Global Journal of Management and Business Research: C Finance
Volume 14 Issue 3 Version 1.0 Year 2014
Type: Double Blind Peer Reviewed International Research Journal
Publisher: Global Journals Inc. (USA)
Online ISSN: 2249-4588 & Print ISSN: 0975-5853

The CAPM, Determinants of Portfolio Flows to Emerging Markets Economics: The Case of Jordanian Financial Crisis

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GJMBR-C Classification : *JEL Code: G01, A11*

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I. Introduction

a) CAPM: An-Overview

The most a significant concept in making decisions on investment is the issues of risk and return that has been received a lot of attention in recent decades. Harry M. Markowitz (1952, 1959) was the first to come up with a parametric optimisation model to this problem which meanwhile has become the foundation for Modern Portfolio Theory (MPT) (Dietmar, 2005). Since the late 1940s and in the early 1950s, prior to the development of the Capital Asset Pricing Model (CAPM) by Markowitz (1952, 1959), the reigning paradigm for estimating expected returns presupposed that the return that investors would require or the "cost of capital" of an asset depended primarily on the manner in which that asset was financed (i.e., Bierman and Smidt, 1966). The CAPM's impact over the decades on the financial community has led several authors inclusive of Fama and French (2004) to suggest that the development of the CAPM marks "the birth of Asset Pricing models".

In recent years, however, before the arrival of the CAPM, the question of how expected returns and risk were related had been posed, but was still awaiting an answer. The global financial crisis, for instance, started to show its effects in the middle of 2007 and into 2008, when the world is shocked by the global markets crisis and large financial institutions collapsed. As a result, governments in even the wealthiest nations have had to come up with rescue packages to bail out their financial systems. On the other hand, many people are concerned that those responsible for the financial problems are the ones being bailed out.

b) Purpose and Study Objectives

The main purpose and objective of this study is to provide a comprehensive literature review and identifying the main methodologies and research techniques that were used of the standard Markowitz model (CAPM) in order to design an algorithm that is based on optimal portfolio determinants approach during and post finical market crisis based on Jordan listed firms on Amman Stock Exchange (ASE). The model's empirical problems may reflect true failings. The key question arises here as to why Jordan has been selected as the case study. In this respect it is vital to appreciate the fact that, like most developing countries, Jordan possesses a stock market. The stock market was established in order to move Jordan economy from being a bank-based to a market-based economy and to contribute towards the capital-raising and capital-allocating process which is critical to increase the economy's growth. In some market-based economies the stock market is a key means of mobilising saving and reallocating resources, acting as a back-up and an assurance for domestic and foreign investment promotion and a significant source of capital formation and business financing. To answer the study question, the theoretical framework and variables are then empirically modified based on risk, return, beta of individual stock and portfolio, number of stocks, correlation coefficient between the assets in the portfolio and investment risk will be used as units of analysis.

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c) Jordanian Financial Market

The public trading in shares is there in Jordan since the 1930's which is the decade of establishing the first shareholding company in Jordan. In 1976, Jordan has officially established Amman Financial Market (AFM) which was converted in 1999 to Amman Stock Exchange (ASE) as a private non-profit institution that is responsible of operating the Jordan securities market. Table 1 presents the main indicators of Jordan financial market as ASE consists between 243 and 277 companies operate in different market sectors. Financial services companies represent the majority of the market at a stake of 43%. However, the economy after a growth of 7.2% in 2008; witnessed a setback in 2009 as the growth rate declined to 2.3% and then increase to 2.7% in 2012 in real terms.

Table 1 : Jordan Financial Market Main Indicators (In US Dollar; Million)

Indicators	2008	2009	2010	2011	2012
Market Capitalisation	35,844.1	31,889.1	30,995.34	26,998.88	26,714.63
Value Traded	13,641.1	28,677.3	9,349.25	3,937.78	2,748.21
Shares Traded	6,022.5	5,442.3	6,912.23	3,982.29	2,338.32
ASE index	2,533.5	2,758.4	2,373.6	1,995.1	1,957.6
Turnover ratio (%)	42.8	80.0	4.7	2.6	2.6
Real GDP Growth (%)	7.2	5.5	2.3	2.6	2.7
Number of Listed Companies	262	272	277	247	243

Source: Arab Monetary Fund (2014), and World Bank (2014).

