Investigating the Relationship Between Financial Factors And P/E Ratio Of Listed Steel Companies On Vietnam Stock Exchange

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Abstract:
The importance of the steel industry and its continuous development for steel companies in developing countries may lead to potential investment opportunities for investors in the stock markets. With the direct impact of financial indicators, this study was conducted with the main purpose to investigate the relationship between financial factors and price-to-earnings (P/E) ratio of listed steel companies on Vietnam Stock Exchange. The research was conducted with quantitative method through collecting secondary data with 13 listed businesses in the period of 2013-2022. The findings indicated that dividend payout ratio, earnings growth and stock price respectively have a decreasing positive impact on P/E ratio. In contrast, earnings per share shows a non statistical relationship with P/E. This will be an important basis for proposing management and policy implications for policy makers, businesses and investors to promote favorable a stock investing environment through a wise assessment of P/E ratio.

Keywords: Dividend payout ratio, financial factors, listed steel companies, price to earnings ratio.

1. Introduction

Along with the rapid socio-economic development in many countries around the world, especially the integration, industrialization and modernization in developing countries has brought space and potentially rapid development for many sectors and industries, including the steel market and stock market. Unlike developed countries which mainly promote the contribution of the service sector to the economy's GDP, developing countries still focus more on heavy industry and gradually modernize, in which Vietnam ranks the 14th for steel exporting in the world. Vietnam has undergone significant economic transformation, which focused on developing key industries such as steel, chemicals, electronics, construction, and automobiles to advance its industrial structure (Jeon, 2019). The steel sector plays a vital role in infrastructure development, trade, and overall economic growth in Vietnam, a country with a rapidly expanding economy and stock market. The country's steel production has been steadily increasing, reaching approximately 34 million metric tonnes in 2022, with significant annual growth (Statista Research Department, 2023). Vietnam exports steel to 30 markets with a significant portion going to ASEAN (36.38%) and the EU (24.15%) (Cam, 2023).

The substantial growth and export potential of Vietnam's steel sector provide ample opportunities for development, particularly in the context of a developing country undergoing modernization. This presents an attractive prospect for investors on the stock exchange to seek profitable opportunities by investing in steel companies. The Price-to-Earnings (P/E) ratio is a crucial financial parameter that investors consider when investing in stocks, as it provides insights into stock profitability and aids in evaluating initial public offerings (IPOs) (Freihat, 2019). It is also a widely used financial metric in stock valuation and investment decision making (Saji et al., 2021), which is considered a fundamental indicator that measures the valuation of a company's stock by dividing the price per share by its earnings per share (EPS). Competitive advantages play a crucial role in determining the long-term viability and potential of an organization, with the competitiveness of the stock market being a key factor. Many steel companies are listing their stocks on

the Ho Chi Minh Stock Exchange (HOSE) and Hanoi Stock Exchange (HNX), which were combined to become Vietnam Stock Exchange (VNX) since 2021, to secure financing for expanding steel production in the Vietnamese market. However, these companies face challenges in controlling their P/E ratio due to market fluctuations. Therefore, it is important to understand the factors that influence changes in the P/E ratio in specific contexts.

Several studies have examined the factors influencing the P/E ratio with a focus on developed countries and using various financial proxies for earnings growth, dividend payout, risk, and discount rates (Rahman & Shamsuddin, 2019; Sajeetha et al., 2023), however the research results are not consistent. Moreover, there is a lack of research on the influencing factors of the P/E ratio in developing countries (Freihat, 2019) like the Vietnamese context, especially in-depth investigations of steel companies listed on the stock exchanges (Ho et al, 2023). Different from economic factors such as GDP growth rate or inflation rate where the value of these indexes has a macroeconomic impact and is influenced by many factors in different fields, financial variables brings a more significant result and direct view and when it is associated with the real performance of steel enterprises. The key purpose of the research is to examine the relationship between various financial factors and P/E ratio of listed steel companies in the context of Vietnam. In addition to the introduction part, the study conducts a theoretical framework related to the research topic based on the Gordon constant dividend discount model (Gordon, 1962) to identify a number of influencing financial factors. Through data analysis using SPSS 27 with correlation test and multiple linear regression analysis, the authors then will provide appropriate policy and management implications to help listed steel enterprises better manage their P/E ratio as well as enhance more effective investment for investors on VNX.

