Time-varying preferences for ESG investments: evidence from an emerging market

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Abstract

This paper aims to examine the time-varying preferences for environment, social and corporate governance (ESG) investing in an emerging market. The investors seek ESG-conscious investments during a positive economic outlook, reflecting the time-varying nature of ESG demand. Specifically, the author shows that high-ESG stocks have negative abnormal returns during bad economic times but turn into positive abnormal returns in good economic times. The author also suggests that the alpha spread between high-ESG and low-ESG stocks is larger in good economic times than in bad times. Furthermore, individual investors prefer high ESG scoring stocks in good economic times. The author highlights that this ESG premium is shaped by economic projection and the households' financial wealth.

Keywords ESG, Time-varying preference, Social responsibility, Economic projection, Emerging markets
Paper type Research paper

1. Introduction

The findings of previous studies are mixed regarding the relationship between environment, social and corporate governance (ESG) investing and performance. The economic theory suggests that sustainability-oriented investors require less compensation for holding high-ESG stocks, and there is a negative premium for ESG investment (Fama and French, 2007; Pedersen *et al.*, 2021; Pastor *et al.*, 2021). Empirical studies support this theoretical strand (Brammer *et al.*, 2006; Renneboog *et al.*, 2008; Hong and Kacperczyk, 2009; Hartzmark and Sussman, 2019; Bolton and Kacperczyk, 2021; Geczy *et al.*, 2021). On the other hand, the studies by Derwall *et al.* (2005), Kempf and Osthoff (2007), Edmans (2011), Ashwin Kumar *et al.* (2016) and Fan and Michalski (2020) argue that the previous findings are inconclusive and suggest that sustainable investments provide high abnormal returns. Despite controversy over the direction of ESG investment performance, most of these studies show that ESG pricing is determined by investors' consciousness for socially responsible investing.

A recent study by Pastor *et al.* (2021) develops an equilibrium model for sustainable investing. They show that the performance of ESG investments depends on the ESG consciousness of investors based on theoretical and empirical results. Pedersen *et al.* (2021) also argue that ESG-motivated investors are willing to accept a lower payoff for highly ESG-rated stocks. Thus, if more ESG-motivated investors are in the stock market, the expected return on highly ESG-rated stocks will be lower. Furthermore, Bansal *et al.* (2022)

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suggest that investment preference for high-socially responsible stocks is time-varying and depends on the investors' wealth in the US stock market.

Given the recent renewed interest in the ESG consciousness of investors, we examine whether the direction of investors' ESG preference is firmly and unconditionally consistent regardless of economic conditions in an emerging market. In other words, we raise the question of whether there is a shift in the time-varying demand for ESG investment in emerging markets. To address this question, first, we identify the economic projection by using two *ex ante* indicators as forecasts of economic conditions—Shiller's price-to-earnings (PE) ratio and GDP forecasts. Next, we implement a trading strategy based on ESG scores to investigate the average alphas of high- and low-ESG stocks.

As a result of analyzing the performance of ESG investing from 2012 to 2020 in the Korean stock market, we find that the high-ESG stocks have abnormal returns ranging from −0.27% to −0.28% in economic downturns and from 0.12% to 0.23% in good economic times for the Fama and French three-factor model. Furthermore, Fama and French's three-factor alphas for the high–low (HL) long–short portfolio(buy stocks with high ESG scores and sell stocks with low ESG scores) range from −0.28 to −0.30% in bad times and are statistically significant. On the other hand, in good times, three-factor alphas for the HL long–short portfolio range from −0.07% to −0.14% and are statistically insignificant. These results support a time-varying preference for ESG investing in an emerging market.

Furthermore, we investigate the entry of individual investors into the ESG investment market. The main hypothesis driving this study is that consumer wealth and economic conditions are crucial factors in ESG investment. The results mentioned previously are consistent with our main hypothesis. An open question is whether investors engage in ESG investing during good economic times and exit during bad times. In our study, we focus on individual investors who are relatively sensitive to economic conditions. Using survey data, Amromin and Sharpe (2014) show that individual investor perceptions of economic conditions strongly influence their expectations and portfolio positions. Sias (1997) suggests that individual investors react more sensitively to changes in market conditions than institutional investors. Along these lines, we extend previous studies to an ESG investment framework, providing evidence that individual investors buy stocks with high ESG scores in good economic times. In other words, we show that individual investors who can afford to be aware of ESG investing drive up demand for high-ESG stocks during periods of high household wealth.

We conduct several additional tests. First, an event study is undertaken to address the endogeneity issues in our research. We define an event as an increase in an ESG score of more than 10% from the previous year. The result shows that stocks with elevated ESG scores experience positive abnormal returns, of a magnitude statistically and economically significant in good rather than bad economic times. These asymmetrical findings support a time-varying preference for ESG factors.

A second additional test is administered to examine complementary channels for the "luxury good" type characteristic of ESG elements, as proposed by Bansal *et al.* (2022). We investigate a consumption channel in which households have a wealth-dependent preference toward ESG. We use the consumer confidence index (CCI) and the retail sales index (RSI) for durable goods as economic indicators. As a result, the HL long–short portfolio generates a more negative performance in bad consumption-based forecasting than in good consumption-based forecasting. These results support the consumption channel. In a negative economic outlook, investors pay less attention to ESG investments that share similar characteristics to luxury goods that are not essential.

Our study extends the work of Bansal *et al.* (2022), who focus on the governance factor (G). First, in this study, we intend to analyze ESG integrated investment and its ability to meet the scope of socially responsible investments in the current capital markets. Furthermore, we

show that the characteristics of firms with high environmental (E) or social (S) factor scores differ from those with high G factor scores. Thus, analyzing integrated ESG is meaningful and timely for the recent ESG-oriented market.

