Capital Asset Pricing Model, Theory and Practice: Evidence from USA (2009-2016)

Mohammad Abdel Mohsen Al-Afeef[1]

[1] Head of Finance & Banking Department, Faculty of Economics & Administrative Science, Jerash Private University, Jerash, Jordan

Correspondence: Mohammad Abdel Mohsen Al-Afeef, Head of Finance & Banking Department, Faculty of Economics & Administrative Science, Jerash Private University, Jerash, Jordan. E-mail: afeif500@yahoo.com

Abstract

This study discussed the Capital Assets Pricing model (CAPM) and its ability to measure the required return, the researcher tested this model on Amazon Company listed in S&P 500 during the period (2009-2016), to measure the impact of beta stock and market index return on the required return. Multiple regression model was used to test the effect of independent variables (Beta stock, Market Index Return) on the dependent variable (Required return), it should be noted that there is a statistically significant impact of the US stock market Return (S&P500) and Amazon stock Beta factor on Amazon stock required return, and the study model explanatory was 20% , this means that 20% of the changes in the required return are due to beta and market return, and 80% of the changes due to other factors, also find that CAPM can be applied on efficiency markets and huge companies.

The researcher recommends applying the variables of the study on a group of large companies in the S&P 500 index, and looking for other factors that may affect the required return.

Keywords: CAPM, Amazon, Required return, Beta, Risk, S&P500, Market Return, Pricing Model.

1. Introduction

Financial markets have an important role in the economic development process because of attracting investors and the accumulated savings and directing them to the right investments by the published information that reflect the market situation and the assets being traded in such a way that gives investors the best choice among the available investments especially in the efficient markets.

Having said this, investors look for an appropriate return that is commensurate with the risk in this investment. Therefore, investments must be evaluated before making a decision. There are many mechanisms that are used in financial analysis and determination of the required return on investments. The most important of these methods is the capital asset pricing model (CAPM), which is based on the required return measurement on a number of factors; nature of the relationship and correlation between the stock returns and market index returns, in addition to the investment risks that the model divided it into systematic risk and non-systematic risk. (Mullins, 1982).

This study was conducted to examine the ability of the capital asset pricing model in order to explain the changes in stocks returns, and its ability to price stocks by forecasting and measuring the required return by applying this model to an important company listed on the S&P500 index, Amazon (2009-2016).

1.1 Problem

Investing in securities is not an easy work, because of the difficulty of estimating the return, especially with regard to the ordinary shares, which increases the degree of uncertainty for the investor and his sense of risk. Thus, in order to reduce the uncertainty of investors and encourage them to make investment decisions, there is a need to have scientific methods to evaluate investments, especially investment in the financial markets, as an important body in any economy in the world, especially efficient markets such as: the US stock market (S&P 500), which measures the performance of the top 500 companies in the US stock market based on the market's value of shares traded on the NYSE and NASDAQ.

The main problem is to test CAPM's ability to explain changes in stock returns as a result of changes in market returns in S&P500 and apply it to one of the major companies in this market, which is Amazon Co.

The Study will try to answer the following questions:

1)   Is there an impact of the market's return on the Amazon required return?

2)   Is there an impact of Amazon's beta stock factor on Amazon's required return?

3)   Can the CAPM model be applied in (S&P 500) (Amazon Co).

1.2 Importance

The importance of the research is highlighted the CAPM model as the most important pricing method used to measure the required return in comparison with risk in the US stock market. The importance came from the model importance in assessing stocks and measuring the cost of financing. It can also guide investors to choose stocks that meet their investment needs, and to build efficient portfolios.

1.3 Objective

The objective of this study is to investigate the possibility of applying CAPM in the US stock market (S&P500) and to clarify the mechanism by which this model can be applied to measure the required return.

2. Literature Reviews

Capital Asset Pricing Model (CAPM)?

Modern financial theory is based on two basic assumptions; the first one is that stock markets are efficient and full competition, the second one is that investors in these markets are rational investors and seek to maximize the yield within acceptable risk limits.

