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Assessing the Greater Resilience of ESG Exchange-Traded Funds (ETFS) During Market Crashes

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ABSTRACT

This paper aims to investigate the impact of a market crash on the risk adjusted returns of Exchange Traded Funds. A comparative analysis of the impact of covid 19 on ESG Vs. Regular ETFs attempts to ascertain whether ESG factors can provide any hedging during a financial market crash. This study tried to establish whether responsible investments can provide any resilience during a market crisis by comparing the risk adjusted returns of pre and post covid returns of ESG ETFs and regular ETFs. This paper discussed that how the risk factors incorporated in the models (market risk, size risk, book to market risk, profitability risk and investment risk) change before and after covid to assess the impact on overall risk during the crisis. All 3 models indicate that regular ETFs overall performed better than ESG ETFs. Our regression analysis does not indicate any resilience to a market crash by ESG factors. Further the paper studies the impact of the covid crisis on small cap, large cap and midcap ETFs to ascertain which category provides greatest resilience to crisis. The study revealed that small cap and mid cap ETFs perform better than large cap ETFs in times of crisis. However, risk factors are reduced for large cap ETFs during a crisis while risk factors for small and midcap ETFs increase during a crisis.

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Introduction

The environmental, social, and governance (ESG) framework has become a growing area of interest for academics and professionals in the discipline of operations management (OM) in recent years (Li, Li, & Xue, 2025). Covid 19 was a crisis which the world had neither anticipated nor was prepared for. Like all other sectors, financial activity came to a standstill. The uncertainty impacted investors in many ways. All global markets crashed in March 2020. In the years before Covid there has been growing interest in ESG investing. However, the relationship between sustainability and financial performance has shown contradictory results. We try to ascertain whether ESG investing can add resilience to investments in times of crisis such as the Covid 19 crisis. During the COVID-19 epidemic, increasing ESG investing greatly enhanced the stock performance of South African financial service firms; a 1% increase in ESG investing increased stock price returns by 5% (Magubane & Wesi, 2023).

Albuquerque, Koskinen, Yang, and Zhang (2020) show that firms with high ES ratings perform better than firms with low ES ratings during a market crash showing the role of ES in creating greater firm resilience. Döttling and Kim (2024) found that during the time of crisis, funds with high sustainability ratings perform better as investors give greater preference to sustainability viewing it as a necessity rather than a luxury.

Kanamura (2023) studied high yield bond ETFs showing that ESG high yield bond ETFs provide greater returns than regular high yield bond ETF returns in the Covid-19 market crash providing greater risk mitigation. Kanuri (2020) found that ESG portfolios showed greater returns compared to US and global equity markets in 2005-2007 in a bullish market, but they underperformed in years 2007-2009 in a bearish market. This paper chose to study the impact of Covid on ETFs as ETFs have a better pricing mechanism than other open-ended funds and provide greater transparency as well as an all-day trading facility. Further, ETFs have lower transaction and operating costs as well as greater tax benefits.

The problem of this study is Do ESG (Environmental, Social, and Governance) Exchange-Traded Funds (ETFs) provide greater resilience to market crashes, as measured by risk-adjusted returns, compared to regular ETFs. To check the impact of ESG ETFs in market crashes. This study focuses on 20 ESG ETFs and 20 regular ETFs, comparing average risk adjusted returns in the 1 year prior to Covid (from March 2019-February 2020) and the 1 year after Covid hit the globe (from March 2020- March2021). The ETFs in both groups were not matched and were chosen randomly. Further, the paper also compares three other ETF classes in terms of their response to the covid crisis. We take risk adjusted returns of small capitalization, medium capitalization and large market capitalization ETFs for the 1 year prior and the 1 year after covid to determine which of these ETF categories provide greatest resilience to crisis. We will also discuss how the risk factors, incorporated in the models used, change before and after covid to assess the impact on overall risk during the crisis.

