

“Sustainable Stock Price Prediction through Pooled OLS Analysis: Integrating Fundamental and Volatility Indicators in India’s Automobile Sector”



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Abstract

Purpose:

Stock price forecasting is still crucial to the emerging economies like India where the automobile industry is the engine of sustainable industrialization and entrepreneurship. This paper will analyze the combined effect of the basic indicators and market volatility in determining the movement in stock prices to make financial predictability a responsible investment and economic resilience tool.

Design/Methodology:

The Pooled Ordinary Least Squares (OLS) model of panel data regression was used in 2017-2024. The basic predictors are the Price-to-Earnings (PE) ratio, Price-to-Book (PB) ratio, and Return on Equity (ROE), and the proxy of volatility is the Standard Deviation (SD) of returns. To ensure that all variables were comparable, Z-scores were used to standardize them.

Findings:

The model describes approximately 52 percent of the stock price movements, indicating that PE, PB, and SD play a major role in price movements, whereas ROE has weak short-term effects. The integration of the valuation and volatility measures makes sustainable investment more predictable and the market more transparent.

Originality/Value:

The article bridges the gap between financial modelling and sustainable entrepreneurship and shows that the integration of valuation volatility can support ethical finance and industrial innovation in the new markets of Asia.

Practical Implications:

The finds give information to investors, analysts and policy makers who are concerned with responsible investment models that strengthen the stability of markets, financial literacy and inclusive economic development.

Keywords: Sustainable Finance; Entrepreneurship; Green Investment; Volatility; Strategic Management; Automobile Sector; Corporate Responsibility; Asia

Introduction

The issue of stock price forecasting has remained a key issue in financial research. The research of the stock market behavior in the modern world of sustainable finance and responsible investment is not only a matter of profitability, but also of the economic stability of the long term and the inclusive growth as well. The trading volumes and investor interest in the Indian stock market have increased significantly, which was predetermined by the increase in financial literacy, online trading platforms, and investment enthusiasm following the pandemic. This transforming financial ecosystem that links financial predictability and ethical development is getting significant in terms of sustainable entrepreneurship and innovation.

In this regard, automobile industry in the NSE (National Stock Exchange of India) has got much attention since it is sensitive to macroeconomics.

The sector, besides being a measure of consumer demand and industrial activity, is also an indicator of the overall economic cycles, and this would make it a good topic of specialized financial analysis. The automobile sector is a central part of the sustainable development agenda in India, and it has contributed to the development of clean technology, green production, and inclusive industrialization. It is thus important to comprehend the factors that drive the price movements of stocks in this industry in order to maximize returns at the same time controlling risk.

The theoretical foundation of the study is based on several fundamental financial and economic theories that explain the relationship between firm fundamentals, market information, and stock price changes. According to the Efficient Market Hypothesis (EMH) of Fama (1970), the stock prices reflect all the publicly available information.

However, in the developing economies such as India, market inefficiencies may allow certain financial ratios to be predictive including the Price-to-Earnings (PE), Price-to-Book Value (PB), and Earnings Per Share (EPS) ratios. Similarly, the Fundamental Valuation Theory which is modeled on theories such as the Gordon Growth Model and the Dividend Discount Model is centered on emphasizing the fact that the intrinsic value of a company is the present value of its future cash flows or dividend payments. These models give the justification of the utilization of valuation multiples and profitability ratios (such as Return on Equity, ROE) as proxies of the estimation of the firm performance and intrinsic value. Together with the principles of sustainability, these valuation perspectives are not only reflecting the economic worth but also reflecting the capacity of the firm to develop in the ethical, responsible, and innovative aspects.

These valuation views can be augmented using the risk-return trade-off assumption which is a critical principle of Modern Portfolio Theory (Markowitz, 1952) and the Capital Asset Pricing Model (Sharpe, 1964) that states that investors will accept higher returns in exchange of taking on more risk. Standard deviation is a volatility measure therefore it is an important measure of uncertainty in stock returns. The theories are integrated to provide a holistic conceptual framework demonstrating that the stock prices are subjected to the firm-specific fundamentals as well as the market-related risk. This framework, when embedded in the framework of sustainability, enables investors and policymakers to understand volatility as a message of adaptive capacity, resilience and innovation in enterprises in addition to risk. The present paper explores to what extent PE, PB, EPS, ROE, and standard deviation can be used to explain the change in the stock prices of automobile companies traded in the NSE. This approach to the sustainable strategic management is friendly because it demonstrates how ethical long-term investment decisions that would strike a balance between financial performance and corporate responsibility can be made using quantitative measures.

The plethora of financial indicators, valuation ratios, such as Price-to-Earnings (PE), Price-to-Book (PB), and performance indicators, such as Return on Equity (ROE) and Earnings Per Share (EPS) are famous tools of measuring the stock value. Dwinanda and Hendriyani (2022) discovered that the three variables of EPS, PE, and PB were found to explain 62.3 percent of the stock returns in the Indonesian automobile firms, which implies the incremental value of the combination of multiple important financial variables to predict stock returns in the emerging markets. PE ratio, in particular, has been part of the diet of investment

analysis since it is easy and understandable, and the foundation of the value investing strategy. Empirical evidence by Basu (1977, 1983) and Jaffe et al. (1989) support the tendency of low PE stocks to pay off in terms of long-term returns, but the correlation is not always uniform across all markets. These conventional measures are re-evaluated in the framework of sustainable finance, since they allow distinguishing the firms that can be profitable and at the same time follow sustainable and ethical business models.