The first Assumption is assumed that the financial market is driven by buyers and sellers with a high degree of sophistication and understanding. The second hypothesis is assumed that investors who are interested in wealth and prefer an additional premium to the required return because of expecting more risks. (Turner A. el al, 2010)

The capital asset pricing model (CAPM) is based on the portfolio theory developed by Harry Markowitz (1959). The portfolio model requires a critical condition on the weights of assets in medium-efficient portfolios. CAPM based on a testable forecast on the relationship between risk and required return by choosing a portfolio that should be effective if the asset prices are clear to the market for all assets (Fama, French, 2004). (Sattar, 2017).

Sharpe (1964), Lintner (1965) and Black (1972) developed the CAPM model, which is the reliable model to Measure the required return, which reflects the cost of equity financing. This model measures the risk of the securities by measuring the sensitivity of the return of the security to the change in market's return, the market's risk in this model measured by Beta Coefficient (B). CAPM model was based on a set of assumptions :(Ross el al, 2008). (Al Naimi el al, 2009), (Bodie, Kane, 2010)

1)   All market investors are planning the same holding period.

2)   Lending and borrowing are carried out in accordance with the risk-free rate of return.

3)   Information symmetry and full efficiency of financial markets.

4)   All investors analyse the securities in the same way and have the same expectations.

5)   Absence of taxes and the costs of financial brokerage.

6)   All investors are characterized by rationality, which means that the investment design based on comparison between return and risk.

7)   Investors do not affect the market individually.

The CAPM includes a set of concepts that translate required return calculation, as follows:

First, the Security Market Line (SML). This concept captures the relationship between the required return and the market risk expressed by Beta Coefficient. Here, it must be noted that the model divides the risk into two types: (Hadad, 2015).

Non-systemic risk: They can be called firm specific risk or diversification risk, this type of risk happen because of the financial and operating decisions taken by the company itself. The financial risks related to financial leverage, and capital structure, the operation risk related to operations Administrative and competitive with other companies. This type of risk can't be predicted but can be reduced through diversification and portfolio formation in a way that minimizes risks in a way that the portfolio contains assets with a weak correlation coefficient between these assets according to Markowitz's theory.

Systematic Risk: This type of risk is caused by market factors and affects the market in general, and does not

affect one company alone. It is linked to economic changes, especially macroeconomic indicators as well as natural disasters, but can't reduce those risks through diversification but by predicting and hedging them.

The systematic risk is measured through the beta coefficient of the company's shares by using the trend of the security market line or using the covariance of the stock's return and market's return as in the following equation, (Fama, French, 2004).:

$$B_j = \frac{\rho_{J,m}\, \sigma_j\, \sigma_m}{\sigma^2_m} \tag{1}$$

Whereas:

B_j: Beta coefficient of the company's shares.

$P_{J,m}$: Correlation coefficient between stock and market.

σ_j : Firm Stock risk.

σ_m : Market risk.

σ^2_m: Market variance.

The beta-market coefficient is constant and equal one (1), and can be proved by using the previous equation as follows (Ross, el al, 2008)

$$B_m = \frac{\rho_{m,m}\, \sigma^2_m}{\sigma^2_m} \tag{2}$$

So the equation becomes as follows (because the correlation coefficient of the original with itself is equal to one:

$$B_m = \rho_{m,m} \qquad So \qquad B_m = 1 \tag{3}$$

Whereas:

B_m : Market Beta

$\rho_{m,m}$: Market correlation with itself

The portfolio risk can be measured according to the beta by the following equation (Hadad, 2015).

$$B_P = \sum_{j=1}^{n} (W_j x\, B_j) \tag{4}$$

Whereas:

B_P: Portfolio's risk According to CAPM

$W_j x$: The weight of the stock in the portfolio.

B_j : Beta coefficient of the company's shares.

The stock's return response to changes in market's returns depends on the beta-stock coefficient. If beta is greater than 1, the change in the stock's return is greater than the change in market's return. But if it is smaller than 1, the change in stock's return is less than the change in market's returns, whereas if the stock beta is equal to 1, that means, the change in stock's return is equal to the change in the market's return, because the value of the beta depends on the coefficient of the correlation between the stock's return and market's returns (Hadad, 2015).

