

# Research on the relationship between ESG ratings and A-H premium — panel regression and investment strategy

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## Abstract

In the context of Shanghai-Hong Kong Stock Connect, the country's emphasis on ESG development has deepened, and the paper speculates that the company's ESG rating can impact the A-H premium. This paper examines 81 corporations listed in mainland China and Hong Kong. It concludes with a strong negative correlation between ESG ratings and A-H premiums. This paper excludes some macro factors that can influence the A-H premium. It jointly analyses and concludes from the time series' vertical dimension and the industry classification's horizontal dimension. Based on the conclusion, the paper uses the change in ESG rating as an investment signal to formulate an investment strategy for A-shares and H-shares and can obtain above-market investment returns.

**Key words:** ESG rating; investment strategy; A-H premium; Industry heterogeneity.

## 1 Introduction

Shanghai-Hong Kong Stock Connect is a stock market trading interconnection mechanism. Since its implementation on 17 November 2014, it has had 567 stocks. Nevertheless, for companies

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with both A-shares and H-shares, it is a fact that there is a specific price difference in the pricing of A-shares and H-shares, and we usually measure it in terms of A-H premium. We study the existent literary work related to A-H premium. From a macro perspective, the factors affecting it mainly include market trading mechanism (Ding & Feng, 2019), information asymmetry (Yang, 2023), market price-earnings ratio (Ding, 2023), etc. Concurrently, the industry classification will also affect the company's A-H premium.

However, we found that very few papers have examined the impact of ESG ratings on AH premiums. ESG rating is an extensive evaluation of a firm's environmental, social, and governance aspects and a digital indicator of its ESG performance. At the same time, we believe that due to the different cultures of mainland China and Hong Kong, the perception of ESG is also different. It may be that investors and company leaders in Hong Kong have received more cultural education and diversified information due to the region, and their understanding of ESG is earlier and more critical. ESG emerged relatively late on the mainland, and those on the mainland may pay more attention to it later than those in Hong Kong. Investors and company leaders' different levels of ESG attention and timing will lead to different ESG ratings of their companies, which may be related to changes in A-H premium. Therefore, we wondered if we could find a relationship between the two through research.

For the development of ESG in China, with the continuous advancement of the economy, the country's awareness of sustainable development is increasing. The importance of developing ESG is increasingly emphasized, and companies are required to reveal their ESG performance in corporate reports. In November 2018, the Asset Management Association of China released a Research Report on the ESG Evaluation System of China's Listed Companies, pointing out that investigating and boosting ESG is a significant device to support the first-rate growth of China's economy. In December 2020, the Shanghai Stock Exchange revised the Rules for the Listing of Stocks on the Science and Technology Innovation Board of the Shanghai Stock Exchange, which requires companies to report on their social responsibilities and separately publish social-responsibility, sustainability, and environmental-responsibility reports, etc., as appropriate. In May 2021, the Ministry of Ecology and Environment (MEE) of China distributed the Reform Plan for the Legal Disclosure of Environmental Information System, which clarified that by 2025, a compulsory disclosure system for environmental information will be built.

In the current academic discussion of ESG ratings, the firm’s ESG performance changes have pulled with the company. Most scholars have pointed out in the literature that ESG factors are closely related to corporate value in the financial industry (Zhang & Wei, 2024). Good ESG performance benefits companies, including reducing operational risks, improving employee and customer satisfaction, attracting investor capital, enhancing corporate brand reputation, and improving information asymmetry (Zhang & Wei, 2024; Tao, 2023). Through ESG performance, the market can intuitively see the comprehensive manifestations of each firm in three aspects: environmental, social, and governance (Chen & Liu, 2024). Companies with high ratings tend to have good ESG performance, which means that the corporation has a solid ability to continue to develop, which can improve the company’s reputation, which in turn gives investors a better impression of the company and its long-term support (Zhang & Wei, 2024).

Based on the theoretical research on AH premium and ESG rating, we can use information asymmetry as a bridge to construct an indirect relationship between the two (Figure 1-1). It is found that an improvement in a firm’s ESG performance can increase its ESG rating. Based on the theory, the information asymmetry of the market can be reduced, and the information is mainly about the environment, society, corporate governance, etc. Moreover, the reduction can decrease the price premium of A-H.

