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A Strategic Path for Housing Enterprises to Enhance Transparency in Accounting Disclosure by Strengthening ESG Performance

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Abstract The practice of ESG concept is of great significance for enterprises to achieve high-quality development, and enterprises with good ESG performance pay attention to the assumption of responsibility for the society, environment and corporate governance while developing the economy, which coincides with the requirements of high-quality development of enterprises. Therefore, improving ESG performance of enterprises is to achieve a certain degree of high-quality development. Based on the concept of sustainable development and economics, the study systematically analyses the relationship between housing enterprises' ESG performance performance and transparency of accounting disclosure. Then the model is constructed for empirical analysis, and 1,550 data of A-share listed companies in Shanghai and Shenzhen during the eight-year period from 2015 to 2023 are selected as samples, and the hypotheses proposed in the article are verified through regression analysis and robustness test. The results of the study show that the better the ESG performance performance and capital structure of housing enterprises, the higher the transparency of accounting disclosure, and the capital structure index plays a mediating effect in the process of the role of ESG performance on the transparency of accounting disclosure. The transparency of accounting information disclosure can be enhanced in three aspects: improving the initiative of corporate disclosure, establishing and improving relevant regulations and standards, and strengthening the role of third-party supervision.

Index Terms sustainable development, housing enterprises, economics, ESG performance, accounting information disclosure

I. Introduction

With the increasing attention to sustainable development around the world, it has become a consensus that enterprises should practice ESG concepts, which is still in its infancy in China, and listed companies, as the main force of the national economy, have played a leading role in practicing the new development concept.

In recent years, the ESG concept has received increasing attention from various parties, and has gradually become the mainstream of the market from a cutting-edge investment strategy [1].The ESG concept stresses that enterprises should fulfil their environmental, social and governance responsibilities with high quality, and use a series of ESG disclosure frameworks and assessment guidelines formulated by different international organisations to assess, measure or compare their ESG performance, as well as publicly disclose the relevant non-financial information [2]-[5]. As an important main body to promote economic and social development, enterprises should not contradict the importance of stakeholders' rights and interests and safeguard the interests of shareholders, and should be guided to abandon the short-term pursuit of scale and profit in their operations, focus on long-term sustainable high-quality development, and organically combine economic benefits with social and ecological benefits [6]-[10]. Therefore, promoting housing enterprises to establish a corporate governance structure with ESG thematic elements will further help them to improve the modern corporate governance system and operation mechanism, and to coordinate and balance the relationship between corporate profitability and social responsibility, and the relationship between short-term interests and long-term development [11]-[14]. Designing internal and external ESG evaluation mechanisms for housing enterprises can enhance their comprehensive governance and sustainable competitiveness, and realise the high-quality development of the housing industry to support the high-quality development of the real economy [15]-[18].

This study innovatively quantifies the ESG performance performance of housing enterprises and the transparency of accounting disclosure, and clarifies the relationship between ESG performance performance of housing enterprises and the transparency of accounting disclosure by combining quantitative and qualitative analyses, which provides theoretical references for the short-sighted phenomena of listed housing companies such as the lack of attention to environmental issues, social issues, corporate governance issues, and the lack of responsibility, as well as for the enterprises how to improve ESG performance performance in the course of business.

This paper explores the impact of housing firms' ESG performance performance on accounting disclosure transparency, and further explores the transmission mechanism of this impact from the perspective of capital structure. Taking accounting disclosure transparency as the dependent variable, housing enterprises' ESG performance performance as the independent variable, and choosing capital structure index as the mediator variable, a multiple regression model is constructed and empirically analysed by combining the data of A-share listed companies in Shanghai and Shenzhen from 2015 to 2023. Finally, the mechanism of housing ESG performance performance on accounting disclosure transparency is verified by descriptive statistics, correlation analysis, multiple regression analysis and robustness test and heterogeneity analysis, and the strategic path of accounting disclosure transparency is also proposed.

II. Theoretical analysis and research hypothesis

II. A. Rationale

II. A. 1) ESG Performance and Measurement of Housing Enterprises

ESG performance is an acronym for environmental, social, and corporate governance under the concept of sustainable development.ESG rating refers to the comprehensive consideration of enterprises from the three levels of environment (E), society (S) and governance (G), using the optimal mix of indicators and scoring ratios to score, so as to comprehensively judge the enterprise's development performance, long-term development ability and investment potential, and provide guidance for investment institutions to make investment selection and It provides guidance for investment institutions to make investment selection and screening [19]. ESG has gradually been valued by enterprises and investors because of the sustainable development value of enterprises in non-financial aspects that it embodies.