II. Study Theoretical Framework

a) Discussion and the Study Background

A number of theoretical studies have begun to show one of the fundamental tenants in financial theory is the CAPM as developed by Sharpe (1964), Lintner (1965) and Black (1972). The model assumes investors are risk averse and, when choosing among portfolios, they care only about the mean and variance of their one-period investment return. As a result, investors could eliminate some but not all risk by holding a diversified portfolio (Markowitz, 1952). Based on these arguments Nyberg (2008) suggests that assets with a riskier pay-offs pattern should offer higher expected return by cause of higher discounting, therefore, have a lower price, than the assets that are then similar but have less risky pay-offs. Zarif and Ghaemi (2003) have calculated in their empirical study that the asset's return depends on the market return with the linearity relationship between risk and expected return.

The works of Campbell and Viceira (2005) propose an empirical model that the changes in investment opportunities can alter the risk-return trade off of bonds, stocks and cash across investment horizons from the U.S. stock and bond markets. They conclude that the asset return predictability has important effects on the variance and correlation structure of returns followed by Yakob *et al.* (2005) find that the CAPM still holds in explaining the risk-return relationship in China and Malaysia. The significant positive risk parameter coefficient suggests a positive linear relationship, which indicates that investors are compensated for assuming high risk. From another perspective Perez-Quiros and Timmermann (2002) observed that, additional returns expected from the stocks of exchange companies during recession, are affected significantly; however, the expected additional returns of the companies in the process of growth are not affected. Harris (1987) provides the index of stock market and Brock and Kleidon (1992) identified the limit between buying and selling for the behaviour of the S&P 500 index. In theory, Markowitz showed that, given either an upper bound on the risk that the investor is willing to take or a lower bound on the re-turn the investor is willing to accept, the optimal portfolio can be obtained by solving a convex quadratic pro-gramming problem.

b) Measurement of Return and Risk

In order to assess analysing the risk and return relationship, there are several methods being used. In Markowitz' model, an investors are assumed to measure the level of return by computing the expected value of the distribution, using the probability distribution of expected returns for a portfolio. Risk is assumed to be measurable by the variability around the expected value of the probability distribution of returns. The most accepted measures of this variability are the variance and standard deviation.

i. *Return*

Given any set of risky assets and a set of weights that describe how the portfolio investment is split, the general formulas of expected return for n assets are:

$$E(r_p) = \sum_{i=1}^{n} w_i E(r_i) \qquad (i=1,2,3\ldots..,\ N) \qquad (1)$$

where: r_i , r_P the return on i^{th} security and portfolio p; n the number of securities; w_i the proportion of the funds invested in security i, $E(r_i)$ the expectation of the variable in the parentheses; and $\sum_{i=1}^{n} w_i$ 1.0. The return computation is nothing more than finding the weighted average return of the securities included in the portfolio.

ii. *Risk*

The variance of a single security is the expected value of the sum of the squared deviations from the mean, and the standard deviation is the square root of the variance. The variance of a portfolio combination of securities is equal to the weighted average covariance of the returns on its individual securities:

$$\mathrm{Var}(r_p) = \sigma_p^2 = \sum_{i=1}^{n}\sum_{j=1}^{n} w_i w_j \mathrm{Cov}(r_i, r_j) \quad (2)$$

Covariance can also be expressed in terms of the correlation coefficient as follows:

$$\mathrm{Cov}(r_i, r_j) = \rho_{ij}\sigma_i\sigma_j = \sigma_{ij} \quad (3)$$

where ρ_{ij} = correlation coefficient between the rates of return on security i, r_i , and the rates of return on security j, r_j , and σ_i , and σ_j represent standard deviations of r_i and r_j respectively.

