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Analysis of Wal-Mart Stock Trend Based on CAPM Model

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Abstract: The Capital Asset Pricing Model (CAPM) model is an important theoretical model in finance. This theory can be used to estimate the price of the target asset and predict its future development trend. As a famous brand, Wal-Mart is an indispensable backbone in the stock consumption sector and has attracted much attention from investors. This paper uses direct data and the CAPM model to conduct a case study on Wal-Mart's US stocks. The historical data of the S&P 500 is used as a sample to calculate the market return rate R(M), the one-year US Treasury bond rate is used as the risk-free rate R(f), and the historical rate of change of Wal-Mart's stock is used as R(i) to calculate its sensitivity to systematic risk β. The author uses Excel to perform regression analysis on the relevant data. The results show that the model passes the F test and T test, and the model is established; the model R 2 is 0.9676, which proves that the model fits well. The β of Wal-Mart stock is 0.9676. This data can prove that the stock is positively correlated with the changes in the S&P 500 market, that is, the stock is close to the market systematic risk. The greater the risk, the better the stock performs. When investors predict that the US stock market is on an upward trend, they can hold the stock.

Keywords: case analysis, regression model, empirical analysis.

1. Introduction

In recent years, CAPM has been widely used in the financial field. Due to its accurate measurement of asset prices, many investment banks like to use it to predict target assets. Since securities trading is a prediction of the future value of assets, investors will face certain risks when investing [1]. In this regard, the CAPM model is a good helper.

CAPM model is the cornerstone of classical financial theory. It was proposed by William Sharpe and other scholars in 1960 and is widely used in the field of corporate finance [2]. In the face of unknown risks, CAPM provides a simple and effective model that only requires the beta value to represent the impact of factors on the model. The CAPM model solves the relationship between investors and risks and confirms the relationship between risk and profitability.

The core of CAPM is Markowitz Portfolio Theorem, which aims to maximize expected returns and minimize risks by analyzing the trade-off between investment returns and risks, thereby helping investors choose the best financial investment products. The CAPM model is developed based on this theory. CAPM describes the investment situation of the market after all investors in a completely efficient market follow the Markowitz theorem, assuming that investors are rational and make diversified investments according to Markowitz's principles [3].

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Nowadays, CAPM has been developed for a long time and is very popular in theory and practice. CAPM was the first to determine the price and quantity of capital assets in equilibrium, using the neoclassical risk decision paradigm. It has become one of the main frameworks in financial economics for analyzing investor behavior under risk conditions [4].

This article will use the CAPM model to analyze the relationship between Walmart stock and the S&P 500, use relevant historical data to calculate the model's beta value, and use it to predict the future development of the asset.

2. Case Description

Walmart was incorporated in 1969 and has grown to become the world's largest retail company since its founding [5]. Its stock was established in the last century and has maintained steady growth since its founding. It has seen several sharp rises since the beginning of the 21st century and is currently one of the stocks included in the S&P 500. Although it still lags the S&P 500 index, Walmart is gradually catching up in recent years. Walmart's stock has risen an average of 6% per year between 2020 and 2024. Despite the impact of covid-19, Walmart has maintained good development during this period, thanks to the company's excellent business strategy, which also shows its hidden investment potential.

Walmart has an excellent supply chain system. They applied IT and other high technologies to the supply chain in the last century and effectively increased sales [6]. The company's continuous technological innovation has brought them huge profits, making them a leading company in the consumer industry and a very representative consumer stock. Therefore, this article selects the company's stock for case analysis.

3. Analysis on the Problems

3.1. Model Analysis

The CAPM model expression is $E(r_i) = r_f + \beta_{im}(E(r_m) - r_f)$: In this article, the U.S. one-year Treasury bond is used to represent the risk-free interest rate r_f; the rate of change of the closing index of the S&P 500, including 50 sets of data from April 2020 to June 2024, is $r_m$used as the yield of the market portfolio M; the rate of change of the closing price of Walmart U.S. stocks, including 50 sets of data from April 2020 to June 2024, is used as the yield of the target stock i r_i.

The core of this model is the calculation of β, which represents the increased risk of the portfolio after investing in assets [7]. According to the standard formula, we know that $\beta = \frac{cov(R_m,R_i)}{var(R_m)} = \frac{\rho\sigma_i}{\sigma_m}$. For the convenience of calculation, we can further deduce from the formula that $\beta_{im} = \frac{r_i - r_f}{r_m - r_f}$.

Therefore, we use the regression function of Excel to analyze and get the following results:

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Table 1: Regression results for Walmart stock data.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.983975
R Square	0.968206
Adjusted R Square	0.967557
Standard Error	0.048372
Observations	51

ANOVA

	df	SS	MS	F	Significance F
Regression	1	3.491518	3.491518	1492.174	2.34E-38
Residual	49	0.114654	0.00234		
Total	50	3.606173			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	-0.00636	0.007193	-0.88433	0.380835	-0.02082	0.008094	-0.02082	0.008094
X Variable 1	0.967603	0.025049	38.62867	2.34E-38	0.917266	1.017941	0.917266	1.017941

As show in Table 1, we can know that 1. significance F < 0.05, T Stat < 0.05, the model is established; 2. R Square is 0.968, close to 1, proving that the model fits well; 3. X Variable is 0.9676, indicating that when the Nasdaq index rises by 1, the target stock rises by 0.9676, and the changes in the two are positively correlated.