The CAPM model provides the required return through the security market line curve equation as follows:

$$K_j = R_f + B_j\ (K_m - R_f) \tag{5}$$

Where is:

K_j : Required stock's return.

R_f: Risk free rate.

B_j: Stock beta coefficient.

K_m : Return on market portfolio.

From the equation (5) the market's risk premium and the stock's risk premium can be calculate as follows: (Zenner el al.2008).

$$\textit{Market risk premium: Market return - risk free rate.} \tag{6}$$

$$\textit{Stock Risk Premium: Market risk premium * Beta stock market.} \tag{7}$$

The variables of the CAPM model can be graphically represented by the security market line (SML), which is very useful when applying the CAPM model, or when applying modern portfolio formation techniques based on the beta factor.

Figure 1 shows the relationship between the beta factor and the required return. It is worth mentioning that there is controversy regarding the use of beta as a measure of risk and required return.
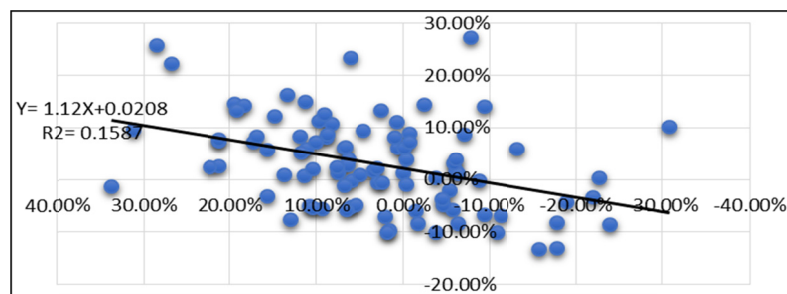

Figure 1. Amazon Beta

Source: Based on the results of the analysis 2017.

2.1 Description of Amazon Company

"Amazon.com, Inc. engages in the retail sale of consumer products and subscriptions in North America and internationally. It operates through the North America, International, and Amazon Web Services (AWS) segments. The company sells, merchandise and content purchased for resale from vendors, as well as those offered by third-party sellers through retail Websites, such as amazon.com, amazon.ca, amazon.com.mx, amazon.com.au, amazon.com.br, amazon.cn, amazon.fr, amazon.de, amazon.in, amazon.it, amazon.co.jp, amazon.nl, amazon.es, and amazon.co.uk. It also manufactures and sells electronic devices, including kindle e-readers, fire tablets, fire TVs, and echo; and provides Kindle Direct Publishing, an online service that allows independent authors and publishers to make their books available in the Kindle Store. In addition, the company offers programs that enable sellers to sell their products on its Websites, as well as their own branded Websites; and programs that allow authors, musicians, filmmakers, app developers, and others to publish and sell content. Further, it provides compute, storage, database, and other AWS services, as well as fulfillment, publishing, digital content subscriptions, advertising, and co-branded credit card agreements services. Additionally, the company offers Amazon Prime, an annual membership program, which provides free shipping of various items; access to unlimited streaming of movies and TV episodes; and other services. It serves consumers, sellers, developers, enterprises, and content creators. The company was founded in 1994 and is headquartered in Seattle, Washington". (Yahoo finance, 2017).

Table 1. An important indicators about Amazon.