Besides these basic indicators, risk and volatility measures are also critical in investment decision making. The level of investment risk is indicated by market fluctuations that are commonly measured in terms of standard deviation of stock returns. Latane and Rendleman (1976) have shown that there is a strong relationship between implied standard deviations calculated using option pricing models and current and future stock returns volatility, which is why such measures are relevant in predicting market behaviour. According to Larequad (2015), the use of standard deviation alone may be deceptive in markets with price restrictions or non-standard trading processes, and recommends a more careful approach in testing volatility. This paper thus understands volatility not only as uncertainty but also as a possible measure of adaptive and innovative ability in the dynamic industries like the automobile industry.

This paper aims at incorporating these dimensions through a Pooled Ordinary Least Squares (OLS) panel data model in order to test the effect of core financial variables PE, PB, EPS and risk proxies including standard deviation on stock prices of automobile firms in the NSE. The panel data is especially beneficial because it has the benefit of capturing cross-sectional heterogeneity among firms and dynamics over time, thus giving a stronger and more granular result than either cross-sectional or time-series analysis. It has been previously established that panel data methods are efficient to isolate firm-specific effects, capture time-varying trends, and enhance the accuracy of financial modeling across a wide range of market conditions (Adekeye et al. 2021; Amoa-Gyarteng and Owusu-Adusei 2024; Ntim 2012). Using this model in the context of sustainability, the current study highlights the opportunities of data-driven finance to attract responsible entrepreneurship and lasting economic inclusivity.

This study is also justified by the fact that the number of retail investors in India is increasing and most of them are keen to invest in equity markets, yet in most cases, they do not have a detailed knowledge of financial ratios, valuation methods, and risk measurement. This study seeks to offer practical recommendations to both new and experienced investors by assessing the predictive

capability of the conventional valuation and risk measures in the Indian auto industry. By so doing, it adds to the discussion of sustainable financial literacy, ethical investment, and socially responsible entrepreneurship. In addition to that, the study will add to the overall discussion on the emerging market finance by determining the relevance of traditional measures of valuation in dynamic market conditions that are marked by the changing behavior of investors, integration of technology and economic uncertainty. This is in line with the mission of the Journal of Asia Entrepreneurship and Sustainability, which is to facilitate research in the interface of innovation, ethical enterprise, and sustainable development in Asia.

The work attempts to fill the gap between the theoretical financial models and the practical investment decision-making and provide a holistic picture of the determinants of stock prices in one of the most important industrial sectors in India. This study advocates the need to pursue inclusive, responsible and innovation-driven growth in the changing economic environment in Asia by connecting financial predictability and sustainability.

The final question in this study is:

Is a combination of PE ratio, PB, ROE, and standard deviation accurate in forecasting the automotive stock prices? The solution can not only enhance returns in a portfolio, but also direct investment strategy to good fundamental and fairly valued stocks that reflect the tenets of sustainable finance and responsible entrepreneurship.

Literature Review

The forecasting ability of financial variables on stock returns has been a very important issue in the literature of finance. Fundamental indicators and volatility indicators have been criticized and examined in the explanation of stock price behavior. According to Richardson, Tuna and Wysocki (2010), accounting information may not reflect the true economic value of a company and this may result to mispricing. Caporale and Plastun (2023) list among the key flaws of volatility analysis subjectivity, reliance on untestable algorithms, susceptibility to data snooping, and unrealistic simplifications. The authors claim that these limitations compromise the scientific validity of volatility analysis and that better forecasting methods would be used to offer more acceptable recommendations to inform investment decision making. Both analyses, according to Petrusheva and Jordanoski (2016) have their advantages and disadvantages that can be combined to offer the most desirable results. Overall, these articles have demonstrated that even though both fundamental and volatility analysis can produce useful information regarding the behavior of stock prices, the shortcomings of these

techniques should be applied with caution. The predictive power may be improved through the integration of different approaches and using systematic and methodologically rigorous methods that might assist in making higher-order investment decisions. In a broader sense, these observations also refer to the role of integrated financial analysis in responsible and informed entrepreneurship as a key component of sustainable business ecosystems.

Earnings-Ratios and Stock Returns

The basic analysis is pegged on the earnings based measures, namely, Earnings Per Share (EPS) and Price to Earnings (PE) multiple. Oh, Kim, Kim, (2006) did not ignore the usefulness of EPS because panel data econometrics were adopted to explore its mean reversion property. They find out that the movement of earnings patterns is predictive of long run stock movement especially in fundamental driven markets. This view was supported by the study conducted by Pandey (2002) of 247 Malaysian firms that used panel data and both earnings-to-price (EP) ratio, and dividend yield that were found to have positive and significant relationship with stock returns. Such findings highlight the importance of earnings-based stock performance indicators in new financial markets.

