

An Exploratory Study of the Relationship between Financial Reporting Transparency and FVA Reliability: A Machine Learning-Based Approach



Antima Sharma
Academician

The research study examines the relationship between transparency and reliability in the Fair Value Accounting (FVA) of Real Estate Investment Trust (REIT) companies. Machine learning techniques are used to analyse data from the annual reports of 22 REIT companies from countries like the USA and China. The study finds that greater corporate transparency, as measured by the S&P Global Ratings DISCLOSURE_INDEX, contributes to more reliable fair-value estimates, as represented by the deviation between reported Net Asset Value (NAV) and actual values.



Dr. Nisha Kalra
Academician

The study identifies several significant predictors of NAV_DEV, including Fair Value Asset (FVA3), Debt-Equity Ratio (DEBT_EQUITY), presence of women in the board of directors (WOMEN_BOD), and the interaction between FVA and transparency. However, financial experts in the audit committee (FINEXP_AC) and the number of directors on board (Num_of_BOD) do not show a significant relationship. To enhance the model's accuracy, a Decision Tree Analysis is employed, with FVA3 identified as the most important variable for predicting NAV_DEV. This research provides practical implications for REIT companies and regulators in improving the reliability of financial reporting through transparency in fair value accounting.

This statement introduced a framework for measuring fair value and provided guidelines on its use in financial reporting. However, the use of market-based inputs in FVA has raised concerns about the reliability of fair value estimates. This study employed S&P Global Ratings companies (renowned financial services company that provides credit ratings, research, and insights to businesses, investors, and governments worldwide), a transparency and disclosure index based on 98 criteria, to examine the relationship between the transparency of financial statements and the reliability of fair value accounting.

The study focused on 22 Real Estate Investment Trust (REIT) companies and used secondary data from their annual reports to collect information. NAV_DEV, which indicates the reliability of fair value estimates, was taken as the target variable, along with other variables like DEBT_EQUITY, WOMEN_BOD, FINEXP_AC, and Num_of_BOD. The research used



Dr. G. Soral
Academician

Introduction

Fair Value Accounting (FVA) has gained popularity since the publication of Statement No. 157 by the Financial Accounting Standards Board (FASB) in 2006.

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regression, decision tree regressor, and random forest regressor techniques to analyze the data. The study applied a decision tree regressor to determine the importance of various variables. Results indicated that FVA3, DISCLOSURE_INDEX, WOMEN_BOD, and DEBT_EQUITY were identified as the most important variables. Notably, the decision tree analysis highlighted that FVA3, DEBT_EQUITY, and DISCLOSURE_INDEX held the greatest significance. The findings have practical implications for REIT companies and regulators in enhancing the reliability of financial reporting. However, further research is needed to explore the potential challenges and opportunities associated with the implementation of the recommendations.

Review of Literature

FVA is an accounting method that measures assets and liabilities at their current market value. It is used to provide relevant and reliable financial information to stakeholders, including investors, creditors, and regulators.

Thanh et al. (2023) found that these six factors positively influenced the applied perception of FVA in the context of the construction of enterprises in Vietnam. Cahyani & Firmansyah (2023) investigated the effect of managerial skill and earnings management on the application of FVA and found that managerial skill positively influenced FVA's reliability. Ibidunni and Okere (2019) found a significant association between FVA and the reliability of accounting information in Nigerian listed firms. In their study, Lim et al. (2017) explored the impact of institutional country differences on investors' perceptions regarding the reliability of FVA hierarchy measurement. The researchers likely examined various institutional factors such as legal frameworks, regulatory environments, accounting standards, and cultural norms across different countries. These factors can influence how investors interpret and rely on FVA measurements, particularly within the hierarchical framework used for fair value assessments. By analyzing these differences, the study aimed to provide insights into how institutional contexts shape investors' confidence in FVA and its hierarchical structure, thereby contributing to a better understanding of the global applicability and reliability of fair value measurements in accounting practices. Lastly, Sawalqa (2016) highlighted the importance of additional disclosures to enhance the reliability of level 2 and level 3 assets in the context of fair value assets.

In terms of disclosure, several studies have highlighted the importance of detailed disclosures, transparency, and management assurance to strengthen the reliability

of FVA estimates. For example, Robinson et al. (2018) found that enhanced disclosure requirements reduced the manipulation of fair value measurements related to level 3 assets in banks. Biljon and Scott (2019) emphasized the significance of detailed disclosures for biological assets. Chung, et al. (2017) found that increased fair value disclosures could mitigate higher information risk and lower share pricing. Finally, Chung, Lee, and Mitra (2016) emphasized the necessity of expanding regulatory guidelines to strengthen the reliability of fair value estimates, considering the mandatory adoption of FVA standards.

