

Too Much of a Good Thing in ESG Ratings? Evidence from Chinese A-Share Market during COVID-19

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Abstract

This study investigates how ESG ratings relate to stock returns and whether the association exhibits a too-much-of-a-good-thing effect. We examine 789 Chinese A-share listed firms during the COVID-19 outbreak, a period marked by a sharp market decline. Using a 5-factor model and quantile regression, we provide evidence on whether such a non-linear “too-much-of-a-good-thing (TMGT) effect” pattern exists in China—an issue that has not been directly tested in prior research.

Our empirical results show that, during the COVID-19 market crash, the effect of ESG ratings on stock excess returns among mainland Chinese listed firms follows a too-much-of-a-good-thing (TMGT) pattern. Specifically, ESG ratings are positively associated with excess returns when ESG ratings are low, but the association turns negative when ESG ratings are high. This suggests that simply increasing ESG investment does not necessarily improve firms’ financial performance or market value. Instead, firms should aim for an optimal level of ESG investment, because overinvestment in ESG may harm financial performance and market value.

Keywords: ESG ratings, stock returns, TMGT, COVID-19, 5-factor model, quantile regression

JEL: G30, M14, G11, C21

1. Introduction

Recently, the relationship between ESG ratings and stock returns has become an important topic in financial market research. For instance, Demers, Hendrikse, Joos and Lev (2021), Broadstock, Chan, Cheng and Wang (2021), Abedifar, Bouslah, Neumann, and Tarazi (2023), Cardillo, Bendinelli and Torluccio (2023), and Xu, Chen, Zhou, Dong and He (2023) examine how ESG ratings are associated with stock returns, particularly during the COVID-19 period.

However, regarding the empirical evidence on “ESG ratings—stock returns,” past studies on the relationship between ESG ratings and stock returns can mainly be classified as a positive effect, The research finds that firms with higher ESG ratings have stock prices that are more resilient and less likely to fall (Broadstock et al., 2021; Yu & Xiao, 2022; Wang, Liao & Zhang 2022; Cardillo et al., 2023; and Xu et al., 2023); Negative effect, some studies report that firms with lower ESG ratings earn higher stock returns (Bolton & Kacperczyk, 2023; Trinks & Scholtens, 2017); Nonlinear effect, some studies document a U-shaped relationship between ESG ratings and stock returns (Korinth & Lueg, 2022; Zhang, Zhao & He, 2022) and Insignificant effect, other studies find no significant association between ESG ratings and stock returns (La Torre, Mango, Cafaro & Leo, 2020; Landi & Sciarelli, 2019; Demers et al., 2021).

In addition, Pierce and Aguinis (2013) point out that researchers have long focused on the monotonic linear relationship between positive antecedents and desirable outcomes and have adopted a “more is better” assumption for the development and application of theory. This has led to one-sided empirical evidence and has limited the breadth and depth of financial theory. Recently, more and more studies have found that the effects of positive antecedent variables do not always lead to positive results, thereby generating the Too-Much-of-a-Good-Thing Effect (TMGT). Specifically, when ESG exceeds the optimal range, stock returns weaken and may even become negative (Mallek, Albaity, Ur-Rehman & Thangavelu, 2024).

To the best of our knowledge, for the Chinese market, prior studies have not directly examined the TMGT effect in the impact of ESG ratings on the relationship with stock returns. In addition, the Chinese market, including the stock market and ESG ratings, has its uniqueness (for details, please refer to the next section of the literature review), and given the conflicting conclusions in prior literature on the relationship between ESG ratings and stock returns, this study investigates it is worthwhile to test whether there is a TMGT effect in the “ESG ratings–stock returns relationship” during the COVID-19 outbreak period in China’s stock market.

Therefore, we investigate whether the TMGT effect exists between ESG ratings and stock returns for Chinese listed firms during the COVID-19 outbreak. We also examine whether the ESG ratings–stock returns relationship is purely linear. Relative to prior work, this study has three features: 1. Research focusing on the Chinese market remains limited. 2. China’s market and ESG setting may be distinctive, which can lead to different results. 3. We help fill the gap on whether the TMGT effect applies to the ESG ratings–stock returns relationship.

Using a sample of 789 Chinese A-share listed firms, we examine whether the TMGT effect appears in the link between ESG ratings and stock returns during the COVID-19 outbreak. Our findings can be summarized as follows. Quantile regression results indicate a TMGT pattern in how ESG relates to firms’ financial performance. When ESG ratings are low, ESG investment is associated with higher financial performance (stock returns), but the effect weakens as ESG increases. When ESG ratings are in the middle range, the effect is not significant. When ESG ratings are high, further ESG investment is associated with lower financial performance. Based on our conclusion that “the effect of ESG ratings on stock returns exhibits a TMGT phenomenon,” Chinese listed firms should pursue a moderate level of ESG investment, rather than if more ESG investment can continuously increase firm value. In other words, firms should invest in ESG moderately to improve financial performance, because excessive ESG investment may instead be detrimental to corporate financial performance.

This paper is organized as follows. Section 1 presents the introduction. Section 2 reviews literature. Section 3 describes the empirical model and data. Section 4 reports and discusses the empirical results. Section 5 concludes and provides implications and suggestions.