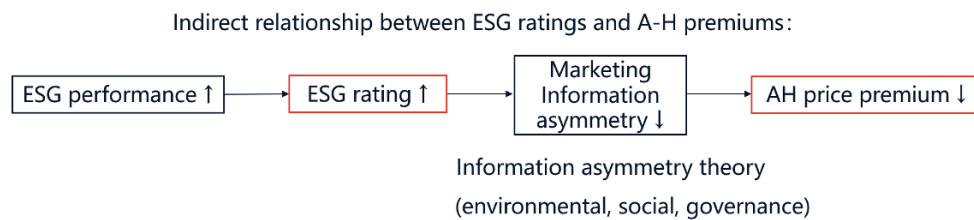


Figure 1-1 Relationship between ESG ratings and A-H premium

Therefore, based on the above-mentioned indirect relationship between ESG performance and A-H premium, summarized through various literature, this paper proposes to examine the direct relationship between them. We initially listed 555 companies from the list participating in the Shanghai-Hong Kong Stock Connect. However, considering the volume and completeness of the data, we finally selected 81 companies as our research sample. We made their A-H premium and ESG rating data into panel data and made panel data with no lag and one-year lag, respectively,

for comprehensive analysis. Since many other factors can lead to the A-H premium, we mainly select macro factors that can affect premiums as control variables and choose from the results of the current studies in the literature, including exchange rates, the Hang Seng Index, and interest rates. Considering the above control variables, we successfully concluded a remarkable negative correspondence between the company's ESG performance and the A-H premium by doing regression analysis on the data. Then, we also considered the impact of different industries on A-H premiums. We grouped 81 companies into 12 industries, analyzed their data separately, and summarized that there is still a strong negative correlation between them. This is an industry testimony to the correctness of our conjectures.

According to our research result, as a company's ESG rating rises, its A-H premium decreases. Based on our conclusions, we use the change in ESG rating as an investment signal to make relevant investment strategies and recommendations. When the ESG rating of a company changes, we make a 5-day investment behavior, which includes the day the signal appears. According to the change in ESG rating, short or long A and H shares are used to obtain investment returns. Each investment action can only involve shorting or going long on 1 unit of the corresponding shares, and no transaction fees are considered during the trading process. By calculating the relevant formula, it is found that 8.6% of the overall excess return can be obtained. At the same time, the individual's market performance will not affect the strategy's returns on the individual. The conclusions of our research can help investors develop sound investment strategies within the company's A-shares and H-shares to achieve above-market average investment returns. This shows that it has some value in research and practical application.

## **2 Literature review**

Dual-listed stocks often have a premium problem, and in various capital markets around the world, the prevalent premium is that foreign shares are at a premium to domestic shares. In China, the premium of domestic stocks to foreign stocks is the so-called "mystery of China's stock market." Many institutional investors and scholars generally believe that the premium problem of AH shares is caused by market segmentation, but since 2014, the Shanghai-Hong Kong Stock Connect has been opened. However, the segmentation has been broken, and the premium problem of AH

shares has become more serious (Ma, 2020).

Sheng (2021) verified that the Shanghai-Hong Kong Stock Connect policy has a vital issue with the premium through multiple regression models, the introduction of interaction terms, and the difference-in-difference model, while the Shenzhen-Hong Kong Stock Connect has a considerably decreasing consequence on premium. The author's explanation for this is that the policy does not solve the problem of market segmentation.

Zhang, Qi, and Chung (2021) found that this was partly due to the contrary trading behavior of Hong Kong investors between the two events. Owing to institutional variance between the two markets, arbitrage possibilities are limited, resulting in persistent price differences. By studying the behavior of investors in the dual listing of China's A-share and H-share markets, it is found that it may be due to the short-selling restrictions and daily price limits in the A-share market.

From the standpoint of market microstructure theory, the trading mechanism affects the dynamic asset pricing procedure. Following the outset of the policy, the market tended to be integrated, and AH premium rose, which contradicts the existing market segmentation hypothesis. Ding and Feng (2019) offer a supplementary interpretation of the share price premium according to the stock market trading mechanism. It is positively correlated with margin trading and oppositely correlated with short selling.

Li (2019) also found that the fulfillment of the policy did not weaken the premium of AH shares but increased the AH premium through the daily data analysis of 10 AH-share dual-listed companies from 2014 to 2016. Through empirical research, it is concluded that the higher the turnover rate of A-shares in comparison with H-shares, the more significant the difference in AH stock prices. In addition, through further research on the ratio of circulating market capitalization, he found that the level of information asymmetry between the two places increases, and the increase of information asymmetry will worsen the phenomenon of AH premium.