Therefore:

$$\mathrm{Var}(r_p) = \sum_{i=1}^{n}\sum_{j=1}^{n} w_i w_j \rho_{ij}\sigma_i\sigma_j \quad (4)$$

Overall, the estimate of the mean return for each security is its average value in the sample period; the estimate of variance is the average value of the squared deviations around the sample average; the estimate of the covariance is the average value of the cross-product of deviations. The amount to which a two-risky-assets portfolio reduces variance of returns depends on the degree of correlation between the returns of the securities. Suppose a proportion denoted by w_A is invested in asset A, and the remainder 1 – w_A , denoted by w_B , is invested in asset B. The expected rate of return on the portfolio is a weighted average of the expected returns on the component assets, with the same portfolio proportions as weights.

$$E(r_P) = w_A E(r_A) + w_B E(r_B) \quad (5)$$

The variance of the rate of return on the two-asset portfolio is:

$$\sigma_P^2 = (w_A\sigma_A + w_B\sigma_B)^2 = w_A{}^2\sigma_A{}^2 + w_B{}^2\sigma_B{}^2 + 2w_A w_B \rho_{AB}\sigma_A\sigma_B \quad (6)$$

where ρ_{AB} is the correlation coefficient between the returns on asset A and asset B. If the correlation between the component assets is small or negative, this will reduce portfolio risk. In addition, Figure 1 shows the opportunity set with perfect positive correlation a straight line through the component assets. There is no portfolio can be discarded as inefficient in this case, and the choice among portfolios depends only on risk preference. With any correlation coefficient less than 1.0 ($\rho<1$), there will be a diversification effect, the portfolio standard deviation is less than the weighted average of the standard deviations of the component securities. There are benefits to diversification whenever asset returns are less than perfectly correlated. Furthermore, correlation coefficients range between -1.0 and 1.0. When the correlation is 1.0, the two assets are perfectly positively correlated. While, when the correlation is -1.0, the returns are perfectly negatively correlated meaning that when one asset goes up, the other goes down and in a fixed proportion (plus a constant).

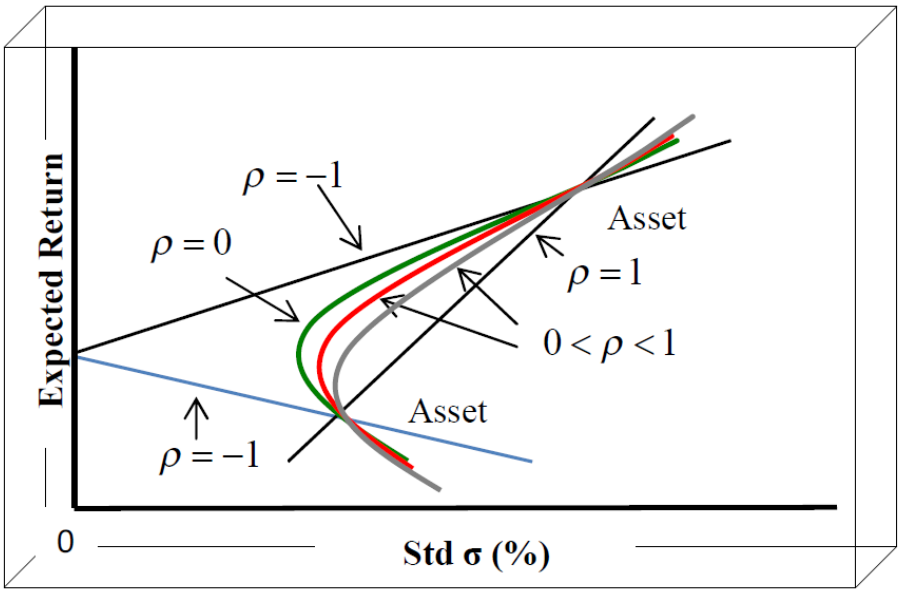

Figure 1 : Investment opportunity sets for asset A and asset B with various correlation coefficients.
Source: authors, 2014.

Figure 2 displays that investors the entire investment opportunity set, which is the set of all attainable combinations of risk and return offered by portfolios formed by asset *A* and asset *B* in differing proportions. The curve *DA* represents all possible efficient portfolios and is the efficient frontier.