2. Theoretical Framework and Hypothesis Development
2.1 Price-to-earnings ratio
Financial indexes are a perpetual subject of study in the finance sector due to the intricate and ever changing nature of the business landscape. The price-to-earnings (P/E) ratio assumes a prominent position as a financial metric, especially in the context of the stock market, where it plays a pivotal role in assessing the valuation and investment prospects of securities (Freihat, 2019). The P/E ratio concept was first mentioned by Graham & Dodd in 1934 to calculate the future growth of companies. It is asumed that the low P/E of a firm may bring a significant returns in the future (Nicolson, 1960) so that this index was considered the earnings multiple or the price multiple. According to Sajeetha et al. (2023), P/E ratio is a crucial tool for comparing listed firms and determining their relative value. The study asserted that P/E ratio offers insights into both the historical performance and projected future growth of companies. A high P/E ratio often signifies investors' expectations of increased earnings growth in the future (Sajeetha et al., 2023). Conversely, a lower P/E ratio may suggest potential undervaluation in the current market or exceptional operational efficiency relative to historical trends as emphasized by Siegel (2021), which leads to the employment of P/E ratio to estimate the potential for future growth of companies (Gottwald, 2012).

The research was conducted by using the Gordon constant dividend discount model (DDM), which has been extensively utilized by researchers to investigate the factors influencing P/E ratio.Various scholars have emphasized the significant role played by the DDM in determining stock value (Gacus & Hinlo, 2018; Gaille, 2018). Investors engaged in buying and selling stocks employ the intrinsic value calculation approach through the DDM to strategically time their transactions and maximize capital gains and dividend yields (Nagendra & Muruganandam, 2012). Accordingly, the P/E ratio is calculated as follows:

$$P/E = \frac{\text{Stock price } (P_0)}{\text{Earnings per share } (EPS_1)} \qquad (1)$$

2.2 Hypothesis development
2.2.1 Stock price

Based on Gordon model, the stock price plays a crucial role in determining P/E ratio. Arslan et al. (2014) conducted a study to explore the relationship between the P/E ratio, firm size, and stock price through encompassing data from 111 non-financial firms listed on the KSE over the period of 1998-2009. The findings of the study indicated a significant relationship between the P/E ratio on stock prices. In a similar vein, Emudainohwo (2017) examined the determinants of the P/E ratio using data from 47 non-financial

companies listed on the Nigerian Stock Exchange between 2012 and 2016. The findings demonstrated that the average share price had a positive and significant effect on the P/E ratio. Furthermore, a recent study by Kecheng (2022) reiterated the fundamental nature of the P/E ratio in evaluating whether a stock is undervalued or overvalued, thus highlighting its significant relationship with stock price. Accordingly, the authors proposes the following hypothesis:

H1: Stock price has a significant relationship with P/E ratio of listed steel companies on VNX.

2.2.2 Earnings growth

Many scholars suggest that a high P/E ratio is typically indicative of optimistic investor expectations for future earnings growth, while a lower P/E ratio suggests lower anticipated growth. Essentially, a low P/E ratio may signify an undervalued firm or exceptional performance compared to historical trends (Goodman & Peavy, 1986). Earnings growth is a fundamental factor influencing the P/E ratio. In a comprehensive assessment conducted by Penman (1996), a correlation analysis was carried out to explore the relationship between P/E and P/B (market-to-book) ratios, as well as their connections to current and future earnings growth. The study revealed that while P/E ratios were associated with the current return on equity, they were weak indicators of future earnings growth. Nayaata (2009) conducted research examining the impact of capital structure and earnings growth on the P/E ratio using data from companies listed on the Nairobi Stock Market between 2002 and 2007. The findings showed a negative influence of earnings growth rate on the P/E ratio. Similarly, Azam (2010) identified a similar relationship in the context of the Karachi Stock Market based on data collected from 2000 to 2008. Accordingly, the authors proposes the following hypothesis:

H2: Earnings growth has a significant relationship with P/E ratio of listed steel companies on VNX.