Specifically, the housing enterprise environment (E) is concerned with the enterprise's impact on environmental governance, and its measurements mainly include the housing enterprise's protection of natural resources, pollutant emissions, and the impact on the climate. Social Responsibility (S) focuses on the housing enterprise's employee development, customer rights, and data security. Governance (G) includes equity structure, business ethics, compensation system, risk management, and information disclosure. Based on the availability of data from the Business Gateway to Unite Green and the balance between positive and negative factors in the selection of indicators, this paper chooses the Business Gateway to Unite Green ESG ratings as the standard to carry out empirical analyses.

II. A. 2) Transparency and measurement of accounting disclosures

Under economic theory, the transparency of accounting disclosure of housing enterprises should have at least the following characteristics: (1) For external information users, accounting information provided to the public should be more open. (2) It should be easier for external information users to obtain accounting information of listed companies. (3) For external information users, the accounting information obtained is at least timely, true, accurate and complete. (4) Financial risk information (e.g., capital structure, cash flow, etc.) of listed companies should be relatively easy to grasp for external information users. (5) For external information users, it should be relatively easy to understand the listed company's operational risks, including information on major events (such as major fund transactions, major investments, major guarantees, major changes in management, etc.). That is, the transparency of accounting information should have at least the following ten basic characteristics: reliability, relevance, completeness, understandability, comparability, materiality, prudence, substance over form, timeliness, and openness. The transparency of accounting information is measured by the Shenzhen Stock Exchange (SZSE)'s “Disclosure Assessment”, which takes the value of 1 if a company's disclosure assessment result is a failing grade, 2 if it is a passing grade, 3 if it is a good grade, and 4 if it is an excellent grade.

II. A. 3) Capital structure and measurement

Capital structure refers to the value composition of the various types of capital and their proportions in a housing enterprise. A proper arrangement of the proportion of debt capital can reduce the consolidated cost of capital of a housing enterprise, gain the benefits of financial leverage, and can increase the value of the company. In the capital structure we need to focus on the relationship between the level of the cost of capital of the housing enterprise and the rate of return on assets, the maturity composition of the sources of funding of the housing enterprise and the adaptability of the enterprise's asset structure. The financial leverage position of the enterprise in relation to the financial risk of the enterprise, the adaptability of the financial leverage position of the enterprise in relation to the future financing requirements of the enterprise as well as the future development of the enterprise, and the adaptability of the internal composition of the owner's equity position of the enterprise in relation to the future development of the enterprise. This is measured by using the equity multiplier.

II. B.Research hypotheses

II. B. 1) Corporate ESG performance and accounting disclosure transparency

According to the theory of information asymmetry, ESG, as a favourable supplement to corporate information, can effectively reduce the adjustment costs arising from information asymmetry. Housing enterprises can achieve the purpose of enhancing the strategy of transparency of accounting information disclosure by strengthening the performance including equity structure, business ethics, compensation system, risk management, and information disclosure, etc. Therefore, the higher the importance of housing enterprises to ESG, the higher the transparency of corporate accounting information, so the hypothesis H1 is proposed.

H1: Restricted to other conditions, the level of ESG performance of housing enterprise performance is significantly and positively related to the transparency of accounting information.

II. B. 2) Transparency in accounting disclosure and capital structure

The equity multiplier of an enterprise's capital structure, which is equal to total assets divided by shareholders' equity, can be used to reflect the level of financial risk of the enterprise. The larger the indicator, the higher the level of corporate liabilities, then the greater the financial risk the enterprise may face, and thus the less incentive it has to disclose high-quality accounting information, and thus the lower the transparency of accounting information, so the hypothesis H2 is proposed.

H2: Restricted to other conditions, the lower the equity multiplier, the higher the transparency of accounting information disclosure of housing enterprises.