These traditional indicators may be considered within the framework of sustainable entrepreneurship as the indicators of financial strength and value generation in which the regular trends of earnings reveal the ability of a firm to sustain operations, staff, and innovation.

Opposing opinions emerge in the studies like Fun and Basana (2012), who studied predictive power of PE ratio on low PE stocks in the Indonesian Liquidity 45 index. Whereas low PE stocks were found to give better returns in a short (six-month) holding period, this was lost in longer periods, and no statistically significant relationship was found. This implies that PE ratios alone might not be good long term predictors in the emerging markets. In another of the studies Gottwald (2012) reaffirmed the utility of PE ratio in intrinsic valuation citing its popularity among investors and analysts. However, Surjanto and Sugiharto (2021) found that PE ratio in combination with PB ratio gave an even better model, with a 80.78% variation in stock price. This evidence demands multi-factor equity valuation models. As Neldi et al. (2023) state, financial variables have a significant impact on the Price Earning Ratio (PER) of LQ45 companies, with higher debt levels positively affecting PE ratio, and higher profitability, firm size, sales, and dividend payouts negatively affecting it, indicating that investors might correlate lower PE ratio with better fundamental performance. Combined, these results show that the sustainable investment policies must not be focused on the short-term speculative

returns, but must incorporate various valuation indicators that are representative of long-term profitability and social responsibility.

More Generalized Financial Ratios and Forecasting Models

Other than the earnings measures, various financial ratios have been studied in terms of their explanatory power. Jallow et al. (2022) examined six financial ratios PE, PB, PCF, PS, ROE, and dividend yield of Kenyan banks listed. They used stepwise multiple regression and found that PE, PB, PCF, and ROE had a significant relationship with stock prices and their model accounted 89.8% of the price variation. This means that combined models which apply various financial ratios are more predictive. These articles have pointed out that holistic ratio models do not only work in improving predictive quality but also significant tools of strategic financial planning and sustainable corporate management especially in emerging economies. Financial predictability allows inclusion and stronger economic systems to be achieved in cases where it assists in decision-making by the entrepreneurs.

Volatility and Risk: Quantifying Uncertainty of Returns

Another significant performance of a stock is market volatility. Latané and Rendleman (1976) came up with the implied standard deviation (ISD) of option prices which was later improved by the Weighted Implied Standard Deviation (WISD). Their analysis reveals that WISDs better predict future volatility than past measures that give a future outlook on market risk. Beckers (1981) has shown that implied standard deviations based on option prices are more useful predictors of future stock price volatility than historical ones, and thus have a practical use in forecasting variance despite the theoretical shortcomings of the Black-Scholes model. Brock, Lakonishok and LeBaron (1992) conducted an experiment based on past data of the Dow Jones Index (1897-1986) to test simple trading rules of volatility. Their results showed that buy signals always gave high average returns compared to sell signals. They also pointed out a distinct difference in risk in terms of standard deviation. The introduction of volatility into the sustainable finance model changes it into an indicator of uncertainty to a measure of resilience. When in line with sustainable investment principles, volatile modeling helps entrepreneurs and policymakers to create risk-reduced, socially responsible, and adaptive financial systems.

Synthesis and Implications for Research

The results of the literature support the argument that financial ratios particularly when employed in

combination have a high level of explanatory power on stock returns in the emerging markets. The results also show that there are conflicting findings about the individual indicators including PE ratio, particularly across various periods of time. Single ratio models are less effective in valuation and projections, and therefore detailed frameworks are more effective than the multivariate approaches, as illustrated in the works of Jallow et al. (2022) and Surjanto and Sugiharto (2021). As far as sustainability is concerned, such synthesis can underline the idea that the integrated financial modeling contributes to the responsible investment practice and aids the enterprises in their ethical development. The correspondence between predictive financial modeling and sustainable entrepreneurship forms a linkage between financial performance and social value creation.

The present research is based on the findings of these studies and explores the following: The effectiveness of the key basic ratios PE, PB, and ROE in forecasting stock returns in both long and short-term. Whether using a combination of several ratios gives more precise stock returns predictions compared to the use of separate indicators. The research on these relations in the Indian automobile industry adds to the discussion of sustainable finance, green innovation, and responsible entrepreneurship that encourages the research that contributes to the sustainable development agenda of Asia.

According to the aims of the study and findings from past research, the following questions are poised to inform the inquiry:

RQ1: To what degree do simple financial ratios, i.e., Price-to-Earnings (PE), Price-to-Book Value (PB), and Return on Equity (ROE), account for the movement of stock prices in the Indian automobile industry?

RQ2: Whether incorporating volatility indicators, particularly standard deviation, in fundamental ratios enhance the predictability of stock price movements in Indian auto companies?

RQ3: What role can the combination of these indicators play in making sustainable investment choices and entrepreneurship in the changing Asian financial environment?

