

2023

U.S. Public Equity ESG Fund Composite and Parnassus Core Equity Fund: Performance and Factor Attribution

Karthik Nemani

University of North Carolina at Chapel Hill

Barrett Buhler

University of North Carolina at Chapel Hill

Follow this and additional works at: <https://commons.case.edu/discussions>



Part of the [Corporate Finance Commons](#), [Economics Commons](#), and the [Finance and Financial Management Commons](#)

Recommended Citation

Nemani, Karthik and Buhler, Barrett (2023) "U.S. Public Equity ESG Fund Composite and Parnassus Core Equity Fund: Performance and Factor Attribution," *Discussions*: Vol. 19: Iss. 1, Article 3.

DOI: <https://doi.org/10.28953/2997-2582.1050>

Available at: <https://commons.case.edu/discussions/vol19/iss1/3>

This Article is brought to you for free and open access by the Undergraduate Research Office at Scholarly Commons @ Case Western Reserve University. It has been accepted for inclusion in Discussions by an authorized editor of Scholarly Commons @ Case Western Reserve University. For more information, please contact digitalcommons@case.edu.



U.S. Public Equity ESG Fund Composite and Parnassus Core Equity Fund: Performance and Factor Attribution

Karthik Nemani^a, Barrett Buhler^b

^aDepartment of Business and Department of Statistics, Kenan-Flagler Business School, University of North Carolina at Chapel Hill, Chapel Hill, NC ^b Department of Statistics, Kenan-Flagler Business School, University of North Carolina at Chapel Hill, Chapel Hill, NC

Abstract

This is the first paper to examine all U.S. public equity Environmental, Social, and Governance (ESG) funds offered by the Forum for Sustainable and Responsible Investment's (SIF) institutional member firms from 2005 to 2020. For ease of communication, this will be called the ESG Composite. With a Net Asset Value (NAV) over \$150 billion, these funds comprise nearly half of the U.S. public equity ESG investment landscape. The article finds that the ESG Composite maintains performance with the Standard and Poor's (S&P) 500 total return index on an overall returns basis with lower volatility, indicating greater risk-adjusted returns. Factor analysis reveals that the ESG Composite returns are primarily driven by underleveraged exposure to market returns as well as prevalence of mid-to-large cap and high beta stocks. When isolating the largest fund in the ESG Composite – the Parnassus Core Equity Fund (PRBLX) portfolio – this study finds significant outperformance over the S&P 500 on an overall returns basis. Factor analysis reveals greater emphasis on underleverage to the market and greater preference for large cap, high beta stocks. When compared to the global mutual fund universe, the ESG Composite outperforms in annualized returns and Sharpe ratios, whereas the PRBLX portfolio outperforms in annualized returns, annualized Sharpe ratios, annualized alphas, and annualized information ratios. Conclusions drawn from this study will (1) supplement the discussion on ESG usefulness and (2) present actionable investment insights.

Introduction

ESG is a broad term that refers to the consideration of environmental, social, and governance standards into investors' decisions for portfolio selections. Generally, ESG companies seek to generate positive societal byproducts

as assessed by nonfinancial data such as carbon emissions, employee satisfaction, and board structure (Armstrong, 2020).

In the past several years, ESG investing in the U.S. public equity market increased exponentially, surpassing \$380 billion in net assets in 2021 (Lev, 2021). Such rapid popularity was accompanied by heavy controversy and ESG bans across the United States. Florida Governor Ron DeSantis passed anti-ESG legislation in July 2022 that prohibited "State Board of Administration (SBA) fund managers from

BIOGRAPHY

Karthik Nemani is an ambitious and environmentally-conscious sophomore double majoring in Business and Statistics at the Kenan-Flagler Business School of UNC Chapel Hill. Fueled by his passion for environmental sustainability, Karthik combines his interests by observing environmental trends from a financial and economic viewpoint using quantitative statistical tools such as R. Outside of academics, Karthik is an avid outdoors enthusiast who enjoys playing tennis and expressing his artistic side through the violin. Furthermore, he actively contributes to his campus community as the assistant director on the executive committee of the Impact Investing Fund, a student-led organization that manages over \$15,000 by investing in ESG-rated companies and strategies, helping to foster a sustainable future through responsible investing.

My name is Barrett Buhler and I am a rising senior studying statistics at UNC Chapel Hill.

considering ESG factors when investing the state's money" (Spectrum News Staff, 2022). In August, Texas Republican Comptroller Glenn Hegar released a list of 10 companies and 348 ESG investment funds – including BlackRock, Credit Suisse, and UBS – that were barred from doing business with the state. A year prior, Texas enacted legislation prohibiting most state agencies and local governments from contracting with such firms (Freedman, 2022).

The primary reason for such bans is the belief that the costs to financial returns outweigh the societal benefits of ESG investing. Florida anti-ESG legislation claims "...the rise of ESG investing [which] sacrifices returns at the altar of...woke agendas," referring to ESG standards as "woke." Furthermore, they state ESG investing "[drives] up costs for consumers in the name of diversity and [sidelines] hardworking Americans by threatening their livelihoods" (Spectrum News Staff, 2022). In a statement the Texas Republican Comptroller said, "The environmental, social and corporate governance movement has produced an opaque and perverse system in which some financial companies no longer make decisions in the best interest of their shareholders or their clients," (Freedman, 2022).

"The models and procedures from the study of 70 U.S. public equity ESG funds and the isolated Parnassus Core Equity ESG Fund provide conclusive empirical evidence that U.S.-based public equity ESG funds produce greater risk-adjusted returns than the market."

This paper seeks to assess the validity of such statements concerning ESG by comparing the financial returns of the U.S. public equity ESG funds offered by the Forum for Sustainable and Responsible Investment's (SIF) – the ESG Composite – institutional member firms to the S&P 500 total return index on several metrics including cumulative return, annualized return, and Sharpe ratio. It then compares the largest individual fund comprising the ESG Composite – the PRBLX portfolio – to the S&P 500 total return index on the same metrics. Next, it compares the ESG Composite and the PRBLX portfolio to the global mutual fund universe

on annualized returns, annualized Sharpe ratios, annualized alphas, and annualized information ratios. Lastly, it conducts a factor analysis of the ESG Composite and the PRBLX portfolio to draw investment insights.

This paper proceeds as follows: section 3 reviews the literature, section 4 presents the data and empirical strategy, section 5 reviews the results, and section 6 concludes.

Literature Review

There are numerous papers that study the link between ESG performance and financial performance. For instance, Friede et al. (2015) used evidence from over 2,000 studies of ESG and financial performance and found that 90% of these studies contain a non-negative relationship that remains approximately the same over time. While this study does find that there is a more positive relationship between ESG and the financial performance of bonds, it does not deny the existence of a positive relationship between ESG and the financial performance of equities.

