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The Performance of ESG Thematic Fund in China

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Abstract: In recent years, driven by regulators around the world, ESG's investment philosophy has been deepened and specialized, and has gradually become a mainstream investment strategy. Our government attaches great importance to green, low-carbon and high-quality development, and has successively issued many ESG related policies. We will briefly discuss the development of ESG investment in the domestic market, and use Fama-French five factor model to explain the excess return of ESG theme funds. Based on statistical analysis and empirical research results, it will provide valuable reference for investors, investment institutions and regulators of ESG theme funds in China.

1. Research Background

1.1. ESG Concept Background

Environmental, Social and Governance, referred to as ESG, is an investment philosophy that fully considers environmental, social and corporate governance factors into the process of decision-making and investment management. The related concepts include ethical investment, responsible investment, and socially responsible investment, impact investment, sustainable investment, etc. Compared with traditional financial information, ESG reflects more dimensional information. By observing ESG performance, it can not only assess the impact of environmental and social factors on investment targets, but also contribute to promoting sustainable economic development and fulfilling social responsibilities. It also reflects the robustness of corporate governance of the company. ESG includes environmental standards, social standards, and governance standards. Environmental factors include climate change, resource consumption, emission management, environmental management, green business, etc.; social factors include supply chain management and supervision, consumer protection, community relations, product safety, production safety and public safety, etc.; governance factors include bribery and corruption, executive compensation, board diversity and structure, information disclosure, etc. [1]

In recent years, international organizations and more and more governments and investment institutions around the world have continuously deepened the concept of ESG and actively explored and practiced ESG responsible investment. Many regulators and market parties have reached an agreement to incorporate environmental, social and governance (ESG) factors in the investment process. On March 21, 2022, the US Securities and Exchange Commission (SEC) voted 3:1 to propose new rules that, if adopted, would require public companies to, among other things, provide audited financial statements containing climate-related financial impact and expenditure metrics, report their greenhouse gas emissions, and disclose details of how climate change is affecting their

businesses. The ESG investment philosophy in the international market has become more mature after more than ten years of development, and ESG products have become more abundant. The concept of ESG investment in China has gained the attention and support of government and regulatory authorities in recent years. Especially in 2022, Carbon Peak and Carbon Neutrality were included in the government work report for the first time. A series of ESG-related regulations and documents issued which encourage enterprises to gradually improve and enhance ESG information disclosure, and guide asset management institutions to continuously improve ESG risk management capabilities and sustainable investment capabilities. Although it has not yet become mainstream for ESG investment, it has shown a broad space for development. With the development of the economy, Chinese capital market has gradually exposed a series of different problems, which have attracted widespread attention from the society and investors. For example, some listed companies disclose false information (often referred to as green washing), discharge pollutants in violation of regulations, major shareholders and executives misbehave, and serious violations or even violations of the law occur, which have brought serious negative effects. For example, it would negatively affect the confidence of investors investing in ESG bonds and may limit future demand. These are very detrimental to the sustainable development of the capital market. Secondly, the degree of opening up of Chinese capital market is constantly improving, and the evaluation system and evaluation standards for enterprises need to be in line with international standards as soon as possible. We may refer to the Sustainable Accounting Standards since the development of the standards in the US as a model is promoting uniform reporting standards. [1]

In June 2018, MSCI included a shares into the MSCI index system and conducted ESG ratings on more than 400 listed companies. Under the two-way promotion of MSCI's inclusion of a shares and domestic pension funds entering the market, ESG investment in China will surely enter the fast lane. In recent years, the government paid highly attentions to green, low-carbon and high-quality development and issued a number of important related policies, such as “Guiding Opinions on Building a Green System” (2016), “Green Industry Guidance Catalog” (2019), “Guiding Opinions on Promoting Investment and Financing to Address Climate Change” (2020), “Green Bond Support Project Catalog” (2021) etc. In the process of mainstreaming development of ESG, market players’ demand for improving ESG-related policies is gradually becoming prominent. Therefore, under the “top-down” regulatory support and policy promotion, and driven by market demand, the environmental ESG investment will usher in a broad space for development in China. [1]