Methodology

Research Design

The research design is quantitative, which is based on the panel data regression analysis to investigate the level of influence of the financial variables on the stock price changes in the Indian automotive industry. It is of interest to identify short-term stock returns predictors using a set of standardized financial variables and standard deviation, which allows valid comparison of firms and different

years. Financial predictability is also put in the study as a strategic instrument of sustainable finance and responsible entrepreneurship. Through the analysis of valuation and volatility indicators, the study aims to prove how financial analysis based on data can be used to promote ethical investment, long-term business sustainability, and inclusive industrial development in accordance with the goals of sustainable development.

Sample Selection

The sample consists of three biggest listed automobile companies in India: Bajaj Auto Mahindra and Mahindra Ltd., Maruti Suzuki India Ltd. The selection of these companies was based on the fact that they were market leaders, offered steady supply of data, and were well represented in their industry. Eight fiscal years (2017-2024) are covered by the research. The choice is indicative of the sector in terms of sustainable industrialization (SDG 9) and economic resilience (SDG 8). Both companies have also shown continuous technological innovation and environmental sustainability, which makes them a good example to look at sustainable financial predictability in an emerging economy.

Data Collection

The data were collected from official company annual reports, NSE filings, and financial databases such as Morningstar, Value-research, Investing.com, and Screener.in. The following variables were extracted for each company-year wise.

Dependent Variable: Stock Price Change: Year-over-year stock price change, standardized with Z-scores.
Independent Variables: Price-to-Earnings (PE) Ratio, Price-to-Book Value (PB) Ratio, Return on Equity (ROE), Standard Deviation (SD) of stock returns (as a proxy for volatility)

All the financial measures were subsequently converted to Z-scores to normalize the data, eliminate the scale differences and allow the comparison of the variables between each other. Such uniform change makes the comparison of firms and periods valid and enhances the quality of sustainability-related analysis of financial statements. It also allows evaluating the extent to which responsible investment decisions in the expanding automobile industry in Asia can be informed by the consistency of financial indicators.

Statistical Method

The study employed the Pooled Ordinary Least Squares (OLS) regression model in determining the extent of the relationship between financial indicators and the change of stock prices. The reason why pooled OLS was applied is because it is easy to use and applicable in the case where individual effects are homogeneous across units

(firms) because the panel size is small. Li (2023) examines the effectiveness of three regression models Ordinary Least Squares (OLS), Ridge regression, and XGBoost in stock price prediction of three listed companies. The paper concludes that the accuracy of both OLS and Ridge regression models is high. The OLS model is also used in predicting statistics, as well as informing sustainable investment structures. The plan demonstrates how the open, reproducible and interpretable econometric models may be used to promote financial responsibility and ethical decision-making in entrepreneurial ecosystems. The regression model is expressed as:

$$Z(\text{Change in Price}) = \beta_0 + \beta_1 Z(\text{PE}) + \beta_2 Z(\text{PB}) + \beta_3 Z(\text{ROE}) + \beta_4 Z(\text{SD}) + \epsilon$$

Where:

Z(Change in Price) is the standardized dependent variable,

Z(PE), Z(PB), Z(ROE), and Z(SD) are the standardized independent variables, β_0 is the intercept,

β_1 to β_4 are the coefficients for each predictor, and ϵ is the error term.

This statement provides a clear quantitative model that represents sustainable financial behaviour. It combines both the variables of valuation (PE, PB, ROE) and volatility (SD) to emphasize the two pillars of sustainable entrepreneurship profitability and resilience.

Software and Tools

Statistical modeling was done with the help of IBM SPSS, and data preparation with the help of Microsoft Excel, which included ANOVA regression analysis, and diagnosis, such as the Durbin-Watson test to check auto-correlation. The application of the existing analytical tools will guarantee transparency, replicability, and methodological rigor that meets the ethical guidelines of the sustainable research and responsible data management.

Assumptions and Diagnostics

Correlations matrices were used to test multicollinearity before regression. Durbin-Watson statistic was used to identify auto-correlation and the value of 1.89 was obtained, which shows no extreme auto-correlation.

An F-test was used to test significance and it determined the statistical significance of the regression model ($p = 0.006$). Significance of the coefficient was determined by t-tests of individual predictors with a $p < 0.05$ level.

These diagnostic tests guarantee validity and reliability of results which are essential in sustainable finance research. Transparency of

methodology enhances responsible entrepreneurship in that future researchers and practitioners are able to build, based on credible and verifiable models. Additionally, intensive testing strengthens the role of the study in developing stable, risk-sensitive and inclusive financial systems in the emerging markets in Asia.

Data Analysis

The panel data regression was conducted by the use of the Pooled Ordinary Least Squares (OLS) to determine the influence of the financial indicators on the stock price changes in the Indian automobile industry. The research incorporated data of three top companies Bajaj Auto Ltd., Mahindra and

Mahindra Ltd. and Maruti Suzuki India Ltd. between 2017 and 2024. The change in stock price was used as the dependent variable of the model which was standardized using Z-scores. The independent variables included the Price-to-Earnings ratio (PE), Price-to-Book ratio (PB), Return on Equity (ROE), and Standard Deviation (SD) which were standardized to Z-scores to balance the differences in scales and make them comparable.