Whelan et al. (2022) build upon Friede et al. (2015) by aggregating over 1,000 studies written between 2015 and 2020. In the corporate studies primarily focused on financial performance, they found that at least 58% of them found a positive relationship between ESG and financial performance. In studies focused on risk-adjusted metrics, 33% of them found a positive relationship, 26% found a neutral relationship, 28% found mixed results, and only 14% found a negative relationship.

Preston and O'Bannon (1997) established several theoretical points of view that express a direction and reason for the relationship between ESG and financial performance. These hypotheses have since been widely adopted in literature, and are as follows: social impact hypothesis, supply and demand hypothesis, trade-off hypothesis, available resources hypothesis, and the managerial opportunism hypothesis.

The social impact hypothesis posits that higher levels of corporate social responsibility (CSR) lead to improved financial performance. This relationship is suggested in the instrumental theories of Garriga and Melé (2004), including the well-known stakeholders' theory, which states that corporations should strive to do right by all of their stakeholders (including employees, customers, suppliers, local communities, environmental groups, and governmental groups) to achieve true lasting success. Stakeholders' theory

is diametrically opposed to shareholders' theory, which states that a company's sole motivation should be to advance its shareholders' interests (McAbee, 2022). The social impact hypothesis believes that CSR procures financial performance by creating competitive advantages in the market (Jain et al., 2017), improving reputation (Fombrun and Shanley, 1990), building brand image (Murray and Montanari, 1986), and strengthening legitimacy (Hart and Christensen, 2002). In terms of reputation, Cornell and Shapiro (1987) find that when a company ignores the preferences of interest groups, it damages its own reputation, which inversely increases risk premium and overall financial risk. On the other hand, Cornell and Shapiro maintain that the cost of CSR is almost negligible to its potential benefits.

"U.S. public equity ESG funds produce greater risk-adjusted returns than the market itself."

Most outstanding literature reviews support the social impact hypothesis, such as Griffin and Mahon (1997), which found that 33 out of 51 reviewed studies describe a positive correlation between CSR and financial performance. Following this trend, Frooman (1997) found that companies deemed to be irresponsible in their social policies obtained lower profits. Orlitzky et al. (2003) obtained similar results when conducting a meta-analysis of over 50 studies between 1970 and 1997, confirming a positive relationship between socially responsible behavior and financial performance. However, Godfrey et al. (2009) noted that the reason for a positive correlation varied between results, such as the positive effect of reputation, or the different methods of measuring CSR and financial performance. Adding to the supportive findings of Orlitzky et al. (2003), Allouche and Laroche (2005) found in an analysis of 82 studies spanning the U.S. and the U.K. that CSR has a positive effect on financial results, with a greater effect measured in the U.K. Tang et al. (2012) also validated the social impact hypothesis, but only when the CSR is adopted as a consistent strategy. In emerging economies, Mishra and Suar (2010) found that CSR strategies prioritizing stakeholders' theory can be profitable to Indian firms. Hebb et al. (2016) revealed empirical evidence about the positive relationship between CSR and aspects such as the degree of CSR awareness and stakeholder pressure in Spain. Therefore, there exists a positive relationship between CSR and financial performance, where CSR is the driving force or independent

variable of the relationship.

The supply and demand hypothesis posits that there is no clear link between social and financial performance, as pointed out by McWilliams and Siegel (2001). Roman et al. (1999) found support for this hypothesis in just 14 of 52 studies reviewed dealing with this relationship. Margolis and Walsh (2003) found evidence for a weak relationship between CSR and financial results in an analysis of 127 studies, in which 31 found it to be either absent or nonsignificant. Van Beurden and Gossling (2008) found nine studies with neutral results, including those by Bowman (1978), Aupperle et al. (1985), Freedman and Jaggi (1986), Fombrun and Shanley (1990), Ruf et al. (2001), and Seifert et al. (2004). There were also studies that found a relationship but reached contradictory conclusions, finding that the relationship is either indeterminate or neutral, according to whether it is positive or negative. Griffin and Mahon (1997) found nine studies with mixed results out of 51, and in the work of Margolis and Walsh (2003) there were 23 out of 27.

According to the trade-off hypothesis, higher CSR levels lead to lower financial performance. Friedman (1970) argues that businesses have no responsibilities other than achieving the highest possible profits, so investing in CSR involves an extra cost that places a company at a disadvantage in relation to its competitors and brings in lower profits. Very few authors found a negative relationship between CSR and financial results in their investigations. Some of the most important empirical studies that did so were those by Brammer et al. (2006) and Van der Laan et al. (2008).

The available resources hypothesis links good financial performance with high levels of CSR. According to Waddock and Graves (1997), good financial results mean that money can be invested in CSR, so that high profits could be a good indicator of subsequent good social results.

Of the above-mentioned reviews, Margolis and Walsh (2003) concentrate the most on studies that consider social responsibility as a dependent variable. Of 22 of this type, 16 found a positive correlation, i.e., good financial performance leads to the adoption of CSR; three found the correlation to be nonsignificant, and three more found it to be bidirectional. Studies such as those by McGuire et al. (1988, 1990) provide empirical support for this hypothesis.

The managerial opportunism hypothesis, empirically validated in the work of Posner and Schmidt (1992), considers

“Adopting holdings strategies of the PRBLX portfolio can offer the greatest financial benefits of ESG investing.”

that higher financial performance levels lead to lower CSR levels. Authors such as Person and O’Bannon (1997) argue that directors may act to increase their personal benefits and reduce investment in CSR when profit levels are high. Similarly, if profits are low, directors may attempt to justify the situation by blaming ambitious social programs.

Although a substantial number of studies show a positive relationship between financial performance and individual companies exhibiting CSR strategies, few look at the landscape of ESG funds, which compile such companies to build an entire portfolio. Furthermore, the scope of “positive financial performance” is loosely defined and often differing in many studies, with no standard benchmark for returns to be compared with. Some studies have compared ESG funds

with a benchmark, but these funds also hold international equities or bonds and inaccurately compare them to the U.S. public equity-based S&P 500. This study compares a list of 70 U.S. public equity ESG funds to the S&P 500 to maintain the “apples-to-apples” theme and generate tangible, consistent metrics of performance.