1.2. Development Status of ESG Theme Investment in the World and China

In 2020, ESG funds in the global market flourished. The growth rate of ESG assets in developed markets such as the United States and Europe is relatively fast. According to statistics, the size of US ESG ETF funds has exceeded 70 billion dollars as of 2020. Europe issued about 72 ETF funds in 2020, accounting for nearly half of all ETF funds issued in Europe in 2020. Meanwhile, Chinese asset management institutions actively deployed and issued ESG fund products, and the size of ESG thematic funds increased significantly. ESG thematic fund is an investment covering ESG-related themes (such as low carbon, environmental protection, green, sustainability, social responsibility, governance, etc.) As of the end of December 2020, there were 103 ESG thematic funds in the market, with a size of 132.9 billion Yuan, an increase of 68% from 2019. The investment methods are mainly active funds and partial equity funds which invest on stocks with a big portion and bonds with a small portion. In general, the development of domestic ESG thematic funds is still in its infancy. It focuses on generalized ESG thematic investments. There are few ESG funds that truly adopt ESG strategies to invest, but they have huge development potential and broad growth space. There are seven mainstream ESG investment strategies, including: positive screening, negative

screening, ESG integration, active ownership norms-based screening, sustainable themed investment and impact investment. Looking at the future, the size of ESG funds is expected to usher in explosive growth.

In recent years, more and more companies have begun to pay attention to ESG concepts and gradually realize the important role of green and innovation development concepts and sustainable development concepts. The number of corporate social responsibility reports disclosed by listed companies has continued to increase. In the context of tightening regulatory policies and accelerating information circulation, companies' information transparency is facing greater challenges and tests. In recent years, China has made some progress in the construction of ESG information disclosure system. The disclosure of corporate responsible investment information has shown a clear trend of standardization, but it is still in the stage of voluntary disclosure. Chinese regulators have begun to transition to a stage where companies are required to disclose ESG-related information, effectively restrict and regulate ESG information disclosure, and gradually improve and unify the ESG information disclosure framework. We hope that improved information disclosure will help companies gain more investors' attention, while better ESG performance can obtain lower financing costs and improve corporate image and reputation. Therefore, many listed companies propose ESG issues at the board level, and gradually realize the ESG integration in various departments of the company, forming a relatively complete ESG organization system and management structure. [1]

The disclosure of ESG information is a prerequisite, and the ESG ratings are the basis for ESG investment. International mainstream ESG ratings include MSCI, Thomson Reuters, FTSE, Dow Jones, Morningstar, etc. Nowadays, China is still in the early stage of ESG development. The ESG evaluation system needs to meet the characteristics of domestic capital market. A number of third-party service providers including research institutions, social organizations, market institutions, etc. have emerged to build ESG indicators. Common ones include Hexun.com, SynTao Green (SynTao), the Chine Securities Index (CSI) ESG rating, HuaZheng ESG ratings and so on. It is worth noting that these "indicators" are still in their infancy. One of the most pressing problems is that there is little consistency between the major ones, which is a very big problem for the users of this information. Furthermore, this is also an ongoing problem in Europe and the U.S. [2-3]

2. Statistical Profiles of ESG Thematic Funds

2.1. Generalized ESG Funds

At present, the size of funds that adopted ESG strategies in the Chinese asset management market is relatively small. The overall focus is on generalized ESG thematic funds, which mainly invest on the ESG-related themes (such as low carbon, environmental protection, green, sustainability, social responsibility, governance, etc.) We refer to them as ESG thematic funds. In the world, it is generally called Socially Responsible Investment Fund (SRIF). As an investment tool, it selects investment portfolios based on environmental, social and governance ESG standards. According to Wind "ESG Investment Funds", ESG thematic funds (excluding non-initial and ETF feeder funds) were selected. As of the end of 2020, there were 103 ESG thematic funds on the market, with a total fund size of 132.9 billion Yuan, which has a 68%increase from 2019.

According to statistics, most of these ESG thematic funds are "ESG concept" funds, involving several themes. Although the ESG investment criteria has not been explicitly incorporated into the investment process and decision-making, it has considered any or two related ESG themes. According to the statistics of fund names, there are the most ESG thematic funds involving environmental themes whose key words include low-carbon, environmental protection, energy, green, beautiful China, ecology, environment, energy saving, cleanliness, etc. There are fewer

products that involve the social (such as social responsibility) and governance (such as governance).

2.2. ESG Funds

"ESG Fund" refers to the funds that adopt ESG investment strategy according to the fund contract. As of April 2021, there are 13 ESG funds in the domestic mutual fund market, including 2 index ESG funds and 11 active ESG funds, with a total fund size of approximately 13.6 billion Yuan. [4-6]

2.2.1. Index ESG Funds

At present, the variety and quantity of domestic index ESG funds still need to be developed. There are only two index ESG funds, including an enhanced index fund and a passive index fund. Among them, the earliest and largest is the CaiTong CSI 100 Index Enhancement Fund, which was established in March 2013, with a fund size of approximately 198 million Yuan. Another HuaBao MSCI China a Shares International Link ESG was established in August 2019. The size is only 33.91 million Yuan. [7-8]

