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Comparing the Influence of the NASDAQ Index and Dow Jones Industrial Average (DJLA) on Pfizer Stock Return

Wenhao, Li[1,a,*]
[1]*Technology University, Sydney NSW2007, AUS*
a. Wenhao,Li@student.uts.edu.au
**corresponding author*

Abstract: The stock market, often known as the secondary market, is a venue for the transfer, purchase, sale, and circulation of stocks for listed firms and investors. There is a subtle relationship between the stock and the market, and market external factors influence the price of the stock. Thus, variations in stock prices can impact the profits of investors. Hence, the stock of Pfizer is the subject of this research. By analyzing the influence of the NASDAQ and DJLA on Pfizer stock prices. Determine the link between the two indices and the stock returns of Pfizer. Utilizing the Capital asset pricing model (CAPM) through regression analysis of the model and systematic Beta risk data constitutes the research methodology. The conclusion of the investigation is that the index influences the predicted portfolio return for investors. The relevance of this research is to demonstrate that investors can utilize the CAPM asset pricing model to evaluate portfolio returns. In addition, it explains the limitations and benefits of utilizing CAPM based on Pfizer stock data and provides investors with a reference for future usage of the modeling.

Keywords: CAPM model, Pfizer company, regression analysis

1. Introduction

The pricing of assets is a distinct research issue within the field of financial economics.

Capital pricing is the price or value of an asset paid at an undetermined period, with the price or value of the asset fluctuating in the future owing to external circumstances. The stock market complies with asset pricing principles [1-3]. In the stock market, investors select the appropriate stocks for their portfolios, and fluctuations in stock prices over a period can affect the investor's overall return. [4-5] To assure the return of a portfolio of assets, investors maintain a degree of investment risk that is controllable while ensuring that the portfolio returns of the invested assets fall within the range of predicted returns. However, the CAPM asset model is consistent with the theoretical foundations of contemporary financial economics and can be utilized as a basis for measuring portfolio risk by investors [6-8]. Investors are reasonable regarding the asset allocation of their assets. However, investors also expect high returns, and a high-yield portfolio necessitates taking significant risks. In addition, rational investors' participation in the stock market leads to the equilibrium of asset prices in the market, which allocates asset portfolios by investors more complex and inefficient [3]. In contrast, the CAPM asset pricing model, as a tool for researching the stock market, provides investors with information regarding the expected risk of the portfolio and the data relationship between the projected returns of the compared assets [1], and the resulting

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data acts as an advantageous investment reference for investors. The investor chooses a portfolio that corresponds with the individual preferences based on the CAPM model to estimate the expected return. In addition, the CAPM formula includes consideration of currency fluctuations and extra hazards, allowing investors to be slightly risk averse. The analysis concludes that both NASDAQ returns and DJI returns have an impact on the returns of Pfizer stock, while DJI returns are more influential when compared to the regression coefficients and beta values [9-10].

This article is organized into four main sections to express the direction of the research clearly. The first section provides a historical context for the research topic, Pfizer, as well as data-driven analysis of the company's financial status and stock market performance over the past year. In the second section, the framework of the CAPM asset pricing model is utilized to quantify the relationship between Pfizer stock and the two major indices via regression analysis, while the fluctuation of beta data in the comparative relationship is investigated in depth. Critique the major body of the paper and assess the model's strengths and flaws. In the third section, the article's major body is summarized, from which the study's limitations are examined and future research directions are considered.

2. Firm Description

Pfizer, a business traded on the New York Stock Exchange, has a history of about 170 years and is known for its breakthrough biopharmaceutical drugs [5]. The company's objective is also to provide scientifically proven advantages to patients. From now on, Pfizer possesses accomplishments that include the discovery of citric acid, the investigation of more than 150 pharmaceutical items [5] in 15 therapeutic categories, and the successful development of the Pfizer vaccine against COVID-19 in 2021. Similarly, Pfizer has been implicated in scandals regarding the manufacture of medications that have additional adverse effects on patients. As a result, Pfizer was compelled to recall a medication known as Chantix.