II. B. 3) The mediating role of capital structure

The ESG performance of housing enterprises can shape a good corporate image, build a good stakeholder relationship, and then reduce the costs incurred in the financing process as well as agency costs. Optimise the corporate financing environment, improve the speed of dynamic adjustment of corporate capital structure, reduce the level of corporate liabilities, reduce the financial risks faced by enterprises, and enhance the transparency of their disclosure of high-quality accounting information disclosure, so hypothesis H3 is proposed.

H3: Restricting other conditions, the improvement of housing enterprises' ESG performance performance can be achieved by accelerating the adjustment speed of capital structure and enhancing the transparency of accounting information disclosure.

III. Research design

III. A. Sample selection and data sources

This paper takes the Shanghai and Shenzhen A-share market as the research object, and given that the disclosure of the Business Integrity and Green ESG rating data started from 2015, this paper selects all listed housing companies with Business Integrity and Green ESG ratings from 2015 to 2023 as the initial sample. In addition, the initial sample is treated as follows according to the research purpose of this paper:

(1) Excluding the existence of ST or *ST enterprises in the reporting period.

(2) Excluding enterprises in the finance and insurance industry.

(3) Excluding the sample of enterprises with serious missing data on core variables.

(4) Excluding enterprises with outliers such as gearing ratio greater than 1 or less than 0.

(5) In order to prevent the impact of extreme values on the empirical results, all continuous variables are shrink-tailed at the 1% level.

In this paper, the data of housing enterprises' business path rung green ratings are from Wind Financial Database, and all other data are from Cathay Pacific CSMAR database.

III. B. Selection of variables

III. B. 1) Explained variables

The explanatory variable (dependent variable) of the study is the transparency of accounting disclosure of housing enterprises ($TRAN$), which is classified by the Shenzhen Stock Exchange as failing, passing, good and excellent in its annual assessment of information disclosure of listed companies of housing enterprises. Therefore, this is assigned a value of 1 to 4 respectively to differentiate the appraisal levels in a balanced way.

III. B. 2) Explanatory variables

The explanatory variable (dependent variable) of the study is the ESG performance performance of housing companies. Compared with other databases, the ESG evaluation system in the Business Gateway Unigreen database includes not only positive but also negative evaluations of a company's ESG performance, so it is more comprehensive and robust in the selection of indicators.At the same time, the Business Gateway Unigreen Ratings draws on the internationally accepted ESG evaluation methodology and combines the realities in China with the market factors, to construct an ESG rating system that is more in line with the Chinese A-share ESG rating system for Chinese A-share listed companies.

In this paper, the data year t of ESG is selected as the disclosure time of ESG report, which is actually a measure of ESG performance of housing enterprises in the previous year (i.e., it indicates the ESG performance of enterprises in the $t-1$ rd period disclosed in the t nd year). Further, this paper assigns a score of 10 to 1 to the ESG rating data of the business road rung green according to A+, A, A-, B+, B, B-, C+, C, C-, and D, respectively.

III. B. 3) Intermediate variables

The mediating variable selected for the study is capital structure (CS), measured by the equity multiplier, which is equal to total assets divided by shareholders' equity, and can be used to reflect the level of a firm's financial risk. The larger the indicator, the higher the debt level of the firm, the greater the financial risk the firm may face, and thus the less incentive it has to disclose high-quality accounting information, and thus the lower the transparency of the accounting information.

III. B. 4) Control variables

Considering the factors affecting the transparency of corporate accounting information, this paper takes equity concentration, gearing ratio, growth, earnings per share, enterprise size and two jobs as control variables to better analyse the relationship between the main variables, and introduces two dummy variables, namely, industry and year, to control the impact of industry and year. Specific variables are defined as shown in Table 1.

Table 1: Variable-definition

Type	Name	Code
Dependent variable	Transparency of accounting information disclosure	$TRAN$
Explanatory variable	Performance of ESG	ESG
Metavariable	Capital composition	CS
Controlled variable	Equity concentration	TOPI
	Asset ratio	LEV
	Growth	Growth
	Earnings per share	EPS
	Enterprise size	Size
	Two positions	Dual
	Industry	Industry
	Year	Year

III. C. Empirical modelling

This paper uses multiple linear regression model analysis to test the proposed hypotheses and study the relationship between the ESG performance level of Chinese housing listed companies and their financial performance, and introduces the capital structure indicator as a mediator variable to explore whether the changes in capital structure have a strengthening effect on the relationship between the ESG performance level of enterprises and their financial performance [20]. The multiple regression model is established for the aforementioned hypotheses as follows.