2.2.3 Earnings per share

The relationship between earnings per share (EPS) and P/E ratio is already explored based on the aforementioned equation. According to Wenjing (2008), EPS has a negatively vdirect impact on the P/E ratio. EPS reflects the connection between a company's capital size and its level of profitability. When the profitability remains constant, a larger capital size leads to a lower EPS, resulting in a higher P/E ratio. Conversely, when the liability-assets ratio is high, indicating a relatively lower allocation of equity capital compared to debt capital, the EPS is higher, leading to a lower P/E ratio. Therefore, there exists a negative correlation between the liability-assets ratio of companies and the P/E ratio. Asad et al. (2023) conducted a study examining the key factors influencing financial performance in Palestine during the Covid-19 pandemic. The results indicated that the pandemic significantly weakened the relationship between financial performance indicators (ROA, ROE, EPS) and the company's value measured by Tobin's Q. Additionally, the pandemic had a notably negative impact on the relationship between financial performance indicators (ROA, ROE) and the company's value measured by the P/E ratio. In Sri Lanka, a study by Sajeetha et al. (2023) also found that EPS had a negative influence on the P/E ratio based on data from annual reports of 30 companies listed on the Colombo Stock Exchange (CSE) over a five-year period from 2015 to 2019. Accordingly, the authors proposes the following hypothesis:

H3: Earnings per share has a significant relationship with P/E ratio of listed steel companies on VNX.

2.2.4 Dividend payout ratio

The theories surrounding P/E ratio emphasize the importance of the dividend payout ratio in its determination. From equation (1), P_0 can be represented by the dividend discount model, $P_0 = D_1/(r - g)$, in which D_1 is the expected dividend payout for the following year, r is the required rate of return by investors or their discount rate, and g is the growth rate of the forecast dividends. Previous research has examined various factors influencing the P/E ratio in developed nations, with dividend payout ratio being a significant factor (Dutta et al., 2018). Premkanth (2013) found a significant positive correlation between the dividend payout ratio and P/E multiple using data from the Colombo Stock Exchange between 2007 and 2011. Krishnan & Chen (2017) further explored the impact of dividend payout ratio on P/E ratio for companies in the S&P Composite 1500 Index in the US between 1995 and 2016. The research revealed that the payout ratio for the current year had a negative effect on the P/E ratio for the subsequent period in the case of companies with high growth potential, and a significant positive correlation with the P/E ratio for the

following year for companies with large firm size. Similar findings regarding the relationship between the P/E ratio and dividend payout ratio were also observed by Emudainohwo (2017); Freihat (2019) and other recent studies by Sajeetha et al. (2023) and Zhang (2022). Accordingly, the authors proposes the following hypothesis:

H4: Dividend payout ratio has a significant relationship with P/E ratio of listed steel companies on VNX.

3. Methodology

3.1 Research method

The study was conducted through the application of quantitative research method with collected secondary data from various sources. The authors deems quantitative research methodology as appropriate for achieving the research aim and objectives. Through the collection of publicly available data on some financial factors such as stock price, earnings growth, earnings per share and dividend payout ratio, the research aims to accurately identify and statistically evaluate their relationship and influence on the P/E ratio. Additionally, quantitative research methods enable the assessment of both positive and negative impacts of these factors on the P/E ratio, as well as the determination of their relative magnitudes, thereby facilitating the derivation of relevant managerial and policy implications.

3.2 Measures

To establish the relationship between the financial influencing factors and the P/E ratio, a multiple linear regression analysis with panel data will be employed. Multiple linear regression is suitable for this study as it allows for the collection of data from the same set of companies over an extended period of time. The variables along with their respective symbols and measurement methods will be presented in Table 1 as follows. The dependent variable in the regression analysis is the P/E ratio (PE), while the independent variables include SPR, EGR, EPS and DPR.

