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A Study on the Dynamic Impact of Environmental Accounting Disclosure on Financial Performance of Housing Construction Enterprises Driven by Green Building Policies

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SUMMARY: *The high rate of development in the housing construction industry has contributed greatly to the economy in terms of economic gains and improvement in construction standards. Nonetheless, environmental pollution is also an urgent problem that cannot be ignored. This paper looks into how environmental accounting disclosure impacts the financial results of housing construction companies, particularly, in connection with green building regulations. The paper is based on the assessment of the situation in the companies engaged in housing construction which allows developing hypotheses, gathering information and using a multiple linear regression model to conduct the analysis. The paper examines the changing relationship between environmental accounting disclosure and financial performance when green building policies are implemented. The results show that there is a statistically significant positive correlation between environmental accounting disclosures and financial performance in the housing sector at a 5 percent level of significance, which confirms the Research Hypothesis H2. Moreover, it is observed that green building policies moderate the effect of environmental accounting disclosure and financial performance.*

KEYWORDS: *multiple linear regression model; green building policies; accounting information disclosure; financial performance*

1 Introduction

Disclosure of environmental accounting information by construction companies refers to the use of certain reporting instruments, including environmental reports, to describe the environmental activities of the company [1, 2].. The disclosed information has two types: financial and non-financial. Financial information in environmental accounting disclosures means quantifiable money values. It includes environmental assets purchased to manage pollution, liabilities to pay fines resulting in damage to the environment, and expenses incurred in efforts to clean up the environment [3-6]. Conversely, non-financial information mostly includes qualitative factors that are more difficult to measure but still important. This involves information regarding the way management deals with environmental issues, the formation of environmental protection systems, among other areas of environmental management [7-10]. Environmental accounting disclosures should be prioritized by housing construction companies as they grow because of green building policies. This mechanism will help to explain the strong relationship between the environmental reporting and the performance of the business [11-13]. Li, M et al. [14] came up with a way to measure the quality of environmental accounting

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disclosures, which is based on three dimensions, namely, relevance, reliability, and compliance. Their study proved the usefulness and applicability of this assessment method through case studies. Ting, N [15] took a mixed qualitative and quantitative approach to evaluate the status of environmental accounting in Chinese companies, which indicates the presence of problems in the environmental accounting disclosures of the country. LaSoaNguyen, M et al. [16] employed quantitative approaches to determine how much environmental accounting disclosure has reached and what determines its level. Their results indicated a positive tendency in the environmental disclosure, which was determined by such factors as the size of the company and profitability. Xiao, Y [17] analyzed environmental accounting in terms of the relationship between sustainable development and the disclosure of environment-related accounting data. This research has also highlighted the significance of this reporting and recommended some measures aimed at enhancing the practice and enhancing general quality. Zhang, L [18] talked about green accounting information reporting by companies under the concept of sustainable development and offered several recommendations on how to solve the problem. The status of environmental accounting information publication and the causes of it were explored by Yang, L[19] through both inductive and empirical approaches, afterwards, he suggested recommendations based on his findings. Zheng, X [20] concentrated on the connection between the development of corporate environmental reporting and the corporate value finding that there is a significant U-shaped relationship between them.

The financial performance of corporations is often considered as a manifestation of a company economic efficiency. The release of environmental accounting information has currently been widely accepted as one of the most effective ways of enhancing environmental accountability and increasing organizational transparency and has emerged as a significant avenue that has been used by organizations all over the world to meet social responsibilities [21-23]. With the passage of time, more and more companies have realized the value of this kind of reporting and have attempted to enhance it [24, 25]. In large overall, these disclosures enhance the environmental protection activities in the organizations, help in managing environmental resources effectively during business growth, and may be useful in enhancing the financial performance and achieving the sustainable development objectives [26-29]. This is why the analysis of how the report on environmental accounting data influences the finances has both theoretical importance and practical implications, particularly with regard to the development of green development policies and improvement of the competitive position of the company [30-32].

The correlation between environmental accounting disclosures and corporate financial performance was explored by Agyemang, A. et al.[33] investigated the association between environmental reporting and corporate financial results by using secondary data from mining companies, and they identified a positive relationship with return on net assets as well as the quick ratio. Zhao, R. et al. [34] discussed the characteristics of green accounting reporting in highly polluting industries and its influence on financial results, arguing that more detailed and transparent disclosure is likely to generate better financial outcomes. Xu, C.[35] conducted an empirical study on the coal industry and found that environmental reporting was positively related to profitability and growth potential, although its connection with debt levels was not statistically significant. Nguyen, T. et al. [36] evaluated the impact of environmental disclosures on corporate financial results. Through purposive sampling and multiple analytical methods, they concluded that such disclosures were positively associated with profitability. ZHENG, J.[37] explored how the fulfillment of social responsibility affects financial performance in both heavily polluting and less polluting industries. The evidence indicated that environmental reporting improved the financial results of highly polluting firms, whereas the same effect did

not appear consistently among low-pollution enterprises. Emmanuel, U. and Ifeanyichukwu, A [38] examined the extent to which environmental reporting shapes financial outcomes in manufacturing industries. The study showed clear effects on stock price and return on assets. Lu, L and Taylor, M [39] carried out extensive research on the links among corporate performance, ethics, and efficiency. Their findings revealed a negative association between environmental performance and financial results, but a positive association between environmental responsibility and overall ecological performance.

