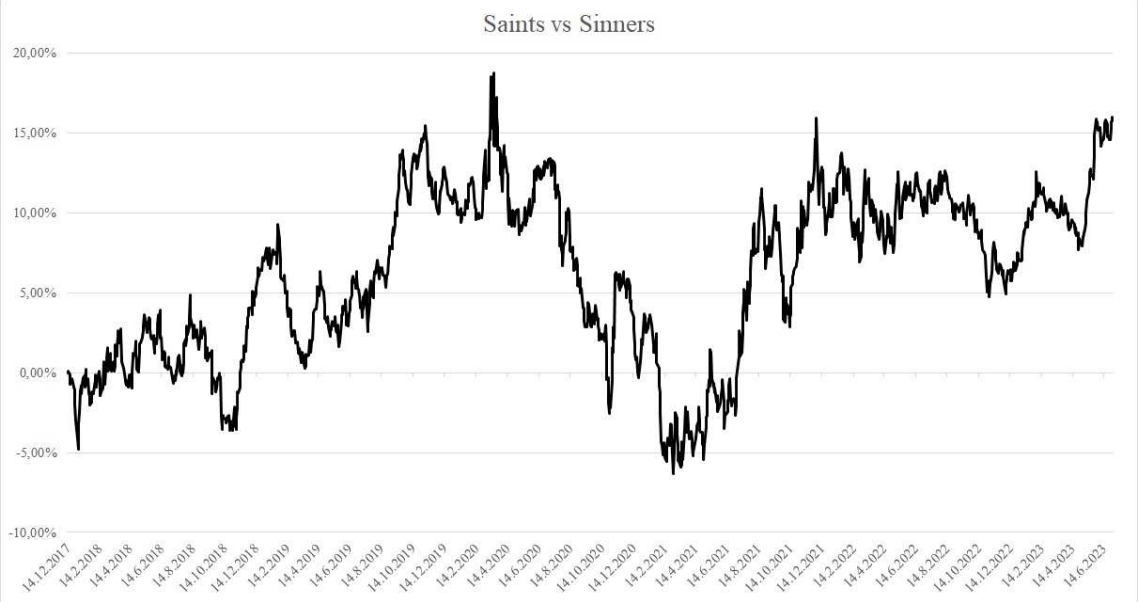


Figure 3- Equity curve for Saints vs. Sinners

CONCLUSION

ESG score abbreviates the Environmental, Social, and Governance scores, encompassing vital dimensions of a company's performance. Despite its appeal, ESG scoring faces significant complexities stemming from a lack of a unified system.

The main motivation for this paper was to quantify the relationship between ESG score and performance. For this purpose, we constructed two spread portfolios: Broad ESG vs SPY and Saints vs Sinners. These portfolios served as the dependent variables in the Ordinary Least Squares (OLS) regression analysis that we conducted. The independent variables used in this analysis were the sector and style factors.

Regarding the Broad ESG vs SPY portfolio, our findings reveal the absence of a statistically significant alpha, accompanied by a lower beta for the Broad ESG Index. Nevertheless, within the context of a beta-neutral portfolio, the Broad ESG index exhibits outperformance relative to SPY. This performance discrepancy can largely be attributed to the unique composition of the Broad ESG index, particularly its significant exposure to technology stocks.

Shifting our focus to the Sinners vs Saints Index comparison, it becomes evident that the underperformance of the Sinners Index can primarily be attributed to the factor of size. Notably, this indicates that companies adhering to saint attributes tend to be larger, benefiting from their greater resources and capacity to meet stringent ESG criteria.

In essence, this analysis sheds light on the intricate relationships within ESG investing, showcasing the nuanced interplay of factors that contribute to performance outcomes across different indices. It underscores the need for a comprehensive understanding of these multifaceted dynamics when making investment decisions in the realm of sustainable and responsible investing.

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