Data and Empirical Strategy

U.S. SIF

The ESG Composite is formed by filtering public equity ESG funds offered by the U.S. SIF member firms. The U.S. SIF is supported by the U.S. SIF Foundation, a 501(c)(3) nonprofit organization that seeks to educate, research and propel the mission of U.S. SIF (US SIF, 2022). It is the leading voice in advancing sustainable investing across all asset classes with the mission to “rapidly shift investment practices toward sustainability, focusing on long-term investment and the generation of positive social and environmental impacts.” Institutional members of the U.S. SIF manage \$5 trillion in assets under management (AUM), and include investment management and advisory firms; mutual fund companies;

Table 1. Summary Statistics for the ESG Composite Versus the S&P 500

Summary Statistics	ESG Composite Return	S&P 500 Total Return
Cumulative Return (01/01/2005 - 12/31/2020)	319.19%	325.06%
Annualized Return	10.04%	10.13%
Standard Deviation	14.51%	16.40%
Downside Deviation	12.45%	22.85%
Sharpe Ratio	0.60	0.54
Sortino Ratio	0.70	0.39
Active Return (vs. S&P 500 Total Return)	-0.09%	N/A
Tracking Error (vs. S&P 500 Total Return)	3.45%	N/A
Information Ratio (vs. S&P 500 Total Return)	-0.03	N/A

Table 2. Summary Statistics for the PRBLX Portfolio Versus the S&P 500

Summary Statistics	PRBLX Portfolio Return	S&P 500 Total Return
Cumulative Return (01/01/2005 - 12/31/2020)	436.10%	325.06%
Annualized Return	11.84%	10.13%
Standard Deviation	14.04%	16.40%
Downside Deviation	10.65%	22.85%
Sharpe Ratio	0.75	0.54
Sortino Ratio	0.99	0.39
Active Return (vs. S&P 500 Total Return)	1.72%	N/A
Tracking Error (vs. S&P 500 Total Return)	4.84%	N/A
Information Ratio (vs. S&P 500 Total Return)	0.35	N/A

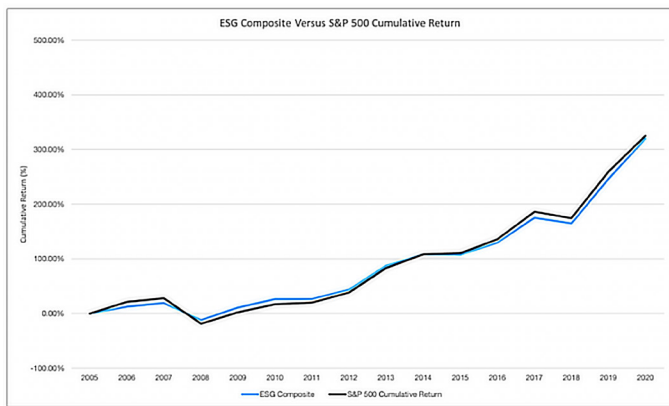


Figure 1. ESG Composite Versus S&P 500 Cumulative Returns

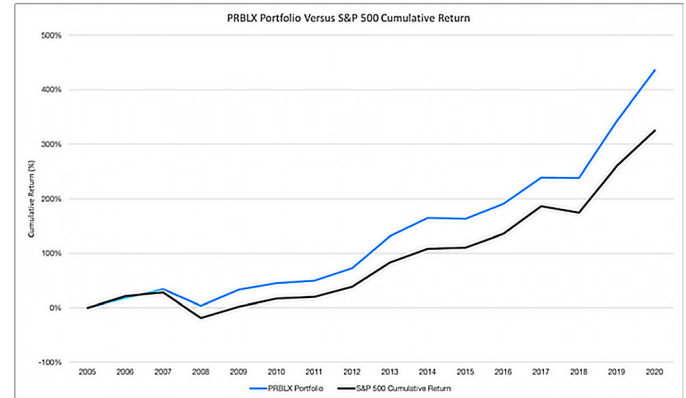


Figure 2. PRBLX Portfolio Versus S&P 500 Cumulative Returns

assets owners and broker-dealers, among others.

ESG Composite

The ESG Composite was created by filtering U.S. SIF Sustainable Investment Mutual Funds and ETFs Chart to all U.S. public equity ESG funds on the database.

ESG Composite, PRBLX, & Mutual Funds Returns Data

Annual total returns of over 23,000 active equity mutual funds through the year 2020 were scraped from YahooFinance and accumulated into one dataset (Kurapatskie & Darnall, 2013).

This dataset is available to the public, along with <https://finance.yahoo.com>. This dataset was filtered for over 10,000 active equity mutual funds that were operative during some period between January 2005 and December 2020. The ESG Composite was further filtered from this list to the 70 funds from the U.S. SIF database, and annual total returns of each fund from 2005 to 2020 were provided.

Annual total returns data for the PRBLX portfolio were provided by Yahoo finance (Parnassus Core Equity Fund, 2020). Annual total returns data for the S&P 500 total return index were provided by YahooFinance (S&P, 2020). Methods for calculating returns can be found in the appendix.

$$(R_{p,t} - R_{f,t}) = \alpha + \beta * (R_{m,t} - R_{f,t}) + \epsilon t \quad (1)$$

$$(R_{p,t} - R_{f,t}) = \alpha + \beta_{MKT} * (R_{m,t} - R_{f,t}) + \beta_{SMB} * SMB_t + \beta_{HML} * HML_t + \epsilon t \quad (2)$$

$$(R_{p,t} - R_{f,t}) = \alpha + \beta_{MKT} * (R_{m,t} - R_{f,t}) + \beta_{SMB} * SMB_t + \beta_{HML} * HML_t + \beta_{UMD} * UMD_t + \epsilon t \quad (3)$$

Calculating ESG Composite Returns

Unlike the PRBLX portfolio and S&P 500, the ESG Composite is a list of funds. A simple average or median of list returns were susceptible to high volatility from small funds, so a weighted average based on NAV was used. The total NAV of the ESG Composite was calculated by summing each NAV, and then a proportion was calculated by dividing fund-specific NAV by the sum. Finally, the proportion was multiplied by annual total return for each fund per year, and year-specific values were summed to create NAV-weighted annual total returns for the ESG Composite.

Factor Data and Analysis

In a factor analysis of the ESG Composite and PRBLX portfolio excess returns ($R_{p,t} - R_{f,t}$), several specifications and regressions were provided using popular academic factors, with data from January 2005 to December 2020. This includes the CAPM (Equation 1) regressing the ESG Composite and PRBLX portfolio excess returns on a leverage factor (MKT-Rf) defined by the S&P 500 minus the risk-free 3-month T-bill rate:

Analysis also includes a Fama-French (1993) Three Factor Model (Equation 2) that regresses the ESG Composite and PRBLX portfolio excess returns on a leverage factor (MKT-R) in addition to size (SMB) and value (HML) factors obtained from the Ken French data library:

Another specification is provided using the Carhart (1997) Four Factor Model (Equation 3) that includes a momentum factor (UMD), also obtained from the Ken French data library:

In separate specifications, this study also regresses the

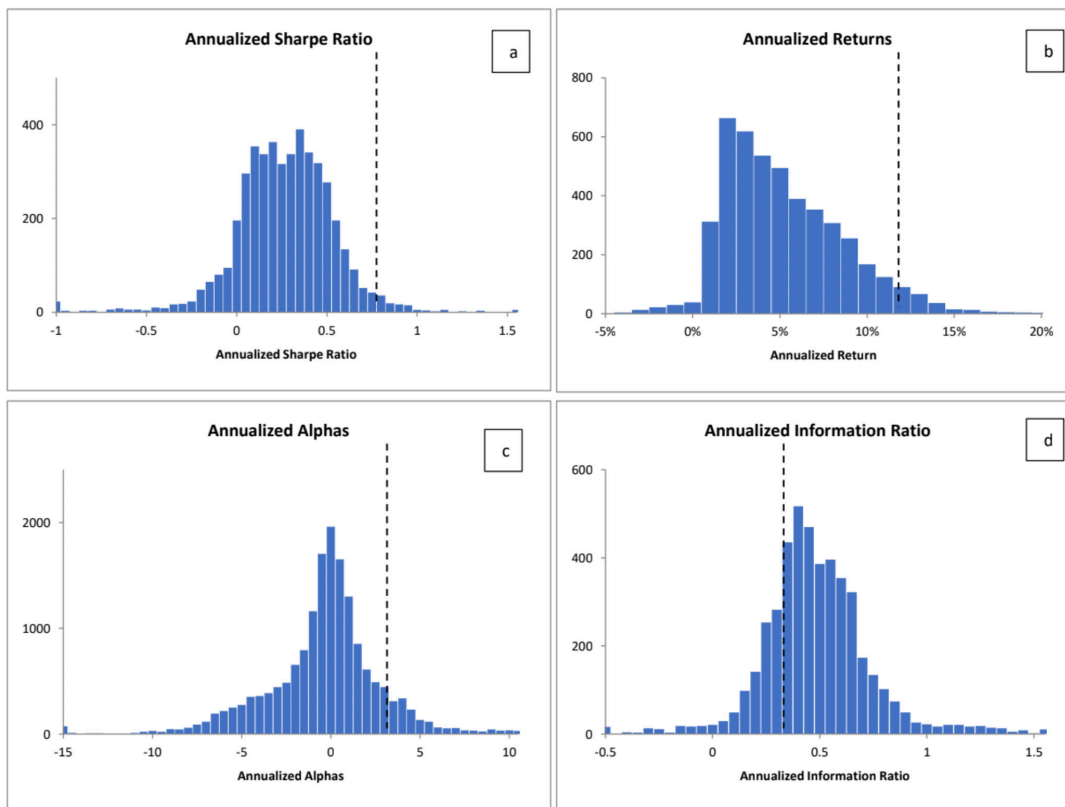


Figure 3. ESG Composite Compared to YahooFinance Mutual Fund Universe (Jan. 1, 2005 – Dec. 31, 2020)

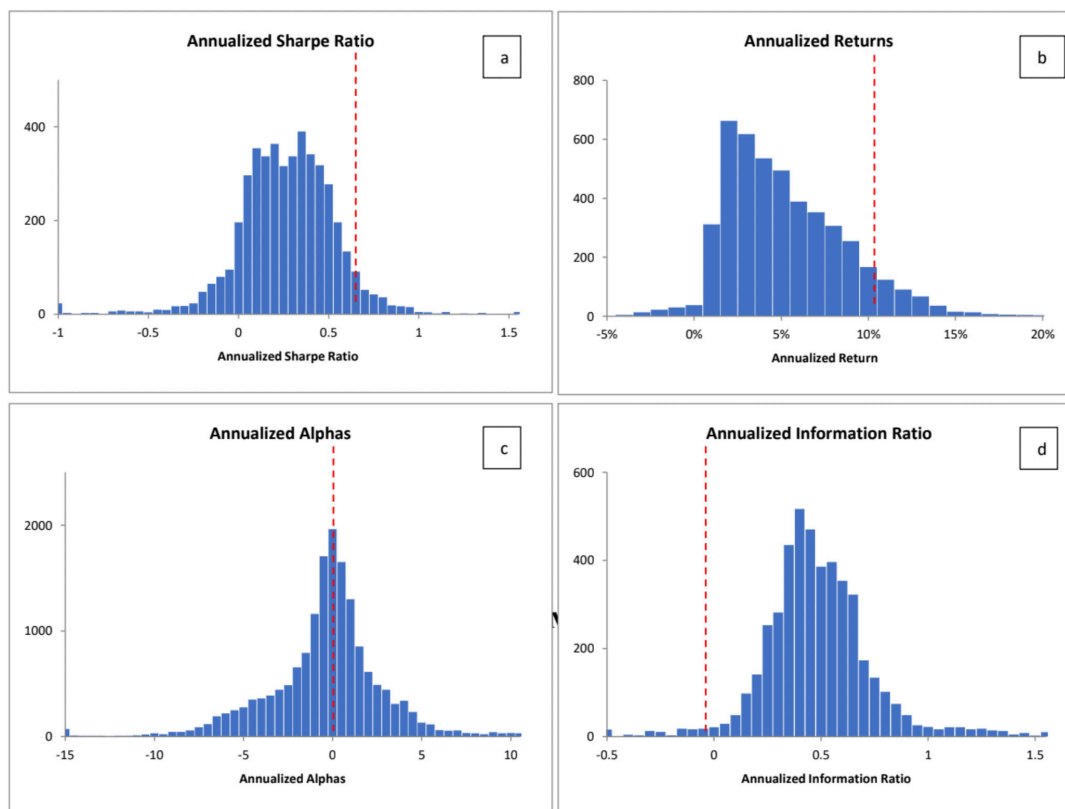


Figure 4. PRBLX Portfolio Compared to YahooFinance Mutual Fund Universe (Jan. 1, 2005 – Dec. 31, 2020)

PRBLX portfolio excess returns on the Frazzini and Pedersen (2014) Betting-Against-Beta factor and the Asness et al. (2013) Quality Minus Junk (QMJ) factor.

Synthetic Portfolio Construction

Systematic synthetic portfolios are constructed from the same regressions of monthly returns in Table 3 and Table 4, namely the Four Factor regression using data over the entire time period of January 2005 to December 2020. The portfolio is rebalanced annually at year-end to keep constant weights. The explanatory variables are the monthly returns of the standard size, value, and momentum factors.

Results

ESG Composite versus S&P 500

Table 1 displays the side-by-side performance of the ESG Composite and the S&P 500 total return index.

On cumulative return, the ESG Composite is less than the S&P 500, at 319.91% and 325.06%, respectively. Annualized return of the ESG Composite is approximately equal to the S&P 500, with a difference of 0.09%. Standard deviation of the ESG Composite is less than the S&P 500, with a difference of 1.89%. Downside deviation of the ESG Composite is much

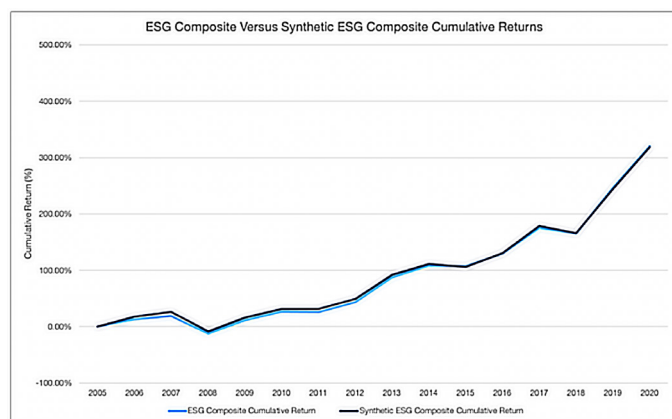


Figure 5. ESG Composite vs. Synthetic ESG Composite Cumulative Returns

lower than the S&P 500, with a difference of 10.4%. Sharpe ratio of the ESG Composite is slightly greater than the S&P 500, with a difference of 0.06. However, the Sortino ratio of the ESG Composite is nearly double the S&P 500, with a difference of 0.31. Active return and Information Ratio of the ESG Composite are both negative, but tracking error is relatively low at 3.45%.