The references and materials used in this research help elucidate the core concepts underlying the research and demonstrate how they can be measured. Considering the present situation of housing construction companies, the analysis identifies the explanatory variables as well as dependent variables, control variables, and moderating variables and suggests two research hypotheses. The sample of listed housing construction enterprises is defined and data sources of every variable are indicated. The analytical framework is based on a multiple linear regression model. Accordingly, the paper explores the dynamic impact of environmental accounting information disclosure on the financial performance of housing construction enterprises especially when green building policies are in place.

2 Conceptual Definitions

2.1 Green Building Policies

2.1.1 Definition of Green Building Policy

At the initial level, green building policy was significantly dependent on market-based regulation. When it became obvious that such an approach had certain drawbacks, there was a gradual shift in policy orientation towards increased government involvement. The existing green building policies can be divided into three major categories based upon the scale of implementation and sphere of application, which are compulsory measures, incentive-based measures, and support service measures. Mandatory policies are intended to implement rigorous adherence to the country-wide, regional, and industrial regulations to guarantee a solid system of promoting green building construction. The incentive programs include mainly money grants, floor area ratio bonuses, accelerated administrative approvals, and green building rating systems. Those incentives give businesses enough freedom not having to be governed by the government. This changes the nature of corporation involvement in passive adherence to active participation that utilizes its potential to the fullest. Service policy support basically includes formulating green building development plans, developing specific talents, and promoting green technological innovation. They act like critical support and protective mechanisms of green building development. Alongside compulsory and incentive policies, the three kinds of policies are supplementary and mutually reinforcing, giving institutional protection to the greater level growth of green buildings.

2.1.2 Green Building Policy Scale

Based on a review of available green building regulations, it is evident that they can be grouped into three main groups; mandatory, incentive and supporting service regulations. The mandatory policies mainly include binding national and regional legislation and regulations and are very important in enhancing green building development through the introduction of stringent limits. Incentive policies usually revolve around incentives offered by governments in terms of subsidies and fast-tracking approval procedures, whereas supporting service policies cover important areas of development planning and talent development and are essential

mechanisms towards enhancing green building behaviour.Green building regulations influence the manner in which the construction sector is oriented towards environmental sustainability. The mandatory policies provide a well-defined regulatory framework, imposing adherence to green building regulations. The incentive policies promote involvement by providing monetary rewards and simplifying certification procedures. At the same time, supporting service policies deal with problems such as developing the workforce, making sure that the workforce has the necessary skills to face the challenges of constructing green buildings. These policies, when combined provide a holistic solution to the achievement of sustainable construction practices and development of long-term environmental advantages

Table 1: Green Building Policy Scale

Dimension	Item
Mandatory policy	MDP-1.The government imposes penalties on buildings that do not meet energy-saving requirements
	MDP-2.The government implements mandatory energy-saving standards in planning and design schemes
	MDP-3.The government has implemented a market access system for green building materials products
Incentive policies	IP-1.The government implements monetary incentives for green buildings
	IP-2.The government implements a floor area ratio incentive policy
	IP-3.The government implements an awarding mechanism for green buildings
Supporting service policies	SSP-1.The government formulates and implements a development plan for local green buildings
	SSP-2.The government has intensified the cultivation of talents related to green buildings
	SSP-3.The government encourages construction enterprises to carry out green technological innovation

2.2 Environmental Accounting Information Disclosure

2.2.1 Definition of Environmental Accounting Disclosure

Most scholars concur that the reporting of environmental accounting information has a number of commonalities with conventional accounting disclosure because both necessitate that organizations offer stakeholders with useful information [40]. Within this framework, the data that is put forward by the companies in relation to the environmental issues can be divided into two dimensions, which are the macro level and the micro level. The reporting at the macro-level focuses more on publicly oriented documents like environmental planning reports whereas the reporting at the micro-level is based on the environmental performance figures of any single enterprise. The focus of the research is on the latter and especially on how businesses report on environmental accounting information at the organizational level.

2.2.2 Quality of Environmental Accounting Information Disclosure

Environmental Disclosure Index (EDI) is frequently used to measure the quality of environmental accounting reports of corporations. Besides indicating the amount of information given, the index assists to determine the operating state of a company. Its significance is that it is able to show the extent to which a company adheres to environmental laws and what this

adherence has to do with financial results [41]. The evaluation of environmental accounting disclosure quality cannot be done based on financial indicators only, so the current research uses a multidimensional approach to assess the quality of environmental accounting disclosures.

2.3 Corporate Financial Performance

2.3.1 Definition of Financial Performance

The financial performance is an economic gain produced by a company within a particular operational timeframe that depicts how effective it is managed [42]. Such a performance includes some important indicators such as profitability, operational efficiency, and growth potential, which all point to the capability of the company to exist and evolve over time.

2.3.2 Measurement of Corporate Financial Performance

The measures of corporate financial performance are usually based on market-based indicators and accounting-based indicators. Market-based approach frequently makes use of commercial transaction information to approximate the value of a company, including Tobin's Q ratio, stock valuation[43]. Conversely, accounting-based approaches depend on financial statements to measure such measures as return on assets (ROA), earnings per share (EPS). In this research, the significance of accounting-based indicators is highlighted as they are more reliable and direct indicators of a company’s performance than market-based indicators.

