ORIGINAL ARTICLES

Capital Asset Pricing Model: The Criticisms and the Status Quo

Abdul Talib Bon. Abdalla Ab Sinusi

Faculty of Technology Management, Business, Entrepreneurship Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Johor, Malaysia

ABSTRACT

Despite the criticisms directed at the capital asset pricing model, the method of this model and the assumptions underlying it, this model still remains a powerful tool for analysis. It is used by the specialized agencies in the financial services and managers to predict the rates of return that are expected to rationalize investment decisions assess financial assets and the cost of capital. That scientific facts state that capital asset pricing model does not focus on all angles because the risks do not represent the main reason for the different expected returns. However there are other determinants that affect the expected returns such as; firm size, rates of diversification, the impact of the industry, liquidity risk and other parameters. To conclude, the capital asset pricing model is designed to estimate the real price of financial assets on the assumption that there is a balance in the market by acknowledging the relationship between risk and expected rates of return on investment in securities, when used in the portfolios of a good investment diversification.

Key words: CAPM, Diversification and Risk, Separation Theory, Optimal Portfolio Hazardous, Capital Market

Introduction

The pricing model, originally known as the capitalist core economics of modern finance is he original capital model which determines the expected return to compensate for the systemic risk faced by the investor. This model shows the precise method to be observed regarding risk and return of the original as would be expected. It is characterized by capital investment and the financial inability of the investor to determine the return on investment for identifying the precise investment decision. Although companies and individuals invest in the light of expectations for the future, different investment returns are expected and required between the investment opportunities, according to degrees of risk associated with each of them. Therefore one must specify the risk of investing to make sure that the expected return on investment commensurate with the risk of investment. Characterized by financial markets as the most important place attracting funds of investors to invest their money in these markets, the volume of trading in securities on these markets was recently increased, prompting investors’ question regarding the relationship between risk and expected return on this investment.

Research Background:
Capital Asset Pricing Model (CAPM):

Capital asset pricing model based on the idea of equilibrium relationship between returns and risks, William Sharpe introduced this model for the first time in 1964 to serve as the basis for evaluating investment in securities. Capital asset pricing model provides us with the minimum level of return, which should be achieved by the investment proposal to compensate the investor for the risks that cannot be avoided, a risk factor measured by beta, reflecting the capital asset pricing model as shown in the following equation:

\[ E(R_i) = R_f + \beta_i [E(R_m) - R_f] \]

Corresponding Author: Dr Abdul Talib Bon, Deputy Dean (R&D), Faculty of Technology Management, Business and Entrepreneurship. Universiti Tun Hussein Onn Malaysia, 86400 Parit Raja, Johor, Malaysia. Tel: +6012 7665756
Email: talibon@gmail.com.
Where:

- \(E(R_i)\) Means the expected rate of return on investment
- \(R_f\) Mean rate of return risk-free.
- \(\beta_i\) Mean formal risk factor
- \(E(R_m)\) Mean market return

The equation of capital asset pricing model can be explained as follows:

Investors expect a return compensating for the utilization of the funds at the present time, due to directing their money to investment. This return is compensation to the investor for the time element, so this return is equal to the revenue that the investor can get if he had invested his money in areas of uncertain check returns, meaning in risk-free areas \((R_f)\), the investor also expects to get equal additional revenue \([E(R_m) - R_f]\) to compensate for systemic risk that may be exposed by the invested money. This is called return instead of risk. That \([E(R_m) - R_f]\) is no different than changing the type of investment, because according to the beta, where the beta measure of risk of the regular cannot be avoided as diversification, meaning that the higher the beta goes up the higher the risk (high yield that compensates the investor on the proportion of the risks involved in investment). The lower the beta the lower the risk allowance, meaning that yield of the additional offset investor risk involved is lower in investment, it is clear from the above equation \((R_f)\) and \([E(R_m) - R_f]\) they do not change by diversification of investment, so therefore it can be concluded that the beta is the key determinant of return on investment, in other words that there is a direct relationship between beta and the expected return on investment. Investments which contain a significant risk is beta for a top and the discounted cash flows using the rate of large investments having low risk is beta, of which small and cash flows are discounted using a small discount rate. On this basis the expected rate of return on investment for any investment does not change even if the company has changed the investment, that all the variables in the equation of the form does not change if there is a change in investment. The general risks posed to investment are the general factors affecting all facilities in the same level of risks.