Literature

The performance of ESG ETFs is commonly regarded as sub-par in its comparison with traditional ETFs on most parameters. Although the fund managers' predictive abilities concerning future movement within the market may be developed, they do not significantly vary from those running modern ETFs. This observation is also true when looking at other funds and indices. However, it was found that ESG ETF managers had more difficulties in both security selection and market timing during the COVID-19 pandemic than their non-ESG counterparts. Also, with regards to the ESG ETFs, these seem to be less correlated with the benchmark indices A and B than the traditional ETFs, thus enhancing the care to which potential investors ought to subject ESG funds. These findings motivate additional research on the association between financially represented activities consisting of an organisation's ESG performance (ESGP) and the company's financial performance (CFP), suggesting the idea that financial outcomes may be influenced by routing issues (Baklaci, Cheng, & Zhang, 2024). The market crash caused by the COVID-19 pandemic effects got the attention of scholars on how sustainable investments withstand such conditions of the equity market. There is a lot of research dedicated to the impact of the pandemic on stock returns of firms. However, there has been limited research on the performance of ESG ETFs which have yielded varied results. Not only does the current research focus on the performance of ESG ETFs, but also there is a need to consider the broader sustainable investment literature. Green business investment is also under the category of socially responsible corporate investment and is a more specialized form of sustainable investing focusing on environmental concerns which is a subset of broader responsible investment. On the other hand, a particular stream of research has suggested that investments into CSR are associated with better performance of companies in terms of stock returns and stock market value (ElBannan, 2024). Focusing on the stock market crash, particularly in 2020 due to the COVID-19 pandemic and its consequences, (Folger-Laronde, Pashang, Feor, & ElAlfy, 2022) studied the relationship between the financial returns of ETFs and the eco fund ratings that Corporate Knights assigned to them. His study showed that within the scope of these negative developments, the application of sustainability investments in ESG ETFs could not protect the funds from adverse effects of such investments on finance. Therefore, the lack of reliable current sustainability ratings did not allow measuring the ability of those investments to hold up against pandemic-induced market shocks. Initiatives that benefit economies and the environment, like those that employ green energy, are supported by the expanding field of sustainable financing (Bilal & Shaheen, 2024; Shaheen, Kazim, Shafi, & Perveen, 2025; ?, ?).

The world markets were hit hard particularly during the COVID-19 pandemic triggering steep decline in values of stocks which was worse than the impact caused by the 20082009 financial crisis. Tumbling markets in Japan and the United States also caused a sharp drop in returns, and turbulence in stock markets within the US, Germany and Italy were also substantial because of the outbreak (Shehzad, Xiaoxing, & Kazouz, 2020). The most recent studies indicate that the performance of environmental, social, and governance (ESG) factors is increasingly becoming crucial to the returns and risk of exchange traded funds

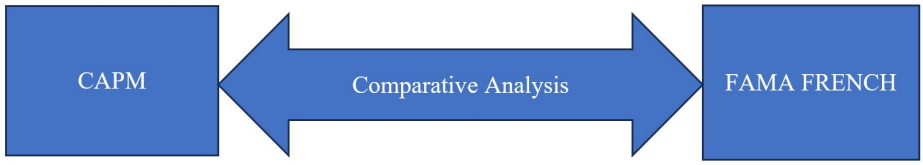
(ETFS), especially in the wake of market turmoil such as the COVID- 19 pandemic. Resentful study examined how the pandemic has affected global stock markets showing that the effects of the COVID-19 pandemic on both developed and emerging stock markets were graver than even the 20082009 global financial market downturn. The COVID-19 pandemic with its induced risks and s thickness had a debilitating effect on the market returns in the effective transformational economies, US and Japan for the instability reigning on equity markets in US, Germany and Italy. As such, another study in this regard investigates how ESG funds perform compared to SRI equity funds during a sinking market. This research used monthly data spanning from 2005 up to 2021 and employed an unbalanced panel consisting of 160 iShares Morgan Stanley Capital International normal as well as ESG/SRI equity funds. The research employed several robust analyses such as sensitivity analysis, volumetric discriminatory cluster regression of multiple panel data and others and all confirmed the findings. ESG EFTs having more resilience in the situation of market crash (Iqbal et al., 2025; Khan et al., 2024). The findings of this study suggest that sustainable funds were able to weather the financial storms well indicative of even empirical restoration in the ETF's returns despite the tremendous financial pressure exerted on the market. This implies that the other aspects of ESG/SRI investment practices may strengthen the performance of the ETFs compared to the ordinary ones which is crucial to coherence with the crisis times. Also, the research supports the use of measures that facilitate the development of sustainable investment, which poses a significant research gap that needs to be filled (ElBannan, 2024). Contrary to those studies for example, claims that sustainable funds were shown to perform quite well during the COVID-19 pandemic. In the first quarter of 2020, a staggering $45.6 billion was garnered in the global sustainable fund market, whilst European sustainable funds alone brought in $33 billion or about 72% of the total worldwide inflows during the period (Brilliant & Collins, 2014).