3 Research on Accounting Information Disclosure in Housing Construction Enterprises

3.1 Basic Status of Housing Construction Enterprises

3.1.1 Current Status of Listed Companies in the Housing Construction Industry

Table 2 shows the market capitalization rankings of companies listed in the construction industry. On January 10, 2022, the ten largest companies by total market capitalization in the housing construction industry in China were: A, B, C, D, E, F, G, H, I and J. The ranking was determined using statistics of 22 listed companies, where 15 of them were found to have market capitalizations higher than 10 billion yuan. In 2022, the first position in the list was taken by Company A of the Guangdong Province, where its market capitalization stood at 25.225 billion yuan. Company B came second with a market value of 23.806 billion yuan, and Company C took the third position with a market capitalization of 21.404 billion yuan.

Table 2: Company market value ranking

Rank	Name	Total market value (100 million yuan)	The province where it is located
1	A	252.25	Guangdong Province
2	B	238.06	Liaoning Province
3	C	214.04	Xizang Province
4	D	204.14	Chongqing City
5	E	194.91	Hunan Province
6	F	182.37	Guangdong Province
7	G	179.93	Anhui Province
8	H	171.89	Fujian Province
9	I	165.04	Shanghai City
10	J	164.96	Henan Province
11	K	152.67	Shanghai City
12	L	151.08	Hunan Province
13	M	142.67	Henan Province
14	N	116.93	Shandong Province
15	O	106.52	Shanghai City
16	P	87.42	Hunan Province
17	Q	79.29	Tianjin City
18	R	62.5	Shanghai City
19	S	43.87	Guangxi Province
20	T	41.13	Fujian Province
21	U	32.21	Xinjiang Province
22	V	28.65	Shandong Province

Table 3 displays the profit rankings of the listed companies. According to the assets of the previously mentioned listed housing construction companies, the housing construction industry entered a new phase of growth in 2022, with the majority of listed firms achieving strong financial results.On the basis of net profits, there are 18 companies that have more than 2 billion yuan and 4 companies that have greater than 1 billion yuan. The figures show that there were 22 listed housing construction companies that produced an overall net income of 838.614 billion yuan and a cumulative net profit of 80.269 billion yuan during the year 2022.

Table 3: Profit ranking list of listed companies

Rank	Name	Revenue in 2022 (100 million yuan)	Year-on-year growth	Net profit in 2022 (100 million yuan)	Year-on-year growth of
1	A	316.31	-0.3212	63.93	-0.3548
2	B	486.56	-0.1367	62.78	0.3573
3	C	100.9	0.2658	61.03	0.3644
4	D	643.62	-0.2803	59.41	0.1262
5	E	689.05	-0.3129	57.98	-0.1797
6	F	227.97	0.2009	53.43	-0.0159
7	G	740.12	0.0555	50.97	-0.2653
8	H	795.84	0.0982	39.86	-0.0627
9	I	211.42	-0.4215	37.35	-0.3746
10	J	302.36	-0.169	35.35	0.3133
11	K	720.18	-0.3927	33.57	0.227
12	L	679.86	-0.2656	32.66	0.2692
13	M	294.78	-0.434	28.47	-0.0068
14	N	444.7	0.1914	27.45	0.3614
15	O	151.66	-0.3921	25.42	-0.1239
16	P	33.71	-0.2865	24.96	-0.0081
17	Q	434.57	0.1762	24.27	-0.3704
18	R	12.3	0.0237	20	0.2527
19	S	426.66	-0.1247	18.89	0.2834
20	T	21.33	0.2757	17.63	-0.2707
21	U	593.24	0.2117	16.77	0.139
22	V	59	0.1597	10.51	0.0539

3.1.2 Analysis of the Specific Circumstances of Case Company W

The Company, W Company (to be referred as the Company hereinafter), was founded on December 15, 1999, with a registered capital of RMB 470.313 million at present. It is mainly involved in the construction equipment and housing design, being a comprehensive organization that focuses on the housing construction industry. After many years of building and growing, the Company has developed 30 subsidiaries and opened more than 150,000 retail stores in the market. The Company comparisons of the growth capability indicators are shown in Table 4, profitability indicators in Table 5, profit quality indicators in Table 6, and financial risk indicators in Table 7. As it can be seen above, the core business and major products of the company did not change significantly in 2021. In general, operations were healthy, with stable growth in performance. Operating income of the company in 2021 amounted to RMB 4.043 billion, which is RMB 3.305 billion or 22.33 percent higher than previous year. Total gross profit increased by 25.68 percent to RMB 1.439 billion. The net profit to shareholders amounted to RMB 506 million in 2021, or an increase of 18.22 percent compared to the previous year. In 2021, the company successfully grew at the same time in profits and scale, which raised the level of its overall development and improved its competitiveness in the market even further.