2.2.2. Active ESG Funds

As of April 2021, a total of 11 active ESG funds have been counted, with a total fund size of approximately 13.4 billion Yuan, including 8 partial-share hybrids and 3 common stocks. The oldest qualified XingQuan Social Responsibility Fund was established in April 2008. The fund is also the largest ESG fund in China so far, with a size of more than 6 billion Yuan. The latest establishment is SPDB-AXA ESG Responsible Investment A, established in March 2021. The fund size reached 1.484 billion Yuan. The smallest is ChuangJinHeXin ESG Responsible Investment A, with a fund size of only about 0.05 billion Yuan. [9-13]

2.2.3. Partial Stock Hybrid ESG Funds

Partial stock hybrid ESG funds have performed well in calendar year 2020, and the performance of different funds varies greatly. According to the average level of comparison, from the annualized return statistics on Wind, the average annualized return of the 9 partial-equity ESG funds is slightly higher than that of other funds of the same type and the benchmark Shanghai and Shenzhen 300 Index, which has certain advantages. Compared with other similar funds, ESG funds have not shown advantages in volatility and Sharpe ratio, and even partial-share hybrid ESG funds have shown greater disadvantages in Sharpe ratio. However, because the number of ESG funds is too small, and some of them have a short establishment time as well as the performance of different funds also shows large differences, the average value may not be very representative.

Judging from the performance of a single fund, the WanJia responsibility fixed-open A achieved the highest annualized return of 68.70%and ranked second among the 9 funds in terms of the Sharpe ratio. The return and Sharpe ratio of CCB Social Responsibility, established in 2012, is also much higher than the average, with outstanding performance. XingQuan Social responsibility, which was established the earliest who’s compounded annualized return is 48.36%, nearly 10 percentage points lower than the average. [12-14]

2.2.4. Common Stock ESG Funds

Among the common stock funds, the best performer is E Fund ESG Responsible Investment Fund. Its annualized volatility is slightly higher than the average of other common stock funds, but the annual yield and Sharpe ratio are both higher than the market average. From the perspective of

the stock allocation ratio, the concentration of these active ESG funds is relatively scattered. Only XingQuan socially responsible holds single stock investment exceeding 10% of the net value (for KangHong Pharmaceutical (002773.SZ), accounting for up to 10.19%). Among the top ten holdings of the ESG funds, the industry configuration is mainly for pharmaceutical and biological, commercial trade, food and beverage, electronics, etc., which reflects the industry orientation of ESG responsible investment. At present, ESG investment in the Chinese market is developing vigorously. With the development of ESG investment, another two, four and four core ESG thematic funds were established in 2019, 2020 and 2021 respectively. One can believe that ESG thematic fund investment will usher in explosive growth in the future. [15-19]

3. Research Hypothesis

The five factor model has been verified and applied in the international market, but whether the five factor model is applicable to the Chinese public fund market and ESG theme funds remains to be studied. The purpose of this paper is to focus on the application of the five factor model to explain the excess return of ESG theme funds, that is, whether the five factor model can explain the performance of ESG theme funds in China's public offering market. This paper will discuss this important issue in detail. We will also study whether the performance of ESG theme funds is significantly different from that of the market during the stock disaster and non-stock disaster periods. Accordingly, we assume the following:

Hypothesis H1: The performance of Chinese ESG thematic funds can be explained by the five-factor model.

Hypothesis H2: There is no significant difference between the performance of ESG thematic funds and that of the market. [20-26]

4. Performance of ESG Thematic Funds

4.1. Model Data and Variables

4.1.1. Model Description

The Fama-French five-factor model is defined as follows:

$$R_{i,t} - R_{Ft} = a_i + b_i(R_{Mt} - R_{Ft}) + s_i SMB_t + h_i HML_t + r_i RMW_t + c_i CMA_t + \varepsilon_{i,t} \quad (1)$$

Where $R_{i,t}$ is the return of portfolio i in period t, R_{Ft} is the risk-free interest rate, and R_{Mt} is the return of market portfolio which is weighted average by market value. $R_{Mt} - R_{Ft}$ indicates the market risk premium. SMB_t is the market value factor that is the difference of the monthly return between a small market value portfolio and a large market value stock portfolio. HML_t is the book-to-market value ratio factor which is the difference of the monthly return between the high book-to-market value ratio stock portfolio and the low book-to-market value ratio stock portfolio. RMW_t is the profitability factor, that is, the difference of the monthly return between the high-profit stock portfolio and the low-profit portfolio. CMA_t is the investment style factor, that is, the difference of monthly returns between the low investment ratio stock portfolio and the high investment ratio stock portfolio. $\varepsilon_{i,t}$ is the residual term with zero mean. If the coefficient of five factors can explain the excess return of ESG thematic funds, then the constant term a_i which is also called alpha in formula (1) will be zero.