2. Literature Review

2.1 ESG Ratings and Stock Returns

ESG ratings have attracted growing attention from both scholars and practitioners. They have been applied to research on organizational reputation (Chen, Zhao, He & Ma, 2025), stakeholder trust (He, Chen, Guo, He & Wan, 2025), corporate management (Hauch, 2026), stakeholder perceptions and emotions (Jaiswal, Gupta & Tiwari, 2026), and investor reactions (Moss, Naughton & Wang, 2024). Much of this literature also examines whether ESG ratings influence stock excess returns. Yet, evidence on the ESG ratings–stock returns relationship remains mixed.

Prior research on ESG ratings and stock returns can be broadly grouped into 4 categories; The first category reports a positive effect. For instance, Engelhardt, Ekkenga and Posch (2021) show that, during COVID-19, European firms with higher ESG ratings had more resilient stock prices in the crisis. Yu and Xiao (2022) find a positive and significant association between ESG ratings and the market value of Chinese listed firms. Wang et al. (2022) report that, in China’s A-share market, portfolios of firms with higher ESG ratings outperform the market average in both raw returns and risk-adjusted returns.

The second category reports a negative effect. Using a sample of UK listed firms, Luo (2022) finds that firms with higher ESG have lower future returns, whereas firms with lower ESG have higher future returns. For Chinese A-share listed firms, Zhang et al. (2022) report a similar pattern in the secondary (industrial) sector: firms with higher ESG have lower future returns.

The third category concerns a nonlinear relationship, which is discussed in Section 2.3.

The fourth category finds no significant relationship between ESG ratings and stock returns. La Torre et al. (2020) examine firms in the Eurostoxx 50 index and find that stock returns are not significantly related to ESG ratings. Similarly, Landi and Sciarelli (2019), using a sample of Italian firms, report no significant association between ESG ratings and stock.

Because the results in the literature on the relationship between ESG ratings and stock returns are not consistent, there is a need for further examination. Therefore, this paper will focus on testing the relationship between ESG ratings and stock returns for China’s A-share market during the COVID-19 outbreak period.

2.2 The Too-Much-of-a-Good-Thing (TMGT) Effect

Pierce and Aguinis (2013) propose the Too-Much-of-a-Good-Thing (TMGT) effect. They argue that the positive effect of an explanatory variable does not always continue to generate better outcomes, and a TMGT pattern may emerge

(Zhao, Jiang & Ahn, 2024). Specifically, after the explanatory variable reaches a threshold (an inflection point), the marginal benefit stops increasing and may even turn negative. This leads to an overall inverted U-shaped, non-linear relationship (Grant & Schwartz, 2011).

Pierce and Aguinis (2013) pointed out that researchers have long focused on the monotonic linear relationship between positive antecedents and ideal outcomes, applying the “more is better” assumption for theory development and applications. This has led to one-sided empirical conclusions and limited the broadening and deepening of theories.

Based on the following, this study investigates the relationship between ESG ratings in China and stock returns may not be a one-way relationship, and that there may be a TMGT effect. The details are described as follows:

- (1) The existing literature provides mixed findings on the relationship between ESG ratings and stock returns.
- (2) Chinese stock market and ESG ratings have a certain degree of uniqueness.

Zhang et al. (2022) conduct an empirical study using Bloomberg ESG ratings data for Chinese listed companies from 2005 to 2018 and find that “high-ESG firms usually earn lower risk-adjusted returns in the market, while low-ESG firms can instead earn higher returns.” Zhang et al. (2022) thus indirectly verify that the relationship between ESG ratings and stock returns exhibits a TMGT phenomenon. Besides Zhang et al. (2022) indirectly verifying that the ESG ratings–stock returns relationship shows a TMGT phenomenon, this paper does not find other studies that test whether the relationship between ESG ratings and stock returns in China exhibits the TMGT effect.

We focus on the COVID-19 outbreak period to examine whether the ESG ratings–stock returns relationship in China shows the TMGT effect. This study has the following unique features:

- (1) Focusing on the COVID-19 outbreak period: This paper is the first to examine whether the ESG ratings–stock returns relationship in China exhibits the TMGT effect during the COVID-19 outbreak. Prior studies have not used the COVID-19 outbreak period as the sample window. Although Zhang et al. (2022) provide indirect evidence on the TMGT effect, their sample covers 2005–2018, which predates COVID-19.
- (2) Supplementing the gaps in the literature: As mentioned above, except that Zhang et al. (2022) indirectly verify that the relationship between ESG ratings and stock returns exhibits a “too-much-of-a-good-thing” phenomenon, this paper does not find other studies that test whether the relationship between ESG ratings and stock returns in China exhibits the TMGT effect.
- (3) Direct evidence rather than indirect evidence: Zhang et al. (2022) provide indirect support for a TMGT in the ESG ratings–stock returns relationship in China. In contrast, our study directly tests whether this TMGT exists in China.
- (4) Using a domestic Chinese ESG rating source (STαR): We use STαR ESG ratings, while Zhang et al. (2022) rely on Bloomberg ESG ratings. Compared with foreign ESG ratings, domestic ESG ratings have certain advantages, including that domestic ratings can better capture differences in national conditions and regulations, and that the risk predictive power of domestic ratings is generally better than that of foreign ratings (Shen, Lin, Han & Wu, 2023; Ling, Xia & Liu, 2024).