Table 4: Comparison of company growth capacity indicators

Growth capacity indicator	2021/10/25	2020/10/25	2019/10/25	2018/10/25
Total operating revenue(100 million yuan)	40.43	33.05	25.51	20.54
Gross profit (100 million yuan)	14.39	11.45	8.64	6.57
Net profit attributable (100 million yuan)	5.06	4.28	3.39	2.67
Non-gaap net profit (100 million yuan)	5.03	4.16	3.34	2.66
Total operating revenue increased year-on-year (%)	23.36	28.78	24.49	17.16
Net profit attributable to shareholders increased by (%) year-on-year	17.78	25.47	27.06	7.16
Non-gaap net profit increased year-on-year (%)	22.16	23.58	26.13	7.78

Table 5: Comparison of the company's profitability indicators

Profitability indicator	2021/10/25	2020/10/25	2019/10/25	2018/10/25
Weighted return on net assets (%)	18.73	26.36	19.01	32.85
Diluted return on net assets (%)	32.02	35.99	12.08	27.84
Diluted return on total assets (%)	26.41	37.5	37.24	22.89
Gross profit margin (%)	14.65	32.69	17.88	16.61
Net profit margin (%)	13.98	32.58	24.5	12.54
Actual tax rate (%)	19.91	26.76	19.41	22.66

Table 6: Comparison of the company's profit quality indicators

Profit quality indicators	2021/10/25	2020/10/25	2019/10/25	2018/10/25
Advance receipts/operating income	0	0	0	0
Sales cash flow/operating income	1.28	1.28	1.28	1.26
Operating cash flow/revenue	0.22	0.22	0.24	0.22

Table 7: Comparison of the company's financial risk indicators

Financial risk indicators	2021/10/25	2020/10/25	2019/10/25	2018/10/25
Asset-liability ratio (%)	10.46	13.11	12.78	15.88
Current liabilities/Total liabilities (%)	99.38	95.67	97.72	99.47
Current ratio	5.16	3.14	3.87	1.86
Quick ratio	4.87	2.86	3.64	1.53

3.2 Analysis of the Current Status of Corporate Environmental Accounting Disclosure Implementation

3.2.1 Overview of Environmental Accounting Information Disclosure

The current section deals with the examination of environmental accounting information disclosure in general. Through rating the environmental information disclosure of 22 companies, it monitors the trends in the rate of environmental accounting information disclosure by companies in the housing and construction sector during the period between 2018 and 2021. The statistics of companies that are providing these disclosures are given in Table 8. It is evident that in 2018, only 19 companies reported their environmental accounting data, but this number grew to 22 companies in 2022. This is a very high increase in the number of companies revealing such data, none of which are non-disclosing, making up 0.00% of the total sample. Statistically, it is also noted that, after 2018, the number of companies sharing environmental

accounting data has been increasing annually over four years. This demonstrates the housing and construction industry's growing emphasis on environmental accounting disclosure. This trend is primarily driven by more comprehensive environmental laws and regulations that explicitly mandate corporate disclosure of environmental information. These legal frameworks provide a clear basis for compliance while simultaneously incentivizing companies to disclose information through legislative measures.

Table 8: Statistics on the number of accounting information disclosure companies

Time	The number of disclosed companies	Proportion	The number of undisclosed companies	Proportion
2018	19	86.36%	3	13.64%
2019	20	90.91%	2	9.09%
2020	21	95.45%	1	4.55%
2021	22	100.00%	0	0.00%

3.2.2 Statistical Analysis of Environmental Accounting Disclosure Content

The statistical analysis of environmental accounting disclosure content is given in table 9. The statistics indicate that the number of companies reporting this kind of data has been steadily rising since 2018. It implies that there is an increasingly active environmental accounting disclosure among the listed companies operating in the housing construction sector. The rise in disclosure can be greatly attributed to the implementation of the appropriate laws and regulations as well as the rising concern about the environment conservation. Both regulations have been supplying more concrete directions in those two aspects, allowing organizations to classify and report environmental accounting data more accurately. It is worth noting that in 2018, 63.64 percent of the firms reported the mandatory content, whereas, in 2021, there were 77.27 percent of the firms reporting the mandatory content, and 77.73 percent of the firms reported the voluntary content in 2018 and 86.36 percent in 2021 However, it is evident that in the housing and construction sector, mandatory disclosures are fewer than voluntary disclosures. This also relates to the nature of enterprises, as choosing to disclose information that fosters a positive environmental image is more advantageous, while avoiding the disclosure of unfavorable information.

Table 9: Statistical analysis of disclosed content

Time	Mandatory content	Proportion	Voluntary content	Proportion	Compulsory and voluntary	Proportion
2018	14	63.64%	16	72.73%	12	54.55%
2019	15	68.18%	17	77.27%	13	59.09%
2020	16	72.73%	18	81.82%	14	63.64%
2021	17	77.27%	19	86.36%	15	68.18%

3.2.3 Statistical Analysis of Environmental Accounting Disclosure Quality Levels

The current section is dedicated to the statistical research of the level of disclosure of accounting information. During the evaluation, ten particular scoring indicators were developed. These indicators were used to evaluate environmental information disclosures with scores ranging between 0 and 5. The scores were further divided into four classes such as: Excellent (4-5 points), Good (3-4 points), Average (2-3 points) and Poor (0-1 points). Based on these criteria, the level of environmental accounting information disclosure of 22 companies was evaluated. Table 10 presents the outcomes of this analysis. The number of companies that increased their

ratings was higher between 2018 and 2021. Namely, the amount of companies that received the rating of Good increased by 4 times since the year 2018 when only 3 companies had such a rating. Although the number of companies rated Excellent did not grow significantly, it was steadily increasing overall. It reflects an overall improvement in the level of quality of environmental accounting information disclosure in the housing and construction sector

Table 10: Disclose the statistical analysis results of the quality level

Time	Excellent	Good	Medium	Poor
2018	1	3	8	10
2019	2	5	9	6
2020	3	6	10	3
2021	4	7	11	0

4 Study Design

In chapter 3, there will be an analysis of the existing environmental accounting information disclosures of the listed companies in the housing construction sector that will provide specific details on what is currently going on in this area. The subsequent chapter elaborates on a research framework that will allow exploring the basic relationship between financial performance and environmental accounting disclosure.