Figure 1 below displays the ESG Composite and S&P 500 cumulative returns tracked from 2005 to 2020. Table 2 displays the side-by-side performance of the PRBLX portfolio and the S&P 500 total return index.

Table 3. ESG Composite Exposures: What Kind of Companies Do U.S. Public Equity ESG Funds Own?

	<u>CAPM</u>	<u>Fama-French</u> (1993)	<u>Carhart (1997)</u>	<u>Frazzini</u> <u>Pedersen (2014)</u>	<u>Asness</u> <u>Frazzini</u> <u>Pedersen (2013)</u>
Alpha	0.497% (0.491)	0.074% (0.932)	0.283% (0.754)	0.226% (0.716)	-0.283% (0.738)
MKT-Rf	0.834*** (~0)	0.868*** (~0)	0.850*** (~0)	0.951*** (~0)	0.979*** (~0)
SMB	N/A	-0.066 (0.543)	-0.097 (0.397)	-0.163* (0.063)	-0.123 (0.201)
HML	N/A	0.031 (0.376)	0.026 (0.457)	0.013 (0.601)	0.002 (0.955)
UMD	N/A	N/A	-0.031 (0.338)	-0.027 (0.235)	-0.030 (0.196)
BAB	N/A	N/A	N/A	-2.218*** (0.004)	-2.242*** (0.005)
QMJ	N/A	N/A	N/A	N/A	0.930 (0.381)

The PRBLX portfolio has a significantly greater cumulative return than the S&P 500, at 436.10% versus 325.06%, respectively. Annualized return of the PRBLX portfolio is also greater than the S&P 500, with a difference of 1.71%. Standard deviation of the PRBLX portfolio is less than the S&P 500, with a difference of 2.36%. Downside deviation of the ESG Composite is significantly lower than the S&P 500, with a difference of 12.2%. The Sharpe ratio of the ESG Composite is greater than the S&P 500, with a difference of 0.21. Furthermore, the Sortino ratio of the PRBLX is over double the S&P 500, with a difference of 0.6. Active return and Information Ratio of the PRBLX portfolio are both positive, indicating outperformance over the S&P 500. Tracking error is still low at 4.84%.

Figure 2 displays the PRBLX portfolio and S&P 500 cumulative returns tracked from 2005 to 2020.

Versus Global Mutual Fund Universe

Figure 3 shows where the ESG Composite (vertical red dashed line) compares against the distribution of annualized returns, Sharpe ratios, alphas, and information ratios of all actively managed equity funds operative between 2005 and 2020.

Figure 3a shows the ESG Composite in the higher ranges of annualized Sharpe ratio amongst the mutual fund universe. Figure 3b shows the ESG Composite in the higher ranges of annualized returns amongst the mutual fund universe. Figure 3c shows the ESG Composite near the center of the annualized alphas amongst the mutual fund universe. Figure 3d shows the ESG Composite near the lower ranges of annualized information ratios amongst the mutual fund universe.

Figure 4 shows where the PRBLX portfolio (vertical black dashed line) compares against the distribution of annualized returns, Sharpe ratios, alphas, and information ratios of all actively managed equity funds operative between 2005 and 2020.

Figure 4. PRBLX Portfolio Compared to YahooFinance Mutual Fund Universe (Jan. 1, 2005 – Dec. 31, 2020)

Figure 4a shows the PRBLX portfolio in the higher ranges of annualized Sharpe ratios amongst the mutual fund universe. Figure 4b shows the PRBLX portfolio in the higher ranges of annualized returns amongst the mutual fund universe. Figure 4c shows the PRBLX portfolio near the center of the annualized alphas amongst the mutual fund universe. Figure 4d shows the PRBLX portfolio near the lower ranges

Table 4. PRBLX Portfolio Exposures: What Kind of Companies Does the PRBLX Portfolio Own?

	<u>CAPM</u>	<u>Fama-French</u> (1993)	<u>Carhart (1997)</u>	<u>Frazzini</u> <u>Pedersen (2014)</u>	<u>Asness</u> <u>Frazzini</u> <u>Pedersen (2013)</u>
Alpha	2.66%** (0.039)	2.26% (0.133)	2.66%* (0.086)	2.60%* (0.061)	1.64% (0.357)
MKT-Rf	(0.779***) (~0)	0.815*** (~0)	0.778*** (~0)	0.898*** (~0)	0.950*** (~0)
SMB	N/A	-0.195 (0.284)	-0.255 (0.177)	-0.332* (0.063)	-0.258 (0.194)
HML	N/A	0.018 (0.744)	0.009 (0.871)	- 0.007 (0.8916)	-0.027 (0.625)
UMD	N/A	N/A	-0.061 (0.247)	-0.056 (0.2268)	-0.063 (0.196)
BAB	N/A	N/A	N/A	-2.609* (0.0617)	-2.655* (0.064)
QMJ	N/A	N/A	N/A	N/A	1.748 (0.421)

of annualized information ratios amongst the mutual fund universe.

Factor Attribution

Table 3 displays the results of factor regression of the ESG Composite.

Alpha values for the Capital Asset Pricing Model (CAPM), Fama-French, Carhart, Frazzini Pedersen, and Asness-Frazzini-Pedersen equations are statistically insignificant. Thus, no conclusions can be drawn from them. Traditional leverage factor betas (MKT- Rf) are statistically significant on the 1% scale across all equations, ranging from 0.834 to 0.979. Small minus big (SMB) factor beta is statistically significant at the 10% scale, with a negative value of -0.163. Betting-against-beta (BAB) factor betas are statistically significant at the 1% scale in both equations that incorporate them, with values less than -2.2.

Table 4 displays the results of factor regression of the ESG Composite.

Alpha values for the CAPM, Carhart, and Frazzini-Pedersen equations are statistically significant, with values around 2.6%. Traditional leverage factor betas (MKT- Rf) are statistically significant on the 1% scale across all equations, ranging from 0.779 to 0.950. Small minus big (SMB) factor beta is statistically significant at the 10% scale, with a negative value of -0.332. Betting-against-beta (BAB) factor betas are statistically significant at the 1% scale in both equations that incorporate them, with values less than -2.6.