Table 1: Measurement of variables

Variables	Symbol	Measurements
Price-to-earnings ratio	PE	Stock price/Earnings per share
Stock price	SPR	The closing price on the last trading day of the year
Earnings growth	EGR	(Net income1 – Net income0)/ Net income0
Earnings per share	EPS	(Net income – Preferred dividends)/Number of ordinary share outstanding
Dividend payout ratio	DPR	Dividends per share/Earnings per share

Source:Authors' analysis

Based on the above hypotheses, the authors come up with the regression equation as follows:

$$PE = \beta_0 + \beta_1 * SPR + \beta_2 * EGR + \beta_3 * EPS + \beta_4 * DPR + \varepsilon$$

In which β_0 is constant, $\beta_1, \beta_2, \beta_3, \beta_4$ are the coefficients of the independent variables and ε is residuals.

3.3 Sample and data collection

The sample population for this study consists of steel firms that are registered and listed on the VNX. The author gathered secondary data from various sources, including Fiin Group, official websites of VNX and data from companies' annual reports. As of 2022, there are a total of 13 officially listed steel enterprises on HOSE and HNX. The study covers a period of 10 years (2015-2022) of 13 firms resulting in a total of 130 observations. In terms of the minimum sample size required for regression analysis, Green (1991) determined by the formula 50 + 8m, where m represents the number of independent variables in the model. Considering the study's identification of 4 financial factors influencing the P/E ratio of listed steel companies on VNX, it is determined that a minimum sample size of 82 observations is required to conduct the regression analysis. This calculation is derived from the formula 50 + 8*4 = 82 observations. Therefore,

the authors' selection of the 104 observations as the sample size for the study is deemed appropriate.

3.4 Data analysis

The research adopt a quantitative methodology in order to investigate the relationship between finanical factors and P/E ratio of listed steel companies on VNX. The authors utilized SPSS 27 software for data analysis. Initially, the author employed the Casewise diagnostics method by running regression analysis with 3 standard deviations to identify and eliminate outliers. This process of gradually removing outliers and re-executing the regression analysis was repeated until achieving the best goodness of fit for the model. Furthermore, regression analysis was conducted to assess the correlation between the independent variables and the dependent variable, which enables an evaluation of their relationship. Multicollinearity was considered present when the correlation coefficient between pairs of independent variables too high. Additionally, given the utilization of panel data, this study aimed to comprehensively address and resolve violations of heteroscedasticity and autocorrelation. By addressing these issues, the research endeavors to establish a final equation that ensures the robustness and integrity of the analytical framework.

4. Findings and discussion

4.1 Casewise diagnostics and sample descriptive statistics

The author firstly initially conducted a regression analysis employing the Casewise Diagnostics technique to identify and mitigate outliers. By employing a selection criterion of three standard deviations beyond the outliers' range, this method effectively identifies observations with residuals that deviate by three standard deviations or more from the mean value. These three observations (2,6,78) in Table 2 characterized by significant errors are deemed potential outliers. Therefore, the authors would remove them and conduct the data analysis again.

Table 2: Casewise diagnostics result

Case Number	Std. Residual	PE	Predicted Value	Residual
2	3.163	76.19	-11.1624	87.35237
6	-5.551	-141.30	12.0191	-153.31914
78	7.517	231.79	24.1808	207.60921
a. Dependent Variable: PE				

Source: SPSS 27

After removing some outliers and performing the regression analysis again, the authors received the overview of variables through the mean value and standard deviation from descriptive statistics result. Table 3 shows the sample descriptive statistics of 127 remaining observations. The notable result is that the mean ERG reaches -0.1730 while others' mean value are all positive. The standard deviation values provide a measure of dispersion or variability around the mean, which presented that in this case, variables such as PE, SPR, EPS, and DPR have relatively higher standard deviations, indicating wider spreads of values around their respective means. On the other hand, EGR has a lower standard deviation of 2.35148 indicating less variability in earnings growth rates.

Table 3: Descriptive statistics result (N = 127)

	Mean	Std. Deviation
PE	9.6695	29.42188
SPR	10497.61	8259.701
EGR	-.1730	2.35148
EPS	2056.92	3500.063
DPR	.9357	4.97576

Source: SPSS 27

4.2 Correlation and regression analysis

After conducting the regression analysis again, the authors first considered the correlation matrix to examine

the relationship between independent variables and PE, as well as the correlation between pairs of independent variables to predict multicollinearity of data. Luckily, the Pearson Correlation did not point out the type of data violation above. Moreover, all independent variables correlate with PE, in which the correlation coefficient between DPR and PE shows the highest value of 0.897.