To verify hypothesis H1, model (1) is constructed:

$$TRAN = \alpha_0 + \alpha_1 ESG_{it} + \Sigma Controls_{it} + \Sigma Year + \Sigma Industry + \varepsilon_{it} \tag{1}$$

To test hypothesis H2, model (2) is constructed:

$$TRAN = \alpha_0 + \alpha_1 CS_{it} + \Sigma Controls_{it} + \Sigma Year + \Sigma Industry + \varepsilon_{it} \tag{2}$$

To test hypothesis H3, model (3) is constructed:

$$TRAN = \alpha_0 + \alpha_1 ESG_{it} + \alpha_2 CS_{it} + \Sigma Controls_{it} + \Sigma Year + \Sigma Industry + \varepsilon_{it} \tag{3}$$

In models 1 to 3, α_0 is the constant term, α_1 and α_2 are the coefficients of each variable, $\Sigma Controls_{it}$ is the control variable, and ε_{it} is the error term.

IV. Analysis of empirical results

IV. A. Descriptive statistical analyses

IV. A. 1) Housing enterprise disclosure transparency assessment results

This paper first collects the disclosure assessment results of 310 listed companies on the Shenzhen Stock Exchange, and then uses Excel to collate the disclosure assessment results of the sample companies. The assessment results of the quality of accounting disclosure of the sample housing companies from 2015 to 2023 are shown in Table 2. Among the sample of 1550 listed companies rated as excellent by the Shenzhen Stock Exchange, 245 companies were rated as good, 1030 companies were rated as good, and 251 and 24 companies were rated as and failed, respectively. The high rate of companies being rated excellent and good indicates that the overall quality of information disclosure of the sample housing companies is high, i.e., the level of transparency of accounting information of housing companies is high. In addition, the proportion of companies rated as excellent in the disclosure ratings of listed companies in 2015-2023 in terms of sub-years has increased from 8.71% to 20.32%, which is increasing, while the proportion of companies rated as failing is 2.58%, 1.61%, 1.61%, 0.97% and 0.97%, which is decreasing, indicating that the quality of disclosure of listed companies (transparency) has a tendency to turn better year by year.

Table 2: Accounting information disclosure quality evaluation results

Evaluation results	Evaluation year	2015	2017	2019	2021	2023	Total
	Sample number	310	310	310	310	310	1550
Excellent	Quantity	27	44	52	59	63	245
	Ratio	8.71%	14.19%	16.77%	19.03%	20.32%	15.81%
Good	Quantity	186	196	212	215	221	1030
	Ratio	60.00%	63.23%	68.39%	69.35%	71.29%	66.45%
Passing	Quantity	89	65	41	33	23	251
	Ratio	28.71%	20.97%	13.23%	10.65%	7.42%	16.19%
Fail	Quantity	8	5	5	3	3	24
	Ratio	2.58%	1.61%	1.61%	0.97%	0.97%	1.55%

IV. A. 2) Descriptive analysis of variables

The descriptive statistics of the variables in Table 1 were analysed and Table 3 shows the results of the descriptive statistics analysis of the variables. The mean value of the ESG performance score of the sample is 5.285, indicating that the ESG performance of the sample is basically distributed around B-, and, the minimum and maximum values are 3 and 8, respectively, indicating that the lowest ESG grade in the sample is C and the highest one is A. The mean values of the transparency of the accounting information of the housing enterprises and the capital structure are 2.825 and 2.445, respectively, and the transparency of the accounting information of the sample enterprises and the capital structure are both close to good level. The mean value of equity concentration TOP1 is 0.325, indicating that the equity of the listed housing enterprises in the sample is relatively concentrated, and the mean value of gearing ratio LEV is 0.411, indicating that the listed housing enterprises in the sample are generally subject to more serious financing constraints. The mean values of Growth and EPS are 0.085 and 1.135, respectively, indicating that the sample housing firms perform well in terms of profitability, but with significant inter-individual differences. The mean and median of Firm SizeSize are extremely close to each other, indicating that the sample firms are similar in size. The mean value of Dual is 0.351, indicating that more than 30% of the sample firms still have too much centralised power, i.e. the general manager and the chairman of the board are held by one person.

