

Green Incentive in Stock Market in China from the Perspective of Enterprise Green Information Disclosure

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Abstract: China's green financial system is developing towards the goal of green sustainability, which depends on the sustainable development of green enterprises. This paper identifies the green degree of enterprises from the perspective of enterprise green information disclosure, divides green enterprises and non green enterprises, and empirically tests whether there is green incentive in China's stock market, so as to judge whether China's stock market can allocate resources effectively. Firstly, based on the concept of green sustainable development, green factor and green efficiency factor are constructed, which are introduced into the three factor model of Chinese version respectively, and the four factor model of Chinese version is constructed. Secondly, take the A-share listed companies in Shanghai and Shenzhen from 2009 to 2021 as the sample for empirical analysis to study the green incentive phenomenon and influencing factors in China's stock market. It is found that the Chinese version of the four factor model can better fit China's stock market than the existing factor pricing model. There is a green incentive effect in China's stock market, that is, the stock market produces higher excess return for green enterprises, and the higher the green efficiency of enterprises, the higher the excess return.

Keywords: Green information disclosure, Green incentive effect, Chinese version of four factor model.

1. Introduction

With the construction of ecological civilization and the continuous promotion of green economy, China has initially formed a policy system and market environment aimed at promoting the development of green finance. While the green financial system is gradually improving, it is also facing great challenges such as the immature mechanism of environmental information disclosure. In September 2015, the CPC Central Committee and the State Council first proposed to build a green financial system in the overall plan for the reform of ecological civilization system, and put forward relevant development suggestions for credit and green bonds. In the guidance on building a green financial system jointly issued by seven ministries and commissions including the people's Bank of China in August 2016, it was pointed out that the development of green finance should be accelerated. On the one hand, we should guide more capital to flow to green industries by innovating financial systems such as environmental information disclosure system of listed companies; On the other hand, we should make full use of all kinds of innovative financial instruments to help green development, such as green bonds, green funds, green indexes, etc. In September 2020, China put forward the goal of "carbon neutralization and carbon peak", which requires to further accelerate green development and build a resource-saving and environment-friendly society while maintaining steady economic growth. In 2021, China made clear the green finance development idea of "three functions" and "five pillars", and pointed out that it is necessary to continue to promote the classification of financial institutions, securities issuers and public departments and improve the mandatory and normative environmental information disclosure. Under

the joint action of the government and the capital market, the development of China's green financial system has made great progress. According to the data of China interbank Dealers Association, by the end of the first half of 2021, the cumulative issuance scale of green bonds at home and abroad had exceeded 1.73 trillion yuan. According to the data provided by Shanghai Stock Exchange, by the end of 2021, China's stock market has successfully launched 74 green stock indexes, including 26 ESG, 19 green bonds, 18 environmental protection industries, 6 green environments, 2 green income and risk, 2 corporate governances and 1 social responsibility. The green stock index is leading the vigorous development of the stock market. As an important driving force of green development, whether China's stock market makes positive feedback on the green innovation and development of enterprises, so as to promote the effective allocation of capital, is an important index to test the effectiveness of the construction of China's green financial system. Existing scholars mainly study the green incentive of China's stock market from two perspectives: the definition standard of green enterprises and the stock excess return of green enterprises.

In terms of defining standards for green enterprises. Qiao Yongfeng and Ma Jingsheng (2011) incorporated sustainable economic development and environmental resources into the green degree evaluation system and improved the evaluation index system of green enterprises [1]. Han Liyan and Cai Lixin (2017) defined enterprises whose main business is green environmental protection as green enterprises. Taking green environmental protection concept stocks as samples, they found that green concept stocks in the stock market have excess returns, and then considered that there is green incentive in China's stock market [2]. Liu Yi et al. (2017) believe that the environmental performance of enterprises is

an important basis and premise for identifying green enterprises. They conduct green evaluation on enterprises from the aspects of enterprise pollution prevention, environmental management and environmental behavior, so as to consolidate the development foundation of green financial market [3]. Liu Yong and Bai Xiaoying (2020) redefined green enterprises from the perspective of sustainable development, and found that China's stock market has a positive green incentive effect on enterprises [4].