2.1. Pfizer Business

Pfizer company is a New York Stock Exchange-listed firm with approximately 170 years of history and a reputation for breakthrough biopharmaceutical medications and biotechnology. Pfizer has the objective is to provide biological assistance to patients by utilizing innovative biotechnology to treat illnesses. Pfizer has now made significant accomplishments, such as the discovery of citric acid and the creation of over 150 pharmaceutical creations spanning 15 therapeutic areas. In addition to the successful development of Pfizer's COVID-19 vaccine in 2021, which will contribute to the fight against epidemics in society. Similarly, however, Pfizer has been implicated in a scandal for allegedly creating medications with additional detrimental effects on patients. Due to public pressure, Pfizer was compelled to recall the medicine Chantix, an event that had a significant impact on the company's revenues and reputation.

2.2. Pfizer Finance

Generally, the financial metrics of Pfizer are separated into three groups.

The first is the indication of solvency, which includes the current ratio, debt ratio, and quick ratio. Each indicator is settled at the end of a quarter, with Pfizer's current ratio in June 2022 standing at 1.42, the quick ratio at 1.2, and the debt ratio at 0.50.

Secondly, the indications of operating capability, including accounts receivable turnover and inventory turnover. Pfizer, inventory turnover was 0.83, while accounts receivable turnover was 7.82. Finally, indices of profitability, including the profit margin and operating margin. At the end of June 2022, Pfizer's profit margin is 28.92% and the operating margin is 34.47%. The metrics

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intelligently reflect Pfizer's previous performance in the market. However, the metrics cannot be utilized as a basis for Pfizer to build future value and performance.

2.3. Daily Share Prices

This document compiles the performance of Pfizer's stock price on the trading market from September 2021 to September 2022 for the purpose of analyzing the stock price.

Throughout the year, Pfizer shares have closed in a range of 40 to 60. In September and October 2021, the daily closing stock price had a declining tendency, reaching a minimum value of 40. Prior to early November, the stock price fluctuated dramatically, indicating a rising trend. In late December, the stock price fluctuated between 54 and 58 per day. Throughout the first half of 2022, Pfizer's daily stock price has gradually decreased. Until now, the share prices have been around 45.

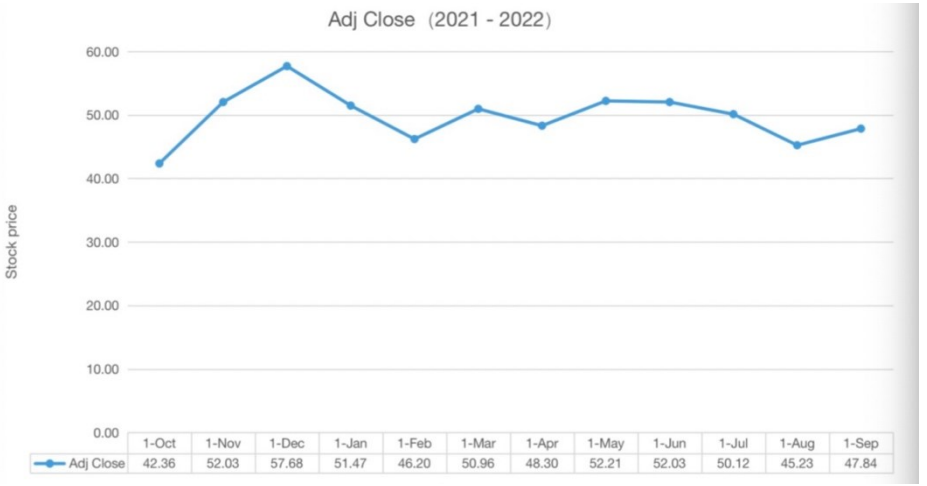

Figure 1: A figure of Pfizer monthly share price.

3. Method

3.1. Introduction of the CAPM Model

The CAPM is a capital asset pricing model and equilibrium theory that measures risk and return price [3]. The primary function of CAPM is to reveal the relationship between the expected return and the risk of an asset to investors. In addition, CAPM has the ability to assess the rationality of stock prices and disclose the existence of non-normal returns in trading marketplaces. Moreover, the CAPM theory is beneficial for investors in assessing the macroeconomic impact on stock prices. Further, if an investor wants to compare the projected return of an asset to the asset's risk, the beta value is crucial. The following analysis examines the impact of the Nasdaq and DJLA on Pfizer stock price utilizing the CAPM model and theory as the basis for the research.

