International Journal of Multidisciplinary Research and Growth Evaluation.

Factors affecting the promotion of green accounting application of listed construction enterprises on Vietnam stock market

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Article Info

ISSN (online): 2582-7138
Volume: 05
Issue: 03
May-June 2024
Received: 16-03-2024
Accepted: 22-04-2024
Page No: 360-365

Abstract
This study examines the factors influencing the adoption and disclosure of green accounting information (GAD) by construction businesses, where sustainable activities have not been widely integrated into their models. Business. We conducted an empirical analysis considering 75 construction enterprises listed on the Vietnamese stock market from 2016 to 2022, applying SPSS 26 software in quantitative analysis to build a regression model. Using panel data, the article has built a regression model to determine the relationship and impact level of internal factors affecting the application and disclosure of green accounting information of construction enterprises. Build. The findings show that firms that rely heavily on debt financing tend to have a negative relationship with the level of green accounting disclosure. However, businesses that rely heavily on equity capital tend to have higher levels of green accounting disclosure. In addition, the results of the estimation analysis show a positive association between ownership concentration and green accounting information disclosure. These findings suggest that policymakers should consider encouraging firms to prioritize equity financing over debt financing to promote higher levels of green accounting disclosure.

Keywords: Construction enterprises, green accounting, influencing factors

1. Introduction

Most ecological harm is related to human behavior such as resource depletion, pollution, and severe climate change. Nowadays, most economies recognize the importance of the environment and environmental awareness is increasingly increasing. Therefore, stakeholders are very interested in preserving the ecological environment for future generations. Economies, countries, and especially businesses have focused on adopting greener practices. In that context, green accounting is seen as the responsibility of businesses to stakeholders. Disclosure of green accounting information is essential to demonstrate ecological conservation and inform stakeholders about the environmental performance of businesses. Green accounting helps businesses anticipate environmental impacts or some factors that can cause negative impacts on the environment, thereby helping policymakers and business administrators have ways to prevent them and deal with those impacts. If businesses implement well, they will reduce the consumption of raw materials, fuel, and energy inputs in the production and business process. In addition, reducing the consumption of these input factors also helps businesses limit environmental pollutants, increase resource use efficiency, and increase competitive advantage by reducing production costs. Therefore, businesses increasingly need to take accountability for their environmental impacts and adopt sustainable practices as one of the most important aspects of sustainable development.

The research was conducted with the purpose of understanding and analyzing the impact of financial decisions on promoting the application of green accounting at construction enterprises listed on the Vietnamese stock market.

2. Theoretical basis and research overview

2.1. Theoretical basis

Representation theory

According to agency theory, information asymmetry leads to conflicts of interest between the principal and the agent. These conflicts can be avoided by creating contracts and monitoring systems that align with the interests of the agent and the principal. According to agency theory, stakeholders may be interested in an organization's environmental performance because it can affect the organization's long-term financial viability, reputation, and social responsibility position. On the other hand, management may be more concerned with short-term financial performance and may not prioritize environmental issues. Agency theory can influence green accounting disclosure by highlighting the potential competing interests of management and stakeholders, and creating incentives for public organizations to disclose their environmental performance to suit the interests of both parties. Effective monitoring and control mechanisms can also promote green accounting disclosure and minimize potential conflicts of interest.

Agency theory further posits that ownership concentration can impact the amount of green accounting disclosure because it can reduce agency conflicts between stakeholders. When ownership is concentrated, stakeholders have more influence over the management of the business, which can lead to greater accountability and transparency. Additionally, agency theory posits that financial decisions may signal a firm's commitment to sustainability, which may increase pressure to disclose environmental information. Therefore, when a business chooses financing methods that align with its sustainability goals, such as issuing green bonds or securing investments from socially responsible investors, the business sends a strong signal to stakeholders about its dedication to social and environmental responsibility.

Stakeholder theory

According to stakeholder theory, businesses must operate in a way that benefits all stakeholders, including workers, customers, suppliers, communities, and the environment. Therefore, businesses must balance the interests of all parties, including stakeholders, employees, consumers, and communities. Because they are more receptive to broader stakeholder needs, organizations with more inclusive ownership structures (including more stakeholders) may be more inclined to engage in sustainability activities sustainable and publish information about their environmental impact. Stakeholder theory is linked to the ability of a business to engage in sustainable business practices because it can also be affected by financial decisions, such as equity and debt financing