The Shanghai-Hong Kong Stock Connect program contributes to AH premiums (Zhang et al., 2022), and they point out that information asymmetry, demand differences, and shareholders' risk appetite differences have forceful descriptive power for AH premiums. However, despite this, the hypothesis of liquidity distinctions and market risk differentials is still being challenged.

Yang (2023) directly estimated the informed trading probability of individual stocks in the H-

share market through the VPIN model and used the relative informed trading probability (A-share informed trading probability/H-share informed trading probability) as the metric of information asymmetry between the two markets and concluded that the asymmetry in information was positively associated with the A-H share premium. Furthermore, the liquidity difference is also positively linked with it. The liquidity difference played a biased mediating effect in the impression of information asymmetry on the premium.

Meanwhile, we also consider the effect of ESG on companies. The concept of ESG completely overturned the early leading idea of "maximizing shareholder interests." It emphasized the simultaneous improvement of corporate financial and social benefits, which has won wide attention from political and industry circles and gradually triggered an upsurge in academic research (Chen & Liu, 2024).

Hu, Zhan, and Xiang (2024) theoretically evaluated the impact and mechanism of stock liquidity on corporate ESG performance. The consequences demonstrate that equity liquidity can substantially improve it. Second, stock liquidity strengthens corporate ESG performance by relieving information asymmetry and fortifying internal and external governance.

Tao (2023) pointed out that good ESG operation can weaken the information asymmetry of enterprises. Based upon the duplicate perspectives of media supervision and internal control, the influence mechanism of ESG performance on the stock price changes of listed firms is further studied. Moreover, he analyzed the impact of the stock price changes and found a significant negative connection between ESG performance and stock price volatility. In addition, media surveillance and internal control play an intermediary function in the relationship between ESG performance and the volatility of registered firms' stock prices.

Zhang and Wei (2024) selected 62 A-share listed firms in the financial business based on ESG data from 2016 to 2022. They investigated the connection between ESG performance and corporate value through empirical analysis. They used a regression analysis model to study the function of ESG performance on corporate value. The consequences show that it has an optimistic impact on their corporate value, and the impact on state-owned enterprises is more significant.

The above literature provides a rough summary of the current research on AH premiums and corporate ESG performance. The existing AH premium phenomenon in the background of

Shanghai-Hong Kong Stock Connect mainly follows the market segmentation theory, and macro factors affecting the AH premium are explored and discussed, including stock price volatility, market trading mechanism, information asymmetry, stock liquidity, etc. Moreover, the current research on corporate ESG performance is mainly about its impact and influencing factors. The standard view is that good ESG performance can increase corporate value and reduce information asymmetry, et cetera. However, we have not found any literature that directly links AH premium and ESG performance, which will be the focus of this paper's research, complementing the existing factors that result in the AH premium and the influence of ESG performance.

### **3 Data and Methodology**

#### **3.1 Data description**

The paper initially selected all 555 companies that have joined the Shanghai-Hong Kong Stock Connect on the official website. However, while working to collect stock data on the Choice financial terminal, it was found that not all companies were listed in mainland China and Hong Kong simultaneously. Therefore, we excluded all companies in one of the two places and obtained 147 companies. We pulled all daily stock price data of these 147 companies from June 1, 2010, to July 1, 2024, from Tushare. We marked all the blank data in the data table and excluded companies on the market for less than three years to get 115 companies. After excluding the companies with too much blank data, we finally got 81 companies as our final company sample.

All daily ESG rating data of all companies from June 1, 2010, to July 1, 2024, were obtained from the Sino-Securities. At the same time, we also pulled the exchange rate (RMB-HKD, HKD-USD) and interest rate on CSMAR; The Hang Seng Index was obtained on the Choice Financial Terminal as the control variable we needed.

To facilitate our data running, we finally selected the daily data from April 1, 2021, to December 29, 2023, as the period of our data sample.

## 3.2 Selection of a variable

This article studies the impact of macro factors and ESG ratings on A-H premiums, focusing on the influence of ESG ratings. Relevant variables were analyzed from the logical reasoning and theoretical level, as our paper stated above, and the dependent variables, the independent variables, and the control variables will be set up and explained below.