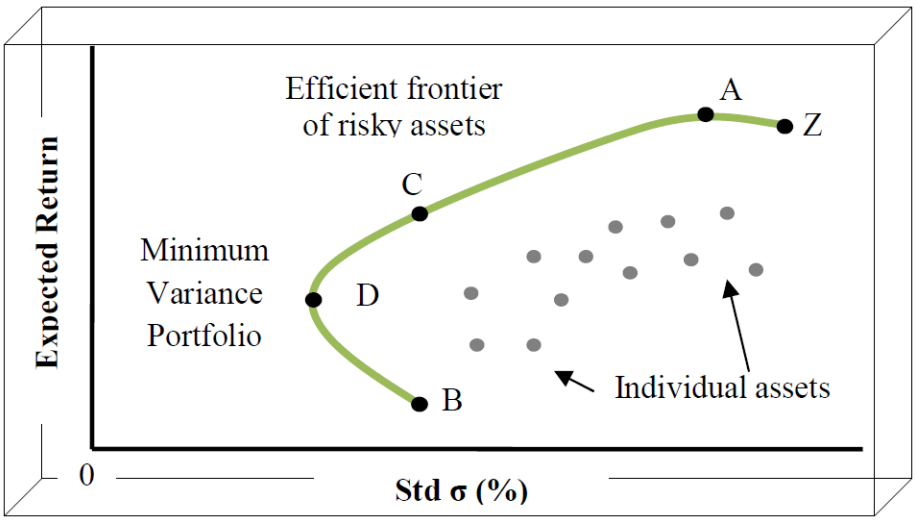

Figure 2 : Investment opportunity set for asset A and asset B.
Source: authors, 2014.

Considerable research has focused on analysing the risk and return relationship, there are several methods being used. For instance Mosaddegh (2006) studied the relation of risk and size with return under different market conditions of the companies listed on Tehran Stock Exchange. Through their empirical result he found that the variable size could be used under up market conditions to explain the changes in return. That means large companies have higher returns. Basu (1983) finds that low earnings-price ratios (E/P) stocks help explain the cross section of US stocks returns while high (E/P) stocks experiencing lower returns could be explained by the CAPM. Tang and Shum (2003) indicate that beta does not have significant relation with returns. Upon combining assets with low beta values, Weinraub and Kuhlman (1994) find that this combination could not minimise the portfolio's risk. Rai and Talangi (2004) contend that, stock return volatility means the achievement of real return different from the expectations. This volatility is also known as investment risk.

c) *Study Hypotheses Development*

Considering the transition period in the Jordanian economy in recent years, which resulted in important changes after finical market crisis, such as the emerging of the private sector, allowing the foreign companies to operate in Jordanian financial market and promoting investors to import and export, during which, these changes are expected to increase the local and foreign competition. However, The CAPM uses a stock's beta, in conjunction with the average investor's degree of risk aversion, to calculate the return that investors require, on that particular stock. Based on the above the present study aims at examining the following hypotheses.

H1: Risk is a significant determinant of portfolio performance during finical market crisis.

H2: Stock size is a significant determinant of portfolio performance during finical market crisis.

H3: Asset correlation coefficient a significant determinant of portfolio performance during finical market crisis.

H4: Investment risk is a significant determinant of portfolio performance during finical market crisis.

Null hypothesis and alternative hypothesis for the significance of the model are as follows:

$$\begin{cases} H_0 : \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0 & = \textit{the model is not significant} \\ H_1 = \beta_i \neq 0_i \ = 1,2,3,4 & = \textit{the model is significant} \end{cases}$$

III. Empirical Methodology

In the previous section, the literature review focused on the theoretical consideration "Theoretical Framework" relevant to the research problem, thereby offering a general overview of the literature and assisting in providing a framework for the theoretical and effects of financial development along with the stock market mechanism. With this knowledge, the aim of this section is to explain and justify the methods used in this study of risk, return, beta of individual stock and portfolio, number of stocks, correlation coefficient between the assets in the portfolio and investment risk from which it will be possible to generate empirical evidence and assess the volatility and reliability of findings.

