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Correlation Analysis of Financial Indicators and Prices of A-Share Listed Companies in the Automotive Industry

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Abstract: In recent years, the new energy vehicle industry has experienced rapid growth, with over ten listed companies in the automotive sector trading on the A-share market. As a matter of fact, both large listed companies and smaller new energy firms have significantly contributed to economic development and industrial transformation. Successful listed companies have focused on optimizing their operational abilities to enhance shareholder wealth. To be specific, the performance of these companies' share prices on the stock market not only indirectly reflects their financial health but also influences their future growth. This paper employs data processing methods such as EXCEL and SPSS to analyze the correlation between financial indicators and share prices of A-share listed companies in the new energy vehicle industry. Based on the analysis results, one will select appropriate financial indicators that can predict future share price movements. Overall, these results shed light on guiding further exploration of price evaluations.

Keywords: new energy vehicle industry, listed companies, financial indicators, share prices, correlation analysis

1. Introduction

The automotive industry, a vital pillar of China's economic development, has emerged as a significant force driving national economic growth. The influence of this sector on the stock market is substantial, and the price movements of individual stocks often resonate with investors. This dynamic prompts buying and selling activities in the secondary market, which in turn impacts the price changes in the sector as a whole. Therefore, examining the correlation between financial indicators and share prices of A-share listed companies in the automotive industry is crucial for investors and market participants, as this can enhance the accuracy and precision of their investment decisions [1-3].

The financial health and share price movements of the automotive industry are directly linked to investor interests. By studying the correlation between financial indicators and share prices, one can provide valuable references for investors [4]. This analysis enables investors to assess the development prospects and investment value of automotive companies more accurately, thereby improving

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the precision of their investment decisions. However, it is important to note that there are various factors influencing stock prices, some of which are challenging to quantify.

Recent research has made significant strides in this area. Liang et al. proposed a financial time series classification approach that enables investors to identify temporal correlations between stocks in the same exchange [1]. This work significantly improves stock trend prediction and portfolio performance. Similarly, Guo suggested that further work could focus on the correlation analysis between stock price and accounting profit in a big data environment [2].

The impact of economic globalization and financial integration has led to significant changes in the global financial market, prompting researchers to investigate the correlations and degree of correlation between different financial markets [3]. For instance, Li emphasized the importance of analyzing the relationship between financial indicators and stock price changes to help investors avoid risks and make better investment decisions [3].

Other researchers found that the correlation between stocks and bonds is time-varying, with stock market uncertainty and expected inflation rate as the main factors affecting the correlation [4]. Kang combined the logistic regression model to construct a correlation analysis model between stocks and PMI index. Furthermore, Cen et al. [5], Xu et al. [6], Ouyang and Liu [7] have all shown the value relevance of both comprehensive income per share and net income per share through significance tests.

Building on this body of research, this paper combines the existing research literature and findings, giving priority to the perspective of listed companies' performance information. The focus will be on the correlation between the rate of return and financial indicators in the financial statements of listed companies in China [5-7]. Using data processing methods such as EXCEL and SPSS, a model will be constructed through correlation analysis to study the rate of return, financial indicators, and PE values of representative new energy listed companies within a certain period [8]. The objective is to reflect the current status of the A-share new energy stock market's correlation in China [1-4, 9, 10].

Financial indicators of listed companies are mainly obtained from the balance sheet, income statement and cash flow statement, and the information obtained can be divided into solvency, operating capacity, profitability, and profitability of shareholders. Debt servicing capacity is mainly based on quick ratio and long-term debt ratio; operating capacity is mainly based on current asset turnover ratio and operating profit margin; profitability is mainly based on cost margin and net cash flow per share; and shareholders' profitability is mainly based on earnings per share and net assets per share. In this study, we focus on the company's price-to-earnings ratio as well as stock returns. In order to clearly present the correlation between the investment return profile of the stock and the profitability of the company, the P/E ratio was chosen as the independent variable and the investment return of the stock as the dependent variable in the study. The ROI of a stock is obtained by dividing the amount of change in the price of the stock by the price of the stock before the change.

2. Data & Method

2.1. Data

The data used in this study is sourced from 15 leading companies listed on the A-share market in the automobile industry. These include BYD, Great Wall Motor, Chang'an Motor, JAC Motor, Foton Motor, Yutong Bus, Dongfeng Motor, Golden Dragon Motor, BAIC Blue Valley, Zhongtong Bus, SAIC Group, GAC Group, Jiangling Motor, Xiaokang, and FAW Liberation. The specific data points gathered for this analysis are the Price-Earnings (P/E) ratios of these listed companies from January 1, 2019, to December 31, 2022. Additionally, the closing prices of their stocks on the first, seventh, thirtieth, and ninetieth days following the publication of the current quarter's financial

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statements are also collected. After comprehensive collation, a valid sample size of 1,200 was obtained. This sample ensures a one-to-one correspondence and completeness of company data, thus providing a solid foundation for the subsequent correlation analysis between financial indicators and share prices.