### 3.2.1 Dependent variable

This paper selects the stock price of the companies listed on the A-share and H-share markets priced by RMB, and then the subtraction following each price takes the logarithm. Since the closing price of Hong Kong stocks is denominated in Hong Kong dollars, we transform the price of H-share into RMB according to the current exchange rate of RMB-HKD. Once a uniformly denominated currency is in place, calculations can be made. The expression for the interpreted variable is

$$y_{it} = \log P_{it}^A - \log P_{it}^H = \log \frac{P_{it}^A}{P_{it}^H}$$

Where  $i$  represents the stock,  $t$  represents time,  $P^A$  and  $P^H$  separately represents the share price of the stock listed in A shares and H shares.  $\log \frac{P_{it}^A}{P_{it}^H}$  represents the level of the premium:  $\log \frac{P_{it}^A}{P_{it}^H}$  greater than 0 indicates that the same company's A share price is higher than H shares; less than 0 means it is lower than H shares.

### 3.2.2 Independent variables

This paper intends to study the mechanism of ESG rating on A-H premium and construct an investment strategy based on the change of ESG rating, so ESG rating is the dependent variable. From the logic above, the expected coefficient of the ESG rating is negative.

### 3.2.3 Control variables

This paper selects the exchange rate of RMB-HKD and HKD-USD, the interest rate of deposit, and the Hang Seng AH premium index as control variables. Macro factors change only with time, not with individuals. RMB-HKD and USD-HKD exchange rates are spot exchange rates, and the Hang Seng index takes the logarithmic. The Hang Seng AH Premium Index formula is

$$HSAHP = \frac{\sum_{i=1}^n \left[ (IS_i^A \times FAF_i^A + IS_i^H \times FAF_i^H) \times P_{it}^A \times \frac{1}{FX_i^A} \right]}{\sum_{i=1}^n \left[ (IS_i^A \times FAF_i^A + IS_i^H \times FAF_i^H) \times P_{it}^H \times \frac{1}{FX_i^H} \right]} \times 100$$

Hang Seng AH premium index greater than one indicates that A shares are higher than H. The larger the index, the greater the price of A shares than H shares, so the index coefficient is expected to be favorable. When interest rates rise on the mainland, a large amount of foreign capital pours into the mainland market, and the central bank injects money into the market to control exchange rate fluctuations. Excessive capital inflows into the A-share market, resulting in a shortage of A-share stocks, so the share price of A shares rises, and the share price of A shares is higher than that of H shares, leading to the expected deposit interest rate coefficient being positive. Since Hong Kong stocks are denominated in Hong Kong dollars, conversion into RMB involves the conversion of exchange rates, so the exchange rate also impacts the A-H premium and needs to be controlled. When the direct exchange rate of the RMB against the Hong Kong dollar increases, it means that the RMB has appreciated relative to the Hong Kong dollar, the Hong Kong dollars have depreciated, and the value of H shares has decreased when converted into RMB, so the RMB-HKD exchange rate coefficient is expected to be negative. Moreover, when the Hong Kong dollar is stronger than the US dollar, when the exchange rate of HKD-USD falls, the Hong Kong dollar appreciates, and the value of H shares is converted into RMB. Therefore, the exchange rate coefficient of HKD-USD is expected to be positive. Table 3-1, which describes the expected properties of the positive and negative coefficients, is shown below.

Table 3-1 Descriptions of variables

Variables	The factors that affect it	Symbol	Expected direction
Dependent variable	A-H premium	$\log \frac{P_{it}^A}{P_{it}^H}$	
Independent variables	ESG rating	ESG	Negative
Control variables	RMB-HKD exchange rate	RMB-HKD	Negative
	HKD-USD exchange rate	HKD-USD	Positive
	Interest rate on deposits	Interest-Rate	Positive
	Hang Seng AH Premium Index	Market-AH-Premium-log	Positive

### 3.3 Model specification

This paper selects the panel data of 81 companies listed on both A and H shares markets from January 4, 2021, to December 29, 2023, which did not delist or suspend trading. First, build a hybrid model of ESG only. The model equation is as follows.

$$Y_{it} = \alpha + \beta X_{it} + \varepsilon_{it}$$

Where  $Y_{it}$  represents the A-H premium level and  $X_{it}$  represents the ESG rating. Based on this model, control variables are added, and the model equations are as follows.

$$Y_{it} = \alpha + \beta X_{it} + \gamma z_t + \varepsilon_{it}$$

Where  $z_t$  represents control variables: the RMB-HKD and HKD-USD exchange and deposit interest rate. Control variables are macroscopic and change only over time, independent of individuals.