Synthetic Portfolio Adjustment

Figure 5 shows calendar-time returns of a synthetic portfolio of the ESG Composite that uses the factor loadings as estimated from factor regression analysis.

Figure 6 shows a zoomed view of the calendar-time returns of the synthetic ESG Composite portfolio.

The synthetic ESG Composite slightly outperforms the ESG Composite's actual cumulative returns for the entire period, particularly between 2005 and 2012, with an approximately 6% improvement in 2007 and an approximately 5% improvement in 2010.

Figure 7 shows calendar-time returns of a synthetic portfolio

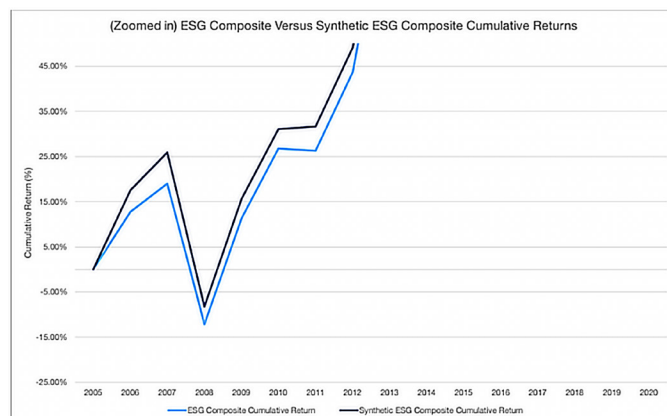


Figure 6. (Zoomed in) ESG Composite vs. Synthetic ESG Composite Cumulative Returns

of the PRBLX portfolio that uses the factor loadings as estimated from factor regression analysis.

The synthetic ESG Composite slightly underperforms the PRBLX portfolio's actual cumulative returns for the entire period, particularly between 2005 and 2015, with an approximately 10% decrease in 2013 and an approximately 15% decrease in 2015.

Interpretation

ESG Composite

Due to statistically insignificant differences in cumulative return and annualized return, it can be assumed that the ESG Composite produces approximately equal returns as the S&P 500. This is supported in Figure 1, as there is little deviation between cumulative returns at any point in the period of analysis. In a worst-case scenario, the ESG Composite minimally underperforms, as active return and information ratio are only slightly negative. Ultimately, it can be concluded that both U.S. public equity ESG funds and the S&P 500 will produce a return of approximately 10% per year. On the other hand, the volatility of the ESG Composite is significantly less than the S&P 500, as shown by the lower standard and downside deviation. The S&P 500's particularly high downside deviation implies that, compared to U.S. public equity ESG funds, investing in the S&P 500 produces a greater risk of negative returns. The ESG Composite produces greater risk-adjusted returns due to lower volatility combined with equal returns. This point is supported by the fact that the Sharpe ratio and the Sortino ratio of the ESG Composite are higher than the S&P 500. The ESG Composite's particularly high Sortino ratio implies that, compared to the S&P 500, investing in U.S. public equity ESG

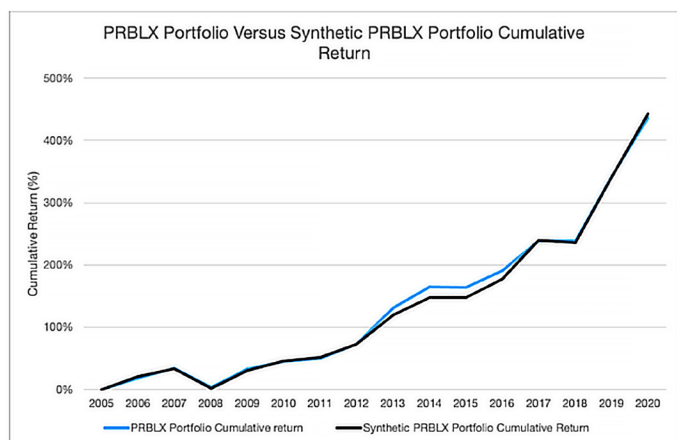


Figure 7. PRBLX Portfolio vs. Synthetic PRBLX Portfolio Cumulative Returns

funds produces much greater risk-adjusted returns.

Figure 3 shows the ESG Composite in the higher ranges of annualized Sharpe ratio and annualized returns of the global mutual fund universe. This implies that the U.S. public equity ESG funds generally outperform mutual funds on both a returns and risk-adjusted returns basis. Annualized alpha values of the ESG composite are average compared to the mutual fund universe, indicating that the U.S. public equity ESG funds offer just as much outperformance over the market as the average mutual fund. Supplementing average to above-average returns with exceptional risk-adjusted returns implies that U.S. public equity ESG funds offer much more stability than their mutual fund competitors.

As described in the introduction, the primary reason for ESG bans in the U.S. is the concern of fewer returns. This analysis dissuades such sentiment by proving that U.S. public equity ESG funds produce greater risk-adjusted returns than the market itself.

Factor analysis of the ESG Composite finds statistically insignificant alpha values across all equations, suggesting that U.S. public equity ESG funds do not deviate much in returns from the S&P 500. Across all specifications, the results demonstrate slight leverage (investing in the market portfolio), with traditional leverage factor betas near one, especially in the Asness-Frazzini Pedersen equation. The relatively low tracking error of the ESG Composite supports this idea, along with Figure 1. In the Frazzini-Pedersen equation, the study finds that the ESG Composite has more exposure to large caps given the negative SMB factor. When including the Frazzini and Pedersen (2014) Betting-Against-Beta factor and the Asness et al. (2013) Quality Minus Junk

(QMJ) factor, this study finds further evidence that the ESG Composite tilts toward large cap stocks and stocks with high beta exposure.

PRBLX Portfolio

With significant differences in cumulative return and annualized return, it can be assumed that the PRBLX portfolio produces much greater returns than the S&P 500. This is shown in Figure 2, as the PRBLX portfolio begins deviating from the S&P 500 in 2007 and continues through 2020. Both active return and information ratio are positive as well, indicating that the PRBLX portfolio minimally outperforms in a worst-case scenario. Ultimately, it can be concluded that the PRBLX portfolio will produce greater returns than the S&P 500's return of approximately 10% per year. Still, the volatility of the PRBLX portfolio is significantly less than the S&P 500, as shown by the lower standard and downside deviations. The drastic difference between downside deviations of the PRBLX portfolio and the S&P 500 implies that, compared to the Parnassus Core Equity Fund, investing in the S&P 500 produces a greater risk of negative returns. Lower volatility combined with greater returns means the PRBLX portfolio produces exceptionally greater risk-adjusted returns, an assertion supported by the fact that Sharpe ratio and Sortino ratio are larger than the S&P 500. The PRBLX portfolio's Sortino ratio is over double the S&P 500, implying that investing in the Parnassus Core Equity fund produces greater risk-adjusted returns than the S&P 500.