Hale (2020) noted the fact that in the first quarter of the COVID-19 pandemic, as well as all equities, sustainable equity funds had suffered market declines, but smaller than normal fund outflows occurred. Seven out of ten maintained under review sustainable equity funds were in the top half of the relevant Morningstar category during the first quarter of 2020 in just about seventy percent of the instances. In the same vein, 24 various ESG index funds performed better than other standard index funds. The growing interest in their sustainability and socially responsible investment has encouraged a lot of scholars to inquire into the effects of these on such operation. ESG proponents contend that good ESG performance translates to great financial performance for companies. Critics argue that ESG investments do not protect firms in times of recession. Several reports that included forecasts for the economy and the society were published during the COVID-19 pandemic in 2020. Importantly, the report issued in September 2021 by the Morgan Stanley Institute for Sustainable Investing claimed that green funds have generated 4.3% higher returns as compared to the traditional funds. In addition, such funds faced 3.1% lower market risks in the downside than conventional funds (Stanley, 2022; Gonçalves, Pimentel, & Gaio, 2021).

As a result, the authors of this study argue that ESG funds' performance during the COVID-19 pandemic will outshine that of conventional funds, both in terms of delivering better returns and generating lower volatility. Following on from the global pandemic onset in Q1 2020 and turning to the crash periods in the trader's market in February, March, it was noted that investors had a strong appetite for low ESG risk funds considering such investments as a cushion from a market downturn (Ferriani & Natoli, 2021).

The theory that is employed in this study is Capital Asset Pricing Model (CAPM). The resilience of ESG (Environmental, Social, and Governance) exchange-traded funds (ETFs) in the event of market crashes is investigated in this study. The study examines the risk-adjusted returns of ESG ETFs and conventional ETFs during the COVID-19 pandemic using the Capital Asset Pricing Model (CAPM) as a theoretical framework. The purpose of the study is to find out if ESG characteristics can operate as a hedge in difficult financial times and if ESG ETFs offer increased resilience to market collapses. This study sheds light on how ESG ETFs perform during market downturns by examining the connection between systematic risk and projected return (O'Donnell, Shannon, Sheehan, & Ashraf, 2025; Wang, 2025).

Figure 1: Comparative Analysis: CAPM and FAMA FRENCH



Data and Methodology

Study 1

We choose 20 ETFs listed on NYSE for both groups. Group 1 consists of 20 regular ETFs and group 2 consists of 20 ESG ETFs. The ETFs in each group were not matched on any basis and were randomly selected based on convenience sampling. Prices of each of the 40 ETFs in group 1 & 2 were collected from reputable databases like investing for the period March 2019 -March 2021. Returns for the given time were calculated. After we calculate the returns for each day in the study time, we calculated the average return for the 20 ETFs in each group for that day. E.g. For March 1, 2019, we calculated the average returns for all 20 ESG ETFs on 1 March 2019 and similarly calculated the average of all returns on March 1, 2019, for the 20 regular ETFs.