Second, to the best of our knowledge, our study is the first to examine the time-varying effect of ESG preferences for individual investors. Bansal *et al.* (2022) do not show time-varying ESG consciousness with investor trading data. In this paper, we confirm the arguments of Bansal *et al.* (2022) by investigating the trading activity of individual investors. To this end, we chose the Korean stock market, an emerging market with a high proportion of individual investors. Our empirical results provide evidence that the consumers' wealth is essential in determining investor perceptions of ESG investing.

In emerging markets, ESG investment was introduced relatively late compared to developed markets, resulting in a lack of a shared understanding of ESG. In addition, the lack of a significant regulatory push in emerging markets gives firms little incentive to adhere to ESG policies. Therefore, in economies with weak ESG policy implementation, investors tend to face high uncertainty and costs when making ESG investments. Asset pricing theories argue that investors require compensation for the uncertainty in their investment expectations. Investigating emerging markets allows us to study investors' expectations and behaviors in uncertain ESG investment conditions.

However, the existing abundance studies focus on ESG implementation in developed capital markets, but few studies focus on emerging markets. Thus, we still have little understanding of ESG implementation and sustainable investment in emerging markets. Studies analyzing ESG investment in emerging markets show the relationship between ESG investment and performance (Sherwood and Pollard, 2018; Khan, 2019; Broadstock *et al.*, 2021; Saci *et al.*, 2022; Zhang *et al.*, 2022), the relationship between ESG and stock price crash (Bae *et al.*, 2021; Feng *et al.*, 2022), ESG screening strategy (Wang *et al.*, 2021) and the relationship between ESG and corporate financial performance (Odell and Ali, 2016; Yoon *et al.*, 2018; Zhao *et al.*, 2018).

Primarily, it is interesting to analyze the sensitivity of the uncertainty in ESG investment in the Korean stock market, where individual investors are remarkable players in the stock market. According to Korea Exchange (KRX), the trading volume by individual investors accounted for 65.1% of the total trading volume from 2012 to 2021. Furthermore, KRX provides daily frequency trading data of individual investors. Therefore, the Korean stock market provides an ideal environment for analyzing the ESG investment preference of individual investors. Using transaction data of Korean investors, we examine whether investors demand an extra premium to hold lowly rated ESG stocks under a negative economic outlook and whether there is a rise in ESG consciousness under a positive economic outlook in an emerging market. We expect our research to contribute to understanding ESG investments and ESG preferences in emerging capital markets.

The rest of this paper is organized as follows: Section 2 provides the related literature and describes the data sources and summary statistics. The empirical findings are then presented in Section 3. Finally, in Section 4, we summarize our main findings and conclude the paper.

2. Related literature and data

2.1 Related literature

The performance of ESG investing is not clearly warranted based on previous research. In other words, the results of ESG investment performance are not all one-sided. Hong and Kacperczyk (2009) show that firms involved in the industries of tobacco, alcohol and gaming (i.e. "sin stock") have higher returns than comparable stocks. They suggest the greater litigation risk and regulatory scrutiny faced by sin stocks as reasons for their premium [1]. The studies by Fabozzi *et al.* (2008), Fauver and McDonald IV (2014) and

Blitz and Fabozzi (2017) also show that sin stocks have abnormal returns relative to comparable benchmarks. Subsequent studies extending the range of sin stocks to ESG concepts show that abnormal returns are available from holding a portfolio of low ESG stocks (Brammer *et al.*, 2006; Renneboog *et al.*, 2008; Hartzmark and Sussman, 2019; Bolton and Kacperczyk, 2021; Geczy *et al.*, 2021).

Conversely, some studies suggest ESG investment can impinge on the expected returns of investment portfolios positively (Derwall *et al.*, 2005; Kempf and Osthoff, 2007; Edmans, 2011). Interestingly, recent studies providing evidence of positive outcomes from sustainable investing provide a new insight: 'high ESG low risk' (Ashwin Kumar *et al.*, 2016; Fan and Michalski, 2020). These studies show that ESG investment could allow opportunities to generate wealth and mitigate risk.

Against this backdrop, recent studies go one step further and investigate the explanatory factor of investors' demand for ESG investment. Hartzmark and Sussman (2019) demonstrate that the salience of sustainability in mutual fund assets leads to significant net fund inflows after Morningstar first published sustainability ratings in 2016. Through a time-varying setup, Pastor *et al.* (2021) and Bansal *et al.* (2022) suggest the relationship between shifts in investor demand for ESG and ESG investment performance.

Our study complements these papers by documenting the time-varying preferences for ESG investing in an emerging market. Furthermore, examining trading data, our study provides a distinct relationship between individual investors' investment decisions for ESG and economic projection.

2.2 Data sources and variable construction

This section describes the data and defines the variables for empirical analysis. Our sample includes all common stocks listed on the Korea Stock Exchange (KSE) and the Korea Securities Dealers Automated Quotation (KOSDAQ) from January 2012 to December 2021. In addition, we obtain stock information data from FN Guide's dataset.

Our data on ESG rating data from SUSTINVEST spans the period 2012 to 2020. ESG scores range from 0.0 to 100.0, with a high score indicating excellent relative ESG performance. Each firm is evaluated according to three complementary factors of ESG: (1) environmental (E-factor), which includes eco-innovation; resource, energy, or water productivity; green gas management; and preparation for environmental accidents; (2) social (S-factor), which include human resource management, supply chain management and social contribution; and (3) governance (G-factor), which include shareholder rights, ownership and transparency, board structure and operation, and subsidiaries' risk.

We obtain the macroeconomic measures from Bloomberg and the OECD. Following Bansal *et al.* (2022), we use two macroeconomic indicators to define the good and bad times: Shiller's (2005) cyclicality-adjusted real P/E (CAPE) ratio from Bloomberg and the real GDP forecast from the OECD database. First, Shiller's P/E ratio of the Korean stock market (KOSPI) is the current price divided by the average inflation-adjusted ten-year earnings per share. Shiller's P/E ratio is used to predict future stock market returns. A higher Shiller's P/E ratio indicates investors' willingness to pay a higher stock price today because of positive expectations for future growth. The second indicator is the real GDP forecast for Korea, which is based on assessing the economic state of individual countries and the world economy. This macroeconomic indicator is measured as a year-over-year growth rate.