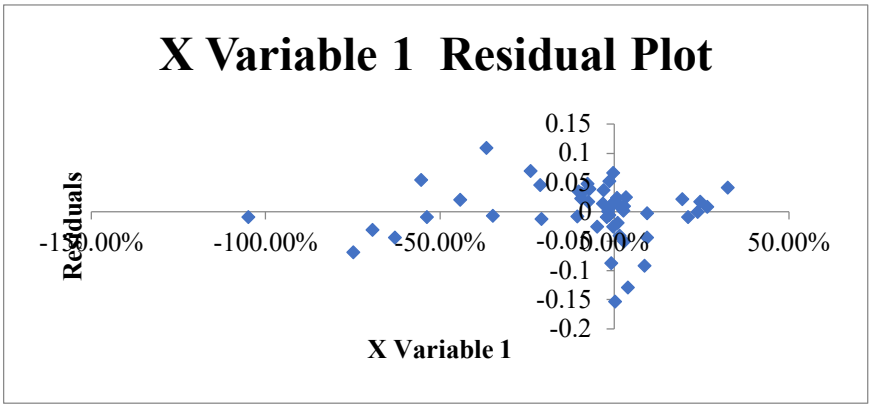

Figure 1: Residual Plot.

As show in Figure 1, it can be found that most of the points represented by the relevant data are randomly distributed above and below the straight line with 0 as the horizontal axis, and the regression

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line fits each observation well. This graph can prove that there is a linear relationship between the data variables x and y, the residual variance is uniform, and there are no outliers.

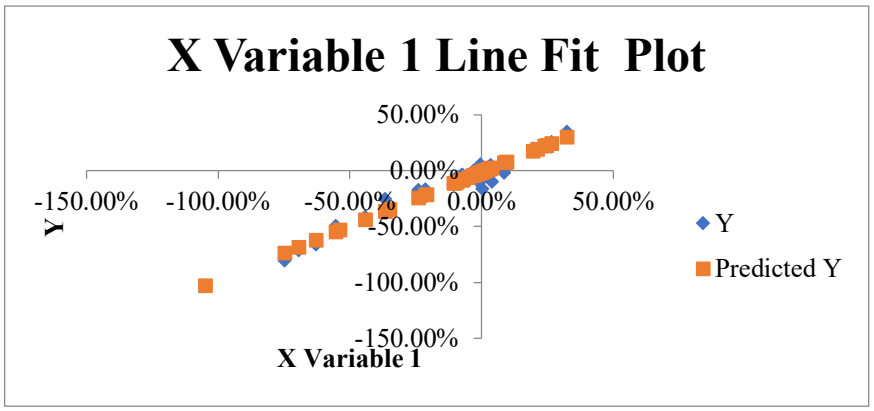

Figure 2: Line Fit Plot.

As show in Figure 2, we can find that the observed point Y and Predicted Y have a high degree of fit, indicating that the actual total price is close to the expected price. Combined with the icon R^2 of 0.9682, it shows that the model can explain 96.82% of the total price change, proving that the model has strong predictive ability.

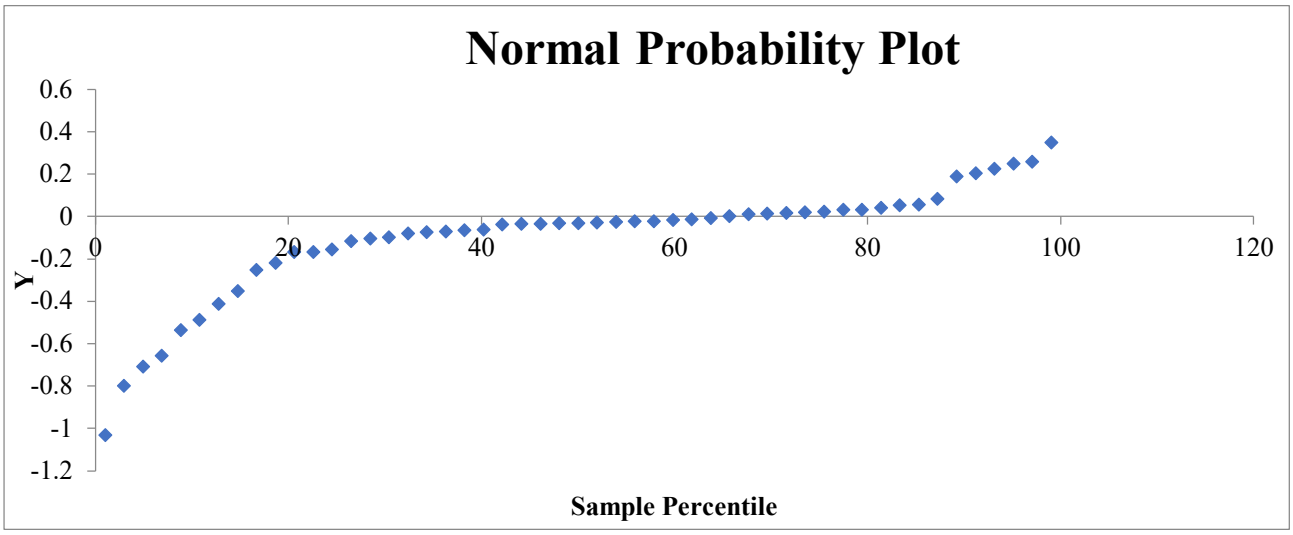

Figure 3: Normal Probability Plot.