4.1 Research Variables and Hypotheses

4.1.1 Research Variables

(1) Dependent Variable: Financial Performance

Financial performance is one of the main standards of assessing the effectiveness of a company and it is also highly correlated with its ability to grow over time. Return on assets (ROA) is one of the common indicators that are often applied in the literature. Relative to Tobin's Q, ROA and earnings per share (EPS) tend to be perceived as more stable. Consequently, this paper will choose ROA and EPS as the major dependent variables of the empirical tests. The analysis of robustness also introduces Tobin's Q, which is calculated as market value / replacement value, as an alternative proxy of corporate performance.

The Explanatory Variable: The Quality of Environmental Accounting Disclosure

Since carbon peaking and carbon neutrality have gained even more popularity as the policy goals, there has been a significant increase in academic interest in the quality of environmental accounting disclosure, with the associated research becoming more diverse. Content analysis has been adopted extensively in current research as a way of organizing and assessing the data disclosed by companies and an Environmental Accounting Disclosure Index (EDI) is developed based on it. The proposed methodology involves using the EDI to evaluate the quality of disclosure, and the particular scoring mechanism will be discussed next:

$$EDI_i = \frac{\sum EDI_i}{\sum SEDI_i} \tag{1}$$

EDI_i denotes the environmental accounting disclosure score for company i in a single fiscal year, $\sum EDI_i$ denotes the sum of all environmental accounting disclosure scores for

company i in a single fiscal year, $\sum SEDI_i$ denotes the maximum environmental accounting disclosure score achieved by a company.

(3) Control Variables

To ensure more accurate, objective, and scientific empirical analysis results, other relevant variables with key influencing effects must be controlled. After reviewing relevant core journal literature, the control variables employed in this empirical analysis of environmental accounting information disclosure and financial performance can be summarized as: enterprise asset size (SIZE), debt-to-asset ratio (LEV), revenue growth rate (Growth), equity concentration (ES), total asset turnover (TAT), and ownership nature (OWN).

(4) Moderating Variables

Given the research objectives of this paper, green building policies are set as moderating variables and categorized into mandatory policies (MDP), incentive policies (IP), and supporting service policies (SSP).

4.1.2 Research Hypotheses

The public release of environmental accounting information is an important means by which firms can demonstrate social responsibility, reduce information asymmetry, ease trust concerns among outside stakeholders, and strengthen their environmental image in the eyes of regulators and financial institutions. These effects may also contribute to business growth and improved financial outcomes. Based on this reasoning, the first hypothesis is proposed as follows: H1: Environmental accounting disclosure by housing construction companies is positively associated with financial performance.

This study further considers the role of green building policies by examining whether they alter the strength of the link between environmental accounting disclosure and corporate performance in the housing construction sector. In other words, green building policies may function as moderating factors in this relationship. On this basis, the second hypothesis is proposed: H2: Green building policies significantly moderate the relationship between environmental accounting disclosure and financial performance in housing construction companies.

4.2 Sample Selection and Data Sources

4.2.1 Sample Selection

The empirical research is aimed at examining the effect of environmental accounting information disclosure on the corporate financial performance of listed companies in the housing construction industry. As per the CSRC industry classification published in 2018 and 2021 Guidelines on Environmental Information Disclosure of Listed Companies, there were 22 listed companies in the housing construction sector by 2021. The last sample adopted in the present study included 300 observations after eliminating all companies with significant amounts of missing data, ST-designated companies and issuers of H-shares or B-shares.

4.2.2 Data Sources

Data for explanatory variables, dependent variables, and control variables were primarily compiled from databases such as Guotai An CSMAR, RESSET, and Wind Information. Partially missing data were supplemented using annual reports disclosed by companies each year. The time span covers four years from 2018 to 2021. Quantitative data on green building policies were obtained through a questionnaire survey involving 22 listed companies in the housing construction industry.

4.3 Model Construction

In the investigation of the relationship between the quality of environmental accounting disclosures and financial performance of housing construction sector listed firms, this paper has developed the following research model:

$$F_{i,t} = \alpha_0 + \alpha_1 EDI_{i,t} + \alpha_2 OWN_{i,t} + \alpha_4 LEV_{i,t} + \alpha_3 SIZE_{i,t} + \alpha_5 Growth_{i,t} + \alpha_6 ES_{i,t} + \alpha_7 TAT_{i,t} + \varepsilon_{i,t} \quad (2)$$

To examine how green building policies affect the relationship between the quality of environmental accounting disclosures and financial performance within the housing construction sector listed companies, this paper develops the following research model:

$$F_{i,t} = \alpha_0 + \alpha_1 EDI_{i,t} + \alpha_2 EDI_{i,t} \times MDP_{i,t} + \alpha_3 OWN_{i,t} + \alpha_4 SIZE_{i,t} + \alpha_5 LEV_{i,t} + \alpha_6 Growth_{i,t} + \alpha_7 ES_{i,t} + \alpha_8 TAT_{i,t} + \varepsilon_{i,t} \quad (3)$$

$$F_{i,t} = \alpha_0 + \alpha_1 EDI_{i,t} + \alpha_2 EDI_{i,t} \times IP_{i,t} + \alpha_3 OWN_{i,t} + \alpha_4 SIZE_{i,t} + \alpha_5 LEV_{i,t} + \alpha_6 Growth_{i,t} + \alpha_7 ES_{i,t} + \alpha_8 TAT_{i,t} + \varepsilon_{i,t} \quad (4)$$

$$F_{i,t} = \alpha_0 + \alpha_1 EDI_{i,t} + \alpha_2 EDI_{i,t} \times SSP_{i,t} + \alpha_3 OWN_{i,t} + \alpha_4 SIZE_{i,t} + \alpha_5 LEV_{i,t} + \alpha_6 Growth_{i,t} + \alpha_7 ES_{i,t} + \alpha_8 TAT_{i,t} + \varepsilon_{i,t} \quad (5)$$