Research Gaps

In today's world, it's vital for researchers and practitioners to focus on improving the reliability of Fair FVA. Previous studies have explored variables like corporate governance, financial distress risk, transparency level, and the role of external qualified valuers, shedding light on the issue. However, further investigation is necessary, especially in the context of Real Estate Investment Trust (REIT) companies, to understand the vital relationship between transparency and reliability in FVA.

Expanding this research to other sectors and contexts is crucial, including exploration of the potential benefits and limitations of machine learning techniques in accounting research. Furthermore, this study highlights several variables with significant predictive power for NAV_DEV, a key measure of the reliability of fair value estimate. By delving deeper into these variables and their impact on various aspects of FVA, researchers can bridge the research gap and advance knowledge in the field. Ultimately, this pursuit will result in more reliable and transparent financial information, meeting the evolving needs of stakeholders in today's dynamic business landscape.

Research Methodology

Scope of the study

This study examines the factors that can affect the reliability of FVA. For the same purpose, the transparency level of companies was taken as a factor. It was examined that if a company provides more disclosures in the annual reports to the users of accounting information, then it affects the reliability of FVA.

Objective of the study

Through a comprehensive review of the existing literature, it is evident that prior studies have investigated the value relevance of accounting information after the adoption of FVA. These studies have consistently demonstrated an increase in the value relevance of accounting information following

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the implementation of FVA standards (Adwan et al., 2020). However, certain research studies have expressed concerns regarding the reliability of fair value estimates (Landsman, Wayne, 2007) and have put forth suggestions to enhance the reliability of such estimates.

It has been proposed that organizations can enhance the reliability of FVA by providing more comprehensive disclosures in their financial reports (Chea, 2011). The provision of adequate fair value disclosures has the potential to reduce investors' uncertainty (Bens, 2016) by allowing investors to gain deeper insights into the financial instruments presented in the financial statements. The collective findings of these studies emphasize the pivotal role of disclosures in the decision-making process of investors and in evaluating the reliability of FVA.

Building upon the existing body of research, the primary objective of this research paper is to investigate the impact of the transparency level of companies' financial reporting on the reliability of FVA.

Sample Selection

Real Estate Investment Trust (REIT) companies were utilized to investigate how a company's level of transparency affected the reliability of fair value accounting. We included 309 REIT companies, including those REIT companies who are members of NAREIT (National Association of Real Estate Investment Trust) (209 companies) and the world's top 100 REIT companies, who have shown investment property at fair value in their financial statements. Later, we excluded those companies which do not show fair value of investment property in their financial statements. Our final sample consists of 22 REIT

companies. Secondary data was used in this research work. Data was collected from the annual reports of the companies which were taken from the individual websites of the companies.

Hypothesis

To achieve the objectives, the following hypotheses have been articulated:

Ha₁: REIT companies with higher levels of transparency in their financial reporting will have more reliable fair value estimates.

Ha₂: REIT companies with more women on the board of directors will have more reliable fair value estimates.

Ha₃: REIT companies with a higher presence of financial experts in their audit committees will have more reliable fair value estimates.

Tools and Techniques

This study used regression, decision tree regressor, and random forest regressor techniques for analysis. To use the regression, following equation was formulated:

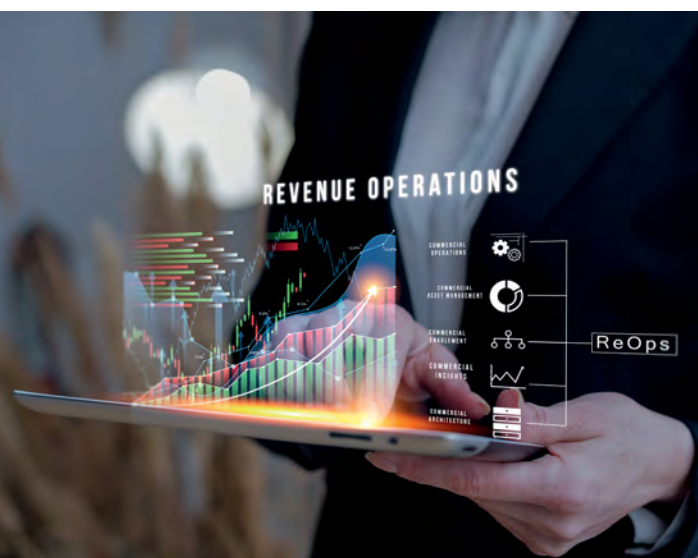
$$\begin{aligned} NAV_DEV_{i,t} = & \beta_0 + \beta_1 FVA_{i,t} + \beta_2 DISCLOSURE_INDEX_{i,t} \\ & + \beta_3 FVA * DISCLOSURE_INDEX_{i,t} + \\ & \beta_4 DEBT_EQUITY_{i,t} + \beta_5 WOMEN_BOD_{i,t} \\ & + \beta_6 FINEXP_AC_{i,t} + \beta_7 Num_of_BOD_{i,t} \end{aligned}$$