Valuation Measures			
Market Cap (intraday) 5	458.78B	Profit Margin	1.81%
Enterprise Value 3	N/A	Operating Margin (ttm)	2.89%
Trailing P/E	180.76	Management Effectiveness	
Forward P/E 1	84.94	Return on Assets (ttm)	3.62%
PEG Ratio (5 yr expected) 1	5.25	Return on Equity (ttm)	14.18%
Price/Sales (ttm)	3.22	Income Statement	

Price/Book (mrq)	21.17	Revenue (ttm)	142.57B
Enterprise Value/Revenue 3	N/A	Revenue Per Share (ttm)	299.84
Enterprise Value/EBITDA 6	N/A	Quarterly Revenue Growth (yoy)	22.60%
Financial Highlights		Gross Profit (ttm)	47.72B
Fiscal Year		EBITDA	12.22B
Fiscal Year Ends	Dec 31, 2016	Net Income Avi to Common (ttm)	2.58B
Most Recent Quarter (mrq)	Mar 31, 2017	Diluted EPS (ttm)	5.31
Profitability			
Trading Information			
Beta	1.39	Avg Vol (10 day) 3	3.75M
52-Week Change 3	37.57%	Shares Outstanding 5	477.98M
S&P500 52-Week Change 3	15.51%	Float	397.69M
52 Week High 3	970.06	% Held by Insiders 1	17.82%
52 Week Low 3	682.12	% Held by Institutions 1	67.50%
50-Day Moving Average 3	924.09	Shares Short 3	5.49M
200-Day Moving Average 3	834.82	Short Ratio 3	2.09
Share Statistics		Short % of Float 3	1.62%
Avg Vol (3 month) 3	3.27M	Shares Short (prior month) 3	5.91M

Sorce: yahoo finance 2017.

There is a theoretical debate about the impact of the risk on the required return according to the CAPM's theory. For example a research of Mashriki, Shehab, (2014), test (CAPM), by using the monthly excess returns of (8) companies listed in (DSE), for the period of (2010-2013), and the monthly excess return of (DSE) index (DWX) for the same period. The researcher concluded that there is a significant relation between the volatility of the market's return and the volatility of the returns of stocks of the examined companies, But the researcher also concluded that (CAPM) is not valid in (DSE), because of the failure in the statistical test. That the constant of the regression equation is not equal to zero and the slope of the security market line is not equal to the average excess return of the stocks of examined companies. An article for Rafael el al, (2014), integrates the ideas from two major lines of research on cost of equity and asset pricing: multi-factor models and ex ante accounting models. The earnings/price ratio is used as a proxy for the ex ante cost of equity, in order to explain realized returns of Brazilian companies within the period (1995 -2013). The finding was that stocks with high (low) earnings/price ratios have higher (lower) risk-adjusted realized returns, already controlled by the capital asset pricing model's beta. The results show that selecting stocks based on high earnings/price ratios has led to significantly higher risk-adjusted returns in the Brazilian market, with average abnormal returns close to 1.3% per month. The researchers conclude that such a risk factor is significant to explain returns on portfolios, even when controlled by size and market/book ratios. Models including the high earnings minus low earnings risk factor were better to explain stock's returns in Brazil when compared to the capital asset pricing model and to the Fama and French three-factor model, having the lowest number of significant intercepts.

In a research for Fama, French, (2004), CAPM estimates of the cost of equity for high beta stocks are too high (relative to historical average returns) and estimates for low beta stocks are too low. Similarly, if the high average returns on value stocks (with high book-to-market ratios) imply high expected returns, CAPM cost of equity estimates for such stocks are too low. A study for Kapil, Sakshi, (2010) examines the (CAPM) for the Indian stock market using monthly stock returns from 278 companies of BSE 500 Index listed on the Bombay stock exchange for the period of January 1996 to December 2009. The findings of this study are not substantiating the theory's basic result that higher risk (beta) is associated with higher levels of return. The model does explain, however, excess returns and thus lends support to the linear structure of the CAPM equation. The theory's prediction for the intercept is that it should equal zero and the slope should equal the excess returns on the market portfolio. The results of the study lead to negate the above hypotheses and offer evidence against the CAPM.

The tests conducted to examine the nonlinearity of the relationship between return and betas bolster the hypothesis that the expected return-beta relationship is linear. Additionally, this study investigates whether the CAPM adequately captures all-important determinants of returns including the residual variance of stocks. The results exhibit that residual risk has no effect on the expected returns of portfolios.