To test the model's robustness, a lag regression was performed based on adding control variables with a lag of 252 days. The equation of the model is as follows.

$$Y_{it+252} = \alpha + \beta X_{it} + \gamma Z_t + \epsilon_{it}$$

The regression model is by industry after adding control variables to check whether industry

heterogeneity exists. The division of the industry is based on the ESG rating table of the Sino-Securities Index. The 81 companies were divided into 12 businesses: insurance, mining, publishing, real estate, supply, processing, construction, finance, retail, transportation, manufacturing, and governance. Returns were made without delay and 252 days behind schedule for each industry.

## 4 Empirical results

### 4.1 Descriptive statistics of the data

Descriptive statistics are performed on the data before empirical evidence is conducted. Figure 4-1 shows a descriptive statistical figure.

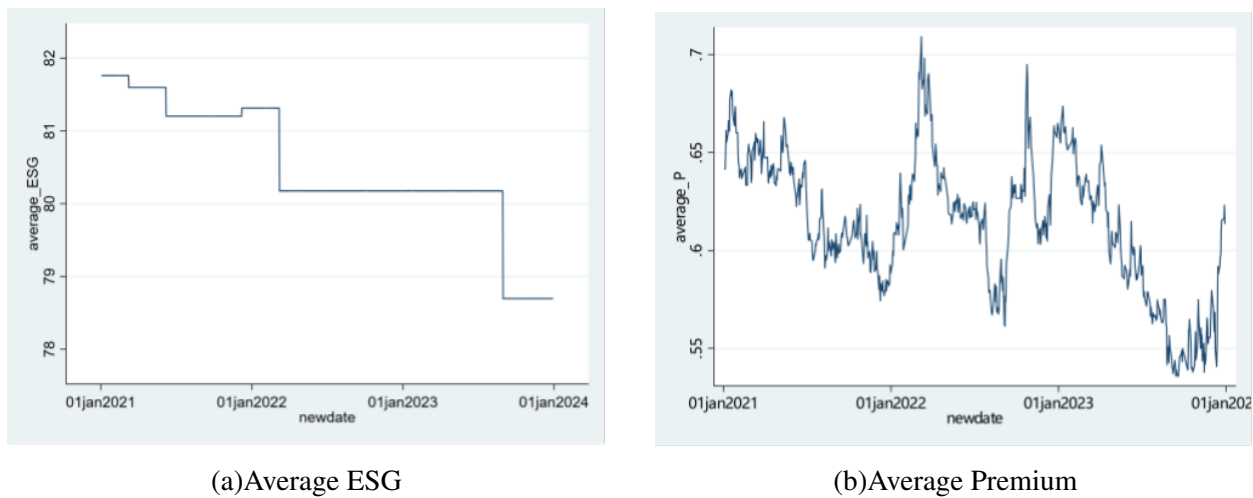
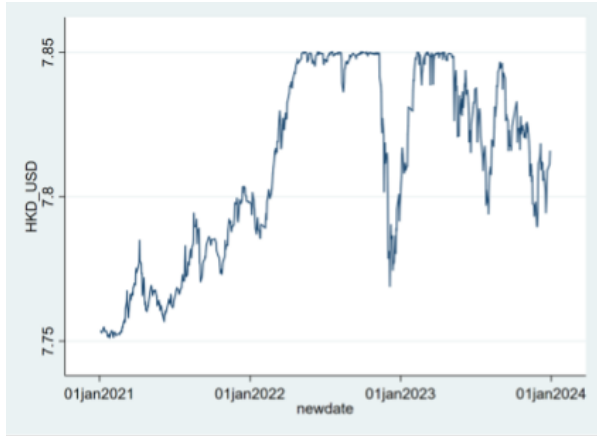
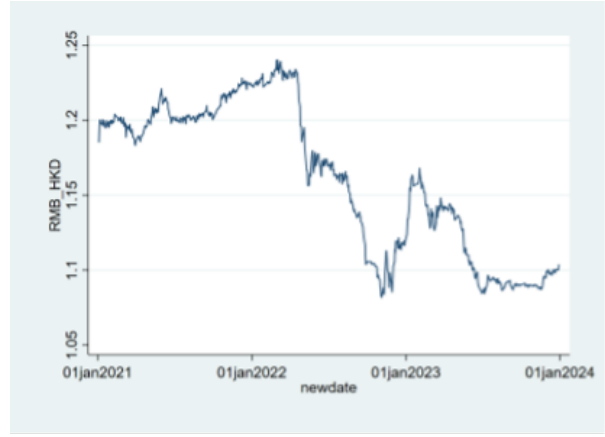