**Hypotheses of capital asset pricing model**

Capital asset pricing model based on the following assumptions:

1. That the investor is evaluating the conservative alternative investment on the basis of two variables, return and risk, which Hogan indicates that in order to verify this, the hypothesis must be a probability distribution of return of normal circulation, meaning that there is a maximum loss equal to 100% of the value of the investment and does not have a limit to profit. This shows that the probability distribution may be oblique to the right, but this phenomenon does not have an impact in practice, especially when the revenue forecast period is relatively short. If the control representing monthly return for any stock during the period of time will be the distribution of this revenue which is distributed normally, in the long term it is expected that the distribution deviates to the right because there is a maximum of loss and does not have a limit to profit.

2. The assessment of the Securities Investor focuses only on the same period of time; this hypothesis provides a better opportunity to assess the return on investment which will be free of risk.

3. That the investor is always trying to achieve better returns if the investor finds an opportunity for investment bankers bargaining chip between the two proposals are identical in all respects except for return, it will choose the alternative that achieves a greater return.

4. That the investor, of course, is not in favor of risk.

5. That the financial assets are indivisible, that the investor can buy any quantity of securities however small in size.

6. That the investor can lend and borrow on the basis of the rate equal to the rate of return on investment without risk.

7. That there is no tax on profits and the cost of transactions.

8. That the information goes up to investors quickly and without cost.

9. There are expectations of similar and homogeneous for investors, meaning that the investors have the same expectation about the expected returns and standard deviation and covariance of the securities traded. This assumption is not far from the truth, because the majority of companies that invests in securities have the same expectations about returns on investment in such securities.
Literature review:

There are some doubts about these assumptions in practice, which are rejected by some due to the information on securities available to all investors and that there is uniformity on the expectations of return and risk. This means that investors analyze and understand the information on the same level. The assumptions that the financial market is an efficient one are difficult to accept. Sharpe (1964) refers to the fact that these assumptions make the investment in the stock market as a single unit. Sharpe (1964) also notes that a model year can be formulate to achieve a balance between returns and risk. This model can also estimate the expected return to compensate for the risk to yield the return, which is called “pricing risk”. Paul Krugman (2007) said Milton Friedman suggests that it should not be evaluated on the basis of theoretical assumptions that underpin them, but better to rely on the basis of the evaluation to test the credibility of this theory. Hogan et al (2004) suggests that assumptions that reflect the efficient market aimed at controlling the variables may affect the form designed to investigate the relationship between expected return and risk and impact of the risk on the return without the side effects of other variables such as transaction costs and taxes, the exclusion of these variables may give us a clear relationship between returns and risk. The results of these studies conclude that the relationship between returns and risk just like the findings of the capital asset pricing model.

Material and Method

Conceptual framework of the capital asset pricing model

Capital asset pricing model contains a set of concepts that form the intellectual framework of the model as follows:

The concept of diversification and risk:

Greater diversification in portfolio investment leads to partial reversal of the overall risk. Diversification has its limits; more diversification does not bring a reduction in overall risk. The risks that cannot be disposed of diversification are called systemic risk, this type of risk is equal to market risks affecting the securities market as a whole, these risks are between 25% to 50% of the overall risk of any securities in the market. The risks that can be disposed of diversification are called the irregular risk or risks viable diversification, this type of risks relates only to securities and not related to other securities which highlights the importance of naive and simple diversification, as the investor if he had an investment portfolio consisting of 10 or 20 and financial papers, it can reduce a large proportion of the overall risk may be to 50% of the overall risk in the case of good diversification. From the previous view, the researcher says that if the investor can get rid of non-regular risks, it must be because the market is not equivalent to incur the risks of possible disposal.

