Value Relevance of Financial Performance Measures: An Indian Context

Abstract: This research presents an empirical analysis of the value relevance of earnings, book value, and various other financial performance metrics for the top 30 companies listed on the BSE SENSEX index in India, covering the period from 2015 to 2019. The theoretical framework underpinning this study is centered on the concept of value relevance of financial performance indicators. This study aims to assess the extent to which a company's stock price is influenced by different financial performance measures. To explore these relationships, two robust regression models have been utilized: the Ohlson-Price Model and the Multiple Linear Regression. The findings of the study indicate that using the Ohlson-Price Model, when analyzed individually, earnings per share (EPS) has greater value relevance than book value per share (BVPS). When analyzed collectively, EPS and BVPS explain 55.86% of the variation in stock price, corroborating previous research findings. Additionally, results from the multiple regression model identify dividend yield (DY) as the most significant determinant affecting stock prices.

Keywords: Value relevance; Financial performance; Ohlson-Price Model; Regression Analysis; India.

1. Introduction

Financial statements are a rich repository that provides crucial information about a company to its stakeholders. One of these key company stakeholders is investors. The financial statements

are helpful for the investors in analyzing the company's financial standing by evaluating the business performance and its value (Subramanyam, 2020). Performance measurement is a way of quantifying the actions taken by a company. The quantified activities are measured using a metric, referred to as a performance measure, which captures the effectiveness and efficiency of the business actions (Neely et al., n.d.). The performance measures, derived from the accounting information of the financial statements, help in benchmarking the actions taken by the companies. Appropriate, adequate, and timely representation of accounting information is therefore crucial for companies (Mohammed Al-Shafeay & Almagtome, 2019).

(Tangen, 2003) describes various types of performance measures like activity-based cost accounting measures, financial measures, traditional productivity measures, time-based productivity measures, and non-cost performance measures. While the accounting information and measures need to be appropriate and adequate, they must also be relevant for the investors. According to Statement 5 of the Statement of Financial Accounting Concepts, accounting information is considered "relevant" if "it is capable of making a difference in user decision". Thus, the availability of value-relevant financial information is crucial for investors to make *informed decisions.*

Based on (Aliabadi et al., n.d.; Barton et al., 2010; Papadaki & Siougle, 2007) work, this paper studies the value relevance of earnings, book value, and other financial performance measures using data from the top 30 Indian companies listed on the Bombay Stock Exchange (BSE), measured on the SENSEX index, from 2015 to 2019. Popularly referred to as the Dalal Street, BSE was established in 1875 under a banyan tree near Mumbai Town Hall (Maharashtra, India) and is one of the oldest stock exchanges in Asia. As of October 2024, 5505 companies are listed on the exchange. SENSEX, the benchmark index of the BSE, captures the performance of the top companies listed on the exchange.

The rest of the paper is organized as follows: literature review in section 2, research methods in section 3, results in section 4, and discussion and analysis in section 5.

2. Literature Review

Amongst the most initial and seminal studies carried out in the domain of value relevance, (Ball & Brown, 1968) studied the usefulness of financial numbers, which concluded that the information on income numbers is content and valuable. They also suggested that the investors have access to timely information to make their investment decisions, implying that they have access to other sources of information than the annual financial reports. Following their work, multiple studies have been carried out in this domain.

(Alali & Foote, 2012; Chen et al., 2001; Fiador, 2013; Mulenga, 2015; Ragab & Omran, 2006; Sami & Zhou, 2004) studied the relationship between stock price (or stock returns) and earnings (or earnings variables) and book values using either the price model or the returns model in various emerging markets. (Fiador, 2013) carried out an examination based in Ghana

and regressed a set of five variables against the market price per share (MPS). Earnings per share (EPS) and net asset value (NAV) were two crucial accounting information variables used in that regression model. The study concluded that the accounting information is value relevant for the firms and that NAV has the highest value as it directly translates into the market valuation.
(Aliabadi et al., n.d.) concluded that a significant association exists between market performance and accounting measures, and identified return on assets (ROA) as the most relevant accounting measure. (Mulenga, 2015) studied the value relevance of accounting information for Indian public sector banks listed on the BSE to conclude that return on equity (ROE) and book value per share (BVPS) were positively correlated with the MPS. Additionally, EPS was identified as the most relevant measure. Studying banking firms in the Asia Pacific region, (Ariff & Cheng, 2011) reported that the changes in earnings disclosed in the annual reports lead to significant changes in the prices of the banking stock.