Figure 4 shows the PRBLX portfolio in the highest ranges of annualized Sharpe ratio, annualized returns, and annualized alpha values of the global mutual fund universe. This finding implies that U.S. public equity outperforms mutual funds from a returns and risk-adjusted basis, as well as exceeds mutual funds in their own outperformance over the market. The information ratio of the PRBLX portfolio is near average but still positive, indicating the PRBLX portfolio provides at least as much outperformance as the S&P 500.

All of these results dissuade anti-ESG sentiment in the U.S. spurred by concern over returns by proving that the PRBLX ESG fund produces significantly greater returns and risk-adjusted returns than the market and the global mutual fund universe. Furthermore, the findings suggest that adopting holdings strategies of the PRBLX portfolio can offer the greatest financial benefits of ESG investing.

Factor analysis of the PRBLX portfolio finds statistically significant alpha values in the CAPM, Carhart, and Frazzini-Pedersen equations of around 2.66%. This implies that the PRBLX portfolio produces expected outperformance over the S&P 500 of at least 2%. Compared to the ESG Composite, traditional leverage factor betas for the PRBLX portfolio are lower, indicating the Parnassus Core Equity fund is less levered to the market than most U.S. public equity ESG funds. On the other hand, SMB value in the same specification is nearly twice as negative as the ESG Composite, indicating the Parnassus Core Equity Fund has a much greater preference for large caps than most U.S. public equity ESG funds. Furthermore, BAB factor betas are more negative than the ESG Composite, indicating the Parnassus Core Equity fund has a greater preference for high beta stocks than most U.S. public equity ESG funds.

Investment Insights

The composite of U.S. public equity ESG funds produced greater risk-adjusted returns than the S&P 500, with a slight underleverage to the market, yet a preference for large cap, high beta stocks. However, there is potential for optimization if these preferences are strengthened. Such improvement is shown in the synthetic portfolio construction of the ESG Composite (Figure 6), which used factor loadings from ESG Composite regression to create 5-6% greater returns in certain years. A real-life example of this optimization is through the Parnassus Core Equity Fund, which maximized such outperformance over the S&P 500 with a more pronounced underleverage to the market, and a stronger preference for large cap and high beta stocks. Synthetic portfolio construction of the Parnassus Core Equity Fund shows that it cannot be optimized any further, as the factor-derived model produced 10-15% worse returns than the actual portfolio in certain years.

As a result, it can be concluded that the most valuable returns in ESG investing come from prioritizing established, high cash flow companies that outperform during periods of economic growth and are stable during contractions. Holdings data of the Parnassus Core Equity Fund support such insight, with companies like Microsoft, Apple, and Alphabet of the largest selections.

Conclusion

The models and procedures from the study of 70 U.S. public equity ESG funds and the isolated Parnassus Core Equity

ESG Fund provide conclusive empirical evidence that U.S.-based public equity ESG funds produce greater risk-adjusted returns than the market. This counters anti-ESG sentiment claiming U.S. ESG funds produce worse financial returns, and builds upon previous literature that found a positive correlation between CSR and financial performance. Factor analysis reveals that preference for large cap, high-beta stocks that outperform during periods of economic expansion will produce the greatest financial returns in the U.S. public equity ESG space, as shown by analysis of the Parnassus Core Equity Fund. This means that investing in blue chip, high cash flow companies like Microsoft, Apple, and Alphabet will produce the greatest financial returns while balancing ESG criteria.

The shortcomings of this study extend to data collection procedures and testing methodology. Although the U.S. SIF provides a significant portion of U.S. public equity ESG funds, an analysis of all funds in the space would provide a more accurate representation of the relationship between US public equity ESG funds and the S&P 500. However, creating such a dataset would require significant effort to analyze individual firms' investment processes. Furthermore, the factor regression produced mostly statistically insignificant results, which could be optimized, but ultimately rejects returns-based claims from anti-ESG legislators by showing that currently ESG funds avoid downside risk.

References

- Allouche, J., & Laroche, P. (2005). A meta-analytical investigation of the relationship between corporate social and financial performance. *Revue de gestion des ressources humaines*, (57), 18.
- Armstrong, A. (2020). Ethics and ESG. *Australasian Accounting, Business and Finance Journal*, 14(3), 6-17.
- Asness, C., & Frazzini, A. (2013). The devil in HML's details. *The Journal of Portfolio Management*, 39(4), 49-68.
- Asness, C., Frazzini, A. (2022). The devil in HML's details: factors, monthly [Data set]. AQR Capital Management. https://www.aqr.com/Insights/Datasets/The-Devil-in-HMLs-Details_Factors-Monthly
- Asness, C., Frazzini, A., & Pedersen, L. (2022). Quality minus junk: factors, monthly [Data set]. AQR Capital Management. <https://www.aqr.com/Insights/Datasets/Quality-Minus-Junk-Factors Monthly>
- Aupperle, K. E., Carroll, A. B., & Hatfield, J. D. (1985). An empirical examination of the relationship between corporate social responsibility and profitability. *Academy of management Journal*, 28(2), 446-463.
- Ben Brik, A., Rettab, B., & Mellahi, K. (2011). Market orientation, corporate social responsibility, and business performance. *Journal*

of *Business Ethics*, 99(3), 307-324.

Bowman, E. H. (1978). Strategy, annual reports, and alchemy. *California management review*, 20(3), 64-71.

Brammer, S., Brooks, C., & Pavelin, S. (2006). Corporate social performance and stock returns: UK evidence from disaggregate measures. *Financial management*, 35(3), 97-116.

Carhart, M. M. (1997). On persistence in mutual fund performance. *The Journal of finance*, 52(1), 57-82.

Cornell, B., & Shapiro, A. C. (1987). Corporate stakeholders and corporate finance. *Financial management*, 5-14.

Download TMUBMUSD03M Data: U.S. 3 month Treasury Bill Price data. MarketWatch. (n.d.). https://www.marketwatch.com/investing/bond/tmubmusd03m/downloaddata?countrycode=bx&mod=mw_quote_tab

Garriga, E., & Melé, D. (2004). Corporate social responsibility theories: Mapping the territory. *Journal of business ethics*, 53(1), 51-71.

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of financial economics*, 33(1), 3-56.

Fombrun, C., & Shanley, M. (1990). What's in a name? Reputation building and corporate strategy. *Academy of management Journal*, 33(2), 233-258.

Frazzini, A., & Pedersen, L. H. (2014). Betting against beta. *Journal of financial economics*, 111(1), 1-25.

Freedman, A. (2022, August 25). Texas bans BlackRock, UBS, others over ESG investing. *Axios*. <https://www.axios.com/2022/08/25/texas-bans-blackrock-ubs-esg-backlash>

Freedman, M., & Jaggi, B. (1986). Pollution performance of firms from pulp and paper industries. *Environmental Management*, 10(3), 359-365.

Friede, G., Busch, T., & Bassen, A. (2015). ESG and financial performance: Aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment*, 5(4), 210-233. <https://doi.org/10.1080/20430795.2015.1118917>

Friedman, M. (1970). A theoretical framework for monetary analysis. *Journal of Political Economy*, 78(2), 193-238.