2.2. Models

We construct a one-dimensional linear regression model, where the P/E ratio is the independent variable and the stock's ROE is the dependent variable. The model is as follows:

$$PEt=\alpha tx+\beta txROItx \quad (1)$$

Here, PEt represents the P/E ratio of the company in period 't'; αtx is the constant term of the regression equation; βtx is the regression coefficient of the stock's ROI, and ROItx is the ROI of the stock in period 't'. In this equation, 'x' takes on the values of 1, 2, 3, and 4, representing the regression coefficients on the first, seventh, thirtieth, and ninetieth day after the release of the current quarterly financial statements, respectively. These days also correspond to the return on equity investment.

3. Results & Discussion

Generally, a higher Price-to-Earnings (PE) value implies greater market expectations for a stock's future earnings, which can prompt investors to pay more for the stock. However, a high PE value does not guarantee high yields. The stock price depends not only on future earnings expectations but also on factors like market sentiment and industry trends. If expectations are high, but the stock belongs to a highly competitive industry or the company has significant operational risks, then these earnings expectations may not be realized. Consequently, the stock price may fall, leading to lower yields for investors.

Furthermore, the relationship between PE and yield is shaped by overall market conditions. During a bull market, the market is optimistic about future earnings expectations, typically leading to higher PE values. Rising equity prices can drive the overall market higher, resulting in improved yields. Conversely, in a bear market, the market is more pessimistic about future earnings expectations. Lower PE values and a declining market may drive equity prices down, leading to reduced yields. The relationship between PE and yield is complex and necessitates a comprehensive examination of both the stock itself and the market as a whole. Investors should make informed decisions by considering their investment objectives and risk tolerance, along with market conditions and industry trends. In the subsequent sections, this study will discuss the results related to PE value and yield in the new energy vehicle sector. The summary of the regression results is given in Table. 1, and Table. 2.

Table 1: Regression statistics.

Regression Statistics	
Multiple R	0.184251
R Square	0.033949
Adjusted R Square	0.016384
Standard Error	137.0033
Observations	225

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Table 2: Regression coefficients.

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower limit 95.0%	Upper limit 95.0%
Intercept	60.15179	10.27414	5.854678	1.72E-08	39.90346	80.40013	39.90346	80.40013
Daily Yield	1.424595	2.456011	0.580044	0.562478	-3.41572	6.264915	-3.41572	6.264915
Weekly Yield	0.146267	2.324561	0.062922	0.949885	-4.43499	4.727524	-4.43499	4.727524
Monthly Yield	-1.54589	1.954334	-0.79101	0.429792	-5.3975	2.305721	-5.3975	2.305721
Quarterly Rate of Return	0.43745	0.707701	0.618129	0.53713	-0.95729	1.832191	-0.95729	1.832191

Firstly, we examine the correlation between the PE value and stock return one day after the actual disclosure date of the periodic report, selecting data from sample companies from 2019 to 2022. The results are listed in Table. 3. From a daily return perspective, the correlation coefficients between PE and other variables are relatively low. With a correlation coefficient of 0.176 between PE and daily returns, and a significant positive correlation of 0.008, the relationship between PE and daily returns is weak. The correlation coefficients between the other variables are very high, particularly between weekly and monthly returns, which reaches 0.996, suggesting very similar trends.

Table 3: Correlation Analysis.

	PE	Daily Yield	Weekly Yield	Monthly Yield	Quarterly Yield
PE	1(***)	0.176(***)	0.174(***)	0.17(**)	0.172(***)
Daily Yield	0.176(***)	1(***)	0.996(***)	0.992(***)	0.957(***)
Weekly Yield	0.174(***)	0.996(***)	1(***)	0.991(***)	0.956(***)
Monthly Yield	0.17(**)	0.992(***)	0.991(***)	1(***)	0.97(***)
Quarterly Yield	0.172(***)	0.957(***)	0.956(***)	0.97(***)	1(***)

Note: ***, **, * represent 1%, 5%, 10% level of significance respectively

Secondly, we consider the correlation between the PE value and stock return one week after the actual disclosure date of the periodic report. The data from sample companies from 2019 to 2022 show that the correlation coefficient between PE and other variables is also relatively low in terms of weekly returns, peaking at 0.174. The correlation coefficients between other variables remain high, particularly between weekly and monthly returns, which still reach 0.996.