In terms of excess returns on green enterprise stocks. Chia et al. (2009) found that the introduction of green factors related to environmental protection can explain the excess return of green enterprise stocks, and the traditional factor pricing model can not fully explain the green incentive effect [5]. Chan and Walter (2014) found that the stock performance of environmentally friendly companies is better than that of non environmentally friendly companies, and there is green incentive [6]. Han Liyan and Cai Lixin (2017) proved that China's stock market has a green incentive effect on companies mainly engaged in environmental protection business, but they can not identify the difference of enterprise green efficiency [2]. Shen Xuefeng (2019) verified that there is green incentive in China's stock market and that green factors have better explanatory power for green concept stocks [7]. Han Guowen and Fan Chengheng (2021) pointed out that it is necessary to speed up the work of enterprise green information disclosure and green rating classification to ensure the green incentive of the stock market [8].

Based on the perspective of enterprise green information disclosure, this paper brings "culture, economy, society, environment and innovation" into the green enterprise evaluation system, focusing on the disclosure of green information related to sustainable development and environmental performance. The green factor and green efficiency factor are introduced into the Chinese version of the three factor model to verify whether there is green incentive in China's stock market, that is, whether the excess return of green enterprise stocks is higher than that of non green enterprise stocks. Based on this, the identification of green efficiency is tested, that is, whether the enterprises with high green efficiency have higher excess return. The main contribution of this paper is to re identify green enterprises from the perspective of enterprise green information disclosure, construct new green factors and green efficiency factors, verify the existence of green incentives in China's stock market by using the Chinese version of the three factor model in line with China's national conditions, and prove that enterprise green information disclosure affects green efficiency to a certain extent. To a certain extent, it has deepened the understanding of the construction of China's green financial system, enriched the green enterprise evaluation system and improved the enterprise environmental information disclosure system. At the same time, it strengthens the enterprises' understanding of the quality and depth of environmental information disclosure, so as to promote the green transformation of enterprises, and provide policy reference for China's green finance to effectively optimize the allocation of resources for a long time.

2. Model and Data

2.1. Theoretical Model

Considering the immature development of China's stock market compared with foreign stock markets and the unique

problem of shell value, the different backgrounds of financial policies and economic means in different periods have led to the changes of China's asset pricing factors, so the Fama-French three factor model popular in the U.S. market is not in line with China's national conditions, if you want to study the green incentive phenomenon in China's A-share market, We should use the Chinese version of the three factor model in line with China's national conditions. Many scholars at home and abroad have studied the applicability of Fama-French three factor model in the Chinese market, and put forward a Chinese version of the three factor model in line with China's national conditions. Zhao Shengmin et al. (2016) concluded through empirical analysis that the applicability of Fama-French three factor model in China's stock market is higher than that of the five factor model, but some scholars also opposed it [9]. Li Zhibing et al. (2017) believe that the capital efficiency of China's stock market has been improved after the split share structure reform, and the five factor model is more applicable [10]. Jianan Liu (2019) and others proposed a Chinese version of the three factor model in line with China's national conditions based on the Fama-French three factor model for the unique shell value problem in China, and verified that it has stronger explanatory power in the Chinese market than the Fama-French three factor model [11]. To sum up, this paper adopts the Chinese version of the four factor model to study the green incentive of the stock market. The Chinese version of the three factor model proposed by Jianan Liu (2019) [11] is as follows:

Firstly, 30% stocks with the lowest market value are eliminated to reduce shell value pollution, and the remaining 70% stocks are used as the stock pool of the evaluation factor model. Then, the stocks in the stock pool are divided into small (bottom 50%) and big (top 50%) according to the market value. Secondly, they were divided into three groups: value (top 30%), middle (middle 40%) and growth (bottom 30%). Finally, it is combined into six portfolios: S / V, S / M, S / G, B / V, B / M and B / G.

$$R_{it} - R_{ft} = \alpha_i + \beta_i(MKT_t) + s_i(SMB_t) + h_i(VMG_t) + \varepsilon_i \quad (1)$$

$$SMB = \frac{1}{3}(S/V + S/M + S/G) - \frac{1}{3}(B/V + B/M + B/G) \quad (2)$$

$$VMG = \frac{1}{2}(S/V + B/V) - \frac{1}{2}(S/G + B/G) \quad (3)$$

Where, R_{it} is the yield of stock or portfolio i; R_{ft} is the yield of stock or portfolio is a risk-free rate of return; $\hat{\alpha}_i$ is an unexplained excess return; MKT_t is a market risk factor ($MKT_t = R_{mt} - R_{ft}$, R_{mt} is the market rate of return); SMB_t the scale factor; VMG_t is a value factor (Value Minus Growth) ; ε_{it} is the residual term. In order to verify the existence of green incentive in China's stock market, this paper introduces green factor on the basis of the Chinese version of the three factor model and constructs a four factor model:

$$R_{it} - R_{ft} = \alpha_i + \beta_i(MKT_t) + s_i(SMB_t) + h_i(VMG_t) + g_i(GF_t) + \varepsilon_i \quad (4)$$