Based on the above conclusions, we propose the following hypothesis:

TMGT effect in the ESG ratings–stock returns relationship hypothesis: As ESG ratings increase to a certain level and reach an inflection point, the effect on stock returns, that is, the coefficient, changes from positive to negative.

2.3 Unique Features of Chinese Stock Market and ESG Ratings

Prior research suggests that both Chinese stock market and its ESG rating environment have distinctive features. First, for Chinese stock market, Tang (2023) finds that daily price limits can delay price discovery and lead to overnight price gaps. Peng, Xiong and Yang (2024) reports that the market is shaped by frequent regulatory intervention and is dominated by retail investors. Jones, Shi, Zhang and Zhang (2025) further show that retail trading in China is associated with behavioral biases and noise trading.

Second, regarding the uniqueness of ESG ratings in China, Shen et al. (2023) and Ling et al. (2024) find that Chinese ESG rating landscape features the coexistence of foreign and domestic providers and a large divergence in rating results. Compared with foreign ESG ratings, domestic ESG ratings have certain advantages, including that domestic ratings can better capture differences in national conditions and regulations, and that the risk predictive power of domestic ratings is generally better than that of foreign ratings.

Since prior studies find that domestic ESG ratings have a considerable degree of advantage over foreign ESG ratings, this paper intends to use Chinese domestic The SynTao Green Finance (STαR) ESG ratings. The main reasons are the following four points, described as follows:

- (1) Earliest establishment: STαR was established in 2015 and is recognized as the first ESG database covering listed firms in China.
- (2) Wide scope: It covers all A-share firms, Stock Connect (Shanghai–Shenzhen–Hong Kong), and major bond issuers.
- (3) Recognition by global financial platforms and institutions: STαR's ESG rating data became available on the Bloomberg Terminal in 2021. In addition, Moody's took a minority stake in STαR in 2019. These developments have increased the international visibility and perceived credibility of STαR's ESG ratings among global investors.
- (4) Widely used in recent SSCI studies: Over the past three years, a growing number of SSCI journal articles have used STαR's ESG rating data. Examples include Wang, Ma, Dong and Zhang (2023), Xiao, Liu and Liu (2023), Bai, Zhao and Tian (2024), Guo, Wang, Sun, Zhao and Liu (2024), and Teng et al. (2024).

Because Chinese stock market and ESG ratings have a certain degree of uniqueness, re-examining the relationship between ESG ratings in China and stock returns may reveal relationship patterns that prior studies have not found, which is promising.

2.4 Quantile Regression

Quantile regression analysis has been widely applied across various fields. For example, quantile regression has been applied in the field of educational economics (Vieira, Constância & Teixeira, 2020), in economic growth theory (Iseringhausen, 2024), in environmental economics (Güney, 2024), in health care management (Su et al., 2022), in valuations of firms' capital structures (Tanin, Sarker, Hammoudeh & Batten, 2024), and in evaluations of labor markets (Andini, 2023). In addition, quantile regression analysis has also been applied to financial market research, including examining the effects of oil price changes and policy uncertainty on G7 stock returns (Nusair & Al-Khasawneh, 2023), analyzing high-frequency data from six major stock markets in the U.S., Europe, the U.K., Japan, China, and India to reveal that volatility spillovers are stronger at the tail quantiles (Bouri & Harb, 2022), and investigating the relationship between investor trading behavior and the dispersion of stock returns (Zhou, Lin & Yang, 2024). The present study applied quantile regression to explore whether a nonlinear association exists between ESG rating and excess stock return. Quantile regression offers two major advantages. First, it does not require the division of samples, enabling the estimation of whether structural changes occur in the influence of explanatory variables on the dependent variable across varying levels of trust (high, normal, low) by controlling quantiles. Second, by using median regression (i.e., the minimum sum of absolute values), the estimated results are more robust and less affected by outliers, reducing the likelihood of changes in the significance of the empirical findings (Lee, 2008; Lee & Kuo, 2026).

2.5 Endogeneity Problems in the Quantile Regression Model

In this study's quantile regression model, the independent variable, ER, may be influenced by the dependent variable, the level of size. This influence suggests that ESG may be highly correlated with the model's residual term. Chernozhukov and Hansen (2006), Lee, Shen and Yen (2010), if endogeneity problems exist within a model's variables and are not addressed, they may bias the empirical results of an analysis. This study adopted the instrumental variable quantile regression (IV-QR) estimator method proposed by Chernozhukov and Hansen (2006), Lee et al. (2010), Ura (2021), Zhu, Li and Lin (2023) and Lee and Kuo (2026) which is detailed in Equation (3):

$$Y = \alpha + \beta X + \gamma W + \varepsilon \quad (1)$$

where Y denotes the dependent variable; X and W are independent variables. X is a vector of exogenous variables, and W is a vector of endogenous variables. The estimated coefficient is biased. ε denotes the residual term, and θ denotes the quantile ranging between 0 and 1.