The concept of separation theory:

The imposition of homogeneity of investors’ expectations about the expected returns and standard deviations of the individual’s investments and the covariance between the returns on these investments are one of the hypotheses of capital asset pricing model. The hypothesis shows that, naturally investors do not like risk. It is expected that there is general agreement among investors about hazardous optimal portfolio which is efficient on a pilgrimage in the Markowitz model. If considering the hypothesis which says that the rate of return on investment without risk, similar to all investors, the line that comes out from the point corresponding to the return on investment, risk-free, which lies on the vertical axis, this line will be similar for all investors. The following format (5.1) shows the line that comes out from the point on the vertical axis will correspond to the rate of return on investment without risk, and passes the optimal portfolio at M.

Since investors agree that the straight line represents the efficient group, the differences on the combinations they prefer are because of the different ways they view return and risk, meaning that in economic terms the diversity of both curves for investors. Investors who do not like risks will choose an investment portfolio located on a straight line connecting the risk-free investment portfolio and dangerous as in the Markowitz model, meaning that the investor will invest a portion of its assets in the portfolio of hazardous and best remaining part of the money will be Deploying to invest without risk. The venture investor on the risks will choose an investment portfolio located on the same line, but to the right portfolio of hazardous,
meaning that the investor will be have a portfolio consisting of investment portfolio as well as dangerous best he can get a loan to increase investment in the portfolio investment hazardous. It is located on the portfolio quality of the ongoing investment, the theory of separation where it says that the portfolio investment which is made by the investor portfolio and dangerous risk-free investment will be from the perspective of an investor on the personal return and risk.

The relative distribution of resources to individual investments that constitute investment portfolio is not affected by hazardous preferences of investors about the return and risk in Markowitz model that is supposed to be homogeneous investor’s expectations about the expected returns of individual investments and the standard deviation and covariance of those returns. In economic terms, there is no effect curve for both the investor to determine the combinations that are hazardous optimal portfolio, but there are only the effects of rates of dividend portfolio allocations between investment and risk-free portfolio of hazardous optimal portfolio, which represents the only efficient reduction in the Markowitz model. The foregoing summary of whatever difference exists in the expectations of investors regarding risks will have the same ratio in the individual’s investments that is hazardous optimal investment portfolio. This conclusion agrees with separation theory, which says that the best allocation of the individual investments that are hazardous optimal portfolio will vary according to predicted investor’s risk.

The concept of optimal portfolio hazardous (market portfolio):

The theory of separatism explains that every investor should allocate part of his money to invest in the portfolio of hazardous optimal, which represents part of the Markowitz portfolio-efficient model, meaning that the point which touches the straight line that comes out of the vertical axis and intersects with the rate of return without risk, which at (M). Figure (5-2) shows that the optimal portfolio is hazardous. Under the hypotheses of capital asset pricing model hazardous optimal portfolio can be defined as the investment portfolio, which includes all shares traded in the capital market. If the shares of a company do not exist in the optimal portfolio, there will be a decline in the demand for the stock and a decrease in its market value, which leads to high return over investment in this stock, and in turn would lead to an increased demand for this stock to the extent that the stock makes this an optimal candidate for the registration of the components of the portfolio. Optimal investment portfolio that will attract all investors should be huge to provide the needs of all investors, so this investment portfolio contains all securities hazardous in the market, that the optimal investment portfolio should contain all the instruments of investment such as equities, blue-chip stocks, bonds, real estate, gold, currencies and other investment assets, but in most cases the practice is limited to investment in equities stocks in the financial market. The portfolio of the market is important to the capital asset pricing model because the group-efficient portfolio must include a portfolio market, meaning that the governor efficient should include investment free of risk (lending) and an additional amount to strengthen the financial resources of the investor and to direct all the savings of the investor to the portfolio the market (Borrow)

The concept of the capital market line:

Capital market line is the line that reflects the relationship between the systemic risk of the investment portfolio and the expected returns to investment in this portfolio, if ruled out two hypotheses are hypothetical by Markowitz, the efficient group will change to a straight line out from a point on the vertical axis and passes the optimal portfolio. The capital asset pricing model has not changed anything; a set of efficient portfolios continues to maintain a straight line, but the portfolio, which is illustrated by this line, is the market portfolio, this line is called a line of efficient group in the capital asset pricing model, also called the line of the capital market (CML). It is as shown in the Figure (5.3). As shown in Figure (5.3), the investment portfolios which are made by the investor do not include portfolio investment and market risk-free, because they lie below the line of the capital market. That means they are not efficient portfolios, except those which lie on the line of the capital market represented by the point (m). In this line, the rate of return on investment free of risk is the same for all investors and all investors argue for investment in a portfolio of market. It is known that each point on the line of the capital market reflects the size of the return and risk of certain investment portfolio.