This paper examines the adaptability of the Fama-French five-factor model in ESG thematic funds and uses it to explain the excess return of the funds which is mainly depending on the number of the constant term a_i. According to the t statistic of the constant term: if the null hypothesis cannot

be rejected and it is not equal to 0, i it indicates that the Fama-French five-factor model can well explain the excess returns. By doing that, we are to explore whether there was a significant difference between the performance of ESG thematic funds and the market during the period before and after the crisis. In the middle of 2015, The Chinese stock market experienced a slump, forming a stock market crash. [27-28]

4.1.2. Sample Selection and Data

In this paper, we used the data in Wind and CSMAR database for analysis. The overall study period is from January 1, 2010 to December 31, 2020. The selection of this period is based on the fact that the stock price of the Chinese market has experienced downward shocks, rapid rises and sharp declines, as well as a recovery of market. In addition, ESG thematic funds have experienced a certain amount of growth after 2010.

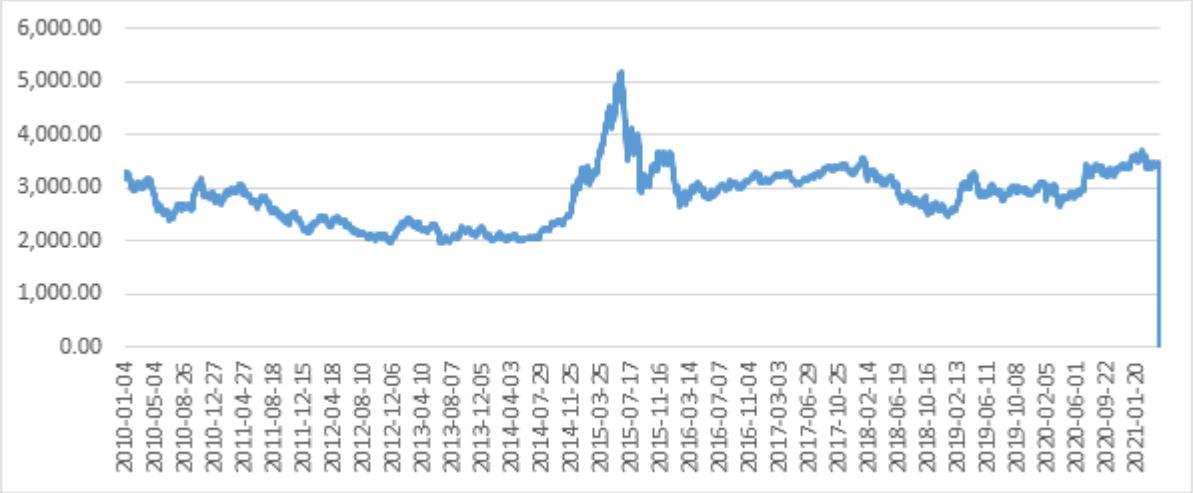

Figure 1: Daily trend of Shanghai Composite Index

As shown in Figure 1, the period from January 2010 to May 2014 is the downward phase. From June 2014 to June 2015, the market experiences a rapid rise. During the period from July 2015 to June 2016, one can find a sharp decline. From July 2016 to December 2020, the market gradually recovers. The true performance of the funds can be reflected in the entire market thus the conclusions would be reliable.

According to "ESG Investment Fund" caliber in Wind database, ESG thematic funds are selected (excluding non-initial and ETF feeder funds). QDII funds are deleted since they invest in the global market and we mainly study the A-share market. We exclude that bond funds which have no factor characteristics. Passive index fund track the underlying index and the factor characteristics are not significant, we also remove it. The number of our equity fund sample is 85, including 17 stock funds and 68 hybrid funds. Considering that Wind's collection of ESG thematic funds may not be complete, the ESG thematic funds discussed in this paper can be regarded as a representative subset of the entire market.