2.2. Research Overview

Loyd John Pereira (2024) [16] in a study said that green accounting is a modern and comprehensive accounting system that fully reflects the contents of assets, liabilities, investment capital, revenue sources, and other benefits—national green environment spending believes that green accounting includes estimating environmental costs and identifying liabilities and payable costs related to handling environmental issues. Implementing green accounting is considered an important factor in business. In the future, businesses will face challenges and requirements from authorities on establishing and implementing business strategies that must comply with requirements on accounting for environmental costs. related to the business activities of the enterprise. Accounting for environmental costs in the production and business cost system can bring certain benefits to organizations and businesses. In Vietnam, Duong, applying green accounting is a long-term process that requires implementation and investment research to create sustainable growth. Green accounting is a part of green growth, by people, for people, contributing to the stability of environmental and social resources for development. According to Nguyen Thi Hai Van (2018) [17], green accounting is considered an important tool related to aspects of the influence of the natural environment on the economy and is considered a direction for transformation in the way of development sustainable development, towards developing the green economy that Vietnam is aiming for. It can be seen that the topic of green accounting has been of interest to many domestic and foreign researchers. However, studies are conducted from different angles on the role of green accounting in the development of the economy in general and of businesses in particular. In Vietnam, research on green accounting stops at articles with the authors' own opinions and comments. There is no comprehensive research on the impact of financial decisions on promoting adoption. Green accounting application by businesses in Vietnam.

3. Research methods

The research sample includes data over 7 years (from 2016 to 2022) of 75 construction enterprises listed on the Vietnamese stock market. The financial statements of these enterprises are established based on compliance with the Vietnamese accounting standards system and have been audited.

Based on the research of Ref. (2021) the econometric model selected to test the impact of financial decisions on the application of green accounting by Vietnamese construction enterprises is:

Overall regression model

$$GAD_i = \beta 0 + \beta 1OC_i + \beta 2EF_i + \beta 3DF_i + \beta 4SIZE_i + \beta 5TIME_i + \beta 6PR_i + \varepsilon_i$$

In the model, the dependent variables disclosing green accounting information are coded as GAD, the independent variables include: OC represents the equity coefficient (Equity concentration level), EF represents represents equity capital, DF represents liability capital, OC represents equity ratio, SIZE represents company size, PR represents profitability, TIME represents business time.

The article runs the model using SPSS 26 software and uses the least squares (OLS) method to determine the regression coefficient βi. Based on the results obtained when running the program, we will write an equation for the impact of financial decisions on promoting the application of green accounting in businesses. Then test the model's suitability, which means testing βi to know whether the independent variable can explain the dependent variable or not. Evaluate the model's suitability through the adjusted coefficient of determination R2 (Adjusted R Square) to determine the model's ability to explain in practice.

The independent variables are coded and determined as follows:

Table 1: Independent variables in the model

Variable name	Variable symbol	Used research	Hypotheses Affecting Business Performance
1. Equity ratio	OC	Tsalis & partner (2020);H. Shalhoob & partner (2020); D. Sun & partner (2019)	H_2: Favorable (+)
2. Share capital	EF	Z. Feng & partner (2021); M. Du & partner (2022)	H_2: Favorable (+)
3. Debt capital payable	DF	H. Al Amosh & partner (2022); K. Wen & partner (2023); A.M. Gerged, (2021); S.Chen & partner (2021)	H_3: Opposite direction (-)
4. Enterprise scale	SIZE	Majumdar (1997); Hall và Weiss (1967); Gleason và partner (2000); Wu & Chua (2009); Uadiale (2010); Chen, Hou & Lee (2012); Pouraghajan và Malekian (2012); Nguyen và cộng sự (2019); Yang và Chen (2009); Prasetyantoko và Parmono (2008); Hardwick (1997)	H_4: Favorable (+)
5. Business time	TIME	Easterbrook và Fischel, (1999); Kipesha (2013)	H_5: Favorable (+)
6. Profitability	PR	Zeitun và Tian (2007); Pouraghajan và Malekian (2012)	H_6: Favorable (+)

4. Research results and discussion

4.1. Research results

Descriptive statistical analysis

Table 2: Statistics describe the variables in the model

	N	Min	Max	Medium	Standard deviation
GAD	525	-.44755	.50474	.038944	.15388
OC	525	.06801	31.87549	4.10770	5.75290
EF	525	.01993	6.47733	.80059	.943708
DF	525	-1.2294	.97135	.60097	.36534
SIZE	525	23.6150	32.20036	26.73487	1.59037
TIME	525	0	54	20.51	9.277
PR	525	.00581	.96983	.4144760	.28069

***Source*:** Results compiled from SPSS 26

The author put the data set collected from 75 construction enterprises in the period 2016–2022 with 525 observations into SPSS software version 26 to run descriptive statistics and obtained the results in Table 2.