That the volume of return per unit of risk \[
\frac{\text{Return on investment}}{\text{Investment Risk}}
\]

This means that market pricing for the unity of the risks involved in investing in the investment portfolio. This is the idea underlying the capital asset pricing model.
The rate change in D (ΔD) is equal [E(R_m)-R_f]
The rate change in C (ΔC) is equal [σ_m=0]

This means that the tendency of the straight line which represents the efficient portfolio is the tendency of the capital market line and is expressed in the following equation:

\[
\text{Tendency of the capital market line} = \frac{E(R_m)-R_f}{\sigma_m}
\]

Where:
- \(E(R_m)\) Means rate of return on market portfolio
- \(R_f\) Means rate of return on investment without risk
- \(\sigma_m\) Means standard deviation of return on market portfolio

So the capital market line represents the equilibrium relationship between returns and risk for efficient investment portfolios (investment portfolios that are only for systematic risk), that explains that the capital asset pricing model provides us with only systemic risk pricing.

**The Concept of the stocks market line:**

The capital asset pricing model is not only the evaluation of the relationship between returns and risk for only efficient investment portfolios, but also to assess the relationship between returns and risks of individual investments (securities), that the securities are subjected to two types of risks which are systemic risks, the Risk of non-systemic. The investor must get rid of the Risk of non-systemic by Diversification of investment. According to the capital asset pricing model, the investor is only compensated for systematic risks. The risks of securities should be measured by the degree to change the return on these securities with the change of market return. If there is a balance in the market, the relationship between the return on investment in securities and risks of investing in securities is the stocks’ market line (SML). Where the vertical axis represents the expected return and the horizontal axis represents the systematic risk measured by Covariance between market return and the return of the securities. As in the Figure (5.5): To find the tendency of the stocks market line, the vertical axis must be selected which is the return and the horizontal axis and represents the risk as in the Figure (5.6):

**Fig. 5.1:** Shows the line of efficient portfolios

**Fig. 5.2:** Shows the optimal portfolios hazardous
Change in the rate of return equals $\Delta D$, where $\Delta D = E(R_m) - R_f$

Change in the rate of risk equals $\Delta C$, where $\Delta C = \sigma_{wm}^2 - 0$

So the tendency of the stocks market line $\frac{\Delta D}{\Delta C} = \frac{E(R_m) - R_f}{\sigma_{wm}^2}$

Where:

$E(R_m)$ Means rate of return on market portfolio
That systemic risk of securities is measured by Covariance of these securities, so the formula for capital asset pricing model is as follows:

$$E(R_i) = R_f + \frac{(E(R_m) - R_f)}{\sigma^2_m} \times COV(R_m, R_i)$$

Where:

- $E(R_i)$ Means expected rate of return on securities
- $COV(R_m, R_i)$ Means the covariance between market return and return on securities
- $\sigma^2_m$ Means the market portfolio return’s variation

The previous equation can be rearranged in the following order:

$$E(R_i) = R_f + \frac{COV(R_m, R_i)}{\sigma^2_m} \times [E(R_m) - R_f]$$

Where the $\frac{COV(R_m, R_i)}{\sigma^2_m} = \beta_i$ Means the measure of systemic risks

So the final version for capital asset pricing model will be as follows:

$$E(R_i) = R_f + \beta_i [E(R_m) - R_f]$$

If the beta of the securities is biggest than one, this means that the risk of investing in securities is biggest than investment risk in a portfolio of market. This means that the stocks’ market line which represents the balance between the expected return and beta is the line which is derived from capital asset pricing model. If the stocks market line shows the balance between the expected return on investment and risk, the capital market line reveals the balance between the expected return on investment and risk.