Instead of using absolute returns, we use risk adjusted returns in our model using the formula:

Risk adjusted return = Average return – Risk free return

Rf data is taken from the Kennith French data website.

STUDY PERIOD:
PRECOVID: March 2019 - February 2020
POST COVID (MARKET CRASH): March 2020- March 2021

MODEL:
To assess the returns, we use 3 models:

Model 1: CAPM

$$r - rf = \alpha + \beta(rm - rf)$$

Model 2 : FAMA FRENCH 3 Factor Model

$$r - rf = \alpha + \beta(rm - rf) + \beta(SMB) + \beta(HML) + \mathcal{E}T$$

Model 3:

$$r - rf = \alpha + \beta(rm - rf) + \beta(SMB) + \beta(HML) + \beta(RMW) + \beta(CMA) + \mathcal{E}T$$

Model 1: The Capital Asset Pricing model shows the volatility of a stock's returns compared to market returns. The CAPM beta indicates the extent to which the stock returns move with a single point movement in market returns and is a measure of systematic risk. The alpha measures the risk adjusted investment return i.e. the return we can expect for the given level of risk in the investment.

Model 2: The FAMA FRENCH 3 Factor model expands CAPM to include 2 other risk factors i.e. Small minus big and High minus low. SMB, also known as small firm effect, measures the degree to which small-cap companies have historically earned excess returns over large-cap companies HML, also known as value premium, accounts for value stocks with high book-to-market ratios that generate higher returns in comparison to the market. HML accounts for the spread in returns between value stocks and growth stocks. The HML factor of the Fama-French Three Factor model measures the average return on value portfolios (those with companies that have a high book-to-market value) against the average return on growth portfolios (those with companies that have a low book-to-market ratio). CAPM only covers market risk whereas The Fama-French Three Factor model calculates an investment's likely rate of return based on three elements: overall market risk, the degree to which small companies outperform large companies and the

degree to which high-value companies outperform low-value companies.

Model 3: The Fama French 5 factor model expands the 3-factor model to incorporate 2 other risk factors i.e. profitability factor and investment factor. RMW, the profitability factor shows the difference in returns of firms with high vs. low operating profitability, whereas the investment factor (CMA) is the difference in returns of Conservative vs. Aggressive firms

ALPHA: We will be using alpha to assess the performance of the ETF groups. Alpha in the above models is the measure of performance on a risk-adjusted basis. A positive alpha indicates the security is outperforming the market. Conversely, a negative alpha indicates the security fails to generate returns at the same rate as the broader sector. The alpha of Fama-French 5 factor model denotes the excess returns that an active portfolio manager achieves above the expected market return due to market, size, value, profitability and investment risk factors. An alpha of zero suggests that an asset has earned a return that compensates for the risk. Alpha greater than zero means an investment outperformed the market, after adjusting for volatility and risk.

FAMA FRENCH DATA: Daily data for SMB, HML, RMW, CMA, Rm-Rf and Rf is downloaded from the Kennith French website data section. Once we have the data, the following 3 regressions are run for the daily returns for each group for the year prior to covid (March 2019-Feb 2020) and for the year post Covid (March 2020-March 2021) separately. The regression results of pre and post covid data can provide useful insights.

$$r - rf = \alpha + \beta(rm - rf) + \mathcal{E}t$$

$$r - rf = \alpha + \beta(rm - rf) + \beta(SMB) + \beta(HML) + \mathcal{E}t$$

$$r - rf = \alpha + \beta(rm - rf) + \beta(SMB) + \beta(HML) + \beta(RMW) + \beta(CMA) + \mathcal{E}t$$

The difference in the results of both groups (regular and ESG ETFs) shows us how each group reacted to the covid crisis and whether ESG factors provided any resilience to crisis.