The "bad economic times" are defined when these macroeconomic indicators are below their average values over the past ten-year rolling distributions; otherwise, it is defined as "good economic times." Our study assumes that investors will be more interested in ESG factors in good than bad times. Therefore, we predict that investment strategy performance based on ESG will decline in good times than in bad times.

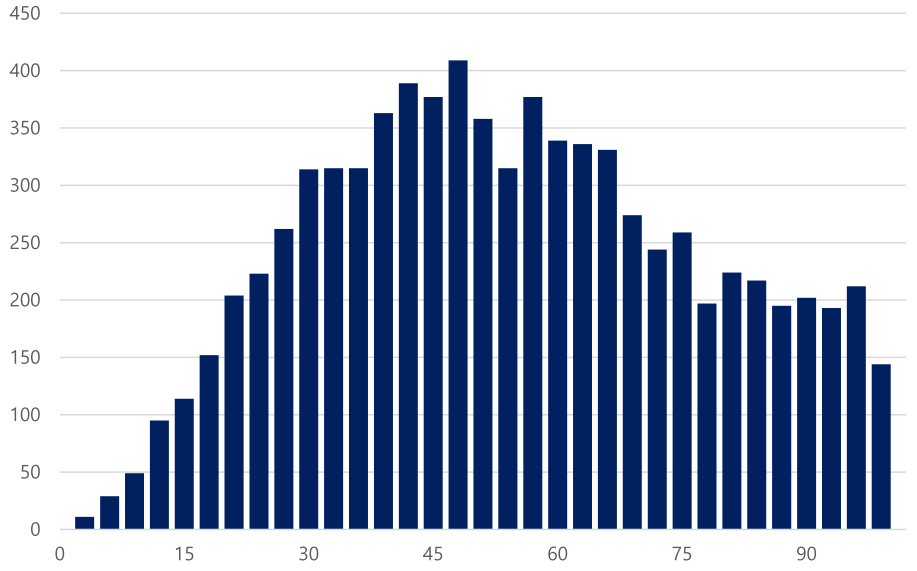
2.3 Summary statistics

Figure 1 shows the overall histogram of ESG scores. The shaded histograms indicate the distribution of firms. It contains rated firms at the yearly level from 2012 to 2020, and the total number of observations in our sample is 8,038. The proportion of observations with fewer than 30 out of 100 points is 14.1%. In addition, observation of fewer than 50 points accounts for 45.0% of the total sample. On the other hand, the proportion of observations exceeding 70 points is 26.0% of the total observations, and the proportion of observations above 90 points is 9.3% of the total sample. This result suggests that the distribution of ESG scores is slightly right-skewed.

Table 1 reports basic descriptive statistics for different ESG criteria by year. Panel A shows the distribution of ESG scores. The average ESG score is 52.25, revealing an increasing trend for ESG scores, from 49.13 in 2012 to 59.14 in 2020. The median ESG score tends upwards incrementally over the analysis period (from 43.83 to 58.86). On the other hand, the standard deviation of ESG scores decreased from 23.56 in 2012 to 21.95 in 2020. These results suggest that ESG awareness is growing among the firms in the market. Table 1 also provides evidence of a right-skewed distribution of ESG scores. The mean of the ESG score is greater than its median.

The scores of the three ESG criteria present different trends. In Panel B, the E-factor score is stable, as it ranges from 15.24 to 20.81, except for 2012. On the other hand, the average S-factor score decreases over the sample period, from 33.93 (2012–2016) to 31.02 (2017–2020). For the score of the G-factor, the average score increases from 50.29 (average from 2012 to 2016) to 53.26(average from 2017 to 2020). The E-factor and S-factor have a lower ESG evaluation score and a higher standard deviation than the G-factor. The results suggest differences in the ESG market participants' perception of E- and S-factors from traditional G-factors.

Table 2 reports the time-series average of the cross-sectional means of the yearly firm characteristic variables across all firms in the ESG quintile portfolios. The sample period is



Note(s): This figure illustrates the distribution of ESG scores from 2012 to 2020
Source(s): Author's work

Figure 1.
The distribution of ESG scores

Panel A. ESG

Year	*N*	Average	STD	Median	Min	P25	P75	Max
2012	504	49.13	23.56	43.83	7.23	30.67	63.45	99.69
2013	600	48.79	22.01	44.27	9.84	32.62	61.33	99.54
2014	603	42.29	25.66	37.01	2.20	21.77	57.83	99.88
2015	595	46.21	25.71	41.99	1.56	25.42	62.07	99.95
2016	873	55.63	21.03	55.50	9.26	39.29	71.62	99.06
2017	882	57.25	20.34	57.05	5.65	41.78	72.47	99.61
2018	971	56.35	20.76	55.84	8.22	41.60	71.20	99.66
2019	1,007	55.44	20.89	55.19	1.99	39.99	70.68	99.41
2020	999	59.14	21.95	58.86	3.88	42.80	76.08	99.54
Average	782	52.25	22.44	49.95	5.54	35.10	67.41	99.60

Panel B. ESG components

		Environmental		Social		Governance	
Year	*N*	Average	STD	Average	STD	Average	STD
2012	504	28.51	17.40	33.24	12.21	52.64	7.45
2013	600	19.51	18.17	36.17	13.50	50.68	8.04
2014	603	17.09	20.45	33.68	16.53	47.46	7.01
2015	595	18.13	21.58	35.75	17.75	48.53	7.03
2016	873	15.24	19.00	30.83	15.17	53.63	7.82
2017	882	19.46	21.65	30.74	15.13	53.54	7.94
2018	971	18.22	19.73	30.68	14.74	53.07	8.10
2019	1,007	18.39	19.66	30.28	15.00	52.58	7.86
2020	999	20.81	22.12	32.38	16.51	53.83	7.74
Average	782	19.48	19.97	32.64	15.17	51.77	7.66