Where, GF_t is the green factor, g_i is the risk load of green factor. If g_i passes the significance test, it shows that the introduction of green factor can explain the excess return of stocks, and China's stock market can bring positive incentives to green enterprise stocks, proving the existence of green incentives.

In order to judge whether the Chinese stock market can recognize the green efficiency of enterprises, this paper introduces the green efficiency factor on the basis of the Chinese version of the three factor model and constructs a four factor model, as follows:

$$R_{it} - R_{ft} = \alpha_i + \beta_i(MKT_t) + s_i(SMB_t) + h_i(VMG_t) + g_i(GEF_t) + \varepsilon_i \quad (5)$$

Where, GEF_t is the green efficiency factor, g_i is the risk load of green efficiency factor. If $g_i = 0$ and passes the significance test, the green efficiency factor cannot price the return of green stocks. If $g_i > 0$ and passes the significance test, it shows that the stock market has a positive incentive to the enterprises with higher green efficiency and provides them with higher excess returns. If $g_i < 0$ and passes the significance test, it shows that the stock market has a negative incentive to enterprises with higher green efficiency and provides them with lower excess return.

To sum up, if g under any test of formula (4) passes the

significance test, this paper believes that there is a green incentive effect in China's stock market. If g under any test of formula (5) passes the significance test, this paper believes that China's stock market can identify the green efficiency of different enterprises, and then produce green incentives in different directions and degrees.

2.2. Green Enterprise Evaluation from the Perspective of Green Information Disclosure

The judgment standard of green enterprises should not only consider whether the main business is environmentally friendly, but also take the concept of sustainable development as the guiding ideology. Starting from the green information disclosed by enterprises, green enterprises are defined. The green information defined in this paper includes five aspects: green culture, economic advantages, environmental friendliness, social responsibility and green innovation. In this paper, the weights of the five relevant items in the report of China's top 100 green companies are used to determine the weights of primary indicators A1, A2, A3, A4 and A5 as 0.2, 0.1, 0.25, 0.25 and 0.2 respectively. Analytic hierarchy process (AHP) is used to determine the weight of secondary indicators.

2.2.1. Green Enterprise Evaluation Index System

The green enterprise evaluation index system is shown in Figure 1:

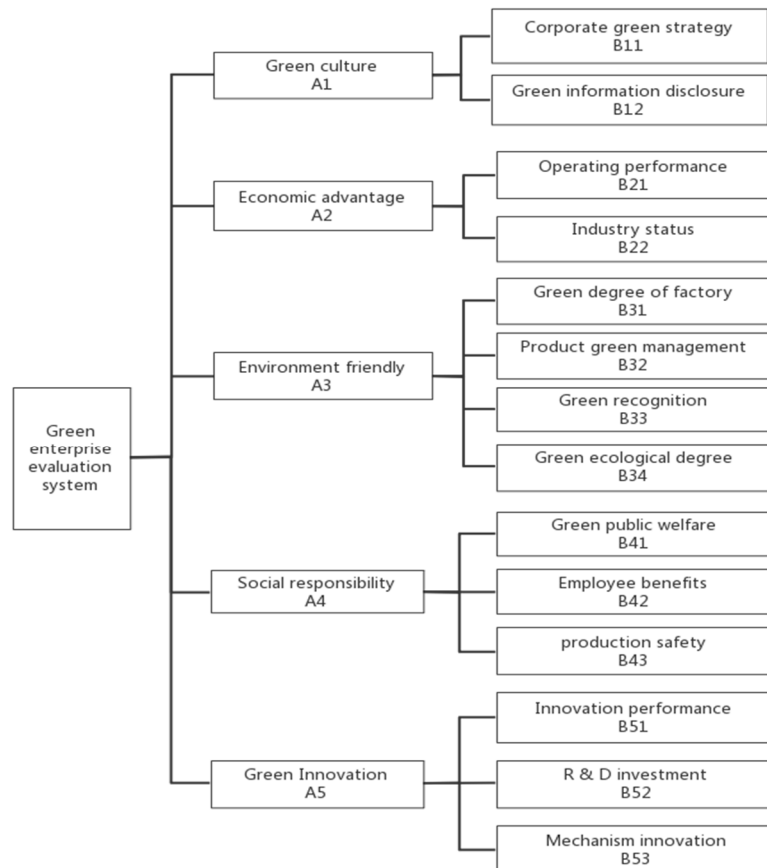


Figure 1. Green enterprise evaluation index system

2.2.2. Determination of Weight Coefficient of Each Level

The judgment matrix is constructed according to the structural model, and Santy's 1-9 scale method is introduced

to compare the elements of the same layer with each other. The resulting judgment matrix is shown in the table below:

Table 1. Judgment matrix A1-B

A1	B11	B12
B11	1	1/2
B12	2	1

Table 2. Judgment matrix A2-B

A2	B21	B22
B21	1	1
B22	1	1

Table 3. Judgment matrix A3-B

A3	B31	B32	B33	B34
B31	1	2	1/2	3
B32	1/2	1	1/2	2
B33	2	2	1	2
B34	1/3	1/2	1/2	1

Maximum characteristic root=4.16, CI=0.054, RI=0.89, CR=CI/RI=0.06<0.1.

Table 4. Judgment matrix A4-B

A4	B41	B42	B43
B41	1	4	2
B42	1/4	1	1/3
B43	1/2	3	1

Maximum characteristic root=3.02, CI=0.012, RI=0.58, CR=CI/RI=0.023<0.1.

Table 5. Judgment matrix A5-B

A5	B51	B52	B53
B51	1	2	3/2
B52	1/2	1	3/4
B53	2/3	4/3	1

Maximum characteristic root=3.01, CI=0.005, RI=0.58, CR=CI/RI=0.009<0.1.

2.2.3. Determination of Green Companies

By searching the annual reports, corporate social responsibility reports and enterprise sustainable development reports publicly disclosed by Shanghai and Shenzhen A-share listed companies (main board and small and medium-sized board) from 2009 to 2021, this paper first determines 840 A-share listed companies, then eliminates the listed companies with the lowest stock market value to reduce shell value pollution, and the remaining 70% of listed companies are taken as the original sample. In the further screening process, companies with unclear disclosure report, false content, lack of credibility and incomplete financial data required by structural factors were removed, and 310 companies were finally determined as the final rating sample. Based on the green enterprise evaluation system, the green value of 310 listed companies is obtained, and the listed companies with the top 50% of green value are taken as the green companies in this paper, and the companies with the bottom 50% of green value are taken as non green companies.

2.3. Data and Factor Construction

2.3.1. Sample

Jianan Liu (2019) [11] pointed out that the listed companies with the lowest market value in China's stock market will be seriously affected by shell value pollution. Therefore, in order to better study the A-share pricing mechanism in China's

market and then study the green incentive phenomenon, this paper selects the monthly data of A-share listed companies (main board and small and medium-sized board) in Shanghai and Shenzhen Stock Exchange from May 2009 to April 2021, and makes the following processing: excluding the stocks with the lowest market value of 30% Eliminate ST and *ST stocks, financial stocks, data with incomplete yield information, and make the EP value non negative (take 0 if it is negative). Determine the appropriate risk-free rate of return and market rate of return.

2.3.2. Green Factor

Because the Chinese version of the three factor model has stronger adaptability in the Chinese market, this paper constructs the green factor and green efficiency factor based on the Chinese version of the three factor model (excluding the listed companies with the smallest market value and choosing EP to construct the value factor). The difference between the green concept shares and the non green concept shares (50%) will be evaluated according to the difference between the green concept shares and the non green concept shares (the average return rate of the enterprise will be 50%). Calculate the green factor by using the above formula (4) and the following formulas (6), (7) and (8).

$$SMB = \frac{1}{6}(S/V/G+S/M/G+S/G/G+S/V/NG+S/M/NG+S/G/NG) - \frac{1}{6}(B/V/G+B/M/G+B/G/G+B/V/NG+B/M/NG+B/G/NG) \quad (6)$$

$$VMG = \frac{1}{4}(S/V/G+B/V/G+S/V/NG+B/V/NG) - \frac{1}{4}(S/G/G+B/G/G+S/G/NG+B/G/NG) \quad (7)$$

$$GF = \frac{1}{6}(S/V/G+S/M/G+S/G/G+B/V/G+B/M/G+B/G/G) - \frac{1}{6}(S/V/NG+S/M/NG+S/G/NG+B/V/NG+B/M/NG+B/G/NG) \quad (8)$$