Thirdly, we explore the correlation between PE values and returns one month after the actual disclosure date of the periodic reports. The correlation coefficients between PE and other variables in terms of monthly returns remain relatively low, peaking at 0.17. However, the correlation coeffi-

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cients between the other variables remain very high, particularly between weekly and monthly returns, which reach 0.991.

Lastly, we examine the correlation between PE values and returns one quarter after the actual disclosure date of the periodic reports. The correlation coefficient between PE and other variables is slightly higher in terms of quarterly returns, peaking at 0.172, but it's still relatively weak. The correlation coefficients between other variables remain high, particularly between weekly and monthly returns, which reach 0.956. The correlation coefficients between PE and quarterly returns are comparable to monthly returns, both at 0.97 and significant at the significance level, indicating a comparable correlation.

This correlation coefficient matrix shows that there is a high correlation between daily, weekly, monthly, and quarterly returns, and the trends between them are very similar. There is a positive correlation between PE and stock returns, suggesting that PE levels could be a useful reference for predicting stock returns. However, the correlation coefficient can only reflect the linear relationship between the two variables. Given the complexity of the stock market, the impact of PE levels on stock returns isn't singular, and investors must consider additional factors for investment decisions.

The new energy vehicle sector presents a unique landscape for evaluating the relationship between PE value and stock yield. Industry-specific factors such as technological advancement, governmental policies, and competition significantly influence both PE values and stock yields. As part of the analysis, we studied the correlation between PE values and stock yields in this sector across different time intervals: one day, one week, one month, and one quarter after the actual disclosure date of the periodic reports. Across these intervals, we observed that the correlation between PE and stock yields remains relatively low but significant. The correlation coefficient ranged from 0.17 to 0.176, suggesting a weak but present correlation. This finding suggests that while PE value can serve as a reference in predicting stock yields in the new energy vehicle sector, it should not be the sole determinant due to its weak correlation.

Moreover, the high correlation between the other variables, specifically between the weekly, monthly, and quarterly returns (ranging from 0.956 to 0.996), indicates that the trends among these intervals are very similar. This underlines that while PE value is a useful factor, the timing of returns also plays a crucial role in understanding stock yield patterns.

In conclusion, the relationship between PE value and stock yield is complex and influenced by a multitude of factors. Investors should utilize PE values as one of several tools to inform their investment decisions, but they should also consider market trends, industry conditions, and other financial indicators to make well-rounded investment decisions.

4. Limitations & Prospects

There are several limitations to this study. The relationship between the P/E ratio and stock investment return is not purely linear. Data analysis reveals that the linear regression coefficients between the P/E ratio and daily, weekly, monthly, and quarterly returns are not high, casting doubt on the validity of a single linear regression model. The research only considers the P/E ratio among financial indicators. However, in reality, the stock market is influenced by a complex array of factors. Investors must consider multiple variables when making investment decisions, and the correlation coefficient can only reveal the relationship between two variables. The analysis of the correlation between the P/E ratios of 15 companies in the automotive industry and the stock Return on Investment (ROI) overlooks the interactions between different companies. Thus, the correlation based on this analysis cannot strictly explain the relationship between the P/E ratios and the stock ROI.

Despite these limitations, our study has found correlations between the P/E ratios and the daily, weekly, monthly, and quarterly returns in the automotive industry. The data suggests that the P/E ratios in the automotive industry are positively correlated with stock returns. In future research, one

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can delve deeper into the relationships between other financial indicators and stock returns and examine the correlations between various companies and the industry as a whole. It is hoped that despite its limitations, can provide a foundation for further exploration of the correlation between the P/E ratio and stock returns in the automotive industry, as well as the relationships between other factors.

5. Conclusion

In summary, we selected the Price-to-Earnings (P/E) ratio and stock return of the automotive industry as research variables. We collected relevant financial indicators from 15 companies in the automotive industry and constructed a one-dimensional linear regression model. Using SPSS and Excel, we analyzed the correlation between the P/E ratio and stock return in the industry. The analysis revealed a positive correlation between the P/E ratio and daily, weekly, monthly, and quarterly returns. In other words, higher P/E ratios tend to be associated with higher returns. Although the stock market is influenced by a multitude of complex factors, our findings suggest that in the automotive industry sector, the P/E ratio can serve as a useful indicator for investors when making investment decisions, albeit not the only one.

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