Note(s): This table shows the summary statistics of the ESG scores by year and ESG category. The sample period is from 2012 to 2020

Source(s): Author's work

Table 1.
Summary statistics

from 2012 to 2020. We divide our sample firms into quintile groups according to the annual ESG scores and each category's ESG scores. Panel A reports the time-series average for the ESG quintile portfolio, Panel B for the E-factor quintile portfolio, Panel C for the S-factor quintile portfolio, and Panel D for the G-factor quintile portfolio. The firm's characteristics include market capitalization, book-to-market ratio, Previous 1-year return, Total volatility, Illiquidity, Firm age and ROA. All independent variables are lagged variables (t-1).

In Panel A of Table 2, the market capitalization of the five ESG quintiles is almost monotonous, increasing from ₩ (Korean won) 465bn ($345m) for the lowest ESG quintile to ₩ 6,425bn ($4,768m) for the highest ESG quintile. Firms with a high ESG score are typically larger-sized, more tenured (older), with lower momentum, higher liquidity, and records of sound financial performance. The results of Panels B, C and D of Table 2 show a similarity to the patterns of Panel A. The highest quintile portfolio of each elemental ESG factor consists of firms with large size, low momentum, high liquidity and solid financial performance.

Interestingly, there is a difference between the E-factor and S-factor patterns and the G-factor pattern. In panels B and C, firm characteristics positively related to the E- and S-factors include the book-to-market ratio and firm age. On the other hand, in Panel D, the book-to-market ratio increases from 1.27 for the bottom quintile to 0.97 for the top quintile. Furthermore, firm age is monotonous, decreasing from 21.6 years for the lowest-G quintile to

	ME	BM	Pre1yr_ret	Tvol	Illiquidity	Firmage	ROA
Panel A. ESG							
Low	465.92	1.03	10.56	2.97	0.07	19.47	1.18
2	465.77	1.05	17.91	2.79	0.11	20.36	2.04
3	554.24	1.13	19.28	2.65	0.06	20.05	2.90
4	1071.89	1.18	15.24	2.56	0.05	21.45	2.97
High	6425.64	1.07	7.87	2.32	0.01	22.05	3.70
Panel B. Environment							
Low	643.76	0.89	19.99	2.80	0.09	18.33	1.97
2	498.86	0.97	18.15	2.80	0.06	18.95	3.15
3	712.48	1.15	14.68	2.68	0.07	21.22	2.68
4	955.74	1.23	13.82	2.62	0.06	21.58	2.28
High	6168.84	1.22	4.37	2.40	0.02	23.30	2.70
Panel C. Social							
Low	490.39	0.95	19.36	2.97	0.08	19.20	1.92
2	453.22	0.99	17.12	2.82	0.09	20.06	1.31
3	626.63	1.11	15.03	2.64	0.07	20.63	2.77
4	1236.31	1.30	11.96	2.50	0.05	21.23	3.48
High	6172.96	1.12	7.60	2.37	0.02	22.23	3.32
Panel D. Governance							
Low	1414.38	1.27	10.52	2.82	0.06	21.59	1.85
2	1099.38	1.12	6.99	2.72	0.07	20.91	1.46
3	1054.68	1.12	14.63	2.66	0.09	20.48	2.32
4	2189.36	0.99	17.44	2.65	0.06	20.14	3.43
High	3212.59	0.97	21.69	2.44	0.03	20.26	3.74

Note(s): This table reports the time-series average of the cross-sectional sample means for the firm characteristics of each ESG quintile portfolio. We divide our sample firms into quintile groups according to the annual ESG scores and each category of ESG scores. SIZE is the natural logarithm of market capitalization (in ₩ billions). BM is a book-to-market ratio. Pre1yr_ret is the past one-year return, excluding the previous month. Tvol is the standard deviation of the stock returns over the previous one-year. Illiquidity refers to Amihud's (2002) illiquidity index. Firm age is the natural logarithm of the years a firm has been listed. Return on assets (ROA) is calculated by dividing pre-tax income by total assets. All independent variables are lagged variables(t−1)

Source(s): Author's work

Table 2.
Firm characteristics

20.2 years for the highest-G quintile. In addition, in the E- and S-factors, the momentum of the top quintile is lower than that of other quintile groups, whereas, in the G-factor, the momentum of the top quintile is the highest is higher than that of other quintiles. These results show that E- and S- factors have similar firm characteristics in each quintile group but are different from those of the G-factor.

3. Empirical findings

3.1 Long–short alphas in good and bad times

The primary purpose of this paper is to examine whether the performance of the long–short strategy based on ESG factors differs according to economic conditions. First, we follow the research design by Bansal *et al.* (2022). We divide all firms into quintile groups for each month based on ESG score. We then construct an HL long–short ESG strategy using quintiles one (Low) and five (High). Next, we further divide the sample period into good and bad times

based on two macroeconomic factors: Shiller's (2005) cyclicality-adjusted real P/E (CAPE) ratio from Bloomberg and real GDP forecasting from the OECD database.

