



ESG and Financial Performance: A Case Study of Healthcare Companies in Hong Kong

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Abstract. By February 2025, Hong Kong's healthcare sector will be faced with multifaceted challenges. It has to align technological progress, such as AI diagnostics, with demographic changes, including a projected 30% elderly population by 2030, all while adhering to strict ESG mandates. The Hang Seng Healthcare Index(HSHCI, P/E 34.96x)reveals market skepticism about short-term gains, despite the sector's long-term reliance on ESG integration. This empirical study uses 2022-2023 data to explore the under-researched correlation between ESG adherence and total assets among 76 biotech and medical service firms, addressing critical knowledge gaps in sustainable profitability metrics. In our analysis, this survey applies OLS regression to examine the relation between ESG scores and financial performance. The dataset consists of 123 valid samples, with ESG ratings sourced from the WIND database and financial performance data from East Money Choice. The results indicate that higher ESG scores have a positive impact on financial performance, while the effect of gross margins is comparatively negative. This study offers new evidence for the healthcare industry, particularly for small and medium-sized enterprises in Hong Kong, providing insights into decision-making for accelerating green and low-carbon transitions.

Keywords: Healthcare, ESG, Financial Performance, HongKong, OLS

1 Introduction

As of February 2025, Hong Kong's healthcare sector stands at a critical juncture, balancing rapid technological innovation, an aging population (projected to constitute 30% of residents by 2030 [1], and escalating regulatory demands for Environmental, Social, and Governance (ESG) accountability. The Hang Seng Healthcare Index (HSHCI), comprising 76 firms in biotechnology, AI diagnostics, and medical services, exemplifies this tension: while its P/E ratio of 34.96x reflects the market's passive attitude toward short-term profitability, the sector's long-term viability hinges on the integrating ESG principles into operational frameworks. This study investigates the under-researched nexus between ESG performance and gross margins—a core profitability metric—in Hong Kong's healthcare ecosystem, leveraging real-time data from 2022 to 2023 to address academic and practical gaps.

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The 2024 Corporate Sustainable Disclosure Standards (CSDS) required companies to provide detailed disclosures of ESG indicators such as clinical trial ethics and carbon-neutral supply chains. This has elevated compliance to a strategic position. Prior studies, such as Friede et al.'s meta-analysis of 2,000+ ESG studies [2], established broad correlations between sustainability and financial performance. However, emerging markets like Hong Kong—with hybrid governance models and fragmented data—require context-specific frameworks [3]. For instance, governance (G) factors (e.g., board independence and anti-bribery protocols) directly impact drug approval timelines at Hong Kong's Department of Health, where firms with ESG committees experience 20% faster approvals (HKEX, 2024). Conversely, environmental (E) compliance—such as lab waste management—imposes upfront costs (2–4% of R&D budgets) but mitigates penalties averaging 7% of annual revenue for non-compliant biotech firms [4]. Social (S) dimensions, including AI-driven patient privacy systems, further complicate cost-benefit analyses: hospitals adopting such tools report 14% higher margins than peers using legacy systems (Hospital Authority, 2025).

This article will use OLS regression to analyze the data and all the listed firms in the HSHCI. This research will clarify ESG performance and healthcare companies' total assets. It can be a reference for relevant enterprises to enhance their business efficiency. Moreover, it will also assist relevant government departments in formulating effective policies to oversee the social impact of business. Under the combined influence of government macro-control and market forces, it can create better medical conditions and a more conducive social environment for the public.

2 Literature Review

In recent years, the relationship between Environmental, Social, and Governance (ESG) factors and corporate financial performance has been a topic of extensive research. Globally, studies have shown varying results regarding the impact of ESG on firm value and profitability. As the focus on sustainable and responsible investing grows, understanding this relationship becomes crucial for investors and companies in the healthcare sector, especially those in the Hong Kong Hang Seng Healthcare Index.