Variable Description

This study aims to investigate the impact of corporate transparency and other factors on the reliability of fair value estimates in REIT companies. The main dependent variable is NAV_DEV, which measures the difference between a company's net asset value per share and its market price per share. A higher NAV_DEV suggests unreliable fair value estimates, while a lower NAV_DEV indicates more reliable estimates.

The study used a transparency index from S&P Global Ratings, which has 98 measures, to evaluate how open companies are about their finances. It also looked at things like how many people are on the board, whether there are financial experts on audit committees, how much debt the company has, and how many women are on the board.

The aim was to figure out if having reliable fair value assets, transparency, low debt, a higher representation of women on the board, and financial experts on audit committees all lead to lower NAV_DEV. This assists investors in making more informed decisions and enhances the clarity and reliability of financial reports within real estate investment.



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Data Analysis and Discussion of Results

Results of Regression Analysis

Table 1: Descriptive Statistics

Variables	Count	Mean	Std	Median	Min	Max.
NAV_DEV (%)	110	-10.51	29.51	-15.96	-61.21	88.10
FVA3 (%)	110	939368	1941309	608	75.15	8019600
DISCLOSURE_INDEX (%)	110	58.82	8.88	57.07	43.48	79.35
DEBT_EQUITY (%)	110	12.41	11.73	9.39	1.02	75.45
WOMEN_BOD (%)	110	24.58	12.58	23.61	7.14	55.56
FINEXP_AC (%)	110	75.39	34.61	100	0	100
Num_of_BOD (%)	110	891.82	276.66	900	400	1500

In the sample of REIT companies, the discount rate of NAV_DEV has a mean value of -10.51%. The mean value of FVA3 is 939368%, The mean value of DISCLOSURE_INDEX is 58.82%. The average DEBT_EQUITY value is 12.41%, indicating a moderate level of leverage. The WOMEN_BOD variable has a mean value of 24.58%, indicating that around

25% of the board of directors in sample companies are women. The FINEXP_AC variable has a mean value of 75.39%, indicating that about 75% of audit committee members are financial experts. Finally, the average value of the Num_of_BOD is 891.82%, which implies that there are a substantial number of board of directors in sample companies.