The research of Al-Jameel, (2009) used the actual data of Kuwait capital market in estimating the capital asset

pricing model. The application has three sides; the first one covered all companies listed in the market and the second side focused on the portfolios building during the research period, whereas the third took the market indices. However, this is the implication of the research objective which is studying the relationship between return and risk under the methodology of the capital asset pricing model. The research analysis indicated two important issues, the determination of beta coefficient for individual stock and for the portfolios. The result is significant in different levels of probability within the traditional capital asset pricing model. Perold, (2004), says that the Capital Asset Pricing Model is a fundamental contribution for understanding of the determinants of asset prices. The CAPM tells that ownership of assets by diversified investors lowers their expected returns and raises their prices. Moreover, investors who hold undiversified portfolios are likely to be taking risks for which they are not being rewarded. As a result of the model, and despite its mixed empirical performance, he says that we now think differently about the relationship between expected returns and risk; we think differently about how investors should allocate their investment portfolios; and we think differently about questions such as performance measurement and capital budgeting.

Table 2. Summary of the results of related researches

Researcher and Research Year	Variable	Result
Mashriki, Shehab, (2014), (8) companies listed in (DSE), for the period of (2010-2013)	market return	Significant relation between the volatility of the market return and the volatility of the returns of stocks of the examined companies.
Rafael el al, (2014), Brazilian companies within the period (1995 -2013)	cost of equity	stocks with high (low) earnings/price ratios have higher (lower) risk-adjusted realized returns, already controlled by the capital asset pricing model's beta
Fama, French, (2004).	cost of equity, beta stocks	if the high average returns on value stocks (with high book-to-market ratios) imply high expected returns
Kapil, Sakshi, (2010), Indian stock market using monthly stock returns from 278 companies of BSE 500 Index listed on the Bombay stock exchange for the period of January 1996 to December 2009.	stock returns, Beta	not substantiating the theory's basic result that higher risk (beta) is associated with higher levels of return
Al-Jameel, (2009) used the actual data of Kuwait capital market.	Return, Beta	The result is significant in different levels of probability within the traditional capital asset pricing model
Perold, (2004).	Expected Risk, Return	the Capital Asset Pricing Model is a fundamental contribution for understanding of the determinants of asset prices

3. Methodology

Descriptive and analytical approach used, based on the financial data published from the S&P500 during the period (2009-2016) to test the hypotheses of the study, in addition to the previous literature that discussed the subject of the study. Financial analysis used appropriate financial ratios, by using Excel program to calculate the variables of study, as well as statistical analysis to analyze the data collected using the (SPSS) to test the model of the study and hypotheses. This will be applied to the US Company Amazon for the period as a study.

3.1 Hypotheses

The 1st hypothesis: There is no statistically significant impact of the US stock's market return (S&P500) on Amazon share required return.

The 2nd hypothesis: There is no statistically significant effect of Amazon beta factor on Amazon shares required return.

The 3rd hypothesis: CAPM can't be applied to the US stock market (S&P 500).

3.2 Study Model

The model of the study will be based on the effect of the independent variables on the dependent variable by using multiple linear regression as shown in Figure (1).
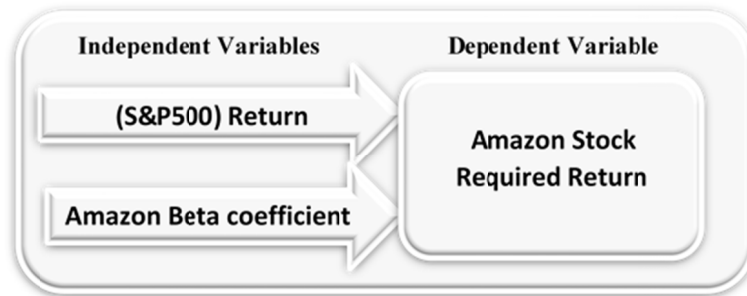

Figure 2. Descriptive model of the study variables

3.3 Variables

Independent variables**:** Return of the S & P500 index, a beta coefficient for Amazon.

Dependent variable: Amazon required return.