We measure the abnormal returns of the long–short ESG strategy by estimating the alphas of the factor asset pricing model. Then, for each month t, we estimate the abnormal returns using the following regressions:

$$\text{CAPM: } r_{H,t} - r_{L,t} = \alpha_{H-L} + \beta_{H-L}^{MKTRF} * (MKTRF)_t + \epsilon_t \quad (1)$$

$$\text{Fama} - \text{French three factors: } r_{H,t} - r_{L,t} = \alpha_{H-L} + \beta_{H-L}^{MKTRF} * (MKTRF)_t + \beta_{H-L}^{SMB} * (SMB)_t + \beta_{H-L}^{HML} * (HML)_t + \epsilon_t \quad (2)$$

where $r_{H,t}$ is the highest quintile portfolios return in the ESG category, and $r_{L,t}$ is the lowest quintile portfolio return in the ESG category. MKTRF, SMB and HML are the market, size and growth factors corresponding to the capital asset pricing model (CAPM) and the three Fama–French factors. The alphas are estimated over a previous 36 months rolling window.

Table 3 shows the parameter estimates from the CAPM and three-factor model for the long–short strategy in both bad and good times. Panels A and B report the results of defining

				Long–short (HL) portfolio		
	$Alpha^H$	$Alpha^L$	$Alpha^{H-L}$	β^{MKTRF}	β^{SMB}	β^{HML}
Panel A. Bad times: Shiller's CAPE						
CAPM	0.140**	0.976***	−0.836***	0.128***		
	(2.30)	(8.56)	(−9.28)	(3.53)		
Fama-French	−0.281***	0.024	−0.305***	0.025	−0.528***	0.339***
	(−4.42)	(0.32)	(−5.88)	(0.91)	(−15.55)	(21.48)
Panel B. Good Times: Shiller's CAPE						
CAPM	0.477**	0.529***	−0.052	0.118***		
	(2.57)	(2.74)	(−0.50)	(3.62)		
Fama-French	0.232**	0.300***	−0.068	0.102**	−0.427***	0.379***
	(2.32)	(3.52)	(−0.50)	(2.10)	(−16.53)	(15.22)
Panel C. Bad Times: GDP Forecasting						
CAPM	0.177**	0.807***	−0.630***	0.175***		
	(2.25)	(7.07)	(−6.96)	(5.21)		
Fama-French	−0.269***	0.014	−0.283***	0.042	−0.555***	0.367***
	(−3.98)	(0.19)	(−4.26)	(1.28)	(−17.42)	(21.00)
Panel D. Good Times: GDP Forecasting						
CAPM	0.360**	0.872***	−0.512***	0.045		
	(2.52)	(4.61)	(−3.59)	(1.08)		
Fama-French	0.127	0.270***	−0.143	0.062*	−0.401***	0.327***
	(1.32)	(2.84)	(−1.38)	(1.71)	(−11.31)	(15.94)

Note(s): This table shows the CAPM alphas and three-factor alphas for the high–low quintile portfolio. HL refers to the long position in the firms with the highest ESG score and the short position in the firms with the lowest ESG score. For each month, stocks are sorted into quintile portfolios according to the ESG score. We then construct a long–short portfolio (HL). The sample period is from January 2012 to December 2020. The *t*-statistics are in parentheses and statistical significance at the 10%, 5% and 1% levels is given by *, ** and ***, respectively

Source(s): Author's work

Table 3. Average monthly Long–short (H-L) alphas in good and bad times

the economic states as Shiller's P/E, and Panel C and D report the results of defining it as gross domestic product (GDP) forecasting. In each Panel, Columns (2) and (3) give the alphas of the long leg (top quintile) and short leg (bottom quintile), respectively. Columns (4)–(7) contain the alphas and factor loadings of the HL long–short ESG portfolio between the long leg (top quintile) and short leg (bottom quintile).

Table 3 conveys a couple of important implications. First, the difference in abnormal returns of high ESG stocks between the good and bad times is greater than that of the low-ESG stocks. In Panels A and B, high ESG scored stocks have monthly abnormal returns of −0.28% in bad economic times and 0.23% in good economic times for the Fama and French three-factor model. On the other hand, low ESG scored stocks have abnormal returns of 0.02% in bad economic times and 0.30% in good economic times for the Fama and French three-factor model. Regarding the economic magnitude of the difference in the performance of high and low ESG, the economic condition can be regarded as one of the most important determinants of ESG investing performance. The results of Panels C and D are similar to those of Panels A and B.

Second, in Panels A and B, which defined the economic state with Shiller's P/E, the three-factor alpha for the long–short portfolio is −0.30% in bad times and −0.07% in good times. Based on GDP projections, Panels C and D, the three-factor alpha for the long–short portfolio is −0.28% in bad times and −0.14% in good times. The high ESG stocks underperform low ESG stocks in "bad economic times," but in "good economic times," the spread is smaller and less statistically meaningful. One interesting point is that the abnormal returns for long–short portfolios are negative in both good and bad economic times. This point is consistent with Fabozzi *et al.* (2008) and Hong and Kacperczyk (2009), who present the result that sin stock causes excess performance.

Next, Table 4 shows the results of the regression analysis for three ESG criteria using the same methodology in Table 3. Table 4 shows that abnormal alphas of the long–short portfolio, formed using each ESG criterion, are negative and statistically significant during bad economic times. However, we cannot find statistically clear evidence that low ESG stocks outperform high ESG stocks during good economic times. The abnormal alphas of long–short portfolios during good economic times are lower than the abnormal alphas in bad economic times, and it is statistically insignificant. Although different results are derived

	Bad times			Good times		
	Env	Soc	Gov	Env	Soc	Gov
Panel A. Shiller's CAPE						
Alpha(CAPM)	−0.769***	−0.720***	−0.441***	−0.059	0.049	−0.283***
	(−6.63)	(−6.42)	(−8.63)	(0.27)	(0.39)	(−5.11)
Alpha(3FF)	−0.398***	−0.317***	−0.011***	−0.100	−0.024	−0.305***
	(−5.97)	(−4.66)	(−0.17)	(−0.78)	(−0.21)	(−3.59)
Panel B. GDP Forecasting						
Alpha(CAPM)	−0.565***	−0.499***	−0.393***	−0.504**	−0.433**	−0.386***
	(−4.87)	(−4.77)	(−7.37)	(−2.58)	(−2.50)	(−6.67)
Alpha(3FF)	−0.396***	−0.260***	−0.021	−0.154	−0.164	−0.240***
	(−5.29)	(−4.26)	(−0.29)	(−1.44)	(−1.35)	(−3.22)

Note(s): By ESG category (environmental, social, and governance), this table shows the CAPM alphas and three-factor alphas for the High–Low quintile portfolio. The sample period is from January 2012 to December 2020. The t-statistics are in parentheses and statistical significance at the 10%, 5% and 1% levels is given by *, ** and ***, respectively

Source(s): Author's work

Table 4. Average monthly Long–short alphas (HL) of each of the categories ESG in good and bad times

from the three-factor model estimation of the G-factor, the results of estimating the CAPM of the G-factor show similar results to those of the E- and S-factors.