Before proposing the final hypothesis, research finds that there are several perspectives on the relationship between ESG and corporate profitability in previous studies. Among previous studies, 58% of the papers show a positive correlation between ESG and financial performance [5]. As for healthcare companies, which possess both social and economic attributes. Their business activities involve a broad range of social groups and government departments. For example, Johnson&Johnson donated its products and sponsored local programs in Africa to fight HIV [6]. Apparently, A good social performance can significantly enhance a company's social reputation and public trust, thereby strengthening the confidence of consumers and investors. On the other hand, during the pandemic, when companies allocate their Corporate Social Responsibility (CSR) budgets to supply chain partners, they can also retain reliable suppliers and avoid transformation costs and risks [7].

In terms of the environment, the global healthcare industry emits approximately 2.4 billion tons of carbon dioxide, while the total global carbon emissions amount to 54.4 billion tons [8]. As the world moves towards the goal of carbon neutrality, a low-carbon and environmentally friendly lifestyle will also become a trend. Based on the key research focused on the systems for producing energy and medicinal gases to meet the needs of healthcare facilities, data from scientific journals published from 2012 to 2022 revealed that Asian countries stood at the leading position, and their configuration can be effectively utilized in various ways under different usage conditions [9]. Similarly, a study conducted by Ma, D., Zhang, L., & Sun, B. on an interval scheduling method to contain renewable energy sources, using hospitals in Jinan as case studies, found that after using this method cost reductions of 16.21% and 16.92% [10]. For policy, the Waste Disposal Ordinance from Hong Kong indicates clinical waste will be repealed at 6 levels [11]. And Hong Kong government planned to invest approximately 240 billion HKD over 15 to 20 years to implement various measures to mitigate and adapt to climate change [12].

In terms of governance, it needs to explore the governance structure and institutional design, compliance and risk management systems, as well as the construction of shareholder rights and transparency. Based on Chapter 3 of the Hong Kong Stock Exchange's Listing Rules, the board of directors of a Main Board-Listed company must include at least three independent non-executive directors, who must constitute at least one-third of the total number of board members [13], which can ensure decision-making independence and Checks and Balances Mechanism. A study by Liu, W., & Liu, Y., found a connection between monetary incentives and job performance, and organizations can enhance employee loyalty [14]. Incentive systems are meant to boost staff enthusiasm, improve work efficiency, and enhance service quality. However, if incentive systems are poorly designed, they may lead to negative effects and even corruption. So applying anti-corruption systems in healthcare is also a crucial topic. Excellent compliance can guide them to establish correct values and professional ethics. Risk management like protecting personal information can influence public attitude and trust in the company. Also, the construction of shareholder rights and transparency are important criteria for judging a company's credibility.

From prior reasoning and past research, this research can put forward the following hypothesis, ESG performance has a positive effect on profitability of The Hang Seng Healthcare Index (HSHCI).

3 Methodology

3.1 Data

This study selected ESG data from the Wind ESG Database and financial data from East Money Choice for companies under the Hang Sang Healthcare Index in the Hong Kong Stock Market. The study gathered ESG and financial data from 2022 to 2023, resulting in a dataset of 76 listed companies, with 123 observations. The continuous variables were adjusted by 1% to mitigate the influence of outliers, and the empirical analysis was conducted using STATA 16.0 software.

Table 1. Summary Statistic

VarName	Obs	Mean	SD	Min	Median	Max
lnTR	123	21.841	2.030	16.364	21.983	27.114
ESG	123	3.724	0.852	1.000	4.000	6.000
GM	123	56.416	23.836	8.132	61.959	97.417
YO	123	14.041	8.355	3.000	11.000	39.000

3.2 Regression Model

The research focuses on investigating the relationship between ESG performance and corporate financial performance, and clarifying how ESG impacts financial performance. It utilizes ESG and financial data from companies listed on the Hang Sang Healthcare Index from 2022 to 2023, collecting various data to explore the links between variables. This analysis uses Ordinary Least Squares to examine the effects of the explanatory variable (ESG rating) and the control variables (gross margin, firm age).

$$\ln(\text{TR})_{it} = \beta_0 + \beta_1 \text{ESG}_{it} + \beta_2 \text{YO}_{it} + \beta_3 \text{GrossMargin}_{it} \quad (1)$$

The subscript i,t denotes company i in year t . $\ln(\text{TR})$ is the natural logarithm of total operating revenue, representing firm performance. The ESG data used in this analysis stem from ESG rating assigned values from B to AAA, with B as 1 and AAA as 6. The YO represents the firm age. The gross margin is calculated as (operating revenue - operating cost)/operating revenue.