Table 3: Descriptive statistics in each variation

Variable	N	Mean	Mid	Std.Dev.	Minimum	Maximum
$TRAN$	1550	2.825	2.000	0.652	1.000	4.000
ESG	1550	5.285	4.000	0.188	3.000	8.000
CS	1550	2.445	1.914	1.448	1.109	1.958
TOP1	1550	0.335	0.397	1.171	-0.007	0.917
LEV	1550	0.411	0.358	1.632	0.015	0.674

Growth	1550	0.085	0.098	1.318	-0.449	0.721
EPS	1550	1.135	1.024	2.294	0.172	11.246
Size	1550	19.72	19.664	0.199	17.617	21.406
Dual	1550	0.351	0	0.348	0	1

IV. B. Correlation analysis

In order to measure the correlation between the main variables, this paper does spearman correlation analysis on the main variables that are not standardised and the results of the correlation analysis are shown in Figure 1 [21]. Observing the correlation coefficients between the variables, the correlation coefficient between the explained variable $TRAN$ and the explanatory variable ESG is 0.313, which is significant at 1% level, and the correlation coefficient between the explained variable $TRAN$ and the mediating variable CS is -0.355, which is significant at 1% level. This indicates that the ESG performance performance of listed housing companies is related to the transparency of accounting disclosure, which preliminarily verifies Hypotheses 1 and 2. The correlation coefficients between all the variables are in the range of (-0.6, 0.6), and there is no serious problem of multiple covariance between the variables, which is suitable for the verification of the hypotheses by means of multiple linear regression analyses.

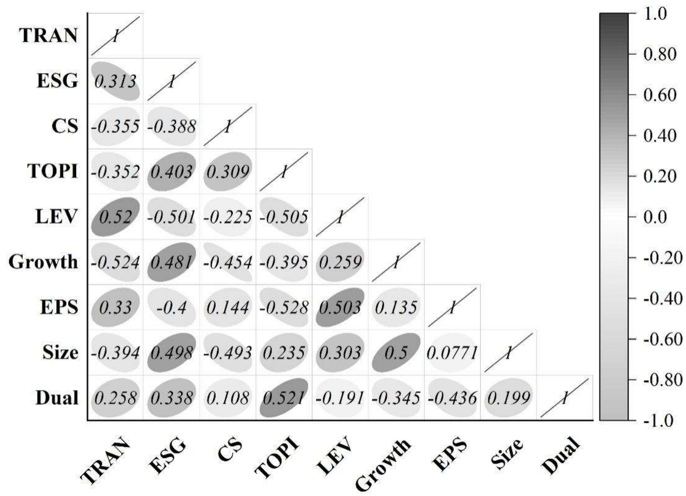

Figure 1: Results of the correlation analysis

IV. C. Multiple regression analysis

Based on the multiple regression analysis based on the previous hypotheses, Table 4 shows the regression results of the effect of housing firms' ESG performance on the transparency of accounting disclosure. The conclusions are drawn as follows:

Column (1) presents the regression results with the inclusion of the explanatory variable ESG performance performance and the results show that ESG performance is significant at the 1% level.

Column (2) is the regression result after adding relevant control variables, and the result shows that ESG performance is still significant at the 1% level, i.e., the transparency of accounting disclosure can be enhanced through good ESG performance performance of firms, and Hypothesis H1 is proved.

Column (3) examines the relationship between capital structure and transparency of accounting disclosure by introducing capital structure, the coefficient of CS is negative and significant at 1% level (-0.028), which indicates that the transparency of accounting disclosure decreases as the ratio of firms' equity multiplier increases, hypothesis H2 is proved.

Column (4) shows the results of regression of ESG performance performance of housing firms on capital structure with a significant positive regression coefficient. In addition, column (5) shows that after including both housing firms‘ ESG performance performance and capital structure in the regression model, the regression coefficient of housing firms’ ESG performance performance is still significant at the 1% level, and the coefficient of capital structure is 1.115 and significant at the 1% level, which indicates that capital structure plays a mediating role in the effect of ESG performance performance on the transparency of firms' accounting disclosure, and hypothesis H3 is is proved.