Study 2

For our second study, we select 7 ETFs listed on NYSE for each of the following groups: Group 3: Small Capitalization ETFs Group 4: Mid Capitalization ETFs Group 5: Large capitalization ETFS For each of the 21 ETFs, we collect daily price data from March 2019 – March 2021. The price data is collected from investing.com. We then calculate returns and for each group we calculate daily average returns for each day in the study period i.e. for each day in the study period, we calculate the average of the returns of the 7 ETFs in

that group. The average returns are converted into risk adjusted returns by deducting the daily risk free ate from the daily average returns. We then run the following regressions for each group's average risk adjusted returns for pre covid and post covid data separately. The difference the pre and post covid data results will show us the impact of the covid crisis. The difference in the results of each group shows us how each group reacted to the covid crisis.

Table 1: Descriptive statistics for excess returns

	REGULAR ETF		*ESG ETF*	
	Pre-covid	Post-covid	Pre-covid	Post-covid
Mean	0.001	0.013	-0.001	0.002
Standard Error	0.001	0.004	0.000	0.000
Median	0.000	0.002	0.000	0.002
Standard Deviation	0.017	0.061	0.007	0.008
Sample Variance	0.000	0.004	0.000	0.000
Kurtosis	205.637	10.788	13.110	1.806
Skewness	13.521	3.397	-2.014	-0.467
Range	0.294	0.328	0.070	0.055
Minimum	-0.043	-0.061	-0.044	-0.029
Maximum	0.251	0.268	0.026	0.026
Sum	0.203	3.633	-0.171	0.460
Count	253.000	252.000	252.000	251.000

Results and Analysis

Results of group 1 and 2 (ESG Vs. REGULAR ETFS) are provided below. Results are based on 20 regular and 20 ESG ETFS listen on NYSE.

Table 2: CAPM

	REGULAR ETF				**ESG ETF**			
	CAPM PRECOVID		**CAPM POSTCOVID**		**CAPM PRECOVID**		**CAPM POSTCOVID**	
	Coefficients	***P-value***	***Coefficients***	***P-value***	***Coefficients***	***P-value***	***Coefficients***	***P-value***
Intercept	0.001	0.502	0.012	0.000	-0.001	0.033	-0.008	0.000
Mkt-RF	0.075	0.608	-0.036	0.829	-0.060	0.198	0.042	0.064

Table 3: FAMA FRENCH 3 FACTOR MODEL

	REGULAR ETF				ESG ETF			
	FAMA3 PRECOVID		FAMA 3 POSTCOVID		FAMA3 PRECOVID		FAMA3 POSTCOVID	
	Coefficients	*P-value*	*Coefficients*	*P-value*	*Coefficients*	*P-value*	*Coefficients*	*P-value*
Intercept	0.001	0.607	0.012	0.000	-0.001	0.042	-0.008	0.000
Mkt-RF	0.109	0.474	0.069	0.684	-0.063	0.183	0.048	0.037
SMB	-0.227	0.369	-0.199	0.581	0.030	0.734	0.107	0.027
HML	-0.102	0.619	-0.533	0.015	0.023	0.739	-0.069	0.020

Table 4: FAMA FRENCH 5 FACTOR MODEL

	REGULAR ETF				ESG ETF			
	FAMA 5 PRECOVID		FAMA 5 POSTCOVID		FAMA5 PRECOVID		FAMA 5 POSTCOVID	
	Coefficients	*P-value*	*Coefficients*	*P-value*	*Coefficients*	*P-value*	*Coefficients*	*P-value*
Intercept	0.002	0.316	0.011	0.001	-0.001	0.164	0.002	0.002
Mkt-RF	-0.135	0.592	0.162	0.336	-0.102	0.046	0.053	0.027
SMB	-0.874	0.052	-0.033	0.929	0.064	0.481	0.091	0.088
HML	0.032	0.944	-0.736	0.022	-0.052	0.574	-0.092	0.042
RMW	-1.197	0.096	0.277	0.672	-0.167	0.252	-0.069	0.455
CMA	-0.751	0.405	0.983	0.191	0.325	0.076	0.110	0.304