The steps for conducting the IV-QR estimation are as follows:

Step 1: For a given quantile θ , perform a quantile regression estimation using Equation (1). At this stage, this study obtained a biased estimate γ_θ of the coefficient vector for W.

Step 2: Define $Y_\theta^* = Y - \gamma_\theta W$. Given a suitable instrumental variable Z and a quantile θ , conduct a quantile regression estimation on the right side of the equation. The present study obtained an estimate of the coefficient vector ρ_θ for the instrumental variable Z.

Step 3: Let vector A represent the variance-covariance matrix of ρ_θ and calculate $\omega = \rho_\theta' A \rho_\theta$.

Step 4: Repeat steps 1 to 3 to obtain a different γ_θ , and select the instrumental variable combination that minimizes ω . This combination corresponds to the optimal instrumental variable combination for the given quantile θ .

Minimizing ω results in the optimal instrumental variable combination, which also minimizes the estimated standard error. The instrumental variables in this study include all the independent variables in the model except for ESG, in

addition to the lagged values of these independent variables. For quantiles between 0.1 and 0.9, the optimal instrumental variable combinations consist of the 10 control variables, excluding ESG, and their lagged values.

3. Empirical Model and Data

3.1 Basic Mode

This study builds on the 4-factor model and adds ESG ratings as a 5-factor. The 4-factor model is developed by Carhart (1997) by adding a momentum factor to the Fama-French 3 factor model. It captures systematic risk, the book-to-market ratio, firm size, and momentum.

We extend the 4-factor model by adding ESG ratings. The estimation equation is as follows:

$$ER_{it} = \alpha + \beta_{ESG_{it-1}} LN_ESG_{it-1} + \beta_{RM_{it}} LN_RMF_{it} + \beta_{LN_SIZE_{it}} LN_SIZE_{it} + \beta_{BM_{it}} LN_BM_{it} + \beta_{MOM_{it}} LN_MOM_{it} + \varepsilon_{it} \quad (2)$$

3.2 Advanced Model—Quantile Regression

To test whether there is a nonlinear relationship between “ESG ratings and stock returns,” this study adopts quantile regression to verify whether the effect of ESG ratings on stock returns changes structurally under different levels of ESG ratings (high vs. low). Following Iseringhausen (2024) and Güney (2024), we construct the quantile regression model as shown in (3):

$$\min_{\hat{\beta}} \left| \theta \sum |Y_i - \hat{\beta}x| + (1 - \theta) \sum |Y_i - \hat{\beta}x| \right| \quad (3)$$

In (3), the dependent variable is denoted by Y , representing stock returns; the explanatory variables are denoted by X , including ESG ratings (the main explanatory variable) and the other four control variables; the coefficients to be estimated are denoted by β ; and the quantile θ between 0 and 1. When the observed value of the dependent variable is y_i , its corresponding fitted value is $\hat{y}_i$. Given a fixed θ , the quantile regression in Eq. (3) can be conducted as follows: estimate the coefficient vector $\hat{\beta}$ that minimizes the sum of absolute residuals. This sum can be divided into two parts. The first part corresponds to the case where the observed value is higher than the fitted value, i.e., the residual is positive, indicating that, on average, the dependent variable is relatively higher. The second part corresponds to the case where the observed value is lower than the fitted value, i.e., the residual is negative, indicating that, on average, the dependent variable is relatively lower. The first part is weighted by θ , and the second part is weighted by $(1-\theta)$. Quantile regression minimizes the sum of “the first part of absolute residuals multiplied by θ ” and “the second part of absolute residuals multiplied by $(1-\theta)$,” thereby estimating $\hat{\beta}$.

The minimization problem in (3) can be solved using linear programming; Buchinsky (1998), Lee (2009), and Lee and Kuo (2026) provide detailed explanations of the solution process. In addition, this study estimates quantile regression using the full sample, thereby ruling out the possibility of sample selection bias.

The quantile regression model used in this study can also be used to distinguish between high ESG ratings and low ESG ratings: empirical results for high ESG ratings (a larger θ) correspond to the right tail of the dependent variable distribution, which intuitively represents outcomes when the level of trust is higher; in contrast, empirical results for low ESG ratings (a smaller θ) correspond to the left tail, indicating outcomes when the level of trust is lower (Lee, 2009; Bouri & Harb, 2022; Nusair & Al-Khasawneh, 2023; Zhou et al., 2024). In other words, $\theta = 0.7-0.9$ can be interpreted as high ESG ratings; $\theta = 0.1-0.3$ and $\theta = 0.4-0.6$ correspond to low ESG ratings and medium ESG ratings, respectively.

3.3 Dependent Variable

The main purpose of this paper is to examine whether ESG ratings affect stock returns, with a special focus on the COVID-19 period. Therefore, the dependent variable in this paper is the excess return (ER) of A-share listed firms. ER is defined as the difference between stock returns and market returns:

$$ER_{it} = R_{it} - R_{ft}$$

3.4 Independent Variable

This paper uses China’s rating agency STaR as the data source for ESG ratings. The score is converted from STaR’s ratings.