This quantitative study offers evidence-based information on the potential role of financial predictability in the responsible investment and sustainable entrepreneurship in the fast-paced automobile industry of India.

Regression Analysis

Table 1

Model Summary ^b										
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.721 ^a	.519	.418	.76285199	.519	5.131	4	19	.006	1.891
a. Predictors: (Constant), Zscore: SD, Zscore: ROE, Zscore: PE, Zscore: PB										
b. Dependent Variable: Zscore: Change in Price										

Interpretation:

The regression model had a R² of 0.519 that implies that the variation in the stock price would be described by the chosen financial variables nearly by 52 percent. The adjusted R² value, 0.418, considers the degrees of freedom and shows that the model has a good explanatory power even after adjusting the number of predictors. The significant p-value of 0.006 and the F-statistic of 5.13 are another confirmation that the overall model is well-

specified and statistically significant. Furthermore, the statistic of Durbin-Watson of 1.89 indicates that the residues are not severely autocorrelated, which makes the model estimates more accurate. This great explanatory ability implies that clear financial indicators can increase predictability of firm performance, which will enable investors and entrepreneurs to make responsible, informed and long-term financial decisions that can facilitate sustainable industrial development.

ANOVA

Table 2

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.943	4	2.986	5.131	.006 ^b
	Residual	11.057	19	.582		
	Total	23.000	23			
a. Dependent Variable: Zscore: Change in Price						
b. Predictors: (Constant), Zscore: SD, Zscore: ROE, Zscore: PE, Zscore: PB						

Interpretation:

The ANOVA table will test the significance of the overall regression model which has been used in the prediction of the Z-score of Change in Price. The p-value of 0.006 and F-statistic of 5.131 indicate that the regression model is statistically significant. This can be interpreted to mean that the set of

independent variable Z-scores of Standard Deviation (SD), Return on Equity (ROE), Price-to-Earnings (PE) ratio, and Price-to-Book (PB) ratio accounts a significant part of the variation in stock price changes.

The statistical significance of the model shows that the measures of valuation and volatility when

viewed in the context of sustainability can be useful in making ethical financial predictions and robust

investment planning.

Coefficients

Table 3

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	8.491E-17	.156		.000	1.000
Zscore: PE	-.658	.267	-.658	-2.463	.024
Zscore: PB	.622	.293	.622	2.123	.047
Zscore: ROE	-.248	.223	-.248	-1.112	.280
Zscore: SD	.627	.271	.627	2.309	.032

a. Dependent Variable: Zscore: Change in Price

PE ratio was also observed to have a significant negative correlation with the change in stock price ($\beta = -0.658$, $p = 0.024$). This means that companies that have a higher PE ratio which is an indication of overvaluation or growth prospects are likely to experience a lower price growth in the short term. This points to why value-based investing is more significant than speculative behavior, as well as, is in accordance with the values of responsible and ethical financial management in terms of sustainability.

The PB ratio was found to have strong positive effect on the stock price change ($\beta = 0.622$, $p = 0.047$), indicating that the higher the asset support of the company, the higher the stock price change. This correlation contributes to the thesis according to which asset-based, physical business belongs to sustainable business development and sustainability and serves to ensure the confidence of investors and long-term sustainability of industries. The influence of ROE on the changes of the price was negative and statistically insignificant ($\beta = -0.248$, $p = 0.280$). Even though profitability is a very crucial measure, the fact that it is not significant implies that profit orientation in the short term does not always translate to sustainable stock performance. Sustainable entrepreneurship thus calls out a compromise that is one that involves profitability and environmental and social responsibility.

Stock price changes were positively and significantly correlated with the volatility (Standard Deviation, SD) ($\beta = 0.627$, $p = 0.032$). This observation reveals that volatility when managed strategically can be an indicator of flexibility and market dynamism attributes that are essential in robust and innovative enterprises that exist in emerging markets.

According to the model, the volatility (SD) and the valuation variables (PE and PB) have a high degree of importance in explaining stock price movements in the Indian auto industry, but the effect of

profitability (ROE) in the short-run is not significant. This study is quite helpful to investors, analysts and policy-makers who desire to know how various financial variables interact to influence market dynamics. We find that both behavioral and quantitative signals are crucial in the trading models or stock monitoring the stock performance.

Linear Regression Model:

$$Z(\text{Change in Price}) = -0.658Z(\text{PE}) + 0.622Z(\text{PB}) - 0.248Z(\text{ROE}) + 0.627Z(\text{SD})$$

Observations

The R^2 of 0.519 was achieved by the regression model, meaning that about 52% of the variability in stock price variations can be accounted for by the financial indicators PE, PB, ROE, and Standard Deviation (SD) chosen.

The Adjusted R^2 of 0.418 also supports the model's validity after adjusting for the number of predictors. The F-statistic of 5.131 ($p = 0.006$) assures that the overall regression model is statistically significant. The value of Durbin-Watson 1.891 is less than 2 which means that there is no significant auto-correlation in the residuals.