- Return on business capital (GAD) has an average value of 0.0389 (3.89%) with a standard deviation of 0.153. The above results show that green accounting information disclosure of construction enterprises is at a low level, in which the smallest value is - 0.447 and the highest value is 0.504.
- Equity coefficient (OC) has an average value of 4.107 with a standard deviation of 5.753. This index is greater than 1, indicating that debt capital must be paid by large construction enterprises.
- Equity (EF) has an average value of 0.8001 with a standard deviation of 0.943; where the smallest value is 0.0199 and the highest is 6.477. This result shows that the equity capital of construction enterprises is at a low level.
- Liability capital (DF) of construction enterprises is at 0.6001 (60.01%) with a standard deviation of 0.365. This coefficient shows that of the total assets of the enterprise, 60.01% is loan capital. This is a relatively high coefficient in the capital structure.
- Enterprise size (SIZE) is measured by the logarithm of total asset value, with an average value of 26,734, equivalent to about 6,200 billion VND. Because the business characteristic of the construction industry is to invest heavily in facilities, most construction enterprises have quite large-scale business capital.
- The average time in business (TIME) of a tourism business is 20.51 years, of which the longest business time is 50 years. Thus, in the research sample, most of the selected construction enterprises are enterprises that have been established for many years, have been in business for a long time, and have experience in construction business activities.
- Profitability (PR) has an average value of 0.4144 (41.44%), standard deviation is 0.281, this is a suitable result for businesses with construction business activities.

Regression analysis

Evaluate the suitability of the model

Table 3: ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	3.431	6	.572	44.689	.000[b]
a. Dependent Variable: GAD					
b. Predictors: (Constant): OC, EF, DF, SIZE, TIME, PR					

***Source*:** Results compiled from SPSS 26

To test the suitability of the regression model, we hypothesize H0: R2 = 0. The F test is used to test this hypothesis.

Inspection results

According to Table, ANOVA gives us the F-test results to evaluate the appropriateness hypothesis of the regression model. The F test sig value is 0.000 < 0.05, rejecting the hypothesis H0, meaning $R2 \neq 0$ in a statistically significant way, the regression model is appropriate. With R2 value = 0.425, it shows that the independent variables included in the regression analysis affect 42.5% of the variation of the dependent variable, the remaining 57.5% is due to variables outside the model and random errors. With the statistical value Durbin Watson = 0.799 ranging from 0 to 4, there is no first-order serial autocorrelation phenomenon.

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.659[a]	.434	.425	.113118982934212	.799
a. Predictors: (Constant): OC, EF, DF, SIZE, TIME, PR					
b. Dependent Variable: GAD					

***Source*:** Results compiled from SPSS 26

Correlation analysis

Table 5: Correlation coefficient between variables in the model

		GAD	DF	EF	OC	SIZE	TIME	PR
GAD	Pearson Correlation	1	.476**	.208**	.360**	.099	.031	-.159**
	Sig. (2-tailed)		.000	.000	.000	.057	.552	.002
OC	Pearson Correlation	.476**	1	-.235**	.459**	.009	-.093	-.458**
	Sig. (2-tailed)	.000		.000	.000	.861	.076	.000
EF	Pearson Correlation	.208**	-.235**	1	-.340**	-.048	.072	-.007
	Sig. (2-tailed)	.000	.000		.000	.354	.170	.896
DF	Pearson Correlation	.360**	.459**	-.340**	1	-.390**	-.031	.139**
	Sig. (2-tailed)	.000	.000	.000		.000	.466	.009
SIZE	Pearson Correlation	.099	.009	-.048	-.390**	1	-.182**	-.197**
	Sig. (2-tailed)	.057	.861	.354	.000		.000	.000
TIME	Pearson Correlation	.031	-.093	.072	-.031	-.182**	1	.028
	Sig. (2-tailed)	.552	.076	.170	.466	.000		.596
PR	Pearson Correlation	-.159**	-.458**	-.007	.139**	-.197**	.028	1
	Sig. (2-tailed)	.002	.000	.896	.009	.000	.596	
**. Correlation is significant at the 0.01 level (2-tailed).								
*. Correlation is significant at the 0.05 level (2-tailed).								

***Source*:** Results compiled from SPSS 26

The correlation coefficient between variables shows the relationship between variables. The correlation between variables is evaluated through the Pearson coefficient (r) with a significance level of 5% (Sig≤0.05). From Table 5, the correlation test between the independent variables and the dependent variable GAD shows that the OC variables; EF; DF; and PR have sig all less than 0.05. Thus, there is a linear relationship between these independent variables and the GAD variable. What about the variables SIZE; TIME has a sig value greater than 0.05 so there is no linear relationship with GAD. Between independent variables, there is no too strong correlation when the absolute value of the correlation coefficient between pairs of variables is less than 0.5, the possibility of collinearity and multicollinearity is also lower.-