(Papadaki & Siougle, 2007) studied the value relevance of accounting information in Athens between 1985 and 1996. Using the earnings capitalization model, they identified a negative price-earnings relation for loss-incurring firms and a positive relation for profit-making firms. Fifty-six firms based in Abu Dhabi that adopted the International Financial Reporting Standards (IFRS) were studied by (Alali & Foote, 2012). The authors used both valuation models to conclude that a positive association existed between accounting information and market values. However, during the bearish run in the markets and at times of speculative rumors, the accounting information was found to be less value-relevant. In the same geographical context, (Khanagha, 2011) studied firms listed on the Abu Dhabi Securities Market to check the changes in value relevance after adopting IFRS. The research concluded that the value relevance of accounting information decreased after adopting the new standards. Moreover, small firms were found to have a higher ‘value relevant’ accounting information than large firms.

(El et al., 2005) studied the impact of earnings and book value and empirically proved that both variables, EPS and BVPS, have a positive and significant relationship with the stock price, individually and jointly. In another study conducted on 18 Jordanian industrial firms between 1992 and 2002, (Shamki & Abdul Rahman, 2012) concluded that value relevance of book value and earnings had increased when regressed individually against the stock price. It was discovered that the relevance of earnings has increased, whereas the relevance of book value has decreased when using the price model on both variables jointly. (Ely & Waymire, 1999) studied the relevance of the earnings variable on 100 New York Stock Exchange (NYSE) data between 1927 and 1993. They concluded that there was no improvement in the relevance of earnings over the selected period of study. However, when the valuation model was applied to earnings and book values jointly, it recorded an increase in the value relevance of book values.

Various researchers explain the valuation models used in testing the value relevance conceptually by multiple researchers, e.g., (Kothari et al., 1995; Lev, 1989). (Kothari et al., 1995) present results proving that the price valuation models are superior to the return models in Market Based Accounting Research. Moreover, the relevance of value relevance literature

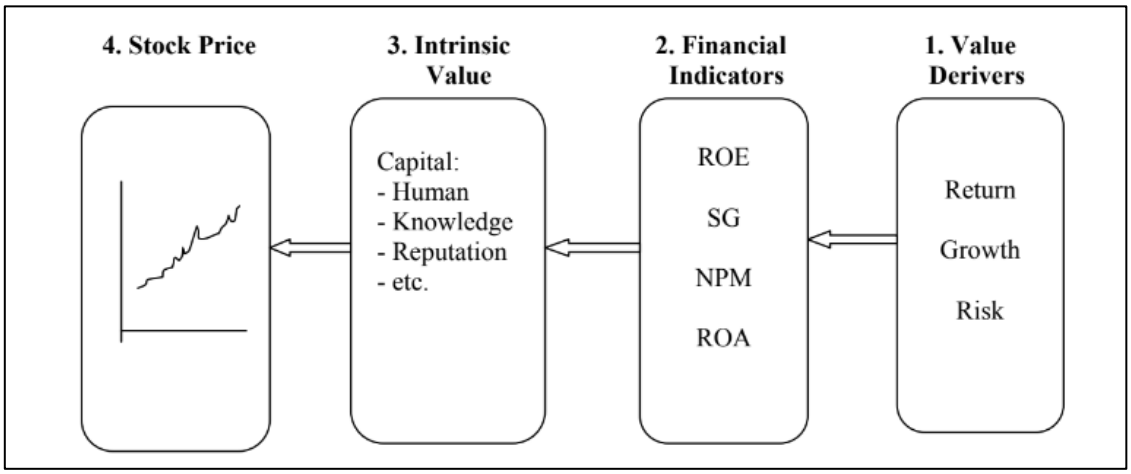
was studied by (Barth et al., 2001) to conclude that it helps academicians, standard setters, and other non-academic participants. It also deduced that the valuation models could be used to derive empirical results regarding value relevance.