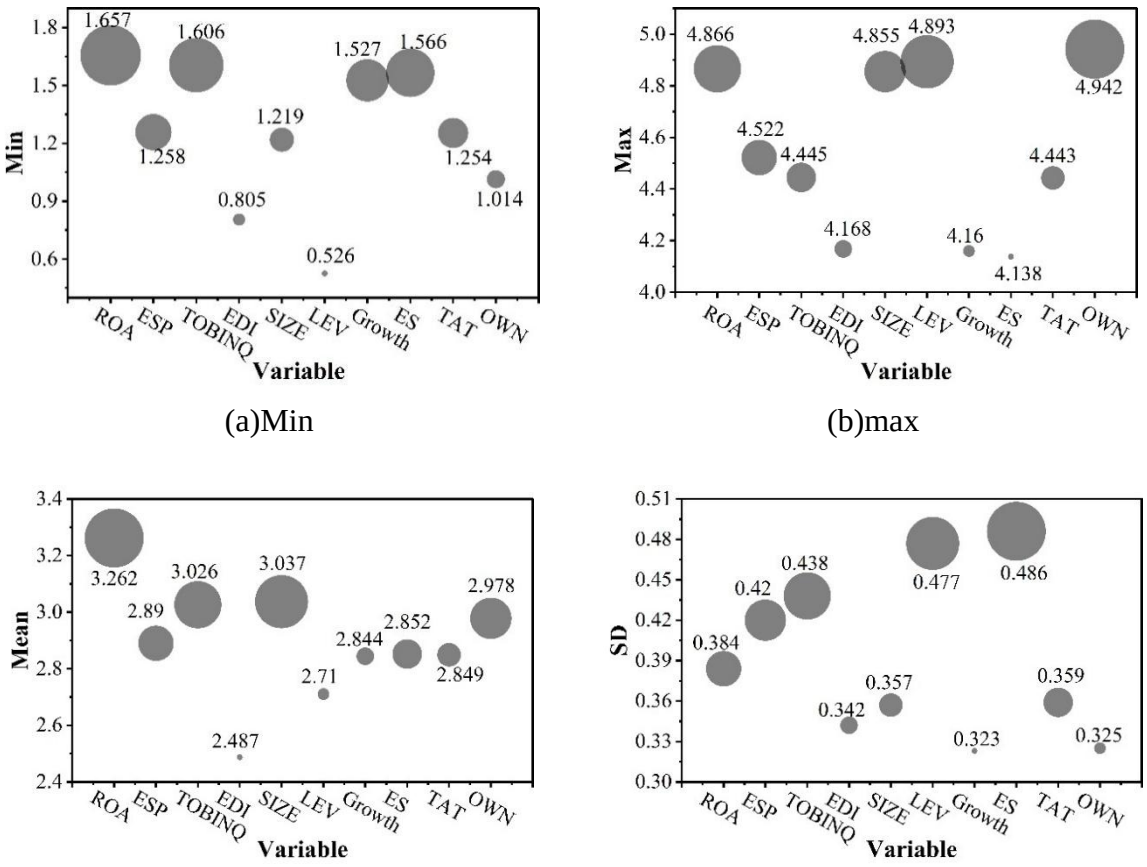
In these models, $F_{i,t}$ represents the financial performance metrics for housing construction sector listed firms. Following the earlier discussion, this research utilizes Return on Assets (ROA) along with Earnings Per Share (EPS) as financial performance measures, with Tobin's Q (TOBINQ) serving as an additional metric for robustness validation. Consequently, $F_{i,t}$ captures three dependent variable measures across various temporal points. The intercept is represented by α_0, while $\alpha_1 \sim \alpha_8$ serve as regression parameters, with $\varepsilon_{i,t}$ representing the error term.

5 Empirical Research Analysis

5.1 Statistical Analysis

5.1.1 Descriptive Statistical Analysis

The descriptive statistics of the 300 observations were calculated in STATA 12.0. The findings are presented in Figure 1 with panels (a), (b), (c), and (d) representing the minimum, maximum, mean, and standard deviation respectively. In the figure, bigger circles represent higher numerical value, which makes the relation between the variables more apparent. The findings show that ROA has a minimum of 1.657, a maximum of 4.866, an average of 3.262, and a standard deviation of 0.384. It implies that the profitability of companies in the housing construction sector is highly diverse. The same trend can be noted with regard to the rest of the variables used in the analysis.