Overall, Tables 3 and 4 suggest that the abnormal alpha difference could result from time-varying demand shifts. Stocks with low ESG scores outperform stocks with high ESG-score during bad economic times compared to good economic times. Furthermore, during good economic times, the performance gap between the two groups becomes smaller.

3.2 Time-variation with the economic indicator in the long–short portfolio

This sub-section uses the good economic time indicator to account for the time-varying performance of long–short portfolios based on ESG scores. We first re-estimate the HL strategy's CAPM alpha and FF3 alpha with the previous 36-month returns using Equations (1) and (2). We then insert the good time indicator and estimate the following specification:

$$\widehat{\alpha}_{H-L,t} = \alpha + \gamma * I_{Good,t} + \epsilon_t \tag{3}$$

$$I_{Good,t} = \begin{cases} 0, economic\ indicator_t \leq \overline{past\ 10-yaer\ rolling\ average} \\ 1, economic\ indicator_t > \overline{past\ 10-yaer\ rolling\ average} \end{cases} \tag{4}$$

where $\widehat{\alpha}_{H-L}$ is the estimated alphas from Equations (1) and (2) using a 36-month rolling regression methodology. Here, γ measures the sensitivity of the economic condition to the performance of a long–short portfolio based on the ESG score.

Table 5 reports the coefficient estimate on γ and the Newey–West t-value in parentheses. Panel A reports the analysis results for the ESG long–short portfolio, Panel B for the environment long–short portfolio, Panel C for the social long–short portfolio and Panel D for governance long–short portfolio. In Panel A, the coefficient estimator (γ) for the economic indicator variable are positive and statistically significant in the specifications that define the economic state as Shiller's P/E. Turning to the coefficients on the economic indicator (γ) for the GDP forecasts, γ is insignificant but positive in most specifications. Overall, our results indicate that investors' preferences for the ESG factor are affected by economic conditions.

The results for Panel A are similar for Panels B, C and D. In most specifications, the coefficients for the economic indicators remain positive and statistically significant. Only two of the estimated coefficients on the economic indicator are negative and significant (in Panel D). Hence, the economic condition is an essential factor in the excess return equation for ESG investing, particularly for portfolios based on ESG factors.

These results are consistent with Bansal *et al.* (2022), which presents an analysis of a developed country. Our study and their study suggest that ESG investment strategies yield better performance in good times than in bad times. On the one hand, there are also differences between their findings and our findings. Contrary to our findings that the HL portfolios generate negative returns in both good and bad times, Bansal *et al.* (2022) show that the long–short portfolio generates a positive abnormal return in good times and does not generate a significant return in bad times.

We interpret the difference in the results of the two studies based on the market's maturity for ESG investments. Unlike developed markets, where market participants are more positively exposed to the ESG environment, the investment environment has not been sufficiently established for ESG investment to cause positive returns in emerging markets. Unlike developed markets, where market participants are more positively exposed to the ESG environment, the investment environment has not been sufficiently established for ESG

	CAPM		3-Factors	
	α	γ	α	γ
Panel A. ESG				
Shiller's CAPE	−0.836***	0.784***	−0.305***	0.237***
	(−9.86)	(5.23)	(−4.46)	(3.03)
GDP Forecasting	−0.630***	0.118	−0.283***	0.139
	(−6.32)	(0.74)	(−3.89)	(1.49)
Panel B. Environmental				
Shiller's CAPE	−0.769***	0.710***	−0.398***	0.298**
	(−6.43)	(3.36)	(−5.35)	(2.27)
GDP Forecasting	−0.565***	0.061	−0.396***	0.242*
	(−4.27)	(0.29)	(−5.03)	(1.91)
Panel C. Social				
Shiller's CAPE	−0.720***	0.769***	−0.317***	0.293**
	(−6.91)	(4.18)	(−4.46)	(2.34)
GDP Forecasting	−0.499***	0.066	−0.260***	0.096
	(−4.23)	(0.35)	(−3.40)	(0.78)
Panel D. Governance				
Shiller's CAPE	−0.441***	0.158*	−0.011	−0.294***
	(−9.31)	(1.89)	(−0.18)	(−2.67)
GDP Forecasting	−0.393***	0.007	−0.021	−0.220**
	(−7.77)	(0.09)	(−0.31)	(−2.05)

Note(s): This table shows the coefficient estimate for the good economic time indicator variable. We estimate CAPM alphas and FF3 alphas of the HL strategy using a 36-month rolling regression methodology. We then insert the good time indicators and estimate the following specification

$\widehat{\alpha}_{H-L,t} = \alpha + \gamma * I_{Good} + \epsilon_t$

The sample period is from January 2012 to December 2020. The t-statistics are in parentheses and are based on standard errors following Newey and West(1987) using twelve lags. The statistical significance at the 10%, 5% and 1% levels is given by *, ** and ***, respectively

Source(s): Author's work

Table 5. The slope estimates of the good times indicators

investment to cause positive returns in emerging markets. For this reason, the lower the maturity of the market for ESG, the higher the ESG cost a firm must bear for ESG management.