Table 4: Results of benchmark regression and mediation effect test

Variable	(1)	(2)	(3)	(4)	(5)
ESG	0.192*** (19.228)	0.092*** (9.115)		0.005*** (3.582)	0.079*** (8.445)
CS			-0.028***(4.155)		1.115*** (13.789)
TOP1		-0.418** (-1.875)	-0.114*** (-1.888)	-0.312*** (-1.642)	-0.226*** (-1.131)
LEV		-0.501*** (-2.448)	-0.522*** (-2.409)	-0.530*** (-2.017)	-0.517*** (-2.088)
Growth		0.532*** (2.631)	0.541*** (2.132)	0.328*** (2.333)	0.222*** (2.438)
EPS		0.573*** (2.734)	0.473*** (2.135)	0.298*** (2.111)	0.025*** (1.198)
Size		0.486*** (2.312)	0.042*** (2.106)	0.105*** (1.324)	0.233*** (0.789)
Dual		-0.368** (-1.712)	-0.313** (-2.709)	-0.099** (-1.225)	-0.118** (-1.370)
Constants	0.062 (0.615)	-9.133*** (-32.885)	-8.759*** (-29.113)	0.156*** (3.551)	-9.872** (-33.741)
Year	YES	YES	YES	YES	YES
Industry	YES	YES	YES	YES	YES
Observed	1550	1550	1550	1550	1550
Adjust R^2	0.211	0.398	0.405	0.501	0.422

By plotting the linear relationship between the level of firms' ESG performance and capital structure, Figure 2 shows the relationship between ESG and CS. The higher the level of ESG undertaking by housing firms, the weaker the contribution to the level of capital structure. The increment brought along with the increase in the cost of firms' investment in ESG is divided into different phases, and the increase in the level of equivalent ESG performance brings about the extension of the period for firms with low ESG level than for firms with high ESG level. Therefore, positive ESG performance can be recognised as a signal of high-quality development of firms, but the promotion effect for high-ESG level firms will be weaker.

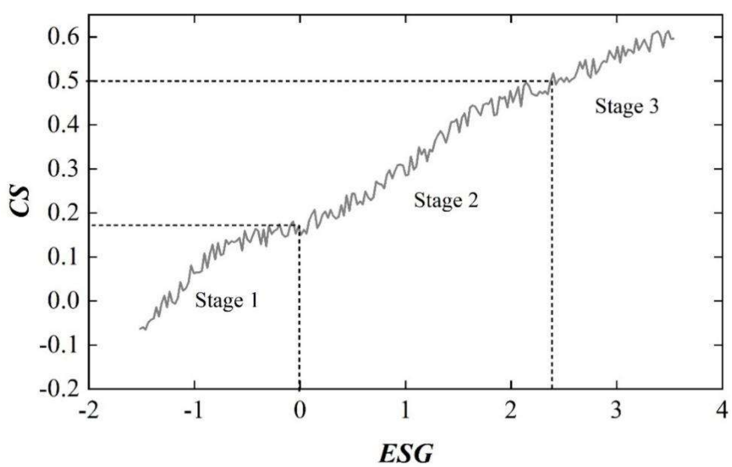

Figure 2: The relationship between ESG and CS

IV. D. Robustness Tests

In order to ensure that the foregoing empirical results are quadratically verifiable, this paper uses Granger causality test, propensity score matching method, and conducts the robustness test of this paper.

IV. D. 1) Gram causality test

For hypothesis 1, the level of ESG performance of housing enterprises has a significant impact on the transparency of accounting disclosure, and we cannot rule out the possibility that 'the level of transparency of accounting disclosure of enterprises has an impact on their ESG performance, and there is a bi-directional causal relationship between the two'. Therefore, this paper chooses Granger causality test to test whether the transparency of corporate accounting disclosure has predictive ability on the level of ESG performance, and does vargranger command on (x,y) under VAR framework [22].

Firstly, in order to verify the smoothness of the time series, the Dickey-Fuller test is performed on the level of corporate ESG and financial performance respectively, assuming that there is a unit root, and the results of the DF test are shown in Table 5. From the results, it can be seen that the t-value of both variables is less than the z-value at the 1% level, so the original hypothesis is rejected, there is no unit root in both x and y, and the data is a smooth series. Therefore Granger causality test can be performed. Subsequently, the lagged second order is selected for Granger causality test and all the eigenvalues are within the unit circle, so the VAR system is stable.