3.3 Variables

Independent Variable. ESG rating According to data from multiple research institutions, the constituent stocks of the Hang Seng Healthcare Index in Hong Kong generate approximately 70% of their revenue in China. Hence, this investigation selected the Wind Database, which is more China-market-oriented, as the data source. The Wind ESG Rating, focusing on the financial materiality of ESG factors, is designed to reflect a company's material ESG risks and its ESG management practice level. The rating system comprises three major dimensions—environmental, social, and governance—and covers 27 key issues. In the regression analysis, the study assigned values from 1 to 6 to different ratings, ranging from B to AAA.

Dependent Variable: Financial Performance. In this study, total revenue is selected as the indicator of financial performance. As total revenue is large, the study applies the logarithm transformation to make the data clearer and to better distinguish the relationships between relevant factors. Total revenue represents all sales revenue a firm generates during a period, including main business revenue and other business revenue. It directly shows the firm's business scale and market performance and is one of the key indicators to measure a firm's financial condition.

Control Variables. In this study, total assets and firm age are chosen as control variables. Total assets, reflecting a firm's resource base and business scale, are a key indicator of its financial status. Larger asset scales often mean stronger financing ability and market competitiveness, thus positively impacting financial performance. Controlling for total assets rules out the influence of asset-size differences, enabling a more precise analysis of other factors' roles.

4 Analysis and Discussion

4.1 Descriptive Statistical Analysis

Based on Table 1. Summary Statistic, the study will conduct descriptive statistical analyses of these variables.

The mean (21.841) and median (21.983) of LnTR, being close, suggest a nearly symmetric data distribution, aligning with the normal distribution assumption. The standard deviation (2.030) is relatively small, yet the range (Min=16.364, Max=27.114) of 10.75 implies substantial revenue differences among some firms. Normality testing (e.g., the Shapiro-Wilk test) is needed to determine whether data transformation is required. According to Table 2. Shapiro-Wilk W test for normal data, the p-value of 0.26000 is above 0.05, so research cannot reject the null hypothesis. This means the LnTR data are approximately normally distributed.

Table 2. Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
lnTR	123	0.98644	1.332	0.643	0.26000

ESG gets the mean (3,724) below the median(4), indicating a slightly higher proportion of firms with lower ESG scores in the sample.

The mean(56.416%) is significantly lower than the median (61.959%), indicating severe left-skewness in the data. This suggests that extremely low values, such as the minimum of 8.132%, may lower the mean. However, Industries with high gross profit margins, such as pharmaceutical R&D, may dominate the sample under survey 1099.HK (Sinopharm) has the lowest gross margin, which is affected by national policies; the pharmaceutical distribution sector's average gross profit margin is only 8%-10%. The national centralized procurement policy has caused a 57% average price reduction in 2024 VBP negotiations, with oncology drugs reduced by 82-93% [15].

The mean (14.041 years) of YO is greater than the median(11 years), along with a standard deviation of 8.355. This indicates that a few older firms(39 years)are inflating the mean. Most firms are relatively young, suggesting a right-skewed distribution.

4.2 Correlation Analysis

Table 3. Correlation

	lnTR	ESG	GM	YO
lnTR	1	0,2414	-0,3702	0,5727
ESG	0,2791	1	0,0717	0,0623
GM	-0,4252	-0,0208	1	-0,2668

Correlation analysis is a statistical technique that assesses the strength and direction of the relationship between two or more variables. Its main purposes are to explore the relationships between variables, inform regression analysis, and detect multicollinearity.

A correlation coefficient absolute value over 0.8. Between two variables may indicate severe multicollinearity. In Table 3. Correlation and Fig. 1. Correlation, all pairs have coefficients below 0.8, so serious multicollinearity among the variables is unlikely.