Figure 4-1 Independent variables and dependent variables

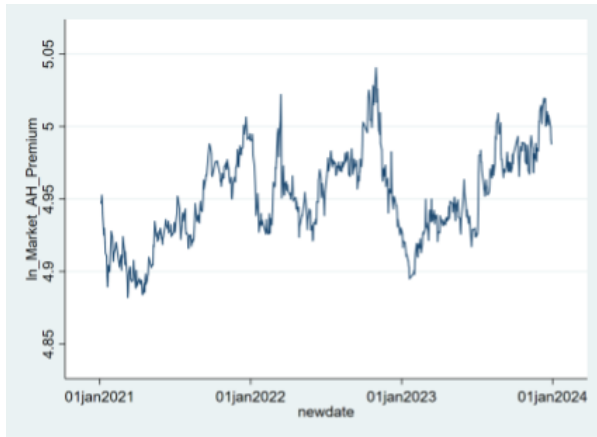
The first chart is a time series chart drawn by averaging the ESG ratings of all companies simultaneously. The second chart is a time series chart drawn by averaging the A-H premium of all companies concurrently. ESG rating data is quarterly, and A-H premium data is daily frequency data. The statistical charts of control variables are shown in Figure 4-2.



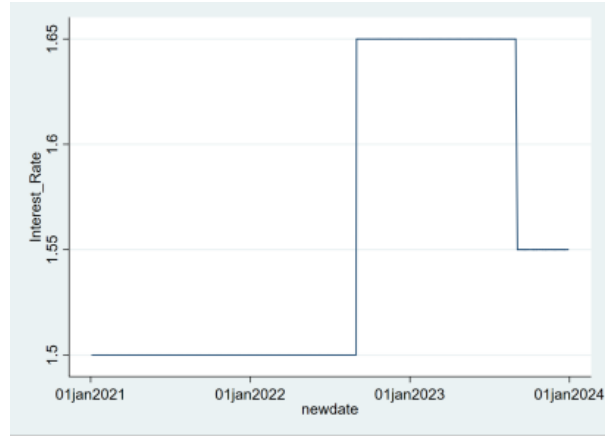
(a) HKD-USD



(b) RMB-HKD



(c) Market-AH-Premium-log



(d) Interest-Rate

Figure 4-2 Control variables

The top left is the spot rate time series chart of HKD against USD, and the top right is the spot rate time series chart of RMB against HKD. Below the left is the time series chart of the Hang Seng index logarithm. The above three macro factors control variables are daily frequency data. Below the right is the time series chart of the deposit interest rate, with a low-frequency change.

The summary of all variables is shown in Table 4-1.

Table 4-1 Summary

Variables	Obs	Mean	Std. dev	Min	Max
HKD_USD	57024	7.81	0.03	77.75	7.85
RMB_USD	57024	1.16	0.05	1.08	1.24
Interest Rate	57024	1.56	0.07	1.50	1.65
Market AH Premium log	57024	4.95	0.03	4.88	5.04
P	57024	0.61	0.33	0.10	1.69
ESG	57024	80.49	3.58	67.45	89.00

The quantity of samples is 57024. The mean value of the independent variable is about 80.49. The higher the ESG rating, the better the ESG performance. The dependent variable's mean value is about 4.95, which means that the price of A shares is 4.95 yuan greater than that of H shares of the same company.

Correlation analysis of variables, which is shown in Table 4-2.

Table 4-2 Pearson correlation

	Premium	ESG	HKD_USD	RMB_HKD	Interest-Rate	Market-AH-Premium-log
Premium	1					
ESG	-0.275*	1				
HKD-USD	0.045*	0.123*	1			
RMB-HKD	-0.038*	-0.172*	-0.493*	1		
Interest-Rate	0.026*	0.153*	0.498*	-0.754*	1	
Market-AH-Premium-log	0.098*	0.107*	0.404*	-0.358*	0.124*	1

Note:\*\*\* p < 0.01, \*\* p < 0.05, \*p < 0.1

The correlation coefficient table verifies the expected impact direction: A-H premium and ESG rating are negatively correlated and significantly, A-H premium is positively correlated and significantly related to the HKD-USD exchange rate, and negatively correlated with the RMB-HKD exchange rate, A-H premium was positively correlating and significant to Interest-Rate, and A-H premium is negatively corresponding and noticeable to the Hang Seng AH Premium Index.

## 4.2 Regression results

### 4.2.1 ESG only and with control variables

ESG rating only and adding control variables. The two regression results are shown in Table 4-3.