The monthly return data of the sample funds comes from the CSMAR database, and we select the month-end net value of the funds in the sample range. The return is $R_{i,t}=\ln(V_t/V_{t-1})$, where $V_t$represents the unit net value of the fund at time t, andV_{t-1} represents the unit net value of the fund at time t-1. The risk-free rate data is also from the CSMAR database. We use the three-month fixed deposit interest rate announced by the central bank. Since the fund return data is monthly, it is necessary to adjust the three-month interest rate to be monthly, that is $R_{Ft}=\ln(1+r/12)$, where r is the three-month fixed deposit interest rate. The purpose of our logarithmic calculation of fund

returns and risk-free rates is to satisfy the basic assumption that the fund returns follow a normal distribution. Due to the differential nature of the logarithmic return, we do not need to do the stationary test of the data. At the same time, there will be no "false regression" phenomenon in the OLS test. [25]

4.1.3. Factor Construction

Fama and French (2015) proposed three methods to construct risk factors. We choose a 2×3 construction method. First, we can divide all stocks into small market capitalization (S) and large market capitalization (B) groups. According to the 30% and 70% points of book-to-market value ratio, all stocks can be divided into three groups: high book-to-market value ratio (H), medium book-to-market value ratio (N), and low book-to-market value ratio (L). Secondly, by crossing the two indicators of market value and book-to-market value ratio, all stocks with six combinations of SH, SN, SL, BH, BN, and BL can be grouped; again, the profitability (OP) and investment style (INV) can be grouped separately. Instead of book-to-market value ratio, repeat the above steps to divide all stocks into 12 combinations of SR, SN, SW, BR, BN, BW, SC, SN, SA, BC, BN, BA. Here, R represents robust profitability and W represents weak profitability, C represents conservative investment style and A represents aggressive investment style, and N represents middle profitability or investment style.

After grouping, we can calculate the market value weighted average return for each period of the above different combinations, and finally, use the difference of the different combinations of returns to construct four factors. Similar to the calculation of Fama and French (2015), we grouped the stocks according to the quantile points of each indicator at the end of June of year t, and used them to determine the portfolio of stocks from July of year t to June of year t + 1. For stock i, we take its market value in circulation at the end of June of year t as an indicator. "Book-to-market value ratio" (BE/ME) is the book value at the end of year t-1 divided by market value in circulation of stock i at the end of December of year t-1. We exclude stocks with a book-to-market value ratio less than or equal to zero. According to the operating profitability (OP), the R, N, and W portfolios are divided into strong profitability stock portfolios, medium profitability stock portfolios, and weak profitability stocks. The OP of t-1 years is used. We can divide the C, N, and A portfolios according to the investment style (INV), corresponding to conservative, neutral and aggressive style respectively. [29-30]

- **Market risk premium$R_M - R_F$**

$$R_M - R_F = \text{Market return considering cash dividend reinvestment} - \text{Three-month fixed deposit interest rate}$$

- **Market value factor(SMB)**

$$SMB = (SMB_{B/M} + SMB_{OP} + SMB_{INV})/3,$$

Where

$$SMB_{B/M}=(SH+SN+SL)/3-(BH+BN+BL)/3,$$

$$SMB_{OP}=(SR+SN+SW)/3-(BR+BN+BW)/3,$$

$$SMB_{INV}=(SC+SN+SA)/3-(BC+BN+BA)/3.$$

- **Book-to-market value ratio(HML)**

$$\mathbf{HML=(SH+BH)/2-(SL+BL)/2.}$$

- **Profitability factor (RMW)**

HML=(SR+BR)/2-(SW+BW)/2.

- **Investment style factor (CMA)**

CMA=(SC+BC)/2-(SA+BA)/2.

4.2. Descriptive Statistics

Table 1: Descriptive statistics of variables

Variable	N	Mean	Sd.	Min	Median	Max
RP	6136	0.007	0.074	-1.035	0.008	0.258
Return	6136	0.009	0.074	-1.034	0.010	0.260
Rate	6136	0.001	0.001	0.00100	0.001	0.003
RP1	6136	0.006	0.061	-0.243	0.006	0.175
SMB1	6136	0.004	0.046	-0.221	0.002	0.229
HML1	6136	-0.002	0.037	-0.144	0.000	0.160
RMW1	6136	0.003	0.027	-0.082	0.003	0.100
CMA1	6136	-0.002	0.021	-0.047	-0.003	0.055

According to the monthly net value matching the corresponding risk-free factor, the monthly return premium factor (Return premium) can be obtained, and then the corresponding market risk premium factor, market value factor, book-to-market value ratio factor, profitability factor and investment style factor can be matched.

Table 1 describes the descriptive statistical results of the sample population. The results show that the model (1) has a total of 6316 observations. Return represents the monthly return, rate represents the monthly risk-free rate and return premium is the monthly return premium of funds, that is, Return premium=Return-Rate(RP). RP1 represents the market risk premium factor, which uses the weighted average method of circulating market value to calculate the monthly market return considering the reinvestment of cash dividends. SMB1, HML1, RMW1 and CMA1 indicate that the calculation of the monthly return of the combination is weighted by the circulating market value. The overall average return of ESG thematic funds is 0.009, with a standard deviation of 0.074. After removing the risk-free return, the average return premium is 0.007, with the standard deviation unchanged. The average return of the market risk premium factor is 0.006, and the standard deviation is 0.061, which is slightly smaller than the ones of the overall fund, indicating that the volatility of the fund is greater than that of the overall market. For market value factor, book-to-market value ratio factor, profitability factor and investment style factor, their average values are 0.004, -0.002, 0.003, and -0.002, respectively.

