

Test of Capital Asset Pricing Model in Amman Stock Exchange

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Abstract

Study primarily designed to test whether the capital asset pricing model met the scientific application of shares for the companies that listed in Amman Stock Exchange in order to achieve this goal, It was collected financial data on study variables that represented monthly for sample companies and prices monthly closing index likely market value of free shares which have free return of risk (Treasury Bills), where the researcher calculates beta for stocks sample companies, both separately then test the capital asset pricing model through a simple linear regression by using statistical analysis program (SPSS). Where the study found a number of results that were the most important: beta coefficient, which is a statistical measure of systemic risk could not interpret without 8.2% of the stock dividend for public shareholding companies that listed in Amman Stock Exchange in other words, stock returns have not been fully interpreted by a beta factor, and it also can say that there are other influential factors on stock returns, that the model could not be interpreted, the final result reached by the researcher that this model is not fit to predict accurately returns traded in Amman Stock Exchange for shares, since it is not available, we have evidence that this form applies to companies that listed in the Amman Stock Exchange companies. Find recommended the following: the requirement to study other influential factors, such as earnings per share index and earnings per share index,. Expand the length of time to research not less than ten years and to include a greater number of data, noted the necessity of complying with the central bank transparency and disclosure of versions of the monthly Treasury exporting permissions.

Keywords: capital asset pricing model, Amman stock exchange

INTRODUCTION

Investing in the stock considered of the growing activities important by days because a wide range spread of dealing with between the large number of individuals, financial institutions, non-financial institutions and governments, also because of the huge amount of money invested in it, as it became essential to economic Activity; also it has a clear impact on local economies and international in developing or developed countries. With the increasing interest in this core activity came into being a group of specialists and researchers, and that their status as a set of principles and virtual scientific principles (theories); to test the validity of, perhaps the most distinguished scientific methods in this field, the investment portfolio of Marcowitz theory, and capital asset pricing model, which is basically a point and its applications in the areas of investment, this scientific model is based on using of regression models and perhaps the most important is the regression model variables (beta), which connects with the earnings per share and return on the market, which then directly reflects the amount of effect market rate of return on stock returns and their relationship to it, based on that, the beta plays a key role in the investment decision in the sense of whether or not the acquisition of the stock. Due to the importance of the capital asset pricing model in this area. This research was for identifying the nature of the model that work mechanism, and how calculated, through its application to companies

shares that listed in Amman Stock Exchange and calculating beta of shares for those companies to prove whether the capital asset pricing model may applied in Amman Stock Exchange or not.

Crystallize this importance in determining the relationship between beta of public shareholding companies which are scale irregular optimal risk for those shares and the statement of the actual impact on stock returns values, the relative importance lies in recognizing the importance of risk in returns for Jordanian stock market and through reach an inter results that help investors, regulators and investment portfolio managers in asset valuation and possibility of precisely for required rate of return is more efficient account. Primarily study designed to test whether the capital asset pricing model met the scientific application of the companies listed in Amman Stock Exchange by:

1. identify whether the required rate of stock in ASE yield securities depends on one factor and influential it is market risk (systemic risk) By Model theory.
2. analyze and identify any risks explain better return on equity for Amman Stock Exchange.
3. Identify the nature of the relationship between expected return and risk for shares of companies.
4. know whether the terms of the model and assumptions applicable to Amman Stock Exchange.
5. Assist the investor in making decisions when investing rational process.

$$R_i = \alpha + \beta_i \text{beta} + \varepsilon$$

Where is:

R_i : rate of return on stock

β_i : liner (sml)

α : hard section to equation (sml), a fixed equation (alpha) and supposedly equal to the risk free rate in the case of proven model capm.

ε : random error.

HYPOTHESIS

Beta: Beta arrow (systemic) risk so that the risk of the stock is measured relative to the overall risk of the portfolio market.

The first hypothesis: the relationship between return and risk (beta) is a linear, and expressed in the form $\varepsilon = \text{zero}$.

The second hypothesis: the relationship between return and risk (beta) is a positive relationship, $\beta_i < \text{zero}$.

The third hypothesis: the intersection of the ASE line with the vertical axis point is the origin point of intersection of $\alpha = R_f$.