Table 4-3 Only ESG and control variables

Variables	ESG only Premium	Control variables Premium
ESG	-0.0256*** (0.000376)	-0.0277*** (0.000378)
HKD_USD		0.0587 (0.0512)
RMB_HKD		-0.0462 (0.0444)
Interest-Rate		0.239*** (0.0319)
Market-AH-Premium-log		1.275*** (0.0503)
Constant	2.675*** (0.0303)	-4.247*** (0.410)
Observations	57,024	57,024
R-squared	0.075	0.095

According to the regression results, the coefficient of the ESG rating is negative and considerable. After adding the control variables, only the coefficient of deposit rate and the Hang Seng index are substantial and in line with the expected impact. Deposit interest rates rise, A-H premium increases; Hang Seng AH Premium Index rises, A-H premium increases.

### 4.2.2 With control variables lag of 252 days and no lag

The regression is performed after adding control variables with a lag of 252 days to examine the robustness of the model. The regression results are shown in Table 4-4.

Table 4-4 Lag 252 days and no lag with control variables

Variables	Lag 252 days Premium	No lag Premium
ESG		-0.0277*** (0.000378)
	-0.0256*** (0.000453)	
HKD-USD	0.163** (0.0698)	0.0587 (0.0512)
RMB-HKD	0.460*** (0.0858)	-0.0462 (0.0444)
Interest-Rate	0.332*** (0.0628)	0.239*** (0.0319)
Market-AH-Premium-log	1.296*** (0.0735)	1.275*** (0.0503)
Constant	-6.082*** (0.505)	-4.247*** (0.410)
Observations	36,612	57,024
R-squared	0.091	0.095

By comparing the regression results, whether lag or not, the regression coefficients of ESG rating are negative and significant. Generally, the higher the ESG rating, the closer the A share price is to the H share price. Nevertheless, whether the relationship is accidental and whether there are differences between individuals requires further industry heterogeneity testing.

### 4.2.3 Inspection of the heterogeneity of the industry

The 81 companies are divided into 12 sectors, and regression is performed for each sector with and without a lag of 252 days, all with control variables added. For the regression coefficient, we only care about the ESG rating. The on-lag regression results are shown in Table 4-5.

Table 4-5 Industry regression without lag

Dependent variable	Premium												
Industries	All firms	Manufacturing	Transportation	Processing	Mining	Construction	Real-estate	Publishing	Supply	Finance	Governance	Insurance	Retail
ESG	-0.0277*** (0.000378)	-0.0291*** (0.001110)	-0.0161*** (0.000790)	-0.0112*** (0.001200)	-0.0447*** (0.000821)	-0.0125*** (0.001210)	-0.1690*** (0.002120)	-0.0150** (0.005850)	-0.0368*** (0.001930)	-0.0409*** (0.000989)	0.0083*** (0.001330)	-0.0489*** (0.002070)	0.0033*** (0.001160)
Controlled variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

With 252 days lag, the regression results are shown in Table 4-6.

Table 4-6 Industry regression with 252 days lag

Dependent variable	P_Shift_1 year Premium												
Industries	All firms	Manufacturing	Transportation	Processing	Mining	Construction	Real-estate	Publishing	Supply	Finance	Governance	Insurance	Retail
ESG	-0.0249*** (0.000456)	-0.0261*** (0.001480)	-0.0130*** (0.000919)	-0.0211*** (0.001410)	-0.0385*** (0.001080)	-0.0105*** (0.001640)	-0.1580*** (0.002870)	0.0238*** (0.008390)	0.0173*** (0.002500)	-0.0398*** (0.001140)	0.0034 (0.002450)	-0.0511*** (0.002110)	-0.0003 (0.001400)
Controlled variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Compare industry regression with 252 days lag and with no lag. The coefficient of supply and publishing changes from negative to positive. The coefficient of retail changes from positive to negative. Furthermore, the coefficient of governance changes from significant to insignificant. If there is a change, then it is not robust. We remove the four industries that have weak coefficients, and the remaining total of 8 businesses all have significant and negative coefficients, which can further explain that ESG's interpretation of premium is notable and damaging and provide an empirical basis for us to build an investment portfolio with ESG as an investment signal.

## 5 Investment Strategy

### 5.1 Strategy Basic

The investment strategy is based on a remarkable negative correlation between the ESG score and A-H premium. When the ESG rating of a company changes, we make a 5-day investment behavior, which includes the day the signal appears. If the ESG rating increases, we short A-shares and go long on H-shares; conversely, if the ESG rating decreases, we go long on A-shares and short H-shares. Each investment action can only involve shorting or going long on 1 unit of the corresponding shares, and no transaction fees are considered during the trading process.