STaR’s ESG ratings are classified into the grades A^+ , A , A^- , B^+ , B , B^- , C^+ , C and C^- . It is necessary to convert them into quantitative data to facilitate empirical analysis. Following Tan (2022), this paper converts ESG ratings into scores. The

conversion table is shown in Table 1. That is, the ESG ratings A^+ , A , A^- , B^+ , B , B^- , C^+ , C and C^- are converted into scores from 9 to 1, and a higher score indicates better ESG performance.

We used the previous year's ESG rating as the variable. Wu, Xiong and Gao (2022) find that, compared with the contemporaneous ESG rating, the lagged ESG rating has a more significant impact on current financial indicators. Therefore, this paper uses the $t - 1$ ESG rating as the fifth explanatory variable in the 5-factor model. Using the 5-factor model, we consider the following explanatory variables that may affect the dependent variable ER. Table 2 provides the symbols, definitions, and frequency of all variables.

Table 1. Mapping of STaR ESG Ratings to Scores

Rating	Score
A^+	9
A	8
A^-	7
B^+	6
B	5
B^-	4
C^+	3
C	2
C^-	1

Notes: 1. Data source: compiled by this paper. 2. This table explains how to convert STaR ESG rating categories into the scoring measure used in this paper. 3. A^+ , A , A^- , B^+ , B , B^- , C^+ , C , and C^- are the original STaR ESG rating grades. A^+ indicates the best level of ESG disclosure, and C^- indicates the worst level of ESG disclosure. 4. Scores from 1 to 9 are the converted scores in this paper. A higher score indicates a better level of ESG disclosure.

3.5 Data

To test the theoretical implications regarding the effect of ESG ratings on stock returns, this study uses Chinese A-share listed firms as the research setting and examines the impact of ESG ratings on stock returns during the COVID-19 outbreak.

As of the first quarter of 2023, the A-share market included 5 186 listed firms, with 2 215 on the Shanghai Stock Exchange and 2 780 on the Shenzhen Stock Exchange. We analyze daily trading data for Shanghai and Shenzhen A-shares from November 19, 2019, to May 20, 2020. To improve data quality, we drop observations with substantial missing values. We also minorize all variables at the 1st and 99th percentiles to reduce the influence of outliers. The final sample contains 789 firms, producing 48 129 firm-day observations. ESG rating data are obtained from the STaR ESG ratings database, while other data are from the Wind database. For the size factor, this paper uses a firm's market capitalization. For MOM, we calculate it using cumulative returns over 14 trading days, that is, from $t - i$ trading days ($i = 1, 2, 3, \dots, 14$) to $t - 1$ trading day.

Table 2. Variable Definitions and Measurements

	Variable	Symbol	Definitions	Frequency
Dependent variable	Stock return	ER	The difference between stocks return and the market return	Daily
	ESG rating	ESG	ESG Converted into a score based on STaR's ratings	Annual
	Risk-free return	RMF	The difference between the market return and the one-year government bond return	Daily
Independent variable	Size	SIZE	Firm market capitalisation	Daily
	book-to-Market ratio	BM	The ratio of a firm's book value to market value (BV /MV)	Daily
	Momentum	MOM	The sum of stock excess returns over 14 days	Daily

Notes: 1. Source: compiled by the authors. 2. This table defines the study variables and explains how they are measured.

4. Empirical Results

Table 3 reports descriptive statistics, including the standard deviation (std), mean (mean), median (median), maximum (max), and minimum (min). The sample of this study includes 789 A-share firms. The highest ESG rating is A (score 8), and the lowest is C^+ (score 3). $R(-30,30)$ refers to the Stock return (ER) over 61 trading days. Since the Wuhan lockdown date during the COVID-19 outbreak in China was January 23, 2020, we set the event date is January 23, 2020. We use 30 days before and 30 days after the event date, totaling 61 trading days, to calculate ER. Therefore, we period is from December 11, 2019, to March 13, 2020. ESG is each firm's ESG rating, RMF is the difference between the market return and the one-year government bond return, SIZE is market capitalization, BM is the book-to-market ratio, and MOM is the sum of stock excess returns over 14 trading days. To avoid scaling issues, when conducting the

regression analysis, this paper takes the natural logarithm of all variables to compress the data. If a variable is a ratio, we add 1 to the value before taking the natural logarithm.

Overall, both the mean and the median of stock returns are -0.5%, indicating that most stocks were declining in the early stage of the outbreak. Firms with high ESG ratings have a larger average size (SIZE) of 9.16E+10, which is higher than 3.58E+10 for firms with low ESG ratings, showing that high-ESG-rated firms tend to be larger. The market factor RMF has a mean of -0.005 within the event window with small fluctuations. The differences in the mean values of the value factor BM and the momentum factor MOM across the three groups are not large, but their standard deviations indicate significant heterogeneity across individual firms.