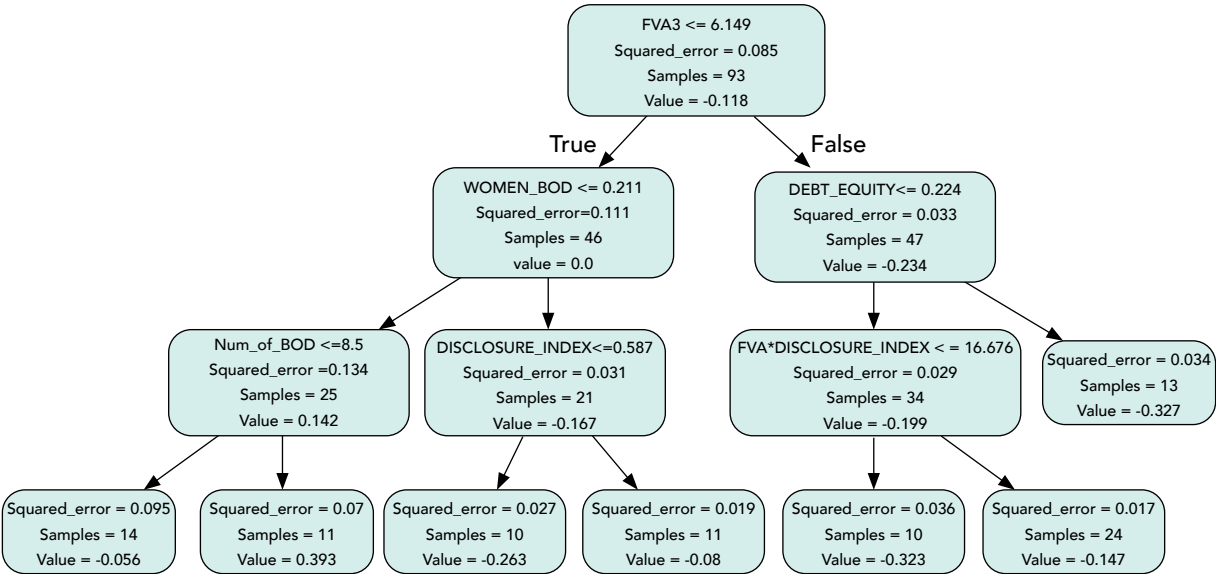
Table 2: OLS Regression Results

Variable	Model 1		Model 2	
	Coefficient	P-Value	Coefficient	P-Value
Const	-0.1630	0.321	-0.1709	0.284
FVA3	2.7522	0.004*	2.8317	0.001*
DISCLOSURE_INDEX	1.1048	0.000*	1.1288	0.00*
FVA*DISCLOSURE_INDEX	-2.5682	0.006*	-2.6462	0.002*
DEBT_EQUITY	-0.7431	0.000*	-0.7367	0.000*
WOMEN_BOD	-0.4375	0.005*	-0.4306	0.005*
Num_of_BOD	0.0877	0.252	0.0913	0.219
FINEXP_AC	0.0131	0.824	–	–
	R-Squared: 0.38 Adj. R-Squared: 0.325 F(Prob): 0.00		R-Squared: 0.38 Adj. R-Squared: 0.333 F(Prob): 0.00	

*Significant at 5% Level

The study conducted regression analysis to investigate the relationship between NAV_DEV and various study variables. Two models were used, and the results showed that FVA3, DISCLOSURE_INDEX, DEBT_EQUITY, and WOMEN_BOD were all significantly correlated with NAV_DEV. The interaction variable FVA3*DISCLOSURE_INDEX was also found to have a significant impact on NAV_DEV. The variables FINEXP_AC and Num_of_BOD did not show any significant correlation. The adjusted r-squared of model 2 (0.333) increased slightly from model 1 (0.325), but the value of r-squared was the same for both models. Additionally, a Decision Tree Regressor Technique was used to further improve the explanatory power of the model.

The graphical presentation of the best decision tree:



The Decision Tree Algorithm is a tool used to understand the relationship between various variables and the dependent variable. In this case, the dependent variable was the deviation of NAV from its market price. The decision tree shows that the variable FVA3 was found to be the best variable to split, with a mean squared error of 0.085. The tree revealed that a higher debt-equity ratio and a higher value of FVA3 could prevent the deviation of NAV from its market price. On the other hand, a higher number of women on the board of directors and a lower disclosure index could lead to a smaller deviation of NAV from its market price. The decision tree slightly improved the value of r2 compared to linear regression, from 0.38 to 0.53. To further improve the value of r2, the Random Forest Regressor Technique was employed.

Results of Decision Tree Regressor

To analyze the data, the Decision Tree Regressor Technique was used which was implemented using the Python programming language. In this research, some hyperparameters were also used, including max_depth [10], min_sample_leaf [10, 15], and max_leaf_nodes [7, 8]. Cross-validation was set at 4 "cv = 4," which means that the decision tree regressor algorithm will build 16 decision trees with different hyperparameters.

After using all these parameters, the decision tree algorithm produced the best decision tree with a maximum depth of 10, maximum leaf nodes of 7, minimum samples per leaf of 10, and a random state = 42.

Results of Random Forest Regressor

Table 3: Most Important Variables

Variable	Importance Value
DISCLOSURE_INDEX	0.23
FVA3	0.19
DEBT_EQUITY	0.16
FVA3*DISCLOSURE_INDEX	0.15
WOMEN_BOD	0.15
Num_of_BOD	0.09
FINEXP_AC	0.02

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The Random Forest Regressor Technique was used to predict a continuous target variable using an ensemble of decision trees. The bootstrap parameter was set to true, meaning that each time a new decision tree was built, a new sample was taken from the observations. The was also set to true, providing an estimate of the model's error. The most important variables were identified using the importance value, with the disclosure index having the highest importance value (0.23), followed by FVA3 (0.19) and DEBT_EQUITY (0.16). The ensemble technique did not provide any information regarding the direction of the variables' influence on the predictions. The variables with the lowest importance values were WOMEN_BOD (0.15), Num_of_BOD (0.09), and FINEXP_AC (0.02), indicating that they did not contribute significantly to making predictions. Overall, the Random Forest Regressor Technique proved to be effective, achieving an r^2 value of 0.80, and providing valuable insights into the most important variables for making predictions.

Conclusions

The decision tree regressor analysis highlighted that FVA3 is the most important variable in reducing NAV_DEV, while a higher debt-equity ratio was found to be associated with lower NAV deviation. The number of board of directors did not have a significant

impact on NAV deviation. The Random Forest Regressor emphasized the importance of the disclosure index as the most influential variable, followed by FVA3 and DEBT_EQUITY. These variables contribute significantly to the accurate predictions regarding NAV deviation.