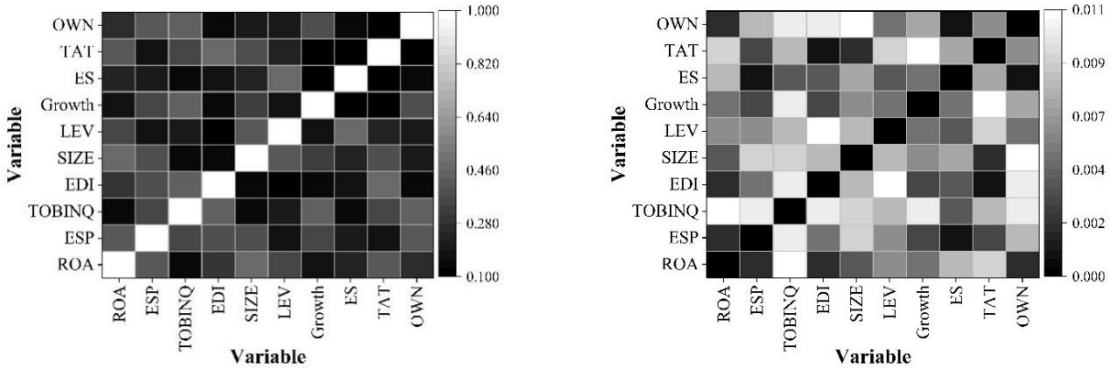
(a)Min (b)max

(c)Mean (d)SD

Figure 1: Descriptive statistical analysis

5.1.2 Correlation Analysis

The given subsection employs STATA 12.0 and Pearson correlation analysis to investigate the relationships between the variables considered in the model. As shown in Figure 2, the corresponding findings are presented. Panel (a) consists of the Pearson correlation coefficients and panel (b) contains the significance levels. The coefficients are between 0.1 and 0.4, and the significance values are between 0 and 0.011. Such outcomes indicate that the chosen variables can be empirically analyzed and are thus appropriate to be used in the later multiple regression estimations.



(a)Pearson correlation coefficient (b)Sig Value

Figure 2: Results of correlation analysis

5.1.3 Benchmark Regression Analysis

Regression benchmark models are used to estimate the key financial performance measures, that is, return on assets (ROA) and earnings per share (EPS), and control variables include firm size (SIZE), leverage (LEV), revenue growth (Growth), equity concentration (ES), total asset turnover (TAT), and ownership structure (OWN). The current part of this work examines the effect of the Environmental Accounting Disclosure Index (EDI) on corporate financial performance using the multiple regression model that has been developed as discussed earlier. The appropriate estimation results are presented in Table 11.

When ROA is taken as the dependent variable, the estimated coefficient for EDI is 0.734 and the corresponding t-value is 2.112. This indicates a positive effect that is statistically significant at the 5% level. The result implies that firms with better environmental accounting disclosure quality tend to achieve higher ROA, which reflects stronger operating performance.

With EPS the dependent variable, the EDI coefficient is 0.722 and the t-value is 2.715. The link is highly significant at the 1 percent level, meaning that firms with a higher environmental accounting disclosure index tend to have higher earnings per share.

Moreover, the adjusted R 2 values are 0.453 in the case of the ROA model and 0.479 in the case of the EPS model, indicating that both models are moderately explanatory. Both F-statistics are 11.465 and 10.145, respectively, which indicates that the linear relationships found in the models are statistically significant as a whole.

Regarding the control variables, the regressions also contain the firm size (SIZE), leverage (LEV), revenue growth (Growth), equity concentration (ES), total asset turnover (TAT), and ownership structure (OWN). Of these, firm size is positively related to both ROA and EPS statistically significantly at 5%. The same significant correlations exist between other control variables.

On the whole, better financial results in the housing construction industry are linked to better environmental accounting disclosure quality. An active role in environmental responsibility and increased informative disclosures do not only help to achieve sustainable development, but also bring advantages in economic and environmental aspects. Such actions may improve government recognition, recognition by people as well as other stakeholders, build up corporate reputation, and provide a basis of future profitability. Hence, enhancing the level of environmental accounting disclosure quality is one of the effective measures to improve the performance of the firms and such result confirms the hypothesis H1 of the research.

Table 11: Benchmark regression analysis results

Variable	ROA	ESP
Constant term	0.3251*** (3.533)	2.072*** (4.335)
EDI	0.734** (2.112)	0.722*** (2.715)
SIZE	0.531** (2.071)	0.452** (2.071)
LEV	-0.104** (-2.357)	-0.543*** (2.325)
Growth	0.245*** (3.253)	0.712*** (0.825)
ES	0.441*** (1.753)	0.671*** (0.423)
TAT	0.515*** (1.731)	0.644*** (0.527)
OWN	0.623*** (1.299)	0.788*** (0.612)
Hausman test	Fixed effect.	Fixed effect.
Observed value	300	300
F value	11.465	10.145
Adj-R^2	0.453	0.479

5.2 Robustness Tests

The substitution method is the most commonly used method in the robustness test of this paper. Here, the dependent variables i.e. Return on Assets (ROA) and Earnings Per Share (EPS) are replaced with Tobin's q during regression analysis to evaluate the effect of environmental accounting disclosures on financial performance. The Tobin's q data of housing construction companies is presented in Table 12 and the regression results of Tobin's q are presented in Table 13. As per the analysis, the correlation between the Environmental Accounting Disclosure Index (EDI) and Tobin’s q is positive and statistically significant at the 5% level even when Tobin's q is utilized. Even though the coefficient is significantly different, the outcome remains statistically significant, which means that it is highly robust. Most of the findings on the robustness tests support the findings on previous correlation and regression tests, supporting Hypothesis H1: Environment accounting information disclosure has a significant positive impact on financial performance. Nevertheless, they become more robust when the indicators of performance are ROA and EPS.