These results prove the validity of the model and also emphasize the significance of the mixture of financial predictability and sustainability-oriented strategy. The findings indicate that the valuation measures and volatility measures can be effectively utilized to come up with ethical, risk-sensitive and forward-looking investment systems that can facilitate sustainable entrepreneurship and innovation in the automobile sector in Asia.

Discussion

Individual Variable Effects:

Variable	Coefficient (β)	Significance (p-value)	Interpretation
PE Ratio	-0.658	0.024	Negative and significant. Higher PE ratios are associated with lower stock price changes.
PB Ratio	0.622	0.047	Positive and significant. Indicates stronger price appreciation for asset-backed firms.
ROE	-0.248	0.280	Negative but not significant. Profitability has limited short-term impact.
Standard Deviation (SD)	0.627	0.032	Positive and significant. Higher volatility leads to larger price changes.

The table presents the regression results of the association between the major financial measures and the stock price changes. The P/E ratio shows a negative and significant correlation ($\beta = -0.658$, $p = 0.024$) which means that those companies whose valuation multiples are higher will have lower short-term price changes, perhaps due to overvaluation effects. The P/B ratio is high and positive ($\beta = 0.622$, $p = 0.047$), indicating that the companies with a higher asset foundation are likely to have a higher price growth. ROE indicates that its effect is non-significant and negative ($\beta = -0.248$, $p = 0.280$), indicating that profitability does not have a significant effect on short-run stock prices. Finally, standard deviation (SD) is also significant and positive ($\beta = 0.627$, $p = 0.032$) which means that the higher the volatility, the higher the stock price changes.

Such findings are a holistic view of how valuation, profitability, and risk interact in the determination of the market performance not only as financial performance but also as the indicator of long-term sustainability, ethical market performance, and investor confidence.

The results of the current research are a useful piece of data as regards to the interaction of the financial variables, as well as the stock price movement in the Indian auto market. The regression equation that has obtained an R^2 value of 0.519 means that more than half of the change in stock price can be explained by the chosen financial ratios PE ratio, PB ratio, ROE and standard deviation. This supports the previous research that has advocated the use of multivariate models compared to unidimensional methods, including those created by Jallow et al. (2022) and Dwinanda and Hendriyani (2022). This multi-factor predictability model can be used to create responsible financial ecosystems in emerging economies where accurate and transparent modeling can minimize speculative trading and

encourage more stable, inclusive and ethical investment environments.

Valuation Metrics – PE and PB Ratios

The negative and statistically significant correlation between the PE ratio and change in stock price ($\beta = -0.658$, $p = 0.024$) supports the value investing hypothesis, as posited by Basu (1977) and reiterated in Fun and Basana (2012), whereby lower PE stocks outperform their high PE equivalents. This result is also consistent with the results of the Indonesian market reported by Neldi et al. (2023), showing investor caution against high-valuation stocks in emerging markets. Ramcharran (2002) underlined that the Price-to-Earnings (PE) ratio, a popular equity valuation metric, is most determined by economic growth in the emerging economies, with the point being made that investors prefer to link higher PE ratios with better earnings growth potential, whereas the contribution of credit risk comes a second best. In the case of the PB ratio, a positive and significant contribution was observed ($\beta = 0.622$, $p = 0.047$), which means that companies with high backing by assets gain more confidence of the investors and appreciate more in value. This is in line with the findings of Surjanto and Sugiharto (2021), who highlighted the importance of PB in the description of stock valuation in addition to PE. This two-way interdependence between PE and PB highlights that those asset-backed and fairly valued firms that are based on tangible and long-term fundamentals are more likely to promote sustainable market performance. Those investors who emphasize on intrinsic valuation as opposed to speculative valuation will contribute towards the creation of stable and responsible financial ecosystems, which will align the capital flows with the reality of economic productivity and industrial innovation.

Profitability – Return on Equity (ROE)

ROE was also determined to have a statistically insignificant but negative effect ($\beta = -0.248$, $p = 0.280$), which means that the short-term variation in the prices of stocks is not significantly influenced by the profitability of a company. This is contrary to the traditional perception where ROE is considered as an important input to investor decision. This may be explained by the fact that the investors are more focused on the growth opportunities and market indicators than profitability in the short term a phenomenon that Mokhtar, A.I. (2014) explains and is reflected in the works of behavioral finance research.

In the context of sustainable entrepreneurship, this outcome suggests that profitability is not a sufficient criterion to be resilient. Investors and entrepreneurs today have to look beyond such measures as social impact, quality governance, and environmental responsibility when assessing companies. A sustainable business is not just about making profits and earning money, but also about the moral and innovative ability to adjust to a dynamic market environment.