Table 5: Robustness test—Granger causality test-1

	t-value	z-value (1%)	p
ESG	-55.781	-3.886	0.000
$TRAN$	-148.452	-3.886	0.000

Granger causality test is done on this premise and the results are shown in Table 6. From row (1), if the joint significance of the coefficient of the variable ESG is tested in the equation with $TRAN$ as the explanatory variable (by excluding the ESG variable from the equation), the chi-square statistic is 7.2256 and the corresponding p-value is 0.031, so ESG is the Granger cause of $TRAN$. Similarly, $TRAN$ is not a Granger cause of ESG.

Therefore, the pre-period changes in firms' ESG levels can effectively explain the post-period changes in accounting disclosure transparency, but the pre-period changes in accounting disclosure transparency do not explain the changes in ESG performance levels. In summary, the role of variable $TRAN$ on ESG can be basically ruled out and the findings of hypothesis 1 are robust.

Table 6: Robustness test—Granger causality test-2

	Exclusion variables	$Chi2$	p
ESG	$TRAN$	0.3588	0.784
$TRAN$	ESG	7.2256	0.031

IV. D. 2) Propensity score matching method

This paper chooses the propensity score matching method for robustness analysis, which is closer to a randomised trial than the multiple linear regression method, and only one variable of the ESG performance performance level of enterprises will have an impact on the explanatory variables and play a role, so that the persuasive power is more going to be strong. Through the data statistics, it is understood that not all listed companies have obtained the ESG scores disclosed on the official website, so the behaviour of enterprises to disclose the level of ESG responsibility is not entirely an exogenous issue, there is a self-selection process, in order to deal with the endogeneity of enterprises to obtain the ESG scores, this paper adopts the PSM method, which will use all the control variables as a matching indicator on whether to disclose the self-selection of ESG performance effect is controlled.

PSM matching is used to first understand how many firms in the sample are outside the common range of values, and the matching results show that in each model, less than one in a thousand of both the control and experimental groups are outside the common range of values (off), and thus the vast majority of the data are in the subsequent matching balance test and can be taken to the next step.

The matching balance test is conducted to obtain the standard deviation of each control variable before and after PSM matching to measure whether the official website has subjective screening in the process of selecting listed companies for ESG scores, and the results of the PSM robustness test are shown in Table 7. Compared with the pre-matching (U), the differences in the standard deviations of all control variables after matching (M) for all models are almost drastically reduced, and the absolute values of the standard deviations of each matched variable are much less than 10%. As can be seen from the concomitant probability values of the mean t-test (values in parentheses), 10 of the 14 observable variables are not significantly different after matching. Therefore, the control variables selected in this paper are considered appropriate and the PSM one-to-one matching method is reliable. From the final PSM test results in Table PSM, the average treatment effect (ATT) values corresponding to Model 1 and Model 2 are 15.78 and -6.92, respectively, and their absolute values are higher than the significant value of 1.96. Therefore, this paper assumes that the conclusions of H1 and H2 are robust.

Table 7: PSM robustness test results

Variable		Model (1)	Model (2)	Variable		Model (1)	Model (2)
CS	U	-4.12 (3.551)***	-4.33 (3.558)***	Growth	U	-5.88 (-3.887)***	7.22 (-6.511)***
	M	-1.22 (0.829)	-0.98 (-0.528)		M	-4.57 (-3.212)***	-2.33 (-1.597)
TOP1	U	-36.7 (-32.418)***	-27.59 (-22.436)***	Size	U	0.98 (0.727)	3.52 (2.769)***
	M	-2.22 (-1.718)	-0.91 (-0.628)		M	1.49 (1.021)	2.14 (1.882)*
LEV	U	44.12 (36.771)***	33.75 (26.253)***	Dual	U	4.22 (3.55)***	4.53 (3.58)***
	M	-0.89 (-0.722)	-0.22 (-0.135)		M	1.15 (0.89)	-0.72 (-0.83)
EPS	U	-19.72 (-16.88)***	-18.45 (-15.33)***	ATT		15.78	-6.92
	M	-2.88 (-2.01)**	-2.72 (-1.85*)				

IV. E. Heterogeneity analysis

In this paper, enterprises are divided into state-owned enterprises and non-state-owned enterprises according to the nature of property rights, the sample of state-owned enterprises is recorded as 1, and the sample of non-state-owned enterprises is recorded as 0. Enterprises are divided into the eastern region, the central region and the western region according to the geographical region, and group regression is carried out, and the results of the heterogeneity test are shown in Table 8.