Multiple linear regression equation can be used to analyze the effect of the independent variables on the dependent variables as in the following equations: (Mashriki & Shehab, 2014)

$$Rit = \alpha 0 + B_1 * Rmt + B_2 * Bit + eit \qquad (6)$$

Whereas:

Rit: company Stock required Return.

Rmt: market index Return.

Bit: Company stock Beta Coefficient.

The researcher performed the following procedures to apply the research model to the Amazon Company.

First: Calculation of CAPM equation (5) variables.

Whereas:

R$_f$: Is the risk-free rate of return, where the researcher relied on the rate of return on US Treasury bonds of 4.25%, (Treasury Direct, 2017).

B$_j$: Amazon Beta, which was calculated using the appropriate financial and statistical functions on the Excel program, which reached 1.12, (Amazon Stock Beta calculated by the researcher depends on the data published in S&P 500).

K$_m$: market Return index calculated based on the data published in S&P500.

4. Statistical Analysis

Table 3. Correlations

	Kj	KM	Beta
Kj	1.000	.305	.318
KM	.305	1.000	-.026
Beta	.318	-.026	1.000

Source: Based on the results of the analysis 2017.

Table 3 shows the correlation between the study variables, the matrix of correlation) has been studied in order to make sure there's no strong relationship between each of the independent variables, so the researcher continued the analysis process

Table 4. Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.446(a)	.199	.182	.03218

a Predictors: (Constant), Beta, RM.

Source: Based on the results of the analysis 2017**.**

Table 4 shows the explanatory power of the model through Adjusted R Square, which is about 20%, this means that 20% of the changes in the required return are due to beta and market return, and 80% of the changes due to other factors.

Table 5. F test, ANOVA (b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.024	2	.012	11.443	1
	Residual	.095	92	.001		
	Total	.119	94			

a Predictors: (Constant), Beta, RM.

b Dependent Variable: K.

Source: Based on the results of the analysis 2017**.**

Table 5 shows that the level of significant is (0.00), less than 5%. This means that the model is acceptable.

4.1 Hypotheses Test

Table 6. Results of evaluating the model

Model		**B**	**Std. Error**	**Beta**	**t**	**Sig.**
1	(Constant)	-.003	.004		-.841	.403
	KM	.090	.027	.313	3.356	.001
	Beta	.037	.011	.326	3.496	.001

a Dependent Variable: Kj.

Source: Based on the results of the analysis 2017.

Table 6 shows the results of the T- test which shows the effect of the independent variables (Beta) and (KM) on the dependent variable (Kj).

The 1st Null Hypothesis: There is no statistically significant impact of the US stock market index Return (S&P500) on Amazon stock required return.

Table (6). Shows the result of the examination of this hypothesis. The above mentioned results indicate that the P value (Sig*) (corresponding to 0.001) is less than (-1) with a confidence level of 5%. This means that the Null hypothesis is rejected and the alternative hypothesis is accepted.

The 2nd sub Null Hypothesis: There is no statistically significant impact of Amazon Beta on Amazon stock required return.

Table (6). Shows the result of the examination of this hypothesis. The above mentioned results indicate that the P value (Sig*) (corresponding to 0.001) is less than (-1) with a confidence level of 5%. This means that the Null hypothesis is rejected and the alternative hypothesis is accepted.