Table 4: Summary of multiple linear regression analysis results

Variables	Standardized Coefficients Beta	Sig.	VIF	F	Durbin - Watson	Adjusted R Square	Hypotheses	Result
SPR	.084	.043	1.189	146.690 (***)	1.984	.822	H1	Accepted
EGR	.145	.000	1.045				H2	Accepted
EPS	-.037	.365	1.151				H3	Rejected
DPR	.902	.000	1.008				H4	Accepted
a. Dependent Variable: PE								

Source: SPSS 27

Table 4 presents the summary of multiple linear regression analysis results. The results shown that the VIF coefficients of independent variables were all smaller than 2, which concluded no violation of multicollinearity. The analysis of variance pointed out that F-test value is 146.690 with sig. of $0.000 < 0.05$. This result confirms the existence of model. Moreover, the model summary concluded that Durbin -Watson value was 1.984 in the range of 1.5 to 2.5. This finding adheres to the assumption of no first-order autocorrelation violation within data. The assessment of the goodness of fit for the multiple linear regression model is ascertained through the examination of the R-square coefficient or adjusted R-square. In accordance with the findings presented in Table 4, the adjusted R-square value was determined to be 0.822, implying that the independent variables (SPR, EGR, EPS, and DPR) incorporated in the regression analysis account for approximately 82.2% of the observed variability in the P/E ratio. The remaining 17.8% can be attributed to exogenous variables not included in the model along with random errors.

To evaluate the level and direction of the impact of independent variables on PE, the study uses Standardized Coefficients Beta and sig. (p-value). When Beta > 0 and sig. < 0.05, which shows that the independent factor has a positive impact on the independent factor. On the contrary, when sig. > 0.05 then the relationship is not statistically significant. Based on Table 4, all financial factors within the model except EPS have positive impacts on PE. For the Beta of -0.037 and sig. of 0.365 (>0.05), earnings per share does not have a significant relationship with P/E ratio of listed steel companies on VNX, or the hypothesis H3 is rejected. On the contrary, hypotheses H1, H2 and H4 are all accepted. Besides, based on the magnitude value of Standardized Coefficients Beta, the authors can confirm that from high to low level, DPR, EGR and SPR respectively have a positive impact on PE. Accordingly, the study can come up with the standardized regression equation as follows:

$$PE = 0.902*DPR + 0.145*EGR + 0.084*SPR + \varepsilon$$

4.3 Discussion

This research is an attempt to provide an in-depth knowledge for companies and investors in practice and financial researchers that how some financial factors (Stock price, Earnings growth, Earnings per share, and Dividend payout ratio) impact on Price-to-earnings ratio of listed steel companies on VNX. In the current study, the authors have formulated four hypotheses to explore these relationship. All hypotheses except H3 were confirmed by the research findings. For the proven positive relationship between SPR and PE, this research is consistent with the empirical findings of Arslan et al. (2014); Emudainohwo (2017) and Kecheng (2022) in the context of developing countries. Regarding H2, the data confirmed that EGR positively predict PE. However, this finding goes against to the research results of Nayaata (2009) and Azam (2010) when these previous studies confirmed the negative relationship between them. Along with that, hypothesis H3 about the relationship of EPS and PE was rejected, showing that this study brought results that were not as expected according to previous studies of Wenjing (2008), Asad et al. (2023) and Sajeetha et al. (2023). This could explain that in the other context not including Vietnam, when a steel company has strong profit growth, the market may value the stock higher to reflect growth prospects, which results in a high initial P/E

ratio. However, if profit growth fails to meet expectations or declines compared to forecasts, the P/E ratio may decrease as the market adjusts stock prices to reflect actual growth. Besides, a company can go through cycles of profit growth. As earnings growth peaks and begins to slow, the P/E ratio may decline. The market may assess that growth has peaked and future prospects are no longer as attractive as they once were. And the final hypothesis H4 was supported due to the positively highest impact of DPR on PE. This finding is consistent to the dividend discount model and also studies by Premkanth (2013); Krishnan & Chen (2017); Emudainohwo (2017); Freihat (2019) and other recent studies by Sajeetha et al. (2023) and Zhang (2022). Thus, this research has found some interesting results in Vietnam, while also providing academic contributions on the relationship between a number of financial indicators such as stock price, earnings growth and dividend payout ratio, which also bring strongly positive influence on the P/E ratio in the context of a developing country.