2.3.3. Green Efficiency Factor

Based on the above green enterprises, the green efficiency factor is constructed. Take the input-output ratio of green enterprises in the corresponding time as the production efficiency index to indirectly measure the use efficiency of green technology. After six groups of stock combinations are obtained based on the scale factor and value factor, the stocks are divided into three groups: high green efficiency (HE), moderate green efficiency (ME) and low green efficiency (LE) according to the 30% quantile and 70% quantile of the evaluation score of green enterprises, That is, the $2 \times 3 \times 3$ grouping method is used to construct the green efficiency factor. Among them, the yield difference between the stock portfolio with the highest production efficiency and the stock portfolio with the lowest production efficiency is the green efficiency factor GEF variable. Calculate the green efficiency factor by using the above formula (5) and the following formulas (9), (10) and (11).

$$SMB = \frac{1}{9}(S/G/HE+S/M/HE+S/V/HE+S/G/ME+S/M/ME+S/V/ME+S/G/LE+S/M/LE+S/V/LE) - \frac{1}{9}(B/G/HE+B/M/HE+B/V/HE+B/G/ME+B/M/ME+B/V/ME+B/G/LE+B/M/LE+B/V/LE) \quad (9)$$

$$VMG = \frac{1}{6}(S/V/HE+B/V/HE+S/V/ME+B/V/ME+S/V/LE+B/V/LE) - \frac{1}{6}(S/G/HE+B/G/HE+S/G/ME+B/G/ME+S/G/LE+B/G/LE) \quad (10)$$

$$GEF = \frac{1}{6}(S/G/HE+S/M/HE+S/V/HE+B/G/HE+B/M/HE+B/V/HE) - \frac{1}{6}(S/G/LE+S/M/LE+S/V/LE+B/G/LE+B/M/LE+B/V/LE) \quad (11)$$

3. Empirical Analysis

3.1. Descriptive statistics

As shown in Table 6 below, from the analysis of the statistical results of various variables, the comprehensive performance of the monthly excess return of green companies is good, and the average rate of return reaches 2.18%, which

is higher than the average rate of return of the whole sample company. However, the extreme value is large. The green companies with the largest rate of return reach 120.9% and the smallest - 39.6%. The standard deviation is also large compared with the full sample companies, indicating that the rate of return of green companies fluctuates greatly and there are unique risks.

Table 6. Descriptive statistics of main variables

Variable	Average value	standard deviation	minimum value	maximum value
Stock portfolio return of listed companies (full sample): R_j-R_f	0.0264	0.0915	-0.3158	0.4419
Green company stock portfolio yield: R_j-R_f	0.0395	0.1015	-0.3476	0.7514
Individual stock yield of listed companies (full sample): R_j-R_f	0.0145	0.0985	-0.7541	1.8820
Green company stock yield: R_j-R_f	0.0218	0.1427	-0.3959	1.2091
market factors: R_m-R_f	0.0195	0.0854	-0.3058	0.2751
SMB	0.0219	0.0531	-0.1852	0.1097
VMG	0.0143	0.0328	0.0051	0.3961
GF	0.0925	0.1073	-0.0834	0.1108
GEF	0.0547	0.0319	-0.0937	0.1833

3.2. Analysis of Chinese Fama - French Three Factor Model

This paper uses the Chinese version of the three factor model suitable for China's national conditions proposed by

Jianan Liu (2019) [11] for regression analysis. In the selection of regression methods, this paper adopts the panel regression model. Based on Hausman test, the fixed effect model is finally adopted, and the regression results are shown in the table below.