Volatility – Standard Deviation (SD)

Standard deviation was a positive and significant predictor ($\beta = 0.627$, $p = 0.032$), and it shows that stocks that are more volatile have more price changes. The finding supports Beckers (1981) that demonstrated the capacity of future-looking volatility proxies to forecast superiorly than the past variance. It also implies that in the times of speculation in markets, investors may be ready to take high-risk assets with high returns. Mamaysky (2000) used non-parametric kernel regression to test the informational content of traditional volatility patterns of U.S. stock prices between 1962 and 1996. They compared the conditional distribution of returns following the identification of patterns with the unconditional distribution which was normalized by the mean and standard deviation and found the differences to be statistically significant. Adaptive market dynamics can also be reflected in the volatility. Strategic resilience is a feature of sustainable entrepreneurship that is demonstrated by enterprises that can deal with volatility. Such flexibility in emerging economies enables firms to innovate, diversify and survive external economic uncertainty thus enhancing the pillars of sustainable industrial growth.

Integrative Interpretation

The findings suggest the complementary impacts of overlaying the simple valuation ratios with volatility risk measures. In spite of the fact that basic measures such as PE and PB may provide an

opinion about valuation and health, the use of standard deviation may provide some behavioral and risk-based information. The fact that ROE is insignificant is, though, shocking, and that indicates the insignificance of traditional profitability in the short-term pricing behavior of an auto industry that is cyclical and sentiment-based. This integrated framework demonstrates how the concerned investors can create a balance between the risk and the value aspects to enable stable and innovation-driven businesses. Predictability, which is based on financial and behavioral indicators, is the key to sustainable finance and entrepreneurship in Asia, as it promotes transparency, accountability, and long-term stakeholder confidence principles.

All in all, the analysis findings demonstrate that predictability is higher when both rational financial indicators and market-based indicators such as volatility are used to build the stock pricing models. Such observation is rather relevant to the new market investors who invest under the conditions of uncertainty and are likely to require integrating volatility and fundamental signals. These indicators combined contribute to the fact that the study develops a roadmap of ethical investment practices and strategic entrepreneurship that would ensure profitability and social responsibility and innovation are consistent. This makes financial predictability one of the facilitators of sustainable development in the Indian automobile industry and in the Asian region in general.

Conclusion

This study confirms that volatility (standard deviation) and valuation ratios (PE and PB multiples) are significant in short term stock price movement in the Indian automobile market, but profitability (ROE) is not significant. The value investing theory is confirmed by the negative correlation with PE, in which low PE shares may offer better returns due to the undervaluation. The positive relationship with PB reflects investor confidence in companies that have strong asset base. The beneficial effect of standard deviation is that the investors can afford to assume more risk in the hope of reward especially during speculative or uncertain market conditions. The results of this study indicate the necessity of considering both old valuation metrics and new risk metrics to establish more sustainable, open, and responsible investment systems. They also show how financial predictability promotes long-term sustainability and entrepreneurship due to a promotion of data-driven, ethical and risk-conscious decision-making. The insignificant impact of ROE implies that the short-term stock price behavior may be more prone to the effects of market sentiment and valuation than the traditional profitability indicators. In terms of volatility and fundamental information

integration, which is necessary and vital to a dynamic and cyclical market such as the automobile industry, such findings indicate the superiority of the fundamental data over the volatility data and they must be integrated to obtain a more realistic and much accurate price prediction stock model. This merger is a significant step towards sustainable finance a system where profitability is in line with social value, environmental stewardship, and innovation-based competitiveness in the new economies such as India.

Policy and Practical Implications

The findings indicate that a combination of both valuation ratios (PE and PB) and volatility indices (standard deviation (SD)) are more predictive of stock prices of Indian automotive companies. The hybrid model allows investors to make more rational risk decisions, and analysts and portfolio managers to have a superior instrument of valuing stocks by taking into account the market dynamics. The latter strategy enables investors to be interested in stability, transparency, and ethical investment choices to foster inclusive economic development as regards sustainability. It also allows the entrepreneurs and SMEs in Asia to practice responsible financial operations, reduce speculative risks, and promote competitiveness through innovation.

The evidence is that to regulators and policymakers, financial literacy programs should be enhanced and more valuation and volatility disclosure made to enhance investor awareness, curb speculative behavior and achieve more stable and efficient capital markets. These policy steps are directly connected with the United Nations Sustainable Development Goals (SDG 8 -Decent Work and Economic Growth, SDG 9 -Industry, Innovation, and Infrastructure) as it enables financial inclusion, capital market integrity and industrial resilience. Sustainable investing should also be encouraged to improve the relationship between corporate responsibility, social welfare, and entrepreneurial sustainability.

Limitations

The current research is informative in the context of the correlation of financial indicators and stock price changes it is likely to be influenced by some limitations, which would probably impact the scope and the depth of the findings.

Ignored Macroeconomic Variables: The key externalities that may influence the performance of the auto stocks such as interest rates, inflation, fuel prices or legislations have not been considered.

The study provides an abundant foundation of bridging the gap between conventional financial analysis and sustainability-based policy and

practice. The following generation of research can involve the application of the ESG performance measures, sustainable innovation measures, and inter-sector comparisons to make the nexus between finance and sustainable development even better.

Forgotten Behavioral and Sentimental Factors: The investor sentiment, news-related impact and market mentality are also factors that affect stock prices in the real-world environment.