Beta : represents the amount of relative change expected to happen in the return for portfolio compared to the change in the incident average yield of shares traded in the stock market or the so-called earnings per share, so used as a measure to assess the market risk of shares or the portfolio. (Rain, , 2005 p. 214.). And if the coefficient (B) of shares equal to the (1) This means that the response or change the expected return of this stock or that portfolio will be the same rate of change in earnings per share incident market in general rate (p rain 215.2005). The coefficient is known beta as a statistical measure of the systemic risk , and measure the beta sensitivity of the securities return to portfolio return in the market (the index of stock prices), and value-based beta on the historical relationship between the financial security rate of return and the portfolio rate of return , statistically represents the variation joint Covariance between financial security and the market return, also considered beta coefficient as an indicator of the direction .also the degree of sensitivity for the company's return to the market rate of return; the sense that the company, which is the beta coefficient equal to one is true, they are moving the same amount and direction that moves by the market. (Hattab, Jmaid, 2008, p. 15). Beta coefficient measures the sensitivity of earnings per share and return to the market ,So the calculation as the following (Hattab, Jmaid 0.2008, p. 16):

$$\beta = \frac{\text{cov}(R_s, R_m)}{\sigma^2 R_m}$$

β : beta coefficient

Cov (R_s, R_m): covariance between the return on the securities and the market return.

R_s : securities return

R_m : market return

: (σ^2) R_m contrast to the market return.

capital asset pricing model: a model linking the required rate of return on a security risk as measured by beta. (Bodie, pp 221, 2003). This model uses to calculate the securities yield based on specific data that is free rate of return (Risk Free) and market return with beta, which measures the systemic risk, this model assumes that the expected return on an asset associated positive relationship linear with systemic risk for this asset in the sense that higher-yielding stocks bear a higher degree of risk. (Hattab, Jmaid 0.2008, p. 33). so CAPM model which is used calculate the expected return is:

$$R_{ei} = R_f + \beta_i (r_m - r_f)$$

R_{ei} : expected return on the stock price of the company i.

R_f : Risk free rate and includes the return on Treasury issued by the Central Bank.

β : beta coefficient for the company i.

R_m : return on the market portfolio.

The expected return on a stock depends on the value of beta coefficient for this stock, and the relationship between beta of shares and the return is positive relationship as assumptions at CAPM. (Hattab, Jmaid, 2008, p. 34).

Market portfolio: the portfolio containing all the securities in the market commensurate with market value. (Bodie, pp 221, 2003)

PREVIOUS STUDIES

Study Abdul Aziz (2012): The study presented titled test the efficiency of the Amman Stock Exchange at almost the strong level using the information on the deployment of the financial statements, this study aims to determine the impact of information relating to announce ,the publication of financial statements for shareholding companies on stock prices , price direction and the speed with which responds with the news of financial statements, this research test the efficiency of Amman Stock Exchange at the semi-strong level, this sample 69 companies from all sectors of the economy and were excluded newly established companies and that sufficient information is not available by measuring variables, which indicated the search results that the total revenue is normal on the day of the actual publication of the financial statements for companies are not different from zero, this means to achieve extraordinary returns on the day of announcement of the publication of financial statements, but the reason for the presence of abnormal negative returns canceled yielding extraordinary positive. also Nadir study (2012): This study titled application capital asset pricing model using the variable beta: Evidence from Amman Stock Exchange, the study aimed to compare between the capital asset pricing model using the variable beta with the passage of time and the same model with a beta constant, a sample study of industrial companies listed composed in Amman Stock Exchange for the period 2000 - 2011 the study