Table 7. Regression results of Fama-French three factor model in China

Excess rate of return: R_i-R_f	Green company sample		All company samples	
	(1) Stock portfolio yield	(2) Individual stock yield	(3) Stock portfolio yield	(4) Individual stock yield
R_m-R_f	0.9846	1.1098	1.1395	1.2405
SMB	0.3307	0.3839	0.7501	0.7998
VMG	0.2719	0.2193	0.3716	0.3098
Constant term	0.0049	0.0019	0.0062	0.0043
F	368.37	809.72	1185.27	6730.21
R-Squared	0.5491	0.3835	0.7904	0.4016

The empirical results show that ($R_m - R_f$), SMB and VMG have a significant positive impact on the stock return of green companies; In addition, for all company samples, the impact of the three factors in the Chinese version of the three factor model is also more significant. The SKT coefficient is significantly positive, which is consistent with the interpretation of CAPM model, indicating that the higher the systematic risk of the market is. The SMB coefficient is significantly positive, indicating that the smaller the company is, the easier it is to be manipulated, the greater the risk it faces, and it can obtain higher risk compensation. On the other hand, due to the speculative psychology of investors, small companies are considered to be more explosive, have greater development space in the future and have higher potential for equity expansion. The VMG coefficient is significantly positive, indicating that the value factor effect has a strong expression in China's stock market, and that Chinese investors prefer value investment. In addition, the coefficient of

constant term also exists significantly in the regression results, which shows that although the current three factor model in China can price China's stock market to a certain extent, there are still other pricing factors that can more fully explain the rate of return of China's stock.

3.3. Analysis of Chinese Fama - French four factor model with green factor

According to the above analysis, SKT, SMB and VMG in the Chinese Fama-French three factor model can explain the return of green stocks to a certain extent, but there is still room to improve the interpretation ability. Therefore, this paper constructs a green factor, introduces it into the Chinese three factor model, and constructs a new four factor model to test the interpretation of the green effect on the capital market, so as to prove that green stocks have higher excess returns than non green stocks. The empirical results are shown in the table below.

Table 8. Regression results of Chinese Fama-French four factor model with green factor

Excess rate of return: R_i-R_f	Green company sample		All company samples	
	(1) Stock portfolio yield	(2) Individual stock yield	(3) Stock portfolio yield	(4) Individual stock yield
R_m-R_f	0.9921	1.1382	1.0953	1.1509
SMB	0.3418	0.4095	0.7213	0.7539
VMG	0.2914	0.3193	0.3360	0.2864
GF	0.0437	0.1601	0.3967	0.4143
Constant term	0.0029	0.0008	0.0018	0.0020
F	349.09	820.64	1039.44	5274.26
R-Squared	0.5508	0.3865	0.8204	0.4107

The regression results show that the coefficient of green factor GF is significantly positive, which means that after controlling SKT, SMB and VMG, the green factor has a significant positive effect on the stock return of sample companies, that is, the stock return of green companies is higher than that of non green stocks, which proves that China's stock market has a positive effect on green enterprises, that is, there is a green incentive effect. On the other hand, compared with the Chinese version of the three factor model, the constant coefficient of the Chinese version of the four factor model is significantly lower and the decisive coefficient is higher, indicating that the Chinese version of the four factor model with green factor has a stronger explanatory ability to China's stock market.

Han Liyan and Cai Lixin (2017) divided green companies and non green companies according to whether their main business is environmental protection [2]. This definition method is reasonable, but it is lack of scientificity and comprehensiveness. Therefore, based on the perspective of enterprise green information disclosure, this paper comprehensively and scientifically integrates the concept of sustainable development into the green information

disclosure standards to define green enterprises, and identifies green enterprises from the five aspects of "culture, economy, society, environment and innovation". Through empirical analysis, it is proved that there is green incentive in China's stock market, which shows that investors not only pay attention to the environmental protection performance of enterprises, but also pay attention to the green culture, economic characteristics, social responsibility and innovation ability of enterprises, and then put forward new requirements for the future sustainable development of enterprises, so as to promote enterprises to carry out green transformation and disclose relevant green information from the five aspects of "culture, economy, society, environment and innovation".

3.4. Analysis of Chinese Fama - French four factor model with green efficiency factor

In order to verify the recognition degree of the capital market to the green efficiency of green companies, this paper constructs the green efficiency factor GEF and introduces it into the Chinese version of the three factor model for empirical analysis. The results are shown in the table below.