Table 2: Correlation analysis among variables

	RP	MRP	SMB1	HML1	RMW1	CMA1
RP	1					
RP1	0.7400*	1				
SMB1	0.3059*	0.1811*	1			
HML1	-0.4718*	-0.2800*	-0.7361*	1		
RMW1	-0.2847*	-0.3279*	-0.7782*	0.4819*	1	
CMA1	-0.1570*	0.0079	0.1024*	0.3180*	-0.4031*	1

Note: * means significant at the 5% level.

Table 2 lists the correlation coefficient matrix of the variables. It can be seen that the overall

return premium of the fund is mainly related to the market risk premium factor, and the correlation is positive. Secondly, the correlation coefficient between the return premium and the market value factor is positive while the return premium is negative to the book-to-market value ratio factor, the profitability factor and the investment style factor. The above analysis did not consider the influence of the control variables, and then the regression model was used for further testing.

4.3. Analysis of the Empirical Results of the Five-factor Model

Based on the model (1) constructed above, we adopt the OLS model to estimate the correlation between the return premium and the five factors through STATA software for conducting regression analysis. The overall period is 2010.01-2020.12. The regression results are shown in Table 3 below.

Table 3: Basic regression results

	(1) 2010.01 -2020.12 Sample period	(2) 2010.01 -2014.05 Downward phase	(3) 2014.06 -2015.06 Rapid rise	(4) 2015.07 -2016.06 Sharp decline	(5) 2016.07 -2020.12 Recover
	RP	RP	RP	RP	RP
RP1	0.826***	0.727***	0.976***	1.012***	0.732***
	(44.298)	(36.301)	(17.506)	(12.502)	(40.555)
SMB1	0.135***	0.422***	0.528***	0.225**	-0.061
	(4.169)	(7.759)	(3.145)	(2.353)	(-1.313)
HML1	-0.518***	-0.300***	-0.274**	0.297*	-0.688***
	(-14.260)	(-5.419)	(-2.205)	(1.655)	(-13.168)
RMW1	0.311***	-0.053	0.592**	-0.108	0.395***
	(7.265)	(-0.577)	(2.138)	(-0.515)	(7.678)
CMA1	-0.155***	-0.721***	-0.376**	-0.013	-0.035
	(-4.018)	(-9.626)	(-2.431)	(-0.081)	(-0.702)
a	-0.000	-0.005***	-0.014***	-0.004	0.002**
	(-0.483)	(-5.001)	(-3.356)	(-1.417)	(2.341)
r2	0.632	0.647	0.632	0.698	0.578
N	6136.000	1340.000	514.000	619.000	3663.000
F	707.544	571.235	112.319	145.704	946.981
="* p<0.1	** p<0.05	*** p<0.01"			

Note: ***, **, and * indicate significant at the level of l%, 5%, and 10%, respectively. The Z Statistics are in parentheses.

The analyses for this study are conducted in two phases. To test Hypothesis H1, the first phase compares the performance of ESG thematic funds with market indexes through the overall period 2010-2020. In order to test Hypothesis H2, after controlling for Fama-French five factors, the four sub-periods of 2010.01-2014.05, 2014.06-2015.06, 2015.07-2016.06, and 2016.06-2016.12 are followed. These four sub-periods contain a complete stock market operating cycle, including the period from the Great Recession to the economic recession and the subsequent recovery period. We are therefore broken down into four stock market cycles: shock downward, rapid rise, sharp decline, and recovery.

The regression result (1) shows that the goodness of fitR^2=0.632, indicating that the fitting effect

is good. It shows that the five factors explain the performance of ESG thematic funds, which achieves the purpose of attributing the fund return. The five factors are all significant at the 1% confidence level. The constant a=-0.0002 and is not significant thus the assumption that the constant is 0 cannot be rejected. There is no significant difference between the performance of ESG thematic funds and the market which shows that ESG funds have almost no excess returns. The assumption of the five-factor model is that the intercept term of the regression model is required to tend to zero. Hypothesis H1 is justified. The market risk premium factor coefficient is positive, the coefficient is 0.826, and is significant at the 1% confidence level. It shows that during the sample period, the performance of the ESG thematic funds is consistent with the overall market. The market value factor coefficient is positive, with a coefficient of 0.135, it is significant at the 1% confidence level, indicating that this type of fund prefers to allocate small-cap stocks. The coefficient of the book-to-market ratio factor is negative, with a coefficient of -0.518, and is significant at the 1% confidence level. One can imagine that the funds prefer allocation of growth stocks (i.e., stocks with relatively low book to market value). The profit factor coefficient is positive with a coefficient equal to 0.311, which is significant at the 1% confidence level. This result suggests that the funds prefer to allocate robust blue-chip stocks. One can also find that the investment factor coefficient is negative and significant at the 1% confidence level, implying that they allocate stocks with a relatively high annual growth rate of total assets, and their investment methods are slightly more aggressive. In general, the factor coefficients of the five-factor model are consistent with the fact that ESG thematic funds allocate more high-tech, environmental protection, and new energy-related stocks.