used three methods to examine the two models (Kalman filter ((GARCH 1.1) to examine the capital asset pricing model by using beta fixed to examine the capital asset pricing model using variable beta , and depending on the results of the standard created (Kalman Filter) give similar results, either way (GARCH1.1) and (OLs), the MSE is better in explaining corporate earnings under study. Also Study of Ayyad (2012): The study entitled the cost of capital and create value indicators: An Empirical Study Casablanca Stock Exchange, this study aimed to analyze some recent studies on the cost of capital , the most important supposed to measure the cost of capital by focusing on the models that discussed financial assets equilibrium model with its assumptions , its relation to the establishment of the value, financial performance evaluation , study also aimed to discuss the possibility of applying the capital asset pricing model in emerging markets, especially Arabic stock markets (Casablanca Stock Exchange model), and the study concluded that the assumptions assets equilibrium model unrealized capital Casablanca Stock Exchange in particular , that most decision-makers used it as a large, which makes creating value index EVA is incorrect in assessing of the financial performance since it depends on the cost of capital. Abdul Hamid study (2010): The study entitled beta roles in building a conservative investment: An Empirical Study , the sample included the Iraq Stock Exchange, deals with this research the most important theories in field of financial investment and portfolio theory is to (Marcowicz) , capital assets CAPM pricing model by examining the basic element in capm model , also beta reflects and diagnose systemic risk of financial assets , the disposal in the extent of the financial asset compared or link yield market, which shows the risk and it's returns that will fluctuate and gives investors a more accurate picture returns on these assets and simple regression was used to find a beta value of shares, also the study linking portfolio Theory and CAPM model , capital market and the stock market through the concept of optimal portfolio. Study of Mosa (2009): this study entitled Measuring the efficiency of the Amman stock exchange through influence of the return and risk size for companies in, this study aims to measure the impact of company's size as measured by total assets on stock returns in industrial companies that listed in Amman Stock Exchange and the risks of these companies, whether these risks are systemic risks, stretched the study period 1999 - 2006 , the sample size was 20 divided industrial company “ ten small companies and ten large companies”, the results indicated the presence of a trace for size of earnings per share for the benefit of large-sized companies , when enter the formal risk as measured by beta coefficient was the systemic risk in the large-sized companies greater systemic risk in small-sized companies, and as it explained the reason for increasing in stocks of companies large-scale

returns because there is a positive relationship between return and risk. Study of Ibn Addub (2009): The study titled application of Capital Asset Pricing on accounting data model, study sample consisted of SMEs active in the construction sector / wargla state in Algeria during the period 2002 to 2006, the results concluded that a relationship is written between ROE and risk irregular, which means that the model is applicable to accounting data.

Study of Hattab, (2008): The study titled Test capital asset pricing model in Amman Stock Exchange, the study was conducted on shares listed on the Amman Stock Exchange from 1/1/2002 - 31/12/2007 the researcher divide the study into two separate parts; the first talked about the concept of risk factor beta and its usefulness to the investor , how calculated and deals with the second part of the study, Test CAPM and the extent which can be relied upon to predict returns on equity, the results of the statistical analysis showed that it did not apply to the Amman Stock Exchange Securities in general, but applicable on some individual stocks and only during certain periods, the study recommended that the study of other factors such as the stock price to profit ratio and the proportion of the share price to book value.

Gharayba study (1997): The study entitled Capital Asset Pricing Model: A Case Study on the Amman Stock Exchange, this study aimed to test the applicability of the capital asset pricing model in the Amman Stock Exchange and had been a sample of 50 listed companies, where the first phase calculates beta stocks sample while the second phase was test correlation and regression to determine the relationship between the expected difference yield between EPS and free return of risk, also systemic risk and irregular the other hand, by using weekly data from the financial market, and have shown the search results not apply with the capital asset pricing model in Amman stock exchange. Hussein study (1993): The study titled Test capitalist asset pricing model in Amman Financial Market regulars, the study aimed to release the potential experimental proof of legitimacy (credibility) of this model ,any statement whether the relationship between expected return and risk are regulars straight linear relationship, also used of historical monthly returns for stocks listed on the Amman Stock Exchange, from 1/1987 to 12/1992, which numbered 47 shares, the usage of monthly returns on Treasury bonds agent and monthly market index published by the Central Bank of Jordan as a proxy for the return on the market portfolio . so he had been using a regressions analysis as a method of statistical analysis to the data collected, first monthly returns analysis and to estimate the beta coefficient as a measure of systemic risk and estimating differences variation as a measure of the risk for non-formal, the results of the study showed that the capital asset pricing model does not

apply in Oman financial market , that it cannot use this model to predict returns of additional shares in this market. Study Judges (2013): The study titled importance of financial analysis for the dissemination of financial information to predict the behavior of stock: study Jordanian industrial sector, the study aimed to identify all the dimensions of financial analysis and its advantages , how to take advantage of it in predicting stock prices through tests of financial ratios and a quantitative model that can be relied upon to predict a price per share for the industrial sector in Amman Stock Exchange in order to assist the investor in decisions making , the purpose of the study were tested three financial ratios consisting of 30 companies that listed its shares , the reliance on annual reports, and using of multiple regressions analysis method.