Table 3. Summary Statistics

	min			max			median			mean			std		
	All	High	Low	All	High	Low	All	High	Low	All	High	Low	All	High	Low
ER	-0.108	-0.108	-0.108	0.096	0.096	0.096	-0.005	-0.005	-0.005	-0.005	-0.005	-0.005	0.03	0.028	0.031
ESG	3	6	3	8	8	5	5	6	5	5.441	6.447	4.762	0.974	0.562	0.482
RMF	-0.09	-0.09	-0.09	0.031	0.031	0.031	-0.003	-0.003	-0.003	-0.005	-0.005	-0.005	0.018	0.018	0.018
SIZE	2.45E+09	5.65E+09	2.45E+09	2.08E+12	2.08E+12	1.49E+12	2.33E+10	3.15E+10	2.04E+10	5.83E+10	9.16E+10	3.58E+10	1.48E+11	2.08E+11	7.82E+10
BM	0.02	0.041	0.02	2.675	2.36	2.675	0.492	0.558	0.435	0.577	0.631	0.540	0.405	0.416	0.393
MOM	-0.334	-0.301	-0.334	1.498	0.778	1.498	0.022	0.018	0.025	0.026	0.020	0.030	0.106	0.096	0.112
N	48129	19398	28731	48129	19398	28731	48129	19398	28731	48129	19398	28731	48129	19398	28731

Notes: 1. Data source: compiled by this paper. 2. This table reports descriptive statistics for each variable during the event period. 3. All denotes the full sample, High denotes the high-ESG-rating subsample (scores of 6, 7, and 8; there are no observations with score 9 in the sample), and Low denotes the low-ESG-rating subsample (scores of 3, 4, and 5; there are no observations with scores 1 or 2 in the sample). 4. Since the Wuhan lockdown date during the COVID-19 outbreak in China was January 23, 2020, the event date in this paper is January 23, 2020. We use 30 days before and 30 days after the event date, totaling 61 trading days, to calculate the excess return ER. Therefore, the study period is from December 11, 2019, to March 13, 2020, and N is the sample size. ESG is each firm's ESG score, RMF is the difference between the market return and the one-year government bond return, SIZE is market capitalization, BM is the market-to-book ratio, and MOM is the sum of excess stock returns over 14 trading days.

Table 4. Quantile Regression Results

	$\theta=0.1$	$\theta=0.2$	$\theta=0.3$	$\theta=0.4$	$\theta=0.5$	$\theta=0.6$	$\theta=0.7$	$\theta=0.8$	$\theta=0.9$
LN_ESG	0.004***	0.003***	0.001**	0.001**	0.000	0.000	-0.001	-0.001	-0.004**
LN_RMF	1.057***	1.056***	1.05***	1.048***	1.035***	1.018***	1.008***	0.998***	0.986***
LN_SIZE	0.001***	0.001***	0.001***	0.000***	0.000**	1.08E-05	0.000**	-0.001***	-0.001***
LN_BM	0.017***	0.011***	0.007***	0.004***	0.001**	-0.003***	-0.007***	-0.011***	-0.019***
LN_MOM	0.008***	0.017***	0.023***	0.031***	0.040***	0.047***	0.058***	0.075***	0.102***

Notes: 1. This table reports the quantile regression results for each variable during the event period. 2. * indicates $p < 0.1$, ** indicates $p < 0.05$, and *** indicates $p < 0.001$. 3. Since the Wuhan lockdown date during the COVID-19 outbreak in China was January 23, 2020, the event date in this paper is January 23, 2020. We use 30 days before and 30 days after the event date, totaling 61 trading days, to calculate the excess return ER. Therefore, the study period is from December 11, 2019 to March 13, 2020. ESG is each firm's ESG score, RMF is the difference between the market return and the one-year government bond return, SIZE is market capitalization, BM is the market-to-book ratio, and MOM is the sum of stock excess returns over 14 trading days. 5. This paper takes the natural logarithm of all variables to compress the data. If a variable is a ratio, we add 1 to the value before taking the natural logarithm. From Table 4, we find that as the quantile level θ increases, the coefficient of ESG ratings on stock returns, i.e., the effect decreases and even becomes negative. For example, in the low-quantile range ($\theta = 0.1$ to 0.3), the corresponding coefficient declines from a positive 0.004 to a positive 0.001. In the middle-quantile range ($\theta = 0.4$ to 0.6), the coefficient declines from a positive 0.001 to being insignificant. Finally, in the high-quantile range ($\theta = 0.7$ to 0.9), the

coefficient declines from being insignificant to a negative 0.001. Therefore, when ESG scores are in the 3–5 range, their effect on stock excess returns weakens. When ESG scores reach 7–8, the effect turns negative. Overall, the optimal ESG score appears to be around 6.

In economic terms, the ESG coefficient is small in magnitude, but the effect is still meaningful. Using the estimate at $\theta = 0.1$ as an example, the ESG coefficient is 0.004, and Table 3 reports a standard deviation of 0.974 for the ESG score. A one-standard deviation increase in the ESG score is associated with an increase in stock returns of about 0.0039, or 0.39 percentage points. Relative to the standard deviation of stock returns (0.03), this is roughly 13%. Thus, even during the highly volatile early stage of the pandemic, ESG ratings have economically meaningful effects on stock returns.