The regression result (2) shows that from January 2010 to May 2014, the stock market was in a downward phase. The five-factor model explains the fund return (R^2=0.647). The constant term a is -0.005 and is significant at the 1% confidence level, indicating that the overall performance of the fund is not as good as the market within this interval. Among the five factors, the market risk premium factor, the market value factor, the book-to-market value ratio factor and the investment factor have significant impacts while the profitability factor has no significant impact. Among them, the market risk premium factor coefficient is positive, equal to 0.727, and extremely significant. It also shows that the overall fund is positively correlated with the market level. The performance is obvious, and the risk is relatively concentrated. A positive market value factor indicates that ESG funds often choose stocks with a small market value (for small and medium-cap investment), a negative book-to-market value ratio factor indicates that ESG funds prefer to allocate growth stocks while a negative investment factor indicates that ESG Fund investment methods are slightly aggressive.

The regression result (3) shows that from June 2014 to June 2015, the stock market experiences a rapid rise. The model is generally better at explaining the fund return (R^2=0.632), where the constant term a is -0.014, and is significant at the 1% confidence level. Thus the overall performance of the fund is inferior to the market within this interval. Among the five factors, the market risk premium factor, market value factor, and book-to-market value ratio factor have a significant impact at the 1% confidence level, and the profitability factor and investment model factor have a significant impact at the 5% confidence level. All of them can explain the performance of the fund. Among them, the market risk premium factor coefficient is positive, equal to 0.976, and extremely significant. The overall funds are positively correlated with the market level, and its performance is obvious, and they follow the overall rise of the stock market. A positive market value factor indicates that ESG funds often choose stocks with a smaller market value to construct a portfolio. A negative book-to-market value ratio factor indicates that the fund prefers to allocate growth stocks (that is, stocks with a relatively low book market value). A positive profitability factor coefficient indicates that the funds prefer to allocate high-quality stocks. A

negative investment factor coefficient indicates that the funds choose stocks with a relatively high annual growth rate of total assets and are slightly aggressive. During the overall upswing of the stock market, funds often make more aggressive investments to increase the return.

The regression result (4) shows that from July 2015 to June 2016, the stock market fell sharply. The model can better explain the fund return (R^2=0.698). The constant term is -0.005, but it is not significant, indicating that there is no significant difference in the performance of ESG thematic funds compared with the market during the Great Depression. This verified Hypothesis H2. During the stock market crash, there was no significant difference between the performance of ESG thematic funds and the market. During the economic crisis, ESG thematic funds demonstrated their ability to resist downside risks. Among the factors, the market risk premium factor has an extremely significant impact, followed by the market value factor. The book-to-market value ratio factor has a significant impact at the 10% confidence level, while the profitability factor and investment model factor have no significant impact. Among them, the market risk premium factor coefficient is slightly greater than 1 and extremely significant, indicating that during the sample period, the operating trend of the funds is consistent with the overall operating trend of the market. They may be aggressive.

The regression results (5) show that from July 2016 to December 2020, the stock market oscillated and corrected, and the economy gradually recovered. The model can partially explain the fund return (R^2=0.578). The constant term is 0.002, and it is significant at the 1% confidence level, indicating that in the sample interval, ESG funds perform slightly better than the market. Among the factors, the market risk premium factor, the book-to-market value ratio factor, and the profitability factor have a significant impact, while the market value factor and investment model factor have no significant impact. Among them, the market risk premium factor coefficient is less than 1. The market value factor is negative, and the fund prefers large market value stocks at this phase. The coefficient of the book-to-market value ratio factor is negative. The coefficient of the profitability factor is positive. Excess income Alpha shows high significance. One can find that the ability to select stocks in this range may benefit from the gradual diversification of ESG investment strategies.