3. Research Methods

3.1. Research Design

The relationship between accounting measures and corporate financial performance is studied closely in various geographical and time contexts, as elaborated in section 2. (Dowling, 2006; Zhang & Rezaee, 2009) explain a four-stage framework, based on work conducted by Copeland, that describes how various financial indicators direct towards the financial performance:

- Figure 1: Corporate Market Valuation Model based on Copeland et al, 2000.



a) Stage 1: Value Drivers – Value for any business is created by generating returns and ensuring growth on investments while managing the risk associated with the business operations (Dowling, 2006).
b) Stage 2: Financial Indicators – The financial measures from the corporate financial statements are considered critical financial indicators (Aliabadi et al., n.d.).
c) Stage 3: Intrinsic Value – Traditionally, it was believed that only financial capital played an essential role in determining a company's value. As exhibited in Figure 1, there are factors like company databases, intellectual properties, customer base, human capital, and corporate reputation that play a role in the determination of the intrinsic value of firms.
d) Stage 4: Stock Price - (FAMA & FRENCH, 1995) suggested that a company's stock price behavior reflects its earnings behavior. The markets being efficient, any information about the company gets immediately reflected in its stock price.

As "agents to the shareholders", the managers of companies must make decisions that lead to maximum benefits to the shareholders. The four-stage model can be summed to deduce that any action undertaken by a company translates into its performance (measured through its stock price) which the accounting information can essentially capture.

3.2. Sample Details

This study examines the top 30 companies listed on the BSE SENSEX Index, from 2015 to 2019. The data for the selected sample were sourced from the CMIE Prowess Database, which provides comprehensive financial information on Indian firms. The use of this database ensures the accuracy and consistency of information, enhancing the reliability of the analysis and findings.

3.3. Research Method

Research studies from (Almagtome et al., n.d.; Almujamed & Alfraih, 2019; Ebaid, 2011; Fiador, 2013; Mulenga, 2015; Papadaki & Siougle, 2007; Shamki & Abdul Rahman, 2012) reveal regression analysis as the most commonly employed technique to identify and study the relevance of various financial measures derived from accounting information. Based on the literature, this study has incorporated regression analysis as follows:

3.3.1. Ohlson – Price Model

The initial segment of the study utilizes the Ohlson – Price Model to examine the relationship between the stock price, EPS, and BVPS. The Ohlson – Price Model, initially introduced in Ohlson's seminal work (Ohlson, 1995), provides a framework for deriving a pricing equation that empirically tests both accounting and no-accounting information (Lo et al., n.d.). In this study, a modified version of the Ohlson–Price Model, as applied by (Ragab & Omran, 2006), is employed for regression analysis.

Prior research (Alali & Foote, 2012; Bae & Jeong, 2007; Fiador, 2013; Mostafa, 2016; Papadaki & Siougle, 2007; Ragab & Omran, 2006) has utilized stock price as a primary indicator of corporate financial performance, which this study also adopts as the dependent variable. The independent variables in this model include:

a) Earnings per Share (EPS) - (Alali & Foote, 2012; Bae & Jeong, 2007; Mohan & John, 2011; Papadaki & Siougle, 2007; Purswani et al., 2017; Ragab & Omran, 2006) have used EPS as an accounting-based performance measure.

$$P_{it} = \beta_1 EPSit + \varepsilon_{it} \quad \ldots\ldots (1)$$

Where, $P_{it:}$: MPS three months after the end of fiscal year' i'

EPS_{it}: Earnings per share at the end of fiscal year 'i'.

b) Book Value per Share (BPVS) – It is an accounting measure that investors use to determine the value of a company's stock compared to its market price. (Alali & Foote, 2012; Bae & Jeong, 2007; Mohan & John, 2011; Mulenga, 2015; Papadaki & Siougle, 2007; Ragab & Omran, 2006) study BVPS as an accounting-based accounting measure.

$$P_{it} = \beta_2 BVPS_{it} + \varepsilon_{it} \quad \ldots\ldots (2)$$

Where $BVPS_{it}$: Book value per share at the end of fiscal year 'i'

Finally, both the independent variables are jointly regressed against the MPS using the following equation:

$$P_{it} = \beta_1 EPS_{it} + \beta_2 BVPS_{it} + \varepsilon_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.. (3)$$

3.3.2. Regression Analysis

In the second part, regression analysis is employed to study seven other financial performance measures to check their relationship with the MPS.