Based on the above quantile regression results, this paper finds that, in terms of hypothesis testing, the hypothesis is supported. The detailed analysis is as follows: Recent research on the TMGT effect also examines the relationship between ESG ratings and financial performance. Many studies find an inverted U-shaped relationship, and in these studies, financial performance is mainly measured by firm market value (Teng et al., 2022; Cherkasova, Fedorova & Stepnov, 2023; Mallek et al., 2024). This indicates that in the low-ESG-rating range, as ESG ratings increase, firm market value increases (i.e., market value is positively related to ESG ratings), but in the high-ESG-rating range, as ESG ratings increase, firm market value decreases (i.e., market value is negatively related to ESG ratings). In other words, prior studies find that the effect of ESG ratings on firm market value and financial performance shows a TMGT pattern, that is, it is positive at first and then turns negative (Teng et al., 2022; Cherkasova et al., 2023; Mallek et al., 2024).

Our results show that the relationship between ESG ratings and excess returns also shifts from positive to negative. That is, in the low-ESG-rating range, the effect of ESG ratings on excess returns is positive, but in the high-ESG-rating range, the effect of ESG ratings on excess returns is negative.

Our findings are consistent with those in the above literature. In Figure 1, the upper panel shows the relationship between ESG ratings and firm market value, and the lower panel shows the relationship of the coefficient estimates of the impact of ESG ratings on excess returns. In the low-ESG-rating range, the effect of ESG ratings on excess returns is positive. Therefore, as ESG ratings increase, firm market value increases. In the high-ESG-rating range, the effect of ESG ratings on excess returns is negative. Therefore, as ESG ratings increase, firm market value decreases. The difference between the two arises because firm market value is a stock variable, whereas excess returns are a flow variable.

Based on the above analysis of the empirical results, this paper finds that, during the COVID-19 stock price crash, the relationship between ESG ratings and stock returns for listed companies in China exhibits a Too-Much-of-a-Good-Thing (TMGT) effect. That is, in the low-ESG-rating range, the effect of ESG ratings on excess returns is positive, but in the high-ESG-rating range, the effect of ESG ratings on excess returns is negative. This indicates that, according to our empirical results, Chinese listed firms cannot improve financial performance and market value simply by continuously increasing ESG investment. Instead, they should pursue an optimal level of ESG investment to enhance financial performance and market value, because excessive ESG investment may have a negative impact on financial performance and market value. This finding is consistent with the evidence in Pierce and Aguinis (2013) and Zhao et al. (2024).