Table 7. Amazon actual and required return 2009-2016

Date	Amazon Return	Required (CAPM) Return	Date	Amazon Return	Required (CAPM) Return	Date	Amazon Return	Required (CAPM) Return
Dec-16	0.001	0.046	Apr-14	0.010	0.037	Aug-11	0.033	0.017
Nov-16	0.050	0.057	Mar-14	0.047	0.038	Jul-11	0.088	0.017
Oct-16	0.057	0.020	Feb-14	0.019	0.064	Jun-11	0.040	0.019
Sep-16	0.089	0.031	Jan-14	0.041	0.009	May-11	0.004	0.024
Aug-16	0.014	0.033	Dec-13	0.039	0.050	Apr-11	0.087	0.053
Jul-16	0.060	0.058	Nov-13	0.021	0.053	Mar-11	0.039	0.032
Jun-16	0.010	0.032	Oct-13	0.072	0.063	Feb-11	0.022	0.057
May-16	0.096	0.044	Sep-13	0.012	0.055	Jan-11	0.058	0.048
Apr-16	0.111	0.035	Aug-13	0.029	0.012	Dec-10	0.026	0.081
Mar-16	0.074	0.081	Jul-13	0.052	0.071	Nov-10	0.062	0.033
Feb-16	0.059	0.030	Jun-13	0.047	0.020	Oct-10	0.052	0.060
Jan-16	0.132	0.003	May-13	0.023	0.048	Sep-10	0.258	0.097
Dec-15	0.017	0.019	Apr-13	0.060	0.045	Aug-10	0.059	0.003
Nov-15	0.062	0.034	Mar-13	0.023	0.059	Jul-10	0.079	0.081
Oct-15	0.223	0.094	Feb-13	0.047	0.040	Jun-10	0.129	0.007
Sep-15	0.002	0.013	Jan-13	0.047	0.068	May-10	0.085	0.021
Aug-15	0.043	0.010	Dec-12	0.005	0.038	Apr-10	0.010	0.044
Jul-15	0.235	0.047	Nov-12	0.082	0.035	Mar-10	0.147	0.077
Jun-15	0.011	0.019	Oct-12	0.084	0.019	Feb-10	0.056	0.054
May-15	0.018	0.041	Sep-12	0.024	0.050	Jan-10	0.068	0.008
Apr-15	0.134	0.039	Aug-12	0.064	0.048	Dec-09	0.010	0.048
Mar-15	0.021	0.021	Jul-12	0.022	0.040	Nov-09	0.144	0.074
Feb-15	0.072	0.072	Jun-12	0.073	0.056	Oct-09	0.273	0.015
Jan-15	0.142	0.012	May-12	0.082	0.007	Sep-09	0.150	0.059
Dec-14	0.084	0.029	Apr-12	0.145	0.027	Aug-09	0.053	0.057
Nov-14	0.109	0.052	Mar-12	0.127	0.054	Jul-09	0.025	0.083
Oct-1	0.053	0.047	Feb-1	0.076	0.062	Jun-0	0.073	0.031

4			2			9		
Sep-14	0.049	0.023	Jan-12	0.123	0.066	May-09	0.031	0.068
Aug-14	0.083	0.060	Dec-11	0.100	0.037	Apr-09	0.096	0.103
Jul-14	0.036	0.023	Nov-11	0.099	0.025	Mar-09	0.134	0.076
Jun-14	0.039	0.047	Oct-11	0.013	0.109	Feb-09	0.101	0.037
May-14	0.028	0.047	Sep-11	0.005	0.018			

Source: Based on the results of the analysis 2017.

Figure 3. Amazon actual return & required return

Source: Based on the results of the analysis 2017.

The 3rd sub Null Hypothesis: CAPM cannot be applied to the US stock market (S&P500).

Table 7 shows that there is a convergence between the required return and the actual return of Amazon Co. during the study period, and that the required and actual returns are moving in the direction of the trend as shown above. This means that the Null hypothesis is rejected and the alternative hypothesis is accepted.

5. Results

There is a statistically significant impact of the US stock market Return (S&P500) on Amazon stock required return.

There is a statistically significant impact of Amazon Beta factor on Amazon stock required return.

1)   CAPM can be applied to the US stock market (S&P500).

2)   20% of the changes in the required return are due to beta and market return, and 80% of the changes due to other factors.

3)   CAPM model can be applied on efficiency markets and huge companies.

4)   20% of the changes in the required return are due to beta and market return, and80% of the changes due to other factors.

5)   CAPM model can be applied on efficiency markets and huge companies.

6. Recommendation

The researcher recommends that investors in financial markets not to rely on capital asset pricing model to evaluate and make decision, even if the study shows its ability of CAPM to explain the changes in stock's returns, but rely on additional models to support investment decision making, like cash flow discount model, accounting valuation, profit multiplier, arbitrage……etc.