a) Earnings before interest, taxes, depreciation, and amortization (EBITDA) – It represents the cash profit available to companies. EBITDA, as a metric, does not include non-cash expenses (i.e., depreciation and amortization), taxes, and interest on debt expenses.
b) Earnings before interest and taxes (EBIT) – This metric measures a company's profitability before its interest on debt expenses and taxes are considered,
c) Cash flow from operations (CFO) – The cash flows generated from a company's core business activities by serving the customers are referred to as CFO. (Habib, 2010; Mostafa, 2016; Olugbenga & Atanda, 2014; Purswani et al., 2017) tested the relevance of the CFO on the companies' performance, as measured by the stock price.
d) Net income (NI) – Also referred to as profit after tax (PAT), it measures the quantum of business earnings that remain with a company after it has spent on all its expenses and taxes. (Alali & Foote, 2012; Dimitropoulos & Asteriou, 2009; Ebaid, 2011; Habib, 2010) have incorporated this measure in their value relevance studies.
e) Return on equity (ROE) – (Abor, 2005; al Manaseer et al., 2012; Aliabadi et al., n.d.; Cheng et al., 2010; Das et al., 2021; Duasa et al., 2014; Le & Phan, 2017) confirm ROE as another reliable accounting-based performance measure. It captures how efficiently a company handles the equity investors' funds and generates returns on them (Tangen, 2003).
f) Net interest margin (NIM) – Measures the performance of banks and financial institutions by capturing their income-generating capacity.
g) Dividend yield (DY) – Mathematically, it is a ratio of a firm's dividend to the firm's stock price, establishing an inverse relationship between stock price and dividend yield. While relatively few studies have incorporated this metric, DY is frequently regarded as an effective indicator of return potential by a large section of investors.

4. Results

4.1. Descriptive Statistics

4.1.1. Earnings and Book Value

Table 1 provides the descriptive statistics and correlation matrix for the selected sample data. Panel 1 of Table 1 indicates the mean MPS is ₹1694.66, with values ranging from ₹137.80 to ₹11,920.65 over the period from 2015 to 2019. The mean EPS is ₹45.95, while the average BVPS is ₹311.36. Panel B of Table 2 reveals a strong positive correlation between MPS and EPS, as well as a positive, moderately strong correlation between MPS and BVPS.

- Table 1 – Panel A: Descriptive Statistics for firm-year observations 2015-2019

Variables	n	Mean	SD	Min.	Max.
Price (P_{it})	150	1694.66	2069.93	137.80	11920.65
Earnings (EPS_{it})	150	45.95	49.08	-17.93	251.59
Book Value ($BVPS_{it}$)	150	311.37	285.34	17.21	1491.18

- Table 2 – Panel B: Correlation among variables of the Ohlson – Price Model

Variables	MPS	EPS	BVPS
MPS	1.000		
EPS	0.749	1.000	
BVPS	0.577	0.815	1.000

4.1.2. Other performance measures

- Table 3 – Panel C: Descriptive Statistics for firm-year observations 2015-2019

Variables	n	Mean	SD	Min.	Max.
%ΔReturn	150	9.412	34.804	-90.216	172.689
%ΔEBITDA	150	12.260	48.027	-414.329	291.578
%ΔEBIT	150	10.011	48.799	-321.899	237.075
%ΔCFO	150	-8.319	153.447	-944.263	616.862
%Δ NI	150	-6.359	272.193	-2460.101	1596.391
ROE(%)	150	18.941	16.509	-9.760	123.280
NIM(%)	150	0.734	1.521	0.000	4.870
DY(%)	150	1.101	0.900	0.000	4.356

- Table 4 – Panel D: Correlation matrix of financial performance measures and MPS

	%ΔReturn	%Δ EBITDA	%Δ EBIT	%ΔCFO	%Δ NI	ROE(%)	NIM(%)	DY(%)
%ΔReturn	1							
%ΔEBITDA	0.070	1						
%ΔEBIT	0.154	0.163	1					
%Δ CFO	0.105	0.401	0.105	1				
%Δ NI	0.129	0.035	0.052	0.015	1			
ROE(%)	0.089	0.071	0.135	0.155	0.119	1		
NIM(%)	0.001	0.040	0.041	-0.140	0.107	-0.184	1	
DY(%)	-0.305	-0.087	-0.076	0.049	-0.058	0.229	-0.297	1

Panel D of Table 4 presents the correlations between stock prices and various performance measures. The correlation coefficient between stock returns and DY indicates a weak negative relationship. Additionally, the correlation coefficients for all other performance measures exhibit a weak positive association with stock prices, as all coefficients remain below 0.8.