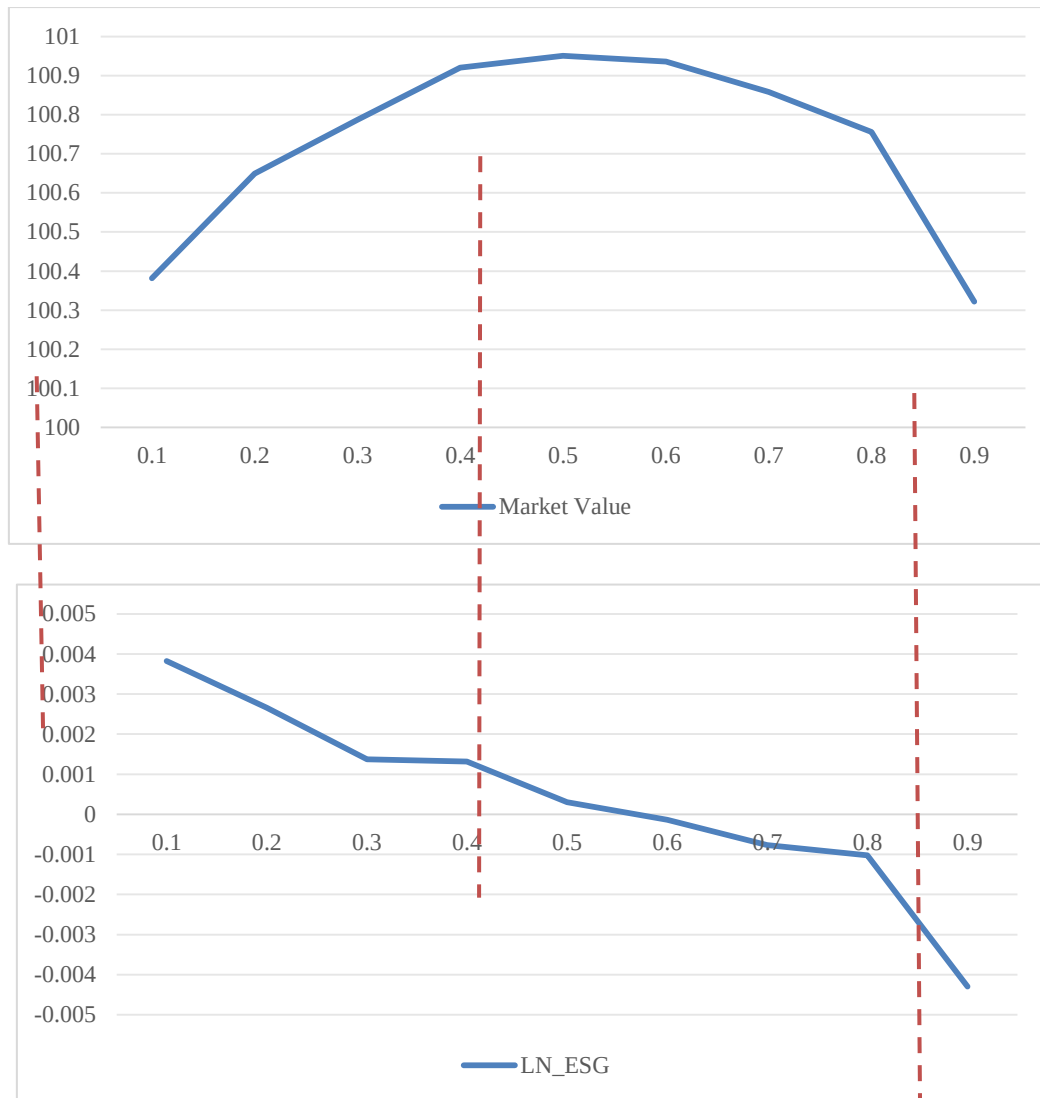


Figure 1. Market Value and Coefficient Dynamics

Notes: 1. This figure illustrates an inverted U-shaped relationship between the ESG coefficient and firm market value; 2. The figure consists of a lower panel and an upper panel, which present the ESG coefficient and the corresponding firm market value, respectively; 3. The lower panel shows the coefficient estimates as the quantile level increases gradually from 0.1 to 0.9. The coefficient represents the effect of an increase in ESG ratings on excess returns; 4. The upper panel shows firm market value as the quantile level increases gradually from 0.1 to 0.9. The initial market value is assumed to be 100. When the quantile is 0.1, the coefficient is 0.005, and the firm's market value increases to 100.5 ($= 100 * (1 + 0.005)$). When the quantile is 0.2, the coefficient is 0.003, the firm's market value at quantile 0.1 increases to 100.5 and then increases to 100.8 ($= 100.5 * (1 + 0.003)$).

Robustness Tests—Considering Endogeneity in Quantile Regression

To ensure the robustness of the empirical results, this paper conducts three robustness tests. The first is to extend the event window, the second is to conduct subsample tests, and the third is to address endogeneity in quantile regression, as described below. First, to examine whether the event-window setting affects our conclusions, we further conduct a sensitivity analysis using alternative event windows. We extend the window from 30 trading days before and after the event date to 60 trading days before and after the event date. Second, we conduct subsample tests by splitting the sample into large firms and small firms, and state-owned enterprises and non-state-owned enterprises. Finally, considering that the dependent variable in this study may affect some explanatory variables, we follow Chernozhukov and Hansen (2006), Ura (2021), Zhu et al. (2023), and Lee and Kuo (2026) and introduce a quantile regression approach that accounts for endogeneity. We use the average ESG score of peer firms in the same industry as an instrumental variable. The first-stage F-statistics exceeds 10, suggesting that weak instruments are unlikely. We estimate a first-stage regression of ESG ratings on the instrument and control variables, and we then add the first-stage residual to the main

regression. The residual is not significant, which implies that ESG ratings do not show a strong endogeneity problem in our data. As a result, our main findings are unlikely to be driven by endogeneity bias.

The empirical results show that under the above three robustness tests, the main findings do not change materially. This indicates that the empirical results are robust to some extent.

5. Conclusions and Suggestions

This study examines the relationship between ESG ratings and stock returns, and tests whether a Too-Much-of-a-Good-Thing (TMGT) effect exists in the relationship between the two. Using a sample of 789 Chinese A-share listed firms during the COVID-19 outbreak when stock prices fell sharply, and we apply a 5-factor model and quantile regression. Prior literature has not directly tested whether a TMGT effect exists in the relationship between ESG ratings and stock returns in China.

The empirical results show that, during the COVID-19 stock price crash, the effect of ESG ratings on stock returns for listed companies in mainland China exhibits a Too-Much-of-a-Good-Thing (TMGT) effect. That is, in the low-ESG-rating range, the effect of ESG ratings on stock excess returns is positive, but in the high-ESG-rating range, the effect of ESG ratings on stock excess returns is negative. This indicates that, according to our empirical results, Chinese listed firms cannot improve financial performance and market value simply by continuously increasing ESG investment. Instead, firms should pursue an optimal level of ESG investment to enhance financial performance and market value, because excessive ESG investment may have a negative impact on financial performance and market value. This finding is consistent with the evidence in Pierce and Aguinis (2013) and Zhao et al. (2024).

The contributions of this study to existing literature are as follows. 1. Supplementing gaps in the literature: whether a TMGT effect exists in the relationship between ESG ratings and stock excess returns in China. 2. ESG investment is not always “the more, the better,” but should be at an appropriate level: excessive ESG investment may have a negative impact on firms’ financial performance and market value. Therefore, Chinese regulators and corporate decision-makers should pay attention that moderate ESG investment is beneficial to firms’ financial performance and market value.

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Author contributions

Dr. Jen-Sin Lee contributed to the supervision, interpretation of the results, review, and revision of the manuscript. Dr. Xi-Yan Zheng was responsible for the conceptualization, research design, methodology, data collection, data analysis, and preparation of the original draft. All authors read and approved of the final manuscript.

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The data that support the findings of this study are available on request from the corresponding author. The data is not publicly available due to privacy or ethical restrictions.

Data sharing statement

No additional data is available.

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