We select 81 publicly public companies' daily data in the A and H stock market on the Shanghai-Hong Kong Stock Connect company list, with no missing data from January 4, 2020, to December 29, 2023, as our investment strategy analysis database. The investment return rate for each company is the product of the long gains and short gains from all single investment actions in a three-year simulation.

## 5.2 Strategy Formula

$$\mathbf{P}_k = \prod_{i=1}^n (1 + \text{RS}_{ki}) \times (1 + \text{RG}_{ki})$$

The three-year investment return rate  $P_k$  of the company  $k$  is equal to the product of the shorting return rate  $(1 + \text{RS}_{ki})$  and the going long return rate  $(1 + \text{RG}_{ki})$  for each investment action during the three years.

$$\text{RS}_{ki} = \frac{\text{SP}_{kt_{i1}} - \text{BP}_{kt_{i2}}}{\text{SP}_{kt_{i1}}}$$

The shorting return rate of a company  $k$  for a single investment action  $i$  is calculated as the closing price at  $t_1$  minus the closing price at  $t_2$ , all divided by the closing price at  $t_1$ .  $t_1$  is the first day of an investment action and  $t_2$  is the last day.

$$\text{RG}_{ki} = \frac{\text{SP}_{kt_{i2}} - \text{BP}_{kt_{i1}}}{\text{BP}_{kt_{i1}}}$$

The going long return rate of a company  $k$  for a single investment action  $i$  is calculated as the closing price at  $t_2$  minus the closing price at  $t_1$ , all divided by the closing price at  $t_1$ .  $t_1$  is the first day of an investment action and  $t_2$  is the last day.

$$\text{MA}_{jk} = \frac{\text{EP}_{jk}}{\text{FP}_{jk}}$$

The three-year market return rate of the company  $k$  in the market  $j$  is calculated as the final day close price divided by the first day during the three years.

### 5.3 Investment Strategy Results

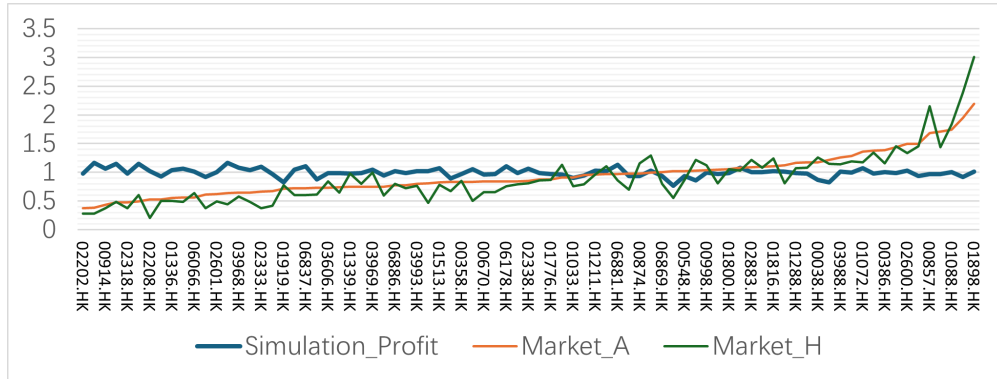


Figure 5-1 Return of investment strategy

Table 5-1 Analysis of the investment strategy results

	Average	Result / Market	Result / Average (Market)
Strategy Profit	0.99516		
Market A	0.939201	1.059581	
Market H	0.893885	1.113297	1.085775

From Figure 5-1, we found that this strategy’s returns tend to be at an overall level and are unaffected by a single company’s market performance.

Furthermore, Table 5-1 presents that our investment strategy has achieved an average return over three years that exceeds the A stock market by 6% and the H stock market by 11%, resulting in an average excess return of 8.6%.

## 6 Conclusion

From the daily data from 81 companies registered in the A and H stock markets through the Shanghai-Hong Kong Stock Connect, we found a notable negative correlation between A-H premium and ESG ratings. After incorporating new macroeconomic and market control variables, time lags, and industry classifications, the results still showed a significant negative correlation, indicating robust results.

Furthermore, based on the results obtained, we designed an investment strategy, and the result shows that the individual's market performance will not affect the strategy's returns on the individual. Over three years, the strategy has achieved an excess return of 6% compared to the A stock market and 11% compared to the H stock market, with an overall excess return of 8.6%. Therefore, our results have significant practical implications.

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