CAPM Analysis: From Table 2, we can see that the alpha intercept improves after covid which indicates that the performance of regular ETFs improved during the crash period. Regular ETFs were outperforming the market to a greater extent after covid. The p value of 0 makes the alpha significant. For ESG ETFs, we see that the alpha coefficients are negative both before and after covid, but they worsen after covid which indicates that ESG ETFs were performing worse than the market both before and after covid on a risk adjusted basis. They were underperforming the market to a greater extent post covid. Thus, we see that ESG ETFs are performing worse after covid than before covid. The p values of both alphas before and after covid for ESG ETFs are significant. The beta co-efficient for market risk for both groups of ETFs show that the impact of market risk becomes less severe for both groups as the beta coefficients decrease in absolute terms for both groups, although the direction of relationship changes for both groups with the beta coefficients turning from positive to negative for regular ETFs and from negative to positive for ESG ETFs post covid. This indicates that regular ETFs start moving in the opposite direction of the market after covid whereas, ESG ETFs were moving in the opposite direction of the market before covid but start moving in the same direction as the market after covid with positive correlation.

FAMA FRENCH 3 FACTOR ANALYSIS: From table we can observe that for regular ETFs, the alpha was positive both pre and post covid, indicating better performance relative to the market. The alpha improved during covid crisis moving from 0.001 to 0.012, which indicates that after adjusting for risk the performance of this ETF group, relative to market performance, became even better during the covid crash. The beta coefficients of the risk factors indicate that market risk and size risk both decreased after the covid crash, but the book to market value risk increased. For ESG ETFs, the alpha was negative both

pre and post covid, indicating underperformance relative to the market. However, the alpha became even worse after the covid crisis, showing an even weaker performance post covid relative to the market performance. We can also observe that all 3 risk factors have higher beta coefficients post covid, indicating an increase in the overall risk level during the market crash. Limitation: The p-values for most coefficients in this regression model are insignificant so the results are questionable, and the variables do not significantly predict the outcome.

FAMA FRENCH 5 FACTOR MODEL: from table 4, we can observe that the alpha intercept improves for both regular and ESG ETFs however the increase is much greater for regular ETFs. Both groups perform better than the market during the covid crisis period but, after adjusting for risk, out of the 2 groups, regular ETFs can beat the market to a greater extent. Regression results for regular ETFs, we can see a decrease in most beta coefficients indicating a decrease in most risk factors especially size risk and profitability risk. However, the market risk and investment risk sensitivities have increased. For ESG ETFs, we see an increase in market value risk and size risk, but a decrease in investment and profitability risk. Results: All 3 models indicate that regular ETFs overall performed better than ESG ETFs. Our regression analysis does not indicate any resilience to crisis by ESG factors.

STUDY 2

We further proceed to see the risk adjusted pre and post covid returns for small cap, large cap and mid cap ETFs. This will help us assess whether investments in a specific firm size can provide any buffer against crisis.

Table 5: CAPM

	LARGECAP				SMALLCAP				MIDCAP			
	CAPM PRECOVID		CAPM POSTCOVID		CAPM PRECOVID		CAPM POSTCOVID		CAPM PRECOVID		CAPM POSTCOVID	
	Coeff	*P-value*	*Coeff*	*P-value*	*Coeff*	*P-value*	*Coeff*	*P-value*	*Coeff*	*P-value*	*Coeff*	*P-value*
Intercept	0.000	0.769	0.001	0.010	0.002	0.540	0.019	0.000	0.010	0.080	0.042	0.005
Mkt-RF	-0.159	0.040	0.072	0.008	-0.042	0.886	-0.011	0.963	-1.015	0.134	0.275	0.694