**Discussions**

**Testing the capital asset pricing model**

The capital asset pricing model has been considered as a new technology for investment for several years, as characterized by the attraction to highlight the relationship between returns and risk. However studies conducted to test the capital asset pricing model has concluded that there is a difference in the results concerning the validity of this model for the application. Some researchers said that the scientific evidence requires a rejection of the model in spite of the clear relationship between the models achieved by the risks and expected returns. Others said that it is difficult to explain the difference between the study’s findings and implications of capital asset pricing model, and cannot return the difference to the studies themselves or that the capital asset pricing model is a simple approximate model of the real market. From the above, it can be deduced that the main problem in testing capital asset pricing model lies in two main pillars:

(i) The capital asset pricing model focuses on the expected returns, while the tests conducted focus on the actual returns.

(ii) According to the capital asset pricing model the market portfolio should include all risky assets available in the market, but most of the evidence that the market contains is only a sample of ordinary shares.

**Aspects to test the capital asset pricing model**

Capital asset pricing model is based on the four major aspects as follows:

(i) Test the intersection of the capital market line with the vertical axis.
(ii) Test the beta factor as a major parameter of return on investment.
(iii) Test whether the line of the capital market is a straight or curved line.
(iv) Test the effect of the indicator used in estimating the return on different market portfolio returns.

Criticises of the capital asset pricing model:

There are eight criticism of a capital asset pricing model. These criticisms are related to the assumptions of the capital asset pricing model, that such criticism is the reason for the differing views of researchers on the ability of capital asset pricing model to determine the relationship between expected returns on investment and risks. These criticisms are as follows:

(i) Criticism of the capital asset pricing model on the equality of the interest rate on lending and borrowing.
(ii) Criticism of the capital asset pricing model on the ability of investors to lend and borrow at a rate free of risk.
(iii) Criticism of the capital asset pricing model to the homogeneity of investor expectations of return and risk.
(iv) Criticism of the capital asset pricing model on the absence of taxes on profits.
(v) Criticism of the capital asset pricing model on the components of the market portfolio (market portfolio includes all assets that can be invested).
(vi) Criticism of the capital asset pricing model on the rate of return on investment is risk-free (this criticism focuses on the impact of inflation on the rate of return on investment).
(vii) Criticism of the capital asset pricing model on the hatred of the investor’s risk (this is obvious and it should not be imposed).
(viii) Criticism of the capital asset pricing model on the absence of costs and availability of free market information for all investors.

The current position of the capital asset pricing model:

Despite all the criticism addressed to the capital asset pricing model, the following points must be emphasized:
(i) understanding that the return and risk are linked together positively, investor always asks for additional revenue to justify affordability to additional risks.
(ii) During the past three decades, the prevailing idea was that the risk of securities can be measured by the simple probability distribution, but under the capital asset pricing model, the risk of the original capitalist is measured from the perspective of the impact of portfolio investment. This is added the core of the model providing a good tool to explain the risks and their relationship to returns expected on the investment in capital assets or investment portfolios, as investors focus on systemic risk only.
(iii) The capital asset pricing model reflects the risk and return by a simple way, and represents a major step in understanding the pricing of securities in the market. It can be concluded that the capital asset pricing model is the real way for the pricing of securities.
(iv) Despite those unrealistic assumptions of the capital asset pricing model, it is still of interest to researchers and economists to measure the important ideas in finance and investment.

Conclusions:

In practice there is an intensive use of the capital asset pricing model, which provides users with good style and enough to know the behavior of securities in the market. The capital asset pricing model also helps to make suggestions and realistic attitudes when pathways prices and returns deviate significantly from the equilibrium. Thus the capital asset pricing model is a powerful tool for analysis which is also used by the specialized agencies in the financial services and managers to predict the rates of return expected to rationalize investment decisions and assessment of financial assets and the cost of capital. Scientific facts stating that the capital asset pricing model do not focus on all angles, because the risks do not represent the main reason for the different expected returns, but there are other determinants which affect the expected returns such as; firm size, rates of diversification, the impact of the industry, liquidity risk and other parameters. To conclude that the capital asset pricing model is designed to estimate the real price of financial assets on the assumption that there is a balance in the market, by acknowledging the relationship between risk and expected rates of return on investment in securities, when used in the portfolios of a good investment diversification.
References