This study aimed to explore how corporate transparency impacts the reliability of FVA in REIT companies. It used the S&P transparency and disclosure index to measure transparency and assessed its influence on NAV_DEV, which indicates the reliability of fair value estimates.

To analyse this relationship, the study employed various statistical techniques such as regression analysis, decision tree regressor, and random forest regressor. The results highlighted significant correlations between NAV_DEV and factors like FVA3, DISCLOSURE_INDEX, DEBT_EQUITY, and WOMEN_BOD. These variables were found to be crucial in determining the accuracy of fair value estimates.

The study's overall findings demonstrate that REITs companies provide extensive disclosures, which have a significant impact on a wide range of stakeholders, as supported by recent research results. These disclosures serve as a foundation for investors, enabling them to make well-informed choices regarding their investments. The study also established in-depth analyses about financial information and risk assessments furnished in these disclosures that empower investors to assess the stability and potential returns of their investments, thereby affecting investment strategies and portfolio management. Additionally, creditors heavily rely on these disclosures to evaluate creditworthiness and assess collateral sufficiency. This information extremely shapes lending conditions and decisions regarding credit extension, thus impacting the company's ability to secure funding and the terms thereof.

This study aimed to explore how corporate transparency impacts the reliability of FVA in REIT companies.

Furthermore, employees, as per research findings, closely monitor these disclosures, which can influence their job security and compensation. Transparent financial disclosures have been shown to instil confidence among employees in the company's financial stability, while disclosures related to executive compensation and benefits directly impact employee morale and satisfaction, as supported by recent research in the field.

Beyond the corporate sphere, communities and public sentiment are also swayed by these disclosures, as indicated by recent studies. Positive

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disclosures concerning corporate social responsibility initiatives, as per research, can enhance a company's reputation and foster goodwill within communities. Conversely, this research study findings have underscored that negative disclosures pertaining to ethical or environmental concerns can have adverse effects, highlighting the substantial impact of company disclosures on the broader societal environment. In essence, the comprehensive and transparent nature of these disclosures, supported by recent research, resonates throughout the stakeholder environment, strongly influencing their perceptions, decisions, and interactions with the company.

REITs companies provide extensive disclosures, which have a significant impact on a wide range of stakeholders, as supported by recent research results.

References

- Amarnath, M., Sugumaran, V., & Kumar, H. (2023). Exploiting sound signals for fault diagnosis of bearings using decision tree. *Measurement*, 46(3), 1250–1256
- Anderson, B., & McGrew, D. (2017). Machine learning for encrypted malware traffic classification. *Proceedings of the 23rd ACM SIGKDD International Conference on Knowledge Discovery and Data Mining - KDD '17*, 1723–1732
- Biljon, M. V., & Scott, D. (2019). The importance of biological asset disclosures to the relevant user groups. *AGREKON*, 58(2), 244–252
- Cahyani, A. D., & Firmansyah, A. (2023). Managerial Ability, Earnings Management and Fair Value Accounting: Does Debt Policy Matter?. *Jurnal Dinamika Akuntansi dan Bisnis*, 10(1), 43–60
- Chen, C., Geng, L., & Zhou, S. (2021). RETRACTED ARTICLE: Design and implementation of bank CRM system based on decision tree algorithm. *Neural Comput & Applic*, 33, 8237–8247
- Chung, S. G., Goh, B. W., Ng, J., & Yong, K. O. (2017). Voluntary fair value disclosures beyond SFAS 157's three-level estimates. *Review of Accounting Studies*, 22, 430–468
- Hermanson, S. D., Kerler III, W. A., & Rojas, J. D. (2017). An analysis of auditors' perceptions related to fair value estimates. *The Journal of Accounting & Finance*, 18–37
- Ibidunni, O., & Okere, W. (2019). Fair value accounting and reliability of accounting information of listed firms in Nigeria. *Growing Science Accounting*, 5, 91–100
- Ji, A. E. (2019). Fair value accounting and corporate capital structure: Evidence from SFAS 157 disclosures. *International Journal of Business & Applied Sciences*, 8(4), 14–22
- Joe, J. R., Vandervelde, S. D., & Wu, Y. J. (2017). Use of high qualification evidence in fair value audits: Do auditors stay in their comfort zone? *The Accounting Review*, 92(5), 89–116



Authors may be reached at
Antima171193@gmail.com,
Nishakalra09@gmail.com,
drgsoral@gmail.com and
eboard@icai.in