5. Implications and conclusion

This research has significant implications for policy makers, management in practice and stock investors. For the strongest impact of DPR on PE, when the dividend payout ratio increases, this may indicate that the company is distributing a larger portion of its profits to shareholders in the form of dividends. Increasing dividends can make it more attractive to investors, as they can receive immediate benefits from receiving dividends instead of waiting for profits to increase by holding shares. When investors receive higher dividends, this can create an increase in demand for that company's shares. An increase in demand for shares can push up the stock price, leading to an increase in the P/E ratio. Besides implications for investors, the research also provides some appropriate managerial implications. The increase of dividend payout ratio may be part of a company policy to attract investors. The company may decide to distribute a larger portion of profits through dividends to make it attractive to investors and increase stock value. This may be done to attract long-term investors or increase shareholder confidence in investing in the company. Besides, the company needs to maintain a stable dividend policy. A company with a stable and reliable dividend policy may be valued more highly by the market. When a company maintains a steady growth rate and continually increases its dividend payout ratio, this can create confidence and stability in investing, which can lead to an increase in P/E ratio due to trust and positive evaluation from investors. In addition, the proposed policy implication is that the government can establish preferential tax policies for dividends, making receiving dividends more attractive to investors. A tax reduction or tax exemption on dividends can create a big incentive for companies to increase their dividend payout ratio, and this can lead to an increase in the P/E ratio.

Regarding the positive impact of EGR on PE, the government can boost companies' earnings growth through supportive policies, including providing capital funds, reducing taxes, simplifying regulations and promoting investment. These policies can help companies grow earnings and facilitate investment in those companies' stocks, leading to an increase in the P/E ratio. The above results also demonstrate that the steel industry and the economy in general are growing strongly, leading to various companies in the steel industry being able to experience earnings growth. This could put upward pressure on the stock prices and P/E ratios of those companies. In this case, the policy implication may be that the government's policy should focus on positive and stable economic growth, contributing to promoting companies' income growth and increasing the P/E ratio. Increasing stock value and P/E ratio can reflect a company's growth potential. The implication to investors is that the company may be planning to expand or invest in new areas, have a larger market share in its industry, or have a unique and promising product/service with high growth potential. Investors may be interested in this potential growth and expect that the stock value and P/E ratio will continue to increase. In the event of a significant increase in stock value, investors need to consider whether the stock value is reasonably priced. The company may still have growth potential and the stock value is not yet fully reflected by the market. Investors may be concerned with fair valuation and expect that the stock value and P/E ratio will continue to increase to reflect the true value of the company.

In summary, the main purpose of this study is to examine the relationship between financial factors and P/E ratio of listed steel companies on Vietnam Stock Exchange. The findings reveal that stock price, earnings growth and dividend payout ratio have a positive influence on P/E ratio while earnings per share does not. Among these factors, DPR has the strongest impact on PE. Accordingly, the steel companies need to distribute a larger portion of its profits to shareholders in the form of dividends to attract long term investors

and try to maintain a steady growth rate. Besides, the goverment should propose some tax reduction or tax exemption on dividends to create a big incentive for companies to increase their dividend payout ratio, as well as focus on positive and stable economic growth, contributing to promoting companies' income growth and increasing the P/E ratio. For investors, they need to consider whether P/E ratio is continously increase and the stock value is reasonably priced in order to evaluate the true value and growth potential of steel firms. The study still remains some limitations such as the varioustiy of financial variables and time scope for the data. Therefore, the future research directions can be considered to increase the sample size as well as examine more financial factors and situational factors to better complete the model.

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