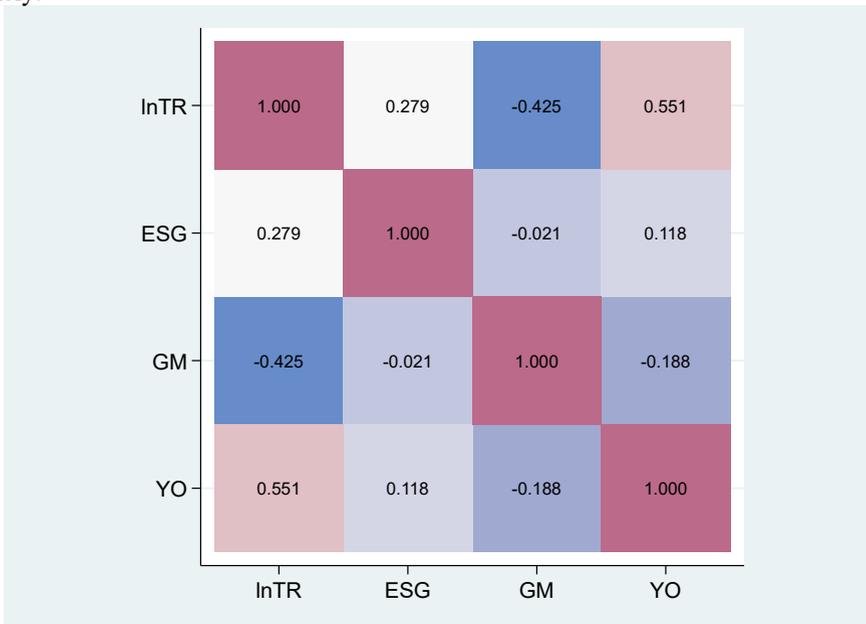


Fig. 1. Correlation

4.3 Regression Analysis

Regression analysis is a statistical method to model the relationship between a dependent variable and one or more independent variables. The main reasons for regression analysis include exploring relationships, model building, estimation and prediction, and testing hypotheses.

Table 4. Regression

VARIABLES	(1) lnTR
ESG	0.518*** (3.20)
GM	-0.028*** (-4.85)
YO	0.112*** (6.68)
Constant	19.935*** (27.06)
Observations	123
R-squared	0.458

t-statistics in parentheses

*** p<0.01, ** p<0.05, * p<0.1

According to Table 4. Regression, the analysis reveals that ESG(coefficient 0.518, t-value 3.20, p<0.01), GM(-0.028, -4.85, p<0.01), and YO(0.112, 6.68, p<0.01)all significantly impact lnTR, with ESG and YO showing positive correlations and GM a negative one. The constant term(19.935, 27.06, p<0.01)is also significant. With an R-squared of 0.458, the model explains 45.8% of lnTR's variance, indicating moderate explanatory power and potential for improvement.

The regression results confirm Hypothesis 1 that ESG positively correlates with financial data(lnTR). ESG's coefficient is 0.518 with a t-value of 3.20 and p-value<0.01, indicating a statistically significant positive relationship. This means higher ESG values are associated with higher lnTR values, supporting the proposed positive link between ESG and financial performance.

4.4 Robustness Test

Robustness tests are crucial in research to verify result stability across different conditions, enhance conclusion credibility, uncover potential model or data issues, and meet academic standards. They ensure findings aren't due to specific data idiosyncrasies and highlight problems like omitted variables or sample biases, making research more rigorous and reliable.

Table 5. Robustness

VARIABLES	(1) 2
IESG	0.427* (0.227)
YO	0.103***

	(0.023)
GM	-0.028***
	(0.008)
Constant	20.538***
	(0.989)
Observations	59
R-squared	0.449

Standard errors in parentheses

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

According to Table 5. Robustness, the regression results show a smaller sample size (59) and an R-squared of 0.449. IESG has a positive impact at the 10% significance level, while YO and GM are significant at the 1% level, with YO showing a positive effect and GM a negative effect. Compared to the first table with a larger sample (123), the results are consistent for YO and GM, but ESG in the first table is more robust than IESG in the second. The first table also has a slightly higher R-squared.