Table 12: Housing construction enterprise Tobin q Data

Enterprise	Q	SIZE	LEV	Growth	ES	TAT	OWN	EDI
A	4.055	3.784	2.619	2.425	1.178	3.545	2.27	1.942
B	1.328	3.24	3.791	3.034	1.862	3.926	1.385	1.227
C	1.149	4.647	1.113	4.502	3.613	3.632	4.331	2.207
D	1.158	2.561	2.84	4.635	1.192	4.75	1.758	3.964
E	3.802	3.51	3.13	3.738	1.858	4.012	3.594	2.674
F	3.963	4.05	1.217	3.4	1.881	1.733	2.52	4.331
G	4.148	4.494	2.223	4.691	1.653	3.081	1.921	2.653
H	4.609	2.096	3.474	1.763	1.396	1.39	1.539	1.645
I	3.706	3.877	2.473	2.796	3.542	4.635	2.161	2.616
J	1.895	4.716	1.723	2.152	2.574	2.565	2.455	2.483
K	3.594	2.048	1.098	4.688	1.912	4.605	3.471	2.275
L	4.124	3.139	3.654	2.288	4.551	3.781	3.41	2.349
M	2.671	1.932	3.586	3.583	4.749	1.258	4.089	2.931
N	2.887	2.72	2.411	2.236	4.014	1.365	1.34	1.203
O	3.562	2.017	1.596	3.268	2.517	1.172	2.206	3.309
P	3.632	3.665	1.708	1.827	1.593	2.841	3.781	1.479
Q	4.486	3.203	1.443	2.128	2.836	1.453	2.975	4.851
R	2.431	3.773	1.735	2.255	2.786	2.652	3.268	3.417
S	4.519	4.614	1.938	1.888	1.953	4.893	3.166	3.651
T	3.027	3.549	3.83	3.541	2.949	3.177	2.029	3.44
U	4.755	3.294	4.08	4.433	1.519	4.031	4.787	2.134
V	2.75	2.214	1.107	1.397	2.514	1.909	1.72	4.724

Table 13: Regression analysis of Tobin q

Variable	Tobin q	
	Regression coefficient	T-Value
Constant term	6.272***	9.081
EDI	2.176**	2.182
SIZE	1.072***	5.452
LEV	-2.506**	2.223
Growth	0.824**	0.934
ES	1.317**	0.266
TAT	0.919**	0.473
OWN	0.437**	0.389
Observations	300	300
R^2	0.504	
Adj-R^2	0.537	
F	14.325	

5.3 Moderation Effect Analysis

In the same way, we investigated the moderating role of green building policies in the association between the quality of environmental accounting information disclosure and financial performance of listed housing construction companies. The findings of the moderation analysis are represented in Table 14. These data indicate that, under no conditions, the regression coefficients between Environmental Accounting Disclosure Index (EDI) and Return

on Assets (ROA) and Earnings Per Share (EPS) are 0.146 (3.075) and 0.207 (3.042) respectively, which indicates a high positive correlation at 1% level of significance. After incorporating the compulsory policies (MDP), incentive policies (IP), and supportive service policies (SSP) of green building projects into the model, the EDI remains positively and significantly correlated with the financial performance measures, ROA and EPS. This result is evidence of green building policies moderating the connection between environmental accounting disclosure quality and financial performance of listed housing construction companies, which supports Hypothesis H2.

Table 14: Analysis results of the moderating effect

Variable	ROA	ESP
Constant term	0.116*** (0.749)	0.615*** (4.351)
EDI	0.146*** (3.075)	0.207*** (3.042)
MDP	0.087** (2.315)	0.028** (0.724)
EDI×MDP	0.179** (1.915)	0.016** (0.353)
IP	0.115** (0.545)	0.004** (2.041)
EDI×IP	0.049** (0.236)	0.015** (1.042)
SSP	0.234** (0.623)	0.258** (0.479)
EDI×SSP	0.419** (0.417)	0.245** (0.311)
SIZE	0.122** (1.351)	0.148** (9.525)
LEV	-1.112*** (-22.405)	-1.206 (-15.242)
Growth	0.024** (0.915)	0.016** (0.465)
ES	0.008*** (5.383)	0.011*** (5.145)
TAT	0.0361** (3.454)	0.209 (7.242)
OWN	0.148*** (10.525)	0.016** (4.452)
Observations	300	300
R^2	0.136	0.107
Adj-R^2	0.342	0.293
F	11.237	10.698

6 Conclusion

There are numerous companies whose primary focus is on financial performance and they tend to ignore the environmental effect and the high costs related to pollution prevention measures.

Under these circumstances, it is particularly relevant to disclose environmental accounting data. To eliminate this, the research applies a multiple linear regression model as a means of finding out how the disclosure of environmental accounting information influences financial performance in the construction industry, specifically, when the green building policies are present. The findings indicate that at constant levels of other variables, there is a significantly positive association between environmental accounting information disclosure and financial performance ($P < 0.05$), which supports Hypothesis H1. The inclusion of green building policies in the analysis does not make the positive correlation between environmental accounting disclosure and financial performance statistically insignificant ($P < 0.05$) as expected by Hypothesis H2. It indicates that green building policies have a moderating effect on the connection between environmental accounting disclosure and financial performance.

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