Therefore, the equilibrium expected rate of return of stock on the trading market can be expressed as:

$$E(R_i) = R_i + \beta_i(E(R_m - R_f) \tag{1}$$

$$Beta = \beta_p = \frac{Cov(D_P, D_m)}{V_{ar}(D_m)} \tag{2}$$

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While in the formula E stands for the portfolio's expected return, Rf is the risk-free rate of return, the second E stands for the market portfolio's expected return, and β stands for a specific portfolio's systematic risk component.

3.2. Regression Analysis

The subsequent chart depicts the regression analysis with NASDAQ's return as the independent variable and Pfizer's return as the dependent variable. First, the coefficient of multiple R represents the correlation between the two parameters; the closer the number is to 1, the greater the positive correlation between the two parameters, which means that the return of NASDAQ and the return of Pfizer stock both grow. R square, the square of R, denotes the correlation coefficient, which typically falls between 0 and 1. The greater the coefficient, the better the data fit, while data close to 0 indicate a poor fit. The following regression df represents the degree of freedom of the regression analysis model with a value of 1, and the following values represent the degree of freedom of the residuals, with a total of 28 parameters for the entire set of data. The significance level is the crucial value of F at the significance level, i.e., the p-value of the F-test, which measures the probability of dismissing the truth. The value of 0.014 is less than 0.05, indicating that the study is statistically significant.

The coefficients reflect the regression values for the intercept, while the X variable represents the slope regression value, commonly known as the beta value. The intercept regression value indicates that when the predictor variable is zero, the average predicted value of the responder variable is displayed. The regression coefficient in the value is -0.1, and the average predicted return of Pfizer without the effect of the NASDAQ index would be -0.1, however, the standard error is just 0.26, showing that the parameter is more precise. The P number shows the likelihood of rejecting the validity of the two parameters. The P value of the independent variable is 0.0014, which is less than the significance level, indicating that the sample data contains adequate evidence that the return of Pfizer is connected to the return of the NASDAQ index and that the parameters are relevant (Table 1).

Table 1: The data of the PFIZER (dependent variable) & NASDAQ (Independent variable).

Regression							
Multiple R				0.562873407			
R Square				0.316826472			
Adjusted R Square				0.291523748			
Standard Error				1.402994088			
Observations				29			
ANOVA							
	df	SS		MS	F	Significance F	
Regression	1	24.64710285		24.64710285	12.52143765	0.001479079	
Residual	27	53.14659511		1.968392411			
Total	28	77.79369796					
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-0.10808008	0.265143685	-0.407628338	0.686760706	-0.652109984	0.435949824	-0.652109984	0.435949824
Beta	0.524643604	0.148264537	3.538564349	0.001479079	0.220429903	0.828857305	0.220429903	0.828857305

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The below regression analysis table uses Pfizer's return as the dependent variable and DJI's return as the independent variable.

The multiple R value in the analysis table is 0.61, and the correlation between the dependent and independent variables is positive. The R square value is 0.38, and the parameters are better fitted than Nasdaq. The coefficient of regression for the intercept is -0.12 and the standard deviation is 0.25. And the variables of P value and significance level are identical.

Table 2: The data of the PFIZER (dependent variable) & DJI (Independent variable).

Regression							
Multiple R				0.618534594			
R Square				0.382585044			
Adjusted R Square				0.359717823			
Standard Error				1.333763717			
Observations				29			
ANOVA							
	df	SS	MS	F	Significance F		
Regression	1	29.76270536	29.76270536	16.73071909	0.000348366		
Residual	27	48.0309926	77892565 2				
Total	28	77.79369796					
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-0.124667841	0.250656063	-0.49736615	0.622957 19	-0.638971601	0.389635919	-0.638971601	0.38963 5919
Beta	0.824840016	0.201656 59	4.090320 17	0.000348 366	0.411074871	1.238605 16	0.411074871	1.23860 516

3.3. Analysis

Based on the research of the CAPM model presented above, the beta coefficient characterizes the risk factor of a portfolio as the ratio of the portfolio risk level to the risk level of market securities [1]. The beta coefficient quantifies the risk associated with all external risk factors. For instance, economic risks may include interest rates, currency exchange rates, inflation, macroeconomic and monetary policies, energy crises, and economic cycles. Further, typical examples of political risks include regime transition and war conflicts.