Table 6: FAMA FRENCH 3 FACTOR ANALYSIS

	LARGECAP				SMALLCAP				MIDCAP			
	FAMA3 PRECOVID		FAMA 3 POSTCOVID		FAMA3 PRECOVID		FAMA 3 POSTCOVID		FAMA3 PRECOVID		FAMA 3 POSTCOVID	
	Coeff	*P-value*	*Coeff*	*P-value*	*Coeff*	*P-value*	*Coeff*	*P-value*	*Coeff*	*P-value*	*Coeff*	*P-value*
Intercept	0.000	0.751	0.001	0.011	0.002	0.517	0.018	0.000	0.010	0.082	0.042	0.005
Mkt-RF	-0.153	0.052	0.072	0.010	-0.081	0.784	0.124	0.597	-1.143	0.097	0.754	0.291
SMB	-0.065	0.658	0.016	0.778	0.452	0.419	0.160	0.744	1.551	0.231	-1.237	0.407
HML	0.019	0.875	-0.006	0.860	-0.154	0.729	-0.796	0.008	-1.092	0.289	-2.236	0.014

Table 7: FAMA FRENCH 5 FACTOR ANALYSIS

	LARGECAP				SMALLCAP				MIDCAP			
	FAMA 5 PRECOVID		FAMA 5 POSTCOVID		FAMA5 PRECOVID		FAMA 5 POSTCOVID		FAMA5 PRECOVID		FAMA 5 POSTCOVID	
	Coeff	*P-value*	*Coeff*	*P-value*	*Coeff*	*P-value*	*Coeff*	*P-value*	*Coeff*	*P-value*	*Coeff*	*P-value*
Intercept	0.000	0.784	0.002	0.008	0.002	0.486	0.018	0.000	0.011	0.079	0.041	0.005
Mkt-RF	-0.117	0.164	0.068	0.019	0.010	0.976	0.092	0.705	-1.065	0.151	0.664	0.370
SMB	-0.045	0.762	-0.021	0.742	0.678	0.231	0.249	0.648	1.592	0.226	-0.765	0.643
HML	-0.099	0.517	0.035	0.518	-0.748	0.195	-0.882	0.056	-1.412	0.292	-2.294	0.102
RMW	0.039	0.870	-0.098	0.378	0.219	0.809	0.583	0.537	-0.827	0.695	2.629	0.359
CMA	0.483	0.109	-0.066	0.607	1.650	0.148	-0.593	0.584	0.766	0.772	-2.122	0.519

CAPM: We can observe from Table 5 that for large cap ETFs, the alpha coefficients improve post covid and the p value is also significant post covid. We can observe the same trend in small cap and midcap companies. Alpha for all 3 groups improve post covid. Thus, we can conclude all 3 groups beat the market during the covid crisis and exhibit improved returns on a risk adjusted basis. However, we observe that the risk adjusted returns for small and mid-cap ETFs outperform the market to a greater degree as compared to large cap ETFs. Post covid data shows significant p values. We also observe that the market risk also decreases for all 3 groups during the market crash.

FAMA FRENCH 3 FACTOR MODEL:

In Table 6, we can observe an increase in Alphas for all 3 groups of ETFs, indicating that all 3 groups performed better than the market during the crisis on a risk adjusted basis. All 3 groups were able to beat the market to a greater post covid as compared to pre-covid. However, a greater increase in alpha is observable in mid cap and small cap ETFs. This indicates that mid cap and small cap ETFs perform better than large cap ETFs in times of crisis and small cap ETFs have greater resilience to a market crash as compared to large cap ETFs.

In large cap ETFs, we observe a decrease in all 3 risk factors pre and post covid i.e. market risk, size risk and value risk. However, in small cap ETFs, we can see a decrease in size risk, but not in book- market value and market risk. Thus, during a crisis risk levels decrease for large cap ETFs, but not for small cap ETFs.