Ajlouni study, (2013): The study entitled dynamic versus static ability to predict CAPM: evidence from Amman Stock Exchange, this study aimed to test whether the dynamic study (conditional) in the capital asset pricing model superior to the static in predicting returns of industrial companies listed in Amman Stock Exchange during the period 2000 - 2011 the researcher used OLS , GARCH1.1 and analysis results indicate that the dynamic in CAPM can through GJR-GARCH provide more accurate returns for shares of the study sample.

Thomson study, (2011): The study entitled the capital asset pricing model: the case of South Africa study, tested this paper correct application of the Capital Asset Pricing Model CAPM for the stock market in South Africa, and worked in compiling returns quarterly indicators sectors that listed in the stock Exchange JSE 1995 - 2009, to validate the assumptions that used stock market line and using each of beta to test nonparametric, the results showed that it was rejected CAPM certain periods of time and used of modeling actuarial long-term CAPM in southern market of Africa which can be acceptable and justified. Qaisi study (2011): This study titled economic determinants of systemic risk in the Jordanian capital market, research aimed to answer the main question: Is it exposed the financial markets and the developed equity markets to the same factors that affect on financial value of systemic risk, researcher took Amman Stock Exchange as a representative of emerging Arab financial markets , also the study discussed economic factors that affecting international systematic risks, researcher used panel approach in the analysis of results as: size of the company, leverage, government deficits and inflation significantly affect the systematic risks for companies study sample value.

METHODOLOGY OF THE STUDY

The study relied on descriptive analytical method, which included a survey of a references and ready-

made sources to build a theoretical framework, previous studies, then refer to the financial statements and analyzed statistically to test the validity of hypotheses of the study, in order to achieve the objectives of the study, and present the results and recommendations. The study population consisted of all companies that listed in Amman Stock Exchange , the companies for the entire duration of the test period from 1/1/2008 until 12/31/2013 reached in 2013 (237) Company, in order to test hypotheses of the capital asset pricing model in Amman Stock Exchange , the study sample of 136 listed company in Amman Stock Exchange, where it was excluded companies that the following conditions are not available in which to measure the variables of the study:

1. Non-trading shares of companies for more than three consecutive months or spaced.
2. Shares of companies that were not listed in stock exchange .
3. that may not be exposed to the merger during period of the study.

Researcher faced a number of parameters during the preparation of this study, which including the following:

1. Take out the financial statements of shareholding companies directory for each company separately and then each year separately, requiring a great time to get that data.
2. Financial statements published Monthly Statistical Bulletin on the ASE site Securities are recent data do not meet study requirements needed by the researcher, and so it was resorting to guide companies in Amman Stock Exchange for the monthly closing prices. The study is based descriptive and analytical method for collecting necessary data for completion of this study ,so the information was depending on: Secondary Sources: originally approved on desktop scanning, financial books, journals on the subject of Capital Asset Pricing Model CAPM as well as some literature Arab studies, foreign and some financial reports published on the Internet. Primary sources: the financial statements aggregated for the purposes of the study through newsletters, ASE site, CBJ site, and the Jordanian shareholding companies.

METHODS OF DATA COLLECTION

1. monthly closing prices were obtained on closing prices of all the companies listed in Amman Stock Exchange, the guide companies through shareholding and monthly statistical bulletin for the entire companies study period from 1/1/2008 to 31/12 / 2013.
2. The index market value of shares: was obtained from the annual reports of the ASE on the Amman Stock Exchange site.
3. The yield on the Treasury Bills for six months was obtained from the periodic reports of the Central Bank of Jordan database.