3.3 Entry of individual investors

In this sub-section, we further examine the market entry of individual investors. We define two variables to measure trading volume. First, the Net_IM for stock i at month t is computed as the trading volume of the buy-side minus the trading volume of the sell-side scaled by the market capitalization.

$$NET_{IM\,i,t} = \frac{Buy\ trading\ volume_{i,t} - Sell\ trading\ volume_{i,t}}{Market\ cap_{i,t}} \tag{5}$$

The following measure is the abnormal net buy–sell imbalance. In this paper, we suggest that ESG investment perceptions in investors are time-varying. Hence, what becomes crucial is not the examination of trading volume *per se* but the investigation of the unusual trading volume. We, therefore, calculate ABNet_IM for stock i on month t, as follows:

$$ABNet_{IM\,i,t} = imbalance_{i,t} - \frac{1}{T}\sum_{all\ days} imbalance_{i,t} \tag{6}$$

where

$$imbalance_{i,t} = \frac{Buy\ trading\ volume_{i,t} - Sell\ trading\ volume_{i,t}}{Market\ capitalization_{i,t}} \tag{7}$$

Table 6 shows the regression results of examining how individual investors perceive ESG in good economic conditions. Columns 1 and 3 correspond to the net buy–sell imbalance, and Columns 3 and 4 correspond to the abnormal net buy–sell imbalance. Table 6 shows that all the model coefficients on the interaction terms between the good times dummy and

	Shiller's CAPE		GDP forecasting	
	Net_IM	ABNet_IM	Net_IM	ABNet_IM
Good times	0.013	−0.001	−0.011	−0.015
	(1.41)	(−0.11)	(−1.21)	(−1.58)
GOOD x ESG	0.022**	0.032***	0.036***	0.041***
	(2.25)	(3.37)	(3.50)	(4.02)
ESG Score	0.009	0.010	0.003	0.005
	(1.35)	(1.49)	(0.55)	(0.86)
Size	−0.001	0.006	0.000	0.007
	(−0.09)	(0.67)	(−0.01)	(0.74)
BM	−0.013	−0.018	−0.013	−0.019
	(−0.56)	(−0.82)	(−0.58)	(−0.84)
Pre1yr_ret	−0.082***	−0.073***	−0.080***	−0.071***
	(−9.92)	(−9.67)	(−9.99)	(−9.72)
Tvol	0.085***	0.046***	0.083***	0.044***
	(11.10)	(6.26)	(10.86)	(6.02)
Illiquidity	0.004	0.009***	0.004	0.009***
	(1.32)	(3.14)	(1.25)	(3.10)
Firmage	0.002	0.014***	0.002	0.013***
	(0.53)	(3.40)	(0.40)	(3.25)
ROA	−0.019***	0.001	−0.019***	0.001
	(−2.75)	(0.17)	(−2.80)	(0.12)
Intercept	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
N	91,237	91,237	91,237	91,237
Adj.R	0.012	0.007	0.012	0.008

Note(s): This table reports a standardized regression analysis relating trading behavior by individual investors to ESG and economic conditions. Net_IM is the net buy–sell imbalance of individual investors. ABNet_IM is the abnormal net trading volume of individual investors. Good is an indicator variable to measure favorable economic conditions. ESG is the ESG score. SIZE is the natural logarithm of market capitalization (in ₩ billions). BM is a book-to-market ratio. Pre1yr_ret is the past one-year return, excluding the previous month. Tvol is the standard deviation of the stock returns over the previous one-year. Illiquidity refers to Amihud's (2002) illiquidity index. Firm age is the natural logarithm of the years a firm has been listed. Return on assets (ROA) is calculated by dividing pre-tax income by total assets. The number in parentheses is the *t*-statistic value. T-values are computed using robust standard errors clustered by firm and year. The statistical significance at the 10%, 5% and 1% levels is marked by *, ** and ***, respectively

Source(s): Author's work

Table 6.
The net trading imbalance of individual investors

ESG-score variables are statistically significant. In good times, stocks with higher ESG score experience high net purchases from individual investors. This result suggests that economic conditions explain the intensification of ESG consciousness in individual investors for the stocks with high ESG scores. In other words, it proves that individual investors' ESG consciousness is time-varying.

3.4 Robustness checks

3.4.1 Event study: ESG score improvement. This sub-section isolates the effects of investor preferences from other explanatory risk factors. We exploit an event study using the market reactions to changes in ESG scores. Specifically, we define an event as an increase in an ESG score of more than 10% from the previous year [2]. For such an event occurring in month t, we specify an event window between t+1 and t+12. Abnormal returns are estimated as the three-factor alphas.

The results are reported in Table 7. The results show that the stocks with ESG improvement during good economic times experience statistically significantly positive abnormal returns except for the E-factor. For the E-factor, ESG improvement during good economic times generates positive abnormal returns but is not statistically significant.

In Panel A of Table 7, the cumulative abnormal returns on a +1, +12 event window are 2.66% during good economic times, defined by Shiller's P/E and 3.28% during good economic times, defined by GDP forecasting. The difference in cumulative returns for stocks with

	Bad times		Good times		
	N	Cum.ret[1, 12]	*N*	Cum.ret[1, 12]	Diff(Good-bad)
Panel A. ESG					
Shiller's CAPE	1,942	0.280	618	2.664*	2.384
		(0.35)		(1.92)	(1.49)
GDP Forecasting	1,637	−0.512	923	3.281***	3.792***
		(−0.59)		(2.88)	(2.64)
Panel B. Environment					
Shiller's CAPE	1,540	−3.143***	598	1.356	4.498***
		(−3.74)		(0.98)	(2.81)
GDP Forecasting	1,186	−3.799***	952	0.501	4.300***
		(−4.02)		(0.45)	(2.98)
Panel C. Social					
Shiller's CAPE	1,542	−1.849**	619	4.089***	5.938***
		(−2.20)		(2.75)	(3.65)
GDP Forecasting	1,299	−2.911***	862	4.015***	6.926***
		(−3.21)		(3.26)	(4.63)
Panel D. Governance					
Shiller's CAPE	1,258	2.445**	410	6.286***	3.841*
		(2.42)		(3.46)	(1.87)
GDP Forecasting	1,057	1.274	611	7.049***	5.774***
		(1.16)		(4.79)	(3.15)