4.1.3. Results analysis from the Ohlson-Price Model

Table 5 presents the slope coefficients derived from the pooled and cross-sectional time series regression equations. Panel A of Table 5 shows the regression results using Equation 3, where the model is statistically significant ($F=95.2947$, $p < 0.05$). Adjusted R^2 serves as a measure of value relevance, as noted in previous research. The adjusted R^2 of the pooled regression indicates the EPS and BVPS together account for 55.86% of the variation in stock price. However, a declining trend in adjusted R^2 from 2015 to 2019 suggests a gradual decrease in the value relevance of EPS and BVPS for equity investors over this period.

- Table 5 – Panel A: Pooled and yearly cross-sectional regressions of the market price of the share on earnings and book value per share (jointly) for the period of 2015-2019

		$P_{it} = \beta_1 EPS_{it} + \beta_2 BVPS_{it} + \varepsilon_{it}$			
Year	n	β_1EPS	β_2BVPS	Adj. R^2	F-stat
2015	30	36.175	-0.709	0.6993	34.7184
2016	30	33.203	0.431	0.7374	41.7137
2017	30	31.001	-0.634	0.5854	21.4725
2018	30	33.976	0.024	0.5259	17.0838
2019	30	41.316	-1.873	0.4097	11.0649
Pooled	150	35.070	-0.733	0.5586	95.2947

The correlation coefficients for EPS, as shown above in Table 5, Panel A, indicate a positive relationship between EPS and stock price in the pooled regression. Specifically, a one percent change in EPS is associated with an approximate increase of 35 percent in stock price. Conversely, there is a weak negative correlation between BVPS and stock price, as evidenced by the coefficient value for BVPS, which suggests that a percentage increase in BVPS results in a 0.73 percent decrease in the stock price.

- Table 6 – Panel B: Pooled and yearly cross-sectional regressions of the market price of the share on earnings (individually) for the period of 2015-2019

		$P_{it} = \beta_1 EPS_{it} + \varepsilon_{it}$	
Year	n	β_1EPS	Adj. R^2
2015	30	32.645	0.7050
2016	30	30.962	0.7455
2017	30	27.963	0.5974
2018	30	34.083	0.5428
2019	30	32.894	0.4111
Pooled	150	31.591	0.5582

The panel above presents the results of the yearly and pooled regressions using Equation 1, analyzing the relationship between EPS and stock price individually. The model is statistically significant ($p < 0.05$) across each year within the study period as well as in the pooled equation.

EPS independently accounts for 55.82% of the variation in stock price. The coefficient values for EPS, derived from a simple regression model between EPS and stock price, indicate a positive relationship between the two variables, where a percentage increase in EPS is expected to lead to an approximate 31 percent increase in stock price.

- Table 7 – Panel C: Pooled and yearly cross-sectional regressions of the market price of the share on book values (individually) for the period of 2015-2019

		$P_{it}= \beta_2 BVPS_{it}+ \varepsilon_{it}$	
Year	n	β_2BVPS	Adj. R^2
2015	30	3.895	0.3764
2016	30	4.417	0.5303
2017	30	4.063	0.3867
2018	30	4.866	0.3254
2019	30	3.619	0.1472
Pooled	150	4.184	0.3283

Table 7, Panel C, presents the yearly and pooled regression results using Equation 2 to examine the individual relationship between BVPS and stock price. With $p < 0.05$, the model is statistically significant, for each year within the study period as well as for the pooled regression. BVPS alone accounts for 32.83% of the variation in stock price. The coefficient values for BVPS, as shown in Panel C of Table 7, indicate a positive relationship between BVPS and stock price, where a percentage increase in BVPS is associated with a 4 percent increase in stock price.

4.1.4. Results analysis of other performance measures

Several studies including (Aliabadi et al., n.d.; Dimitropoulos & Asteriou, 2009; Ebaid, 2011; Habib, 2010; Mostafa, 2016; Mulenga, 2015; Olugbenga & Atanda, 2014; Sharma et al., n.d.) have investigated various performance measures such as net income, return on equity, income before extraordinary items, and return on net worth. For the present study, eight performance measures were selected: Earnings before interest and taxes (EBIT), net income (NI), cash flow from operations (CFO), earnings before interest, taxes, depreciation, and amortization (EBITDA), return on equity (ROE), return on assets (ROA), net interest margin (NIM), and dividend yield (DY).