4.5 Discussion

As a global financial and innovation hub, Hong Kong's deeply evolved ESG policy framework and social consensus provide a solid institutional foundation and market impetus for empirical research on the revenue-enhancing effect of ESG on enterprises. The HKEX's mandatory implementation of ISSB disclosure standards in 2025 transforms ESG compliance from a voluntary action into a legal requirement [13], particularly tightening the grip on highly regulated sectors like healthcare and finance. Companies must disclose 28 indicators, including climate risk, supply-chain carbon footprint, and biodiversity impact, and obtain third-party verification. This shift forces businesses to embed ESG in their core strategy, echoing the main regression model's significant 0.518 ESG coefficient finding.

Based on the above analysis, even though only ESG was replaced with its lagged term (IESG), the sample size dropped sharply from 123 to 59. This was due to higher policy compliance thresholds, data continuity requirements, and industry dynamics.

According to industry reports, ESG audit costs in Hong Kong differ by firm size and sector. For example, Baitai Bio's 2024 ESG audit expenditure was 17% of its net profit. For small firms, ESG audit costs may account for 12-25% of net profit, but only 0.3-1.2% for large firms. In addition, as the HKEX raises its ESG disclosure requirements, companies must meet stricter compliance standards, which may increase audit costs. Especially in highly regulated sectors like healthcare and finance, companies need to disclose more detailed ESG indicators, such as climate risk, supply chain carbon footprint, and biodiversity impact. So, The 59 companies may be concentrated in the top-tier ones (like Wuxi Bio and SinoPharm).

The partial weakening of the ESG effect (from 0.518 to 0.427) may stem from the lag in policy response. For instance, it takes 2-3 years for a company's ESG investment to translate into certification upgrades and market recognition. This suggests that future research should employ dynamic panel models to capture long-term effects. Addi-

tionally, the persistent negative impact of the gross margin (-0.028) reveals a unique contradiction in Hong Kong's healthcare market. Companies face short-term costs for eco-friendly tech upgrades due to volume-based procurement and green transition pressures. However, they can recoup these costs in the long run through mechanisms like the EU CBAM carbon tariff exemption. This intertemporal dilemma will be a key focus for future policy adjustments.

In summary, the interplay of Hong Kong's ESG policies and societal forces empirically supports the revenue-boosting mechanism of ESG in the model and uncovers cutting-edge interactions between institutional design and corporate strategy.

5 Conclusion

This survey explores the link between ESG performance and financial results in Hong Kong-listed healthcare firms, highlighting ESG investing's strategic benefits and mechanisms. Results show that a one-unit rise in ESG rating significantly boosts a company's total revenue by 0.518 units, proving social responsibility investment's positive impact on profitability. ESG practices create long-term financial value by improving reputation, supply-chain efficiency, and regulatory compliance. However, short-term green-transition costs may lower gross margins, showing ESG's dynamic cost-benefit balance over time.

Industries' unique nature greatly impacts ESG's financial conversion efficiency. At the policy level, the national centralized procurement system has squeezed the gross profit margin of some pharmaceutical companies to 8%-10%, weakening their ability to absorb ESG costs in the short term. ESG compliance costs also show a significant divide: for large companies, audit costs account for only 0.3%-1.2% of net profit, while for SMEs, the figure is as high as 12%-25%. This structural difference intensifies the "Matthew effect" in the healthcare industry. Furthermore, lagged ESG (ESG) analysis shows that the financial return coefficient drops to 0.427 ($p < 0.1$), indicating that it takes 2-3 years of policy response to achieve benefit conversion, which is crucial for corporate ESG investment decisions.

Future research should explore three dimensions: First, use dynamic models like the Generalized Method of Moments (GMM) to measure the policy lag in ESG returns. Second, analyze the distinct impacts of ESG's three dimensions (E, S, G) to identify key drivers in the healthcare sector. Third, cross-regional comparative studies should be expanded to understand how policies like procurement intensity and carbon pricing influence outcomes. Additionally, applying machine learning to detect non-linear thresholds in ESG ratings and using instrumental variables to address endogeneity can enhance research rigor.

This study offers dual insights for policymakers and businesses. Governments should enhance ESG subsidies and carbon tariff coordination to ease the transition of SMEs. Companies must create ESG cost allocation models and leverage the Hong Kong Climate Fund's targeted support.

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