Both state-owned enterprises and non-state-owned enterprises are significantly positive at the 1% level, and the ESG coefficient of the sample of state-owned enterprises is larger than that of the sample of non-state-owned enterprises. The test of difference in regression coefficients between groups is significant (SUR test chi-square value Chi2 (1) = 6.58, SUR test p-value Prob>chi2 = 0.0087), indicating that good ESG performance plays a greater role than that of non-state-owned enterprises in transparency of accounting disclosure in state-owned housing enterprises. This is mainly due to the fact that state-owned enterprises have a strong capital scale and high-quality production factors, and as the main force in the execution and implementation of national strategic policies.

The coefficient of ESG performance of firms in the eastern region is significant at the 1 per cent level relative to those in the central and western regions, suggesting that the effect of good ESG performance on the transparency of accounting disclosure of housing firms is stronger among firms in the eastern region. The reason for this may be that the eastern region is relatively economically developed and pays more attention to corporate environmental governance, social responsibility fulfilment, and corporate governance mechanisms, and the construction and services of innovation platforms are more complete. In contrast, the market size and investment activities in the central and western regions are relatively small, and the impact of ESG performance on the transparency of accounting disclosure is not significant.

Table 8: Results of the heterogeneity test

Variable	State	Non-state	East	Centre	West
ESG	0.115*** (5.885)	0.078*** (6.224)	0.079*** (8.451)	0.522** (1.999)	0.038 (1.478)
Controlled variable	Yes	Yes	Yes	Yes	Yes
Constant	-10.882*** (-19.225)	-6.887*** (-22.456)	-9.389*** (-32.415)	-8.393*** (-9.782)	-8.661*** (-11.226)
Year	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes
Observed value	550	1000	800	400	350
Adjust R2	0.5155	0.3274	0.4112	0.3553	0.4081

V. Conclusions and recommendations

This paper empirically examines the impact and mechanism of ESG performance performance on accounting information disclosure transparency with the data of A-share housing listed companies in Shanghai and Shenzhen from 2015 to 2023 as a sample, and draws the following conclusions. Enhancing ESG performance performance can enhance accounting disclosure transparency, and as the ratio of the company's equity multiplier rises, the transparency of accounting disclosure decreases, and capital structure plays a mediating role in the impact of ESG performance performance on corporate accounting disclosure transparency. The heterogeneity study found that the facilitating effect of ESG performance on corporate accounting disclosure transparency is more pronounced in state-owned enterprises as well as in enterprises located in the eastern region. Based on the above findings, this paper proposes the following strategic paths (recommendations):

(1) Improve the initiative of corporate disclosure, at the initial stage of the implementation of the relevant standards, the relevant departments can adopt some appropriate incentive policies to make housing enterprises aware of their obligations in terms of ESG performance and fulfil them spontaneously, which will in turn make them improve their initiative in disclosing environmental accounting information. After the relevant standards have been implemented for a period of time, the state should set up relevant incentive and punishment programmes to assess and judge the implementation of the standards by housing-related enterprises. Enterprises that fail to effectively implement the relevant regulations and cause serious pollution should be heavily fined, while enterprises that actively implement the requirements of the guidelines can be given certain material incentives or policy preferences, thus improving the initiative of enterprises to disclose environmental accounting information.

(2) Government departments should improve the disclosure quality requirements for housing enterprises' accounting information, formulate practical ESG performance policies, and enforce compliance with comparability standards in the disclosure process, so that companies can have a law to follow in the process of information disclosure, and also allow information users to have a basis to follow. Relevant administrative authorities should also further add ESG performance and continue to improve the system of information disclosure rules for environmental protection administrations.

(3) Strengthening the role of third-party supervision, the responsibility of corporate managers and the disclosure of corporate accounting information in the annual report are clearly stipulated. However, there are still no specific requirements on the problems of corporate accounting and auditing. In addition, most accounting firms do not have enough experience in these areas, so it is urgent to strengthen the auditing of accounting.

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