The study variables and parameters used:

1. beta share: for beta stocks account must provide monthly returns of stocks and the market portfolio for a period of 72 months, for that were taken monthly closing prices of the shares listed in the Amman Stock Exchange data during period 1/1/2008 until 01/31/2013 ,was calculated monthly return for shares of companies through the following equation:

$$R_{i,t} = \frac{p_{i,t} - p_{i,t-1}}{p_{i,t-1}}$$

Where is :

$R_{i,t}$: Monthly earnings per share (i).

$p_{i,t}$: monthly closing share price of (i) the current month.

$p_{i,t-1}$: Monthly closing share price of (i) the previous month.

B. Is calculated monthly return for the year price index is likely the stock market value of the shares free through the following equation:

$$R_{m,t} = \frac{pm,t - pm,t-1}{pm,t-1}$$

Where is :

$R_{m,t}$: monthly return of the index is likely stock prices at market value for shares on the market portfolio.

pm,t : the record year monthly prices likely, the stock market value of shares for the current month.

$pm,t-1$: record number of monthly average for prices of stocks likely market value of the shares for the previous month.

Capital asset pricing model:

In order to examine this model to companies listed in the study sample in Amman Stock Exchange had been taking monthly closing prices during the period 1/1/2008 to 12/31/2013 and was taken closures monthly record of figures likely market value of the shares free.

Free Risk Rate:

To calculate the return location in stock model CAPM, I must choose a return-free risk which is achieved here when beta for any stock is equal to zero , coefficient shall be then yield represents the interest rate on Treasury bills because the versions by Jordanian Central for three months is very limited and had been substituted by the Treasury permissions for six months and apply the following equations calculated:

A. Annually, according to the following equation:

B. A monthly basis according to the following equation:

$$((1 + \text{return for a period of three months})^{(1/3)} - 1)$$

LIMITATIONS OF THE STUDY

The study period from 1/1/2008 - 12/31/2013 include shareholding companies in the study sample that listed in Amman Stock Exchange.

DATA ANALYSIS METHODS

Regression analysis measured the affect for the independent variables on the dependent variable, also through (F-Test) and (T-test) to test the health of the hypotheses of the study.

HYPOTHESIS TESTING AND ANALYSIS OF RESULTS

The data relating to test of capital asset pricing model in Amman Stock Exchange was performed by using SPSS statically program to answer the study hypotheses, which has been relying on the arithmetic mean and regression testing. Depend on test model the values of beta stocks for companies , also beta coefficient for each share of stock to the study sample was a preliminary regression of data based on the following:

I identified beta for each company that analysis regressions from the previous equation and based on the financial statements of the aggregate of variables of the study, as it has been estimated differences contrast var (ei) (residual mean square) from the analysis initial regressions and considers the differences contrast values as a measure statistically , also risks specific to each company and the difference between earnings per share and the market rate of return that could not beta values interpreted as systematic risk , so we must definition those risks: nevertheles risks related to internal or external company , the environment examples of the (risk of poor management , operational risk and industry risk).It is clear from our previous results, I've the ability to test CAPM model regression analysis and another in which it used beta of shares for companies. Regressions analysis II: application of CAPM model for companies

In the first case beta coefficient is calculated based on the benchmark year is likely the market value of the free shares , the actual monthly returns of shares for the sample study companies during period 1/1/2008 until 12/31/2013, where used beta coefficient values of shares as a variable independent, while earnings per share has been used as a rate continued, and was then apply the following form:

$$R_i = \alpha + \beta_i \text{ beta} + \epsilon$$

So reached the following conclusions:

Table (1) Model Summary^a

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.287 ^a	.082	.076	.01575

a. Predictors: (Constant), beta

Table (2) ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.003	1	.003	12.040	.001 ^a
	Residual	.033	134	.000		
	Total	.036	135			

a. Predictors: (Constant), beta

b. Dependent Variable: ri

Table (3) Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.010	.002		-4.177	.000
	beta	.010	.003	.287	3.470	.001