Table 9. Regression results of Chinese Fama-French four factor model with green

Excess rate of return: R_i-R_f	(1) Stock portfolio yield	(2) Individual stock yield
R_m-R_f	0.9527	1.1981
SMB	0.2933	0.3549
VMG	0.2325	0.2106
GEF	0.0215	0.0473
Constant term	0.0019	0.0005
F	311.52	641.04
R-Squared	0.5317	0.3479

The results of regression analysis show that the stock return of green companies is affected by Green Efficiency: the greater the difference in green efficiency, the greater the difference in stock return, and the smaller the difference in green efficiency, the smaller the difference in stock return. As shown in column (1) of table 8, the stock return of green companies is 4.37% higher than that of non green companies, while as shown in column (1) of Table 9, the stock return of the top 30% efficient green companies is only 2.15% higher than that of the bottom 30% inefficient green companies, that is, China's stock market will generate green incentives for green companies, but China's capital market can not accurately identify the green efficiency with small differences, Unable to bring higher excess returns to efficient green enterprises. Therefore, although there is green incentive in China's stock market, it can not accurately identify green

efficiency. It is necessary to establish a more perfect enterprise green evaluation system.

4. Conclusions and Suggestions

4.1. Conclusions

Based on the perspective of enterprise green information disclosure, this paper selects the green information and other relevant data indicators disclosed by the company from 2009 to 2021, redefines the green enterprise, constructs the green factor and green efficiency factor based on the concept of sustainable development, makes an empirical analysis on the green incentive effect of China's stock market by using the Chinese version of four factor model, and obtains the following conclusions:

(1) The Chinese version of the four factor model has a

better fitting effect on Asset Pricing in China's stock market. With technological innovation and policy changes constantly changing the development pattern of China's stock market, the traditional Chinese version of the three factor model can not fully price China's stock assets. This paper constructs a green factor based on the concept of green development, and the use of the Chinese version of the four factor model can better explain the changes of China's stock market.

(2) There are green incentives in China's stock market. The green company defined in this paper is different from the green company in the traditional sense. It re-identifies the green company from the five aspects of "culture, economy, society, environment and innovation" in which enterprises disclose green information. Green companies bring more social benefits and environmental performance to the society with their advanced green culture concept and green innovation and transformation technology. However, compared with traditional enterprises, green enterprises will need more costs and face greater risks, such as technology risk, financing risk, policy risk and so on. Therefore, green companies bring excess returns due to their related benefits, that is, China's stock market compensates for the unique risks of green enterprises.

(3) China's stock market cannot accurately identify green efficiency. Empirical analysis shows that the greater the difference of green efficiency, the greater the difference of stock return. That is, China's stock market will have a positive incentive effect on enterprises with higher green efficiency, but the stock market can not bring higher excess returns to enterprises with higher green efficiency. Therefore, China needs to establish a more perfect and scientific green enterprise evaluation system and fully disclose the relevant information of green efficiency in order to achieve the effective allocation of green capital.

4.2. Suggestions

The research of this paper confirms the adaptability of the Chinese version of the four factor pricing model in China, verifies the positive impact of the green factor, that is, the green sustainable development behavior of enterprises, on the excess return of stocks, and promotes the green transformation of enterprises; To a certain extent, it enriches the content of enterprise green information disclosure and provides new ideas for the pricing of green financial products and the construction of green financial system in China; This is conducive to the effective allocation of funds, guide more capital to green industries, and encourage enterprises to carry out green transformation and build a beautiful China from the five aspects of "society, environment, economy, culture and innovation". From this, we can get the following enlightenment:

(1) Improve the green information disclosure system of enterprises. Under the joint action of legislative bodies and relevant supervision and management departments, improve the green information disclosure system, not only strictly control the quality of enterprise information disclosure from the aspect of environmental performance, but also improve the content of information disclosure from the aspects of

green culture, green innovation, green economy and green sustainable development. At the same time, pay attention to the innovation of information disclosure forms to realize the quantifiable nature of information disclosure; On the other hand, we should strengthen supervision, strictly control the authenticity and accuracy of relevant disclosure information, and reduce the occurrence of "green drift".

(2) We will improve the financial incentive mechanism for green and sustainable development enterprises. From the perspective of green finance, with the joint promotion of the people's Bank of China, China Banking and Insurance Regulatory Commission, China Securities Regulatory Commission and other departments, gradually improve the financial support mechanism for green enterprises, reduce the financing difficulty and cost of green enterprises, and reduce the income tax of green enterprises. On the other hand, we should fully improve the green enterprise evaluation system, accurately identify green enterprises and establish special audit channels for green enterprise IPO, appropriately reduce the time and cost of listing of green sustainable development companies, and speed up the listing of green enterprises.

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