Phân tích hồi quy

To evaluate whether the regression coefficient of each independent variable is significant in the model or not, based on the t (student) test with hypothesis H0. The inspection results are as follows:

Table 6: Regression coefficient

Model	Regression coefficients are not standardized		Standardized regression coefficient	t	Sig.	Multicollinearity	
	B	Standard error	Beta			Tolerance	VIF
(Constant)	-2.594	.424		-6.112	.000		
OC	.034	.008	.281	4.282	.000	.377	2.652
EF	.068	.006	.472	10.845	.000	.855	1.170
DF	.088	.012	.486	7.508	.000	.387	2.585
SIZE	.805	.128	.296	6.298	.000	.732	1.367
TIME	.027	.011	.099	2.366	.019	.922	1.084
PR	-.002	.006	-.017	-.313	.755	.547	1.830

***Source*:** Results compiled from SPSS 26

The results in Table 6 show that the PR variable has a sig value of 0.755, greater than 0.05, so this variable is not meaningful in the regression model, or in other words, has no impact on the dependent variable GAD. The remaining variables OC; EF; DF; SIZE; and TIME all have t-test sig less than 0.05, so these variables are all statistically significant, affecting the GAD variable. The regression coefficients of these variables all have positive signs, so they have a positive impact on the GAD variable. Also according to the results in Table 6, the variance magnification coefficient VIF of the independent variables is almost lower than 2, only the VIF coefficient of the variable DF; OC higher than 2 is not significant. The results show no violation of the multicollinearity assumption.

From the results of the regression coefficient, a standardized regression equation can be built as follows:

GAD = 0,281*OC + 0,472*EF + 0,486*DF++ 0,296*SIZE+ 0,099*TIME + ui

Based on the magnitude of the standardized regression coefficient Beta, the order of impact from strongest to weakest of the independent variables on the GAD variable is DF (0.486) > EF (0.472) > SIZE (0.296) > OC (0.281) >

TIME (0.099). The above variables all affect the same direction as the GAD variable. This result is consistent with hypotheses H1, H2, H4, and H5 and contrary to hypothesis H3 in the theoretical research model.

Table 7: Experimental analysis results

Variable name	Variable symbol	Hypothesis	Research results
1. Equity ratio	OC	H_1: Favorable (+)	Favorable (+)
2. Share capital	EF	H_2: Favorable (+)	Favorable (+)
3. Debt capital payable	DF	H_3: Opposite direction (-)	Opposite direction (-)
4. Enterprise scale	SIZE	H_4: Favorable (+)	Favorable (+)
5. Business time	TIME	H_5: Favorable (+)	Favorable (+)
6. Profitability	PR	H_6: Favorable (+)	No impact

***Source*:** Results compiled from SPSS 26

4.2. Discuss research results

The research results have evaluated the factors affecting the promotion of green accounting applications by construction enterprises in Vietnam, including the level of equity concentration; Source of equity capital, owner's equity, company size, time in business have a positive influence and liabilities that have a negative influence. In today's new context, stakeholder theory emphasizes the commitment of business to consider the interests of all stakeholders and the potential benefits of balancing financial and social responsibilities. Therefore, a business's debt financing affects its ability to meet its long-term obligations to its stakeholders, including the announcement of environmental initiatives. Additionally, high debt financing indicates that a business is highly leveraged, which can reduce financial flexibility and increase the risk of default, leading to less spending and less disclosure about environmental impact. On the other hand, a business can balance its financial and social responsibilities and create long-term value for all stakeholders. The results of our analysis confirm that debt financing is negatively associated with green accounting adoption and disclosure. Therefore, the first hypothesis is accepted. Therefore, our findings show that debt financing negatively affects green accounting disclosure. Studies show that businesses with high debt capital are less likely to disclose environmental information to avoid negative financial impacts.

5. Conclusion

Environmental sustainability is increasingly of concern, so the impact on the application and disclosure of green accounting must be clearly understood. The study examines the factors affecting the application and disclosure of green accounting information for construction enterprises in Vietnam. The study confirms that businesses that rely heavily on loan capital tend to have an inverse relationship with the level of green accounting information adoption and disclosure. However, businesses that rely mainly on equity capital have a higher tendency to disclose green accounting information than businesses that rely on loan capital. In addition, the results of the estimation analysis show a positive correlation between ownership concentration and green accounting information disclosure. This indicates that firms with high ownership concentration are likely to provide more information about their use of green accounting. Therefore, in the process of promoting and developing green accounting information disclosure, enterprise management boards and policymakers must encourage the number of large shareholders to hold a large number of shares of small enterprises than. This will support businesses to operate more efficiently and increase the disclosure of green accounting information. Therefore, businesses must implement ownership concentration policies as part of their strategic plans to ensure environmental performance and enhance sustainable growth.

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