In the meantime, the beta component represents the strategy's market sensitivity. If the Beta of Pfizer's execution plan is 1.5, for instance, the strategy may climb 1.5% while the Nasdaq or DJLA rises 1%. Conversely, If the Beta of the Pfizer execution plan is -1.5, it indicates that when the two broad market indices increase by 1%, the Pfizer strategy may decrease by 1.5%.

The characterized Systemic risk is hurting the whole stock market and the vast majority of stocks. At the same time, the consequences of systemic risk are universal. The primary characteristic is that it causes most stock prices to decline. Systematic risk is also known as a non-diversifiable risk because it cannot be removed or mitigated by diversification techniques.

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4. Discussion

4.1. Discussion of CAPM Advantage

Through the practice of the CAPM model above, it has been determined the advantage that all investment assets with risky return characteristics can be analyzed and investigated by the Camp model [1]. The model separates all variables that affect asset values into three categories: risk-free benefit, market risk, and stochastic risk, and then naturally combines the three categories. Second, based on the practice of the model, investors can utilize the CAPM model as a tool for measuring portfolio risk, specifically for determining whether effective diversification is proven in terms of diversified market risk [1]. The portfolio advantage is hence less volatile and systematically risky.

4.2. Discussion of CAPM Disadvantages

The lack of realistic limitations in the CAPM model is a disadvantage. The reason for this is that the source of the asset advantage lies among the models. Further, market risk and risk-free return are the only two risks involved [1]. All other threats are identified and addressed as stochastic threats. Analysis of the linear link between Beta values and individual stock returns demonstrates that the relationship breaks down after a short period. Such a CAPM asset model application for a proof surface may be incorrect [3]. Also, the values of Beta might fluctuate, and the passage of time can change their values, resulting in ambiguity regarding the predicted return values [3]. There is no ability to concurrently simulate inside without considering transaction costs and taxes, or even dividends and inflation, thus investors' actual predicted stock returns would be calculated incorrectly.

5. Conclusion

Mostly, stock prices in the market are influenced by external factors, the index is one of the factors. When investing in stocks, investors observe and predict the movement of the broad market index. This is due to the correlation between index changes and stock market movements, which influences investors' tendency to make portfolio decisions. This article analyses the impact of two indexes on Pfizer stock price to examine changes in Pfizer stock price returns. More specifically, this study investigates variances in Pfizer stock returns by analyzing the impact of two indices on the market shares. Accessing the regression analysis of the CAPM model to correlate and compare index returns and stock price returns as the dependent and independent variables, the data conclusions corroborate the investor's dependence on broad market index analyses when selecting portfolios.

The experimental investigation determined that DJI returns, and Nasdaq returns impact Pfizer's returns. In addition, the degree of fit and correlation of DJI returns are increased. Further, the slope of the DJI regression analysis is greater than that of the NASDAQ, indicating that DJI returns exert a greater influence than NASDAQ returns.

The study is limited by the fact that the data measured by the CAPM model as modeling are only logically conditioned, and the findings of the reference data measured by modeling do not include perceptual circumstances as a reference. As the term implies, reliable data cannot compete with human variability, the risk connected with human elements. Although relying on the data results measured by CAPM modeling enables investors to more precisely manage the risk of their portfolios by examining changes in the broad index, the CAPM modeling data is no longer accurate for investors when irrational events causing risk to affect the index occur.

As evidenced by the limitations of CAPM, another constraint of the experiment is that the accuracy of the computation of predicted returns is low due to the partial elements addressed by the

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model. Although it is beneficial to analyze data and draw conclusions based on the regression analysis of the entire experiment, the results offer very little insight. Other information, like the experiment's fit and correlation, cannot be supplied because the study's outcomes are limited to statistical measurements and are evaluated solely based on the dependent and independent variables. The data collected are biased, and the experiment as a whole can only explain a phenomenon through equations. Further, the experimental process entails incredibly complex computational and analytical steps. The CAPM model will be enlarged to include more realistic reference values for future research relevant to the study of indexes on stock returns.

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