As show in Figure 3, we can find that the overall trend of Y is rising, and when the Percentile is 65.6863, it is greater than 0, indicating that the model shows an overall upward trend.

Summary: 1. The model has a high degree of fit and is successfully constructed; 2. There is a high correlation between variables X and Y; 3. There is a positive correlation between their changing trends.

3.2. Macroeconomic Analysis

According to the data from the U.S. Department of Labor, the growth rates of the U.S. Consumer Price Index (CPI) and the core CPI slowed down in June 2024. The CPI grew by 3% year-on-year in that month, lower than 3.3% in May, and it was the first negative CPI growth since May 2020. This shows that the U.S. economy is gradually cooling down, but it also indicates that the Fed's future

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interest rate hikes will also slow down. The market has already responded to this. In fact, the S&P 500 index stopped growing, and technology-related stocks such as Microsoft and Nvidia fell. However, there are still about 400 stocks that have risen, including Walmart.

In the short term, the decline in CPI is a negative news for the stock market. Generally speaking, it indicates a slowdown in economic growth in the future. However, this economic slowdown is the result of the Fed's interest rate hike to fight inflation. So far, the effect is good.

The central bank may stop raising interest rates because in the long run this decline in CPI is actually good for the economy and the stock market.

3.3. Enterprise Analysis

Wal-Mart's business model is based on many aspects, the core of which is its innovative supply chain system. In the early stages of its development, the company vigorously developed its supply chain and used its own supply chain system to save a lot of transportation costs [8]. This is the reason for Wal-Mart's low cost and the basis of its competitiveness. Supply chain management has enabled Wal-Mart to develop rapidly and not just stick to the retail industry but has helped Wal-Mart expand its business scope.

As the industry leader, Walmart has always encouraged innovation [9]. Due to the high inflation in recent years, the consumption capacity of the American people has declined. Therefore, Walmart is planning to create a new operating model in the near future. This model will abandon the idea of using fresh food as the main category to attract customers to operate supermarkets and will complement membership stores such as Sam's Club. In addition, Walmart is also investing in green supply chains [10]. These investments prove that Walmart has development potential and prove that the company has investment potential.

4. Suggestions

For investors, since the long-term trend of the stock market is optimistic, investing in Walmart stocks with a positive beta will bring investors stable and good returns. At the same time, beta is close to 1, proving that the stock has been very stable for a long time, in line with the overall development of the US economy, and is a very stable stock. By observing the Normal Probability Plot, we can find that the overall trend of Y is rising, which indicates that this stock has the potential to rise in the future. In general, this stock is worth investing in.

From a macro perspective, the current inflation in the United States has gradually decreased, so the Federal Reserve is likely to reduce deposit rates in the short term to encourage money circulation and promote the rise of the stock market, which is a major positive for the US stock market. As for Walmart stock, since the beta is 0.9, it indicates that the stock is likely to rise in the future. In addition, the reduction in inflation is also positive for the retail industry, which means that people can have more ability to consume. In short, in view of the overall environment of the gradual easing of inflation in the United States, this stock is worth investing in.

From the company's perspective, Walmart has an advanced supply chain system, which gives it a great advantage in market competition. Moreover, the company encourages innovation and encourages the creation of new management and business models, which makes its long-term development dynamic and will not decline due to outdated management or business models. In general, the company has a good long-term development momentum and is worth investing in.

5. Conclusion

In general, this paper uses the CAPM model to conduct a regression analysis on Walmart's stock to draw conclusions. According to the regression model, it can be seen that the stock is generally on an

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upward trend, and the increase is very close to the increase of the S&P 500. According to the analysis of the macro economy, the overall development trend of the US economy in the future is positive, which is good news for the development of the market and companies such as Walmart. Regarding the analysis of the company, the company has innovation capabilities and a good supply chain foundation and has great potential for growth.

In general, Wal-Mart stock has a strong potential for growth. The regression model proves that the stock has been rising well in the past period. With the help of the overall economic environment and the company's own advantages in management and operation, the stock's future development trend will also be positive. Therefore, for investors, this stock has good development potential and has performed very steadily in the past, making it a very good investment option.

As a case study, this study helps the market fill the gap in the stock analysis of retail companies such as Walmart, and at the same time provides relevant investors with a reference for investment in the consumer sector. This study is helpful to professional investors, investment companies, relevant researchers, and companies in the consumer sector.

The model still has some problems. For future research, more professional data analysis software such as stata can be used to replace excel, and more charts can be used to describe the problem in more detail.

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