Note(s): This table shows the cumulative one-year abnormal returns from the ESG score improvement. We estimate abnormal returns by using the Fama and French three-factor model. We define the ESG score improvements as events in which the ESG score of this year(t) increases by more than 10% compared to the previous year(t-1). The statistical significance at the 10%, 5% and 1% levels is given by *, ** and ***, respectively

Source(s): Author's work

Table 7. The cumulative abnormal returns (CAR) after the ESG score improvement

improved ESGs between good and bad times ranges from 2.84% to 3.79%. In all the Panels B, C and D specifications, the difference in average cumulative returns after ESG improvement between good and bad times is positive and statistically significant. These results show that market participants tend to pay more attention to the ESG factor in good economic times than in bad economic times.

3.4.2 Alternative variables of the economic indicator. In this sub-section, we use two alternative variables of the economic indicator to account for the relationship between households' wealth and ESG consciousness: the CCI and the RSI for durable goods [3]. The CCI indicates prevailing economic conditions and provides insight into the future development of household consumption and saving. The RSI for durable goods is an important indicator leading to economic conditions. Durable goods can be used repeatedly for more than one year and are mainly expensive, for example, automobiles, home appliances, and furniture. A high RSI represents an economy on the upswing, while a low RSI represents a downward trajectory. We define a good time where the CCI or SRI at time t is in the upper of their respective ten-year rolling medians.

Table 8 shows the CAPM alphas and three-factor alphas for the HL ESG quintile portfolio. Panel A reports the results of dividing the total sample into good times and bad times by defining the economic condition based on CCI, and Panel B reports the results of those based on RSI. Table 8 indicates that our main results are supported by two indicators representing consumers' perception of the economic situation. The alphas (α^{H-L}) in the bad times are statistically and economically more negative than the alphas (α^{H-L}) in the good times.

After all, these results confirm that ESG investing generates more negative performance in bad than good times. Under a pessimistic economic outlook, investors pay less attention to ESG goods that are not essential.

4. Conclusion

This paper investigates the role of economic conditions in the cross-sectional pricing of ESG portfolios. First, we use Shiller's P/E and the OCED GDP forecast to define the economic condition. Next, we estimate the CAPM alphas and three-factor alphas of the long–short strategies to long the top quintile and short the bottom quintile based on the ESG score during good and bad economic times. Our empirical results provide evidence that ESG investment strategies yield better performance in good than bad times. Furthermore, we show that individual investors have a time-varying preference for ESG. The consumer's wealth is an important factor in determining investor perceptions of ESG investing in an emerging market.

Overall, this study shows that a time-varying preference for ESG exists in an emerging market. The economic condition is a critical determinant of the investors' preference for the ESG factor, and its effect generates subsequent returns for ESG investing. These results indicate that investors demand extra compensation to hold low ESG stocks under a negative economic outlook. Conversely, they are willing to pay attention to high ESG stocks under a positive economic outlook. The fact that the future consumption–investment risk predicts the variation in future returns of ESG investing suggests that the economic condition is an important factor for future ESG investing returns.

An open question for future research is which types of investors enter the stock market during good economic times and exit during bad times. Furthermore, in good economic times, increasing the trades of these ESG-conscious investors is more likely to lead to positive ESG investment performance, but the link between the existence of these investors and the ESG improvement of the firms is less clear-cut. In future research, interesting conclusions could be drawn by analyzing these avenues of inquiry.

Table 8. Robustness check: CCI and Retail Sales Index

	Bad times				Good times			
	α^{H-L}	β^{MKTRF}	β^{SMB}	β^{HML}	α^{H-L}	β^{MKTRF}	β^{SMB}	β^{HML}
Panel A. CCI (consumer confidence index)								
CAPM	−0.710***	0.120***			−0.360***	0.133***		
	(−7.27)	(3.48)			(−2.92)	(3.18)		
FF	−0.259***	−0.022	−0.506***	0.331***	−0.176	0.178***	−0.478***	0.390***
	(−3.95)	(−0.81)	(−14.04)	(20.48)	(−1.62)	(4.26)	(−18.59)	(17.05)
Panel B. Retail Sales Index (durable goods)								
CAPM	−0.590***	0.120***			−0.574***	0.134***		
	(−6.07)	(3.40)			(−4.34)	(3.41)		
FF	−0.365***	0.058*	−0.531***	0.351***	0.026	0.033	−0.430***	0.352***
	(−5.23)	(1.81)	(−17.69)	(20.42)	(0.30)	(0.92)	(−10.12)	(16.40)

Note(s): This table shows the CAPM alphas and three-factor alphas for the High–Low quintile portfolio. HL refers to the long position in the firms with the highest ESG score and the short position in the firms with the lowest ESG score. For each month, stocks are sorted into quintile portfolios according to the ESG score. We then construct a long–short portfolio (HL). In addition, we define good and bad times in terms of CCI or Retail sales index. The sample period is from January 2012 to December 2020. The t-statistics are in parentheses and statistical significance at the 10%, 5% and 1% levels is given by *, ** and ***, respectively

Source(s): Author's work

Notes

1. See also Kim and Venkatachalam (2011).
2. Similar results are also obtained when we define an increase in the ESG score of more than 30% from the previous year.
3. CCI and RSI are from Bank of Korea and KOSTAT (statistics Korea).

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