To assess multicollinearity among these independent variables, the Variation Inflation Factor (VIF) was employed. The selected variables were transformed into their respective percentage changes for regression analysis and the VIF was calculated. Subsequently, the regression model excluded ROA, as it exhibited a VIF greater than 2 (a high VIF indicates a strong correlation between the variables). The high VIF suggested that the variance explained by ROA was captured by the other remaining variables.
The final equation that was studied is:

$$\% \Delta P_{it} = \beta_1 \% \Delta EBITDA_{it} + \beta_2 \% \Delta EBIT_{it} + \beta_3 \% \Delta NI_{it} + \beta_4 \% \Delta CFO_{it} + \beta_5 \Delta NIM_{it} + \beta_6 \Delta ROE_{it} + \beta_7 \Delta DY_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Where,

$\%\Delta P_{it}$: Change in a firm 'i''s stock price three months after the end of fiscal year 't' over 't-1.'

%Δ EBITDA: Change in the EBITDA of a firm 'i' at the end of fiscal year 't' over 't-1.'

%Δ EBIT: Change in the EBIT of a firm 'i' at the end of fiscal year 't' over 't-1.'

%Δ NI: Change in the NI of a firm 'i' at the end of fiscal year 't' over 't-1.'

%ΔCFO: Change in the CFO of a firm 'i' at the end of fiscal year 't' over 't-1.'

NIM_{it}: Net Interest Margin of banking/ financial institutions 'i' from the selected sample at the end of fiscal year 't'

ROE_{it}: Return on Equity of the firm at the end of the fiscal year 't'

DY_{it}: Dividend Yield of a firm 'i' at the end of year 't'

- Table 8: Regression results of the financial performance measures for the selected sample for 2015 – 2019

Variables	Coefficients	p-value
% ΔEBITDA	-0.0154	0.8048
% ΔEBIT	0.0748	0.1889
% ΔCFO	0.0201	0.3057
% ΔNI	0.0125	0.2164
ROE (%)	0.2430	0.1644
NIM (%)	-1.8914	0.3206
DY (%)	-13.4531	0.0000

The regression analysis conducted using Equation 4 yielded an adjusted R^2 of 0.1109, indicating that the selected financial performance measures account for only 11.09% of the variation in the stock price for the study sample. This suggests that the factors beyond those included in this research model play a more substantial role in impacting the stock price relevance and contribute to the observed variation.

The multiple regression model 4 is statistically significant with $p < 0.05$ (and Significance F value = 0.001167). The results, as presented in Table 8, reveal that ROE, with a coefficient value of 24.30, has the most significant positive influence on stock price. Conversely, DY, with a negative coefficient. Based on the p-values of the variables presented in Table 8, it can be concluded that all factors, except DY, are statistically insignificant as their p-values exceed the 0.05 threshold. Only DY demonstrates statistical significance.

5. Discussion and Analysis

The results derived from the Ohlson – Price Model, as discussed in the previous section, indicate that when tested individually, EPS explains a greater proportion of variation in

companies' stock prices (55.82%) compared to BVPS, which accounts for 32.83% of the variation. Thus, EPS is more value-relevant than BVPS. When considered together, EPS and BVPS explain 55.86% of the variation in stock prices. These findings are consistent with the studies of (El et al., 2005; Mostafa, 2016b; Shamki & Abdul Rahman, 2012). Following the work of (Aliabadi et al., n.d.; Chen et al., 2001; Purswani et al., 2017), this study confirms a significant association between accounting information and performance.

The year-wise analysis reveals a declining trend in the value relevance of EPS and BVPS, both individually and jointly. Consequently, this concludes that the value of relevance of both earnings and book values has diminished since 2015. This outcome supports the accounting literature that highlights the decline in the value relevance of accounting information. (Barth et al., 2001) indicates that the value relevance of accounting information, particularly earnings variables, has been declining, largely due to the increasing scale of investments firms allocate to intangible assets. This trend is supported by studies from (Dichev & Tang, 2009; Lev, 1989; Lev & Zarowin, 1999). (Barth et al., 2018) further observed a gradual shift in the significance of various accounting measures, attributing this change to two main factors: the rise in loss-making firms and the substantial growth investments in intangible assets.

The multiple regression analysis of the seven financial performance measures, beyond EPS and BVPS, reveals that ROE and DY exert the most substantial influence on a company's stock price. ROE demonstrates a positive effect, whereas DY shows an inverse relationship with the stock prices. Notably, the test yielded statistical significance solely for DY. Thus, for the selected sample of companies, ROE emerges as the most value-relevant financial performance measure, followed by DY.

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