Researcher also recommends future researchers to expanding in-depth academic research into the market capitalization of stocks to include other determinants not covered in the study, such as the risk-free rate of return, the type of investors, the nature of the prevailing economic situation, and other factors, and returning the same analysis to a group of huge companies in S&P500 market, or in another financial market.

References

Al-Mashreqi, H., & Shehab, A. (2014). Capital Asset Pricing Model Test in the Damascus Stock Exchange. *Al-Ba'ath University, 63*(1), 255-286.

Sattar, M. (2017). CAPM Vs Fama-French Three-Factor Model: An Evaluation of Effectiveness in Explaining Excess Return in Dhaka Stock Exchange. *International of Business and Management, 12*(5), 119-129. https://doi.org/10.5539/ijbm.v12n5p119

Fama, E., & French, K. (2004). The Capital Asset Pricing Model: Theory and Evidence. *Economic Perspectives, 18*(3), 25-46. https://doi.org/10.1257/0895330042162430

Choudhaary, K., & Choudhaary, S. (2010). Testing Capital Asset Pricing Model: Empirical Evidences from Indian Equity Market. *Business and Economics, 3*(6), 127-138. http://ejbe.org/EJBE2010Vol03No06p127CHOUDHARY-CHOUDHARY.pdf.

Al-Jameel, S. (2009). Application of Capital Asset Pricing Model in Kuwait Capital Market. *Development of Rafidain, University of Mosul, 31*(94), 253-270.

Perold, A. (2004). The Capital Asset Pricing Model. *Economic Perspectives, 18*: (3), 3-24. https://doi.org/10.1257/0895330042162340

Bodie, Z. A., & Marcus, A. J. (2010). Essentials of Investments, (8th ed.), McGraw-Hill/ Irwin, New York.

Al-Nuaimi, A., & Arshad, F. (2009). *Advanced Financial Management* (2nd ed.), Amman, Jordan.

Ross, S, Westerfield, R., Jaffe, J., & Jordan, B. (2008). *Modern Financial Management* (8th ed.), McGraw-Hill/ Irwin, New York.

Hadad, F. (2015). *Corporat Finance* (4th ed.). Al Hamed, Amman, Jordan.

Mullins, D. W. (1982). Does the Capital Asset Pricing Model Work? Harvard Business School. Retrieved from https://hbr.org/1982/01/does-the-capital-asset-pricing-model-work

Turner A., Haldane, A, Woolley, P., Wadhwani S., Goodhart, C. H., Smithers, A., Large, A., Kay, J., & Wolf, M., Boone, P., Johnson, S., & Layard, R. (2010). The future of finance and the theory that underpins it. Retrieved from https://harr123et.files.wordpress.com/2010/07/futureoffinance5.pdf

Ross, S., Westerfield, R. W., Jeffrey F. J., & Bradford, D. (2008). *Modern Financial Management* (8th ed), New York: McGraw-Hill/Irwin.

Zenner, M., Hill, S., & Clark, J., & Mago, N. (2008). The Most Important Number in Finance the Quest for the Market Risk Premium, J. P. Morgan Securities Inc. Retrieved from https://www.jpmorgan.com/jpmpdf/1320675769380.pdf

Noda, R. F., Martelanc, R., & Kayo, E. K. (2014, January) The Earnings/Price Risk Factor in Capital Asset Pricing Models, Paper presented at the BALAS Annual Conference, Port of Spain, Retrieved from http://www.scielo.br/pdf/rcf/2015nahead/1808-057x-rcf-201412060.pdf

Treasury Direct. (2017). Retrieved from Retrieved from https://www.treasurydirect.gov/indiv/research/indepth/tbonds/res_tbond_rates.htm

Yahoo Finance. (2017). Retrieved from https://finance.yahoo.com/quote/AMZN?p=AMZN.

Yahoo Finance. (2017). Retrieved from https://finance.yahoo.com/quote/AMAZ/profile?p=AMAZ