The findings from this study informs the literature on ESG thematic funds performance leading to and through the period of Great Recession and through the subsequent recovery and economic expansion periods following the Great Recession. The results of this study are consistent with our hypothesis. During the entire sample period of the study, the five-factor model can explain the excess returns of ESG themed funds and can be used for attribution analysis of performance. ESG thematic funds performed poorly during periods of market volatility and rapid growth. However, many investors participating in ESG thematic funds have sustainable or socially responsible motives. For these investors, exceeding market performance is usually not the most important criterion. The results show that, despite the poor performance of ESG thematic funds in the market during certain periods, there is no significant difference between the performance of ESG thematic funds and the market during the economic crisis. Even during the economic recovery, performance was slightly better than market performance.

The results also show that during the entire study period (2010-2021), ESG thematic funds have a negative alpha value relative to the market, but it is not significant. However, the market risk premium factor, market value factor and profitability factor are related to the return.

4.4. Limitation Check

However, given that the mutual fund market in China has available data for more than 20 years, the existence period of ESG thematic funds and the period covered by this study are relatively short.

We need to do further study to check whether the performance of ESG thematic funds remains consistent over a longer period. Our limitation is the limited number of funds and the availability of past data. However, with the rapid development of ESGthematic funds in China and more diverse investment strategies, more data will become available to permit additional research opportunities.

5. Conclusions and Policy Suggestions

5.1. Main Conclusions

This paper uses ESG thematic funds from Wind database to conduct a detailed statistical analysis of their operating status, including the size, the proportion of different investment types, and the characteristics of return and risk. We use the monthly fund net value data in the CSMAR database as the initial sample. The research interval is from January 1, 2010 to December 31, 2020. We match equity ESG thematic funds to do OLS regressions. We apply the Fama-French five-factor model in Chinese mutual fund market. The conclusions drawn in this paper are as follows.

First, during the entire sample period of the study, the five-factor model better explained the excess returns of ESG thematic funds and can perform attribution analysis on the fund performance. Our test contains the period of economic recession that is the period of stock market crashes, and the subsequent period of recovery. The results show that, despite the poor performance of ESG thematic funds in the market during certain periods, there is no significant difference between the performance of ESG thematic funds and the market during the economic crisis.

Second, the results also show that during the entire period (2010-2021), ESG themed funds have a negative alpha relative to the market, but it is not significant. However, the market risk premium factor, market value factor, and profit factor are positively correlated with the performance. It indicates that ESG thematic funds perform well when the overall market premium rises, and they prefer to allocate small market capitalization and blue-chip stocks. Consistent with this, ESG thematic fund returns are negatively correlated with book-to-market value ratio factors and investment model factors.

5.2. Policy Suggestions

Although there is a large gap between domestic ESG responsible investment and overseas developed capital markets, it still shows a broad development space and growth potential. Looking forward to the future, regulators, asset owners, asset managers and third-party service providers need to work together to promote the construction of “ESG ecosystem” in China.

5.2.1. Suggestions to the Government

The high attention paid by government regulators to ESG is the core motivation of market development. In the ESG field, supervision should continue to steadily promote top-down mandatory data disclosure policies, urge companies to improve the disclosure of ESG information, promote listed companies to implement ESG responsible investment concepts, and at the same time promote and encourage ESG responsible investing in the asset management market. One of the most important impacts would be on the climate, which is probably of great concern to the government. Stimulating demand could incentivize companies to engage in more climate friendly manufacturing practices.

5.2.2. Suggestions to the Institutional Investors

For asset owners, the funders represented by insurance should actively follow the market

development trend and integrate ESG into the investment process. With the growth of size, the improvement of marketization and the adjustment of the assessment cycle, social security and pension institutions will become leaders in ESG investment in the future. It drives institutional investors to attach importance to ESG concerns.

For asset managers, the long-term investment capability represented by ESG is a weapon to stand out in the fierce market competition in the future. It is recommended that institutional investors systematically build their leading ESG investment capabilities, including improving the analytical capabilities in big data at the level of business construction. Meanwhile they should strengthen ESG talent investment, and provide support in organizational structure and management assessment, and actively deploy the diversification of ESG products.

In addition, the development of ESG is inseparable from the support of solid industry infrastructure. Domestic third-party data providers should further learn and use advanced technologies such as financial technology, explore the collection, quantification and analysis of ESG data, and continuously improve professional knowledge and algorithm models. It also helps the development of ESG in academic empirical research and industry practices.

5.2.3. Suggestions to Individual Investors

Individual investors should strengthen the learning of ESG investment knowledge. Investors should fully learn ESG-related investment knowledge, receive investor training and education, and improve investment judgment and risk identification capabilities. Investors should also objectively evaluate their own investment capabilities, determine appropriate investment objectives based on their own capabilities, and select matching investment targets.

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