a. Dependent Variable: ri

THE FIRST HYPOTHESIS

The relationship between yield and systemic risk (beta) is a positive linear relationship, $\epsilon = \text{zero}$. To test this hypothesis, the researcher used simple linear regression analysis method. And has to find the relationship between return and beta stocks where the results of the regressions analysis demonstrated by reference Table (2) which measures the strength of the relationship between the independent variable (beta stocks) and the dependent variable (return) the parameter value mentioned has reached 28.7%, that it refers to the existence of a very weak relationship where the changes that occurred in the dependent variable (stock dividend), interprets the independent variable (beta stocks) increased by 28.7%. In order to identify the degree of confidence (statistical significance) of that relationship by reference to (t) test, I find that the relationship within the permissible and the amount of 5% of the border as the value (t) .001 less than 5%. The coefficient of determination (R^2 , which measures the strength effect of the independent variable (beta stocks) in the dependent variable (return on equity), when return to value found an 8.2% which means that the independent variable (stock beta) explains what accounted for 8.2% amount of change that is happening in (earnings per share) back to the other factors, and random error value of $\epsilon = 0.1575$. 0 which is supposed to be equal to zero. The previous results accept the premise, which states that the relationship between return and risk (beta) is not a linear relationship, by Form $\epsilon \neq \text{zero}$.

THE SECOND HYPOTHESIS

The relationship between return and risk (beta) is a positive relationship, $i\beta < \text{zero}$. The mile line securities market SML, which indicates this amount to change that is happening in the dependent variable (stock dividend) when the independent value change (beta stocks), from results of analysis regressions that the value of the slope of regression line $b_i = 0.010$ at 0.001 confidence which is less than 5% level, this

means that they are statistically significant and result is consistent assumptions of CAPM. the previous result reject the Zero hypothesis, and accept the alternative hypothesis, which states that the relationship between return and beta is positive, $i\beta < \text{zero}$.

THE THIRD HYPOTHESIS

The intersection of the securities market point line with the vertical axis is the intersection origin point of $\alpha = R_f$. The hard limit value of Alpha α from regression equation equal to value of the dependent variable (return on equity) When the value of the independent variable (beta stocks), and the results of the analysis showed that the value of regressions $\alpha = -0.010$, which means that there are other factors that affect earnings per share - non-systemic risk (beta) based on this value conclude that the intersection of the securities market line and supposedly equal to the risk-free return in the case of applicability of the model. From the previous result I can accept the premise of Zero hypothesis, which states that the intersection of the securities market point line with the vertical axis is the origin $\alpha \neq R_f$ intersection point.

CONCLUSIONS AND RECOMMENDATIONS

This study has tested the Capital Asset Pricing Model CAPM in ASE through simple regression models, with a series of monthly prices of shares for 136 companies that listed in Amman Stock Exchange during the period 1/1/2008 and up to 31 / 12/2013. So the study concluded as follows:

The relationship between return and risk (beta) is not a linear relationship, by Form $\epsilon \neq \text{zero}$. On the other hand the relationship between return and beta is positive relationship, $i\beta < \text{zero}$. Also the intersection of the securities market point line with the vertical axis is the origin $\alpha \neq R_f$ intersection point. And based on the progress of these results, these results are not consistent with the terms and assumptions that the capital asset pricing model, therefore the capital asset pricing model does not apply in Amman Stock

Exchange. Beta coefficient, which is a statistical measure of systemic risk could not interpret only 8.2% of the stock dividend of shareholding companies that listed in Amman Stock Exchange in other words, that stock returns have not been fully interpreted by a factor of beta, it also can say that there are other factors influential on stock returns, so that the model could not explain it. The final result reached by the researcher that this model is not fit to predict accurately returns traded in Amman Stock Exchange, since it is not available, we have evidence that this model applies to those companies that listed in Amman Stock Exchange.

RECOMMENDATIONS

Based on the results of this research researcher recommends the following: Find a way making this investment portfolios as the diversification effect hides the risk of irregular and keeps systemic risk. Also use a daily or weekly return for shares instead of monthly earnings per share to confirm or deny the findings of the researcher. Furthermore need to study other influential factors, such as earnings per share index "size" and earnings per share index Eps. In addition to the necessity of complying with the central bank transparency and disclosure of versions monthly Treasury exporting permissions due to its importance to the public beneficiaries such as researchers and investors. Also expand the length of time to research so that not less than ten years and to include a larger number of data. Disclosure activate urge companies not to delay in the publication of financial statements.

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