Frooman, J. (1997). Socially irresponsible and illegal behavior and shareholder wealth: A meta analysis of event studies. *Business & society*, 36(3), 221-249.

Godfrey, P. C., Merrill, C. B., & Hansen, J. M. (2009). The relationship between corporate social responsibility and shareholder value: An empirical test of the risk management hypothesis. *Strategic management journal*, 30(4), 425-445.

Griffin, J. J., & Mahon, J. F. (1997). The corporate social performance and corporate financial performance debate: Twenty-five years of incomparable research. *Business & society*, 36(1), 5- 31.

Hart, S. L., & Christensen, C. M. (2002). The great leap: Driving innovation from the base of the pyramid. *MIT Sloan management review*, 44(1), 51.

Hebb, T., Hawley, J. P., Hoepner, A. G., Neher, A. L., & Wood, D. (Eds.). (2016). *The Routledge handbook of responsible investment*. Oxon: Routledge.

Jain, P., Vyas, V., & Roy, A. (2017). Exploring the mediating role of intellectual capital and competitive advantage on the relation between CSR and financial performance in SMEs. *Social Responsibility Journal*.

Kurapatskie, B., & Darnall, N. (2013). Which corporate sustainability activities are associated with greater financial payoffs?. *Business strategy and the environment*, 22(1), 49-61. Leone, S. (2021). US Funds dataset from Yahoo Finance. [Data set]. Kaggle. <https://www.kaggle.com/datasets/stefanoleone992/mutual-funds-and-etfs>

Lev, H. (2021, December 13). ESG funds set a new record inflow by doubling in 2021. *ConserviceESG*. <https://www.gobyinc.com/esg-funds-new-record-inflow-2021/>

Margolis, J. D., & Walsh, J. P. (2003). Misery loves companies: Rethinking social initiatives by business. *Administrative science quarterly*, 48(2), 268-305.

McAbee, J. (2022, June 1). What is Stakeholder Theory?. *Wrike*. <https://www.wrike.com/blog/understanding-stakeholder-theory/>

McGuire, J. B., Schneeweis, T., & Branch, B. (1990). Perceptions of firm quality: A cause or result of firm performance. *Journal of management*, 16(1), 167-180.

McGuire, J. B., Sundgren, A., & Schneeweis, T. (1988). Corporate social responsibility and firm financial performance. *Academy of management Journal*, 31(4), 854-872.

McWilliams, A., & Siegel, D. (2001). Corporate social responsibility: A theory of the firm perspective. *Academy of management review*, 26(1), 117-127.

Michelon, G., Boesso, G., & Kumar, K. (2013). Examining the link between strategic corporate social responsibility and company performance: An analysis of the best corporate citizens. *Corporate social responsibility and environmental management*, 20(2), 81-94.

Mishra, S., & Suar, D. (2010). Does corporate social responsibility influence firm performance of Indian companies?. *Journal of business ethics*, 95(4), 571-601.

Murray, K. B., & Montanari, J. B. (1986). Strategic management of the socially responsible firm: Integrating management and marketing theory. *Academy of management review*, 11(4), 815-827.

Naylor Association Management Software. (n.d.). *Naylor Association management software*. The Forum for Sustainable and Responsible Investment. Retrieved January 9, 2023, from <https://www.ussif.org/about>

Orlitzky, M., Schmidt, F. L., & Rynes, S. L. (2003). Corporate social and financial performance: A meta-analysis. *Organization studies*, 24(3), 403-441.

Parnassus Core Equity Fund. (2020). *Parnassus Core Equity Fund (PRBLX)* [Data Set]. *YahooFinance*, <https://finance.yahoo.com/quote/PRBLX/performance?p=PRBLX>

Posner, B. Z., & Schmidt, W. H. (1992). Values and the American manager: An update updated. *California Management Review*, 34(3),

80-94.

Preston, L. E., & O'Bannon, D. P. (1997). The corporate social-financial performance relationship: A typology and analysis. *Business & Society*, 36(4), 419-429.

Roman, R. M., Hayibor, S., & Agle, B. R. (1999). The relationship between social and financial performance: Repainting a portrait. *Business & society*, 38(1), 109-125.

Ruf, B. M., Muralidhar, K., Brown, R. M., Janney, J. J., & Paul, K. (2001). An empirical investigation of the relationship between change in corporate social performance and financial performance: A stakeholder theory perspective. *Journal of business ethics*, 32(2), 143-156.

Seifert, B., Morris, S. A., & Bartkus, B. R. (2004). Having, giving, and getting: Slack resources, corporate philanthropy, and firm financial performance. *Business & society*, 43(2), 135-161.

S&P 500. (2020), S&P 500 (^GSPC) [Data Set]. *YahooFinance*, <https://finance.yahoo.com/quote/%5EGSPC/history?p=%5EGSPC>

Spectrum News Staff. (2022, July 27). Gov. DeSantis takes aim at 'woke corporations'. *Spectrum News*. <https://www.baynews9.com/fl/tampa/news/2022/07/27/speaking-in-tampa--gov--desantis-takes-aim-at--woke-corporations>

Tang, Z., Hull, C. E., & Rothenberg, S. (2012). How corporate social responsibility engagement strategy moderates the CSR-financial performance relationship. *Journal of management Studies*, 49(7), 1274-1303.

Van Beurden, P., & Gössling, T. (2008). The worth of values—a literature review on the relation between corporate social and financial performance. *Journal of business ethics*, 82(2), 407-424.

Van der Laan, G., Van Ees, H., & Van Witteloostuijn, A. (2008). Corporate social and financial performance: An extended stakeholder theory, and empirical test with accounting measures. *Journal of Business Ethics*, 79(3), 299-310.

Waddock, S. A., & Graves, S. B. (1997). The corporate social performance-financial performance link. *Strategic management journal*, 18(4), 303-319.

Whelan, T., Atz, U., & Clark, C. (2022). ESG and financial performance: Uncovering the Relationship by Aggregating Evidence from 1,000 Plus Studies Published between 2015-2020. *NYU, ESG and Performance*.

Yahoo! Finance. (2022, May 25). Parnassus Core Equity Fund - Investor Shares (PRBLX) Stock Price, News, Quote & History - Yahoo Finance. <https://finance.yahoo.com/quote/PRBLX?p=PRBLX>

ACKNOWLEDGMENTS

Karthik Nemani

I would like to extend my deepest gratitude to Dr. Carol Hee, Dr. Allison Schlobohm, and Dr. Jeffrey McLean for their invaluable guidance and support in constructing this research paper.

Barrett Buhler

I would like to thank Dr. Carol Hee for supporting our research and always being a resource for both Karthik and me. I would also like to extend my gratitude to Justin Fligstein for introducing me to the world of ESG and impact investing through UNC's Impact Investing Club and for helping inspire this paper.