FAMA FRENCH 5 FACTOR MODEL:

Table 7 shows an increase in alphas in all 3 groups indicating the ability of all 3 groups to outperform the market during financial crisis. But the risk adjusted performance of small and mid-cap ETFs increases to a greater extent. We find the same result as the previous 2 models. Small cap and midcap ETFs can beat the market to a greater degree as compared to large cap firms. Thus, we see that investments in small cap ETFs do provide some resilience in times of a financial crisis.

All 5 risk factors for large cap firms decrease during the covid period as compared to pre-covid, as can be seen by a decrease in all beta coefficients. For small cap firms market risk and size risk increase during the covid period. For midcap companies, book to market

risk, profitability risk and investment risk increase during the covid period.

Results

All 3 models indicate that alphas increase for all 3 groups during crisis indicating that all the 3 groups under study can outperform the market to a greater extent during covid as compared to pre-covid. All 3 models also indicate that small cap and medium cap firms can outperform the market to a greater extent than large cap firms. Thus, we can conclude than investments in small cap firms can provide some resilience during a market crash. We can also observe that all risk factors decrease for large cap firms during covid, but for small and midcap firms, some of the risk factors under study increase during the covid crisis and these results are validate by Almustafa, Nguyen, Liu, and Dang (2023). Limitation: p values for some variables show insignificance, hence we need to make further investigation to add validity to our results.

Conclusion

Our analysis indicates that regular ETFs can outperform the market, with higher risk adjusted returns than the market during a financial crash. ESG ETFs, on the other hand showed worse risk adjusted performance post covid. These results are confirmed by all 3 models i.e. CAPM, FAMA French 3 factor and Fama French 5 factor models. Thus, according to our analysis, ESG factors do not provide any resilience to a market crash. We expanded our study to see whether firm size provides any resilience during a financial crisis. Comparing the risk adjusted performance of large cap, midcap and small cap ETFs pre and post covid, we observed that all three groups performed better than the market both pre and post covid. Small and midcap ETFs were able to outperform the market to a greater extent compared to large cap companies. This was confirmed by all 3 models in our study. Thus, we can conclude that ETFs with investment in small cap companies do have some resilience to a market crash. We also observed that risk levels decreased for large cap companies during the crisis, but some risk factors increased for small and midcap companies. Thus, firm size does have an impact on risk levels. Practical implications of this study are investors who want to be resilient in the event of a market meltdown could think about putting more of their money into small-cap and mid-cap ETFs. Investors should also exercise caution when it comes to ESG ETFs because, according to our data, they might not offer the anticipated resilience in times of market stress (Demers, Hendrikse, Joos, & Lev, 2021; Nguyen, 2023; Valadkhani & O'Mahony, 2025).

Limitations and Future Avenues

Some of the coefficients in our study were not significant. If we conduct a similar study with a bigger sample size, it is like that our regression results will show better p values. We divided the ETF groups only based on the factor we were studying i.e. ESG, regular, small cap, midcap and large cap. However, with more data access, it is advisable to match

the ETFs in each group by industry, sustainability ranking and ETF age. This is also likely to enhance the reliability of our results. This study only included ETFs listed on NYSE. With the onset of Covid, most financial markets crashed. Hence, a similar study can be done on ETFs from Toronto stock exchange, Tokyo stock exchange, Shanghai stock exchange and some of the other bigger stock exchanges. Also, a comparative study can be done on ETFs from developed, underdeveloped and developing countries to see the impact of a market crash on ESG vs. regular ETFs. Further, we can expand the study to see the impact of other market crashes on ETFs. This study only analysed the pre and post covid risk adjusted returns. A similar study can be done on NYSE listed ETFs before and after the 2008 market crash as well as the market crash in S&P 500 and Dow Jones after Russia attacked Ukraine in 2022. Similar studies can be done on other ETF characteristics e.g. Growth vs. value ETFs, Industry defined ETFs and other characteristics to determine which characteristics can provide resilience in times of a financial crisis. Studies done in other stock exchanges and studying other market crashes can provide further insight into the effects of a market crash on ETFs and whether ESG factors and firm size can help develop resilience to crashes.

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