References:

1. Adekeye, K. S., Igwe, K. E., & Olayiwola, O. M. (2021). On pooled OLS and panel regression models for assessing the contributions of electronic payment system on commercial banks' profitability. *Journal of Statistical Advances in Theory and Applications*, 25(2), 61–81.
2. Amoa-Gyarteng, K., & Owusu-Adusei, D. (2024). Capital structure and solvency of manufacturing firms: Evidence from Ghana. *African Journal of Accounting, Auditing and Finance*, 8(3), 235–251.
3. Basu, S. (1977). Investment performance of common stocks in relation to their price-earnings ratios: A test of the efficient market hypothesis. *The Journal of Finance*, 32(3), 663–682.
4. Basu, S. (1983). The relationship between earnings' yield, market value, and return for NYSE common stocks: Further evidence. *Journal of Financial Economics*, 12(1), 129–156.
5. Beckers, S. (1981). Standard deviations implied in option prices as predictors of future stock price variability. *Journal of Banking & Finance*, 5(3), 363–381.
6. Brock, W., Lakonishok, J., & LeBaron, B. (1992). Simple volatility trading rules and the stochastic properties of stock returns. *The Journal of Finance*, 47(5), 1731–1764.
7. Caporale, G. M., & Plastun, A. (2023). *Seven pitfalls of volatility analysis* (No. 10213). CESifo Working Paper.
8. Dwinanda, M. G., & Hendriyani, R. M. (2022). The effect of earnings per share (EPS), price-earnings ratio (PER), and price-to-book value (PB) on stock returns in automotive sub-sector companies. *Primanomics: Jurnal Ekonomi & Bisnis*, 20(3), 41–56.
9. Fun, L. P., & Basana, S. R. (2012). Price-earnings ratio and return analysis (evidence from liquidity 45 stocks listed in Indonesia Stock Exchange). *Jurnal Manajemen dan Kewirausahaan*, 14(1).
10. Gottwald, R. (2012). The use of the PE ratio to stock valuation. *European Grants Projects Journals*, 21–24.
11. Jaffe, J., Keim, D. B., & Westerfield, R. (1989). Earnings yields, market values, and stock returns. *The Journal of Finance*, 44(1), 135–148.

12. Jallow, M. A., Abiodun, N. L., Weke, P., & Aidara, C. A. T. (2022). Efficiency of financial ratios in predicting stock price trends of listed banks at Nairobi Securities Exchange. *European Journal of Statistics*, 2, 9–9.
13. Larequad, F. S. E. G. T. (2015). Is standard deviation a good measure of volatility? The case of African markets with price limits. *Annals of Economics and Finance*, 17(1), 145–165.
14. Latane, H. A., & Rendleman, R. J. (1976). Standard deviations of stock price ratios implied in option prices. *The Journal of Finance*, 31(2), 369–381.
15. Li, Y. (2023). Stock price prediction based on multiple regression models. *Highlights in Science, Engineering and Technology*, 39, 657–662.
16. Liem, P. F., & Basana, S. R. (2012). Price-earnings ratio and stock return analysis (evidence from liquidity 45 stocks listed in Indonesia Stock Exchange). *Jurnal Manajemen dan Kewirausahaan*, 14(1), 7–12.
17. Lo, A. W., Mamaysky, H., & Wang, J. (2000). Foundations of volatility analysis: Computational algorithms, statistical inference, and empirical implementation. *The Journal of Finance*, 55(4), 1705–1765.
18. Mamaysky, H. (2000). *Essays in capital markets* (Doctoral dissertation, Massachusetts Institute of Technology).
19. Mokhtar, A. I. (2014). Behavioral finance: Investor psychology perspective. *Journal of Finance and Investment Analysis*, 3(2), 41–60.
20. Neldi, M., & Hady, H. (2023). The determinants of price-earning ratio: Evidence from Indonesia. *Journal of Law and Sustainable Development*, 11(4), e1003.
21. Ntim, C. G. (2012). Director shareownership and corporate performance in South Africa. *African Journal of Accounting, Auditing and Finance*, 1(4), 359–373.
22. Oh, K. Y., Kim, B., & Kim, H. (2006). An empirical study of the relation between stock price and EPS in panel data: Korea case. *Applied Economics*, 38(20), 2361–2369.
23. Pandey, I. M. (2001). The expected stock returns of Malaysian firms: A panel data analysis.
24. Petrusheva, N., & Jordanoski, I. (2016). Comparative analysis between the fundamental and volatility analysis of stocks. *Journal of Process Management. New Technologies*, 4(2), 26–31.
25. Ramcharran, H. (2002). An empirical analysis of the determinants of the PE ratio in emerging markets. *Emerging Markets Review*, 3(2), 165–178.
26. Richardson, S., Tuna, I., & Wysocki, P. (2010). Accounting anomalies and fundamental analysis: A review of recent research advances. *Journal of Accounting and Economics*, 50(2–3), 410–454.
27. Surjanto, D., & Sugiharto, T. (2021). LQ45 stock price valuation analysis using price-to-book value (PB) and price-earnings ratio (PER) variables from 2016–2020. *Enrichment: Journal of Management*, 12(1), 205–211.