The model draws on the portfolio theory as developed by Markowitz (1952, 1959) takes the form of an (Eq. 7) that predicts the value of outcome variable $R_{i,t}$ from a combination of prediction variables, each multiplied by its own respective coefficient, plus residual term. In its simplest form the CAPM is defined by the following equation:

$$R_{i,t} = \alpha_i + \beta_i X_{i,t-1} + \varepsilon_i \qquad (7)$$

where $R_{i,t}$ represents the dependent variable; $X_{i,t}$ the set of explanatory or predictor variables includes the financial variables (i.e., *risk, stock size, asset correlation, investment risk),* α_i *the constant term;* β_i *and the beta coefficient;* given market clearing asset prices at *t-1*, investors agree on the joint distribution of asset returns from *t*-1 to *t* (see Sharpe, 1964; Lintner, 1965); and ε_i the random error term. If β_i values replace into the equation, the potential framework for this study is as shown in Eq.7 which can be defined as follows:

$$Subject\ to: \begin{cases} RETURN = \alpha_i + \beta_1 BETA + \beta_2 SIZE + \beta_3 ASSET + \beta_4 INVEST + \varepsilon_i & (8) \\ E(R_i) = R_f + \beta_i \left[E(R_m) - R_f \right]; & (9) \\ \rho_{i,m} = \beta_i (\sigma_m / \sigma_i) & (10) \end{cases}$$

where *RETURN* refers to the price level of the stock (*i*) the average return in month (*t*). RISK refers to portfolio beta. *BETA* is calculated based on CAPM of each stock which represented as market risk. Furthermore, beta is the indicator for changes in price of stocks that respond to the market force as shown in Eq. 9: where, $E(R_i)$ is the return on individual stock; R_f is the risk free rate of the return of the market (also known as the nominal, or quoted) rate; R_m is the expected return of the market; β_i is the market risk of the stock, where $\beta_i = \frac{COV(R_i, R_m)}{VAR(R_m)}$. *SIZE* refers to the number of the stock; while *ASSET* is the asset correlation coefficient which measures the correlation between the assets in the portfolio according to Eq. 10. Is utilised since it gives a number between -1 and +1; a correlation of -1 or +1, which indicates a perfect correlation, negative, respectively, between two variables (see Figure 1); where $\rho_{i,m}$ is the correlation coefficient; σ_m is standard deviation of market or ASEI; σ_i is standard deviation of stock and β_i is the market risk of the stock. *INV EST* refers to stock return volatility known as investment risk.

The argument that the global financial crisis that started in advanced economies spreading to emerging markets and low-income countries has been reviewed, as have various empirical studies which have examined the relationship between CAPM and stock market indicators. The CAPM model assumes a linear

relationship between the expected return in risky asset and its β is an applicable and sufficient measure of risks that captures section of average return, that is, that assets can only earn a high average return if they have a high market β. Furthermore, β drives average returns due to β measures how much the inclusion of additional stock to a well-diversified portfolio increases the inherent risk of volatility from changing values.

IV. Data Analysis

The data were collected by ASE and income statements for the financing choice of firms listed with a market capitalisation, which are analysed from 2008 to 2012. The records were divided to two categories. The first category included the years 2008 to 2009 which existed before the appearance of the international financial market crisis, while the second category included the financial records of the post financial market crisis period from 2010 to 2012. The firm sample contains panel data dynamic framework for 59 sample companies were chosen throughout three different sectors (financial, industrial and services) listed in the ASE for which a continuous data set exists over the sample period. This study uses the secondary data in term of the stock's daily closing prices of the last day of the month. The data were obtained from two main sources; Jordanian stock market website and the DataStream. Besides, the Amman Stock Exchange Index (ASEI) is chosen as the benchmark in analysing the risk and return for each stock from the different sectors.

a) Descriptive Findings

Having outlined the collection and preliminary screening processes in respect of the data in the previous discussion, the study now focuses upon the analysis of that data. In order to discuss the results obtained from the secondary data, Table 2 illustrates that descriptive statistics for the study variables were measured in this research, followed by the *mean* as a measure of central tendency, *standard deviation* as a measure of distribution spread, *minimum* and *maximum* values of all variables for During financial market crisis and Post financial market crisis to check for each variable's normality[1]. In order to generalise the findings from regression analysis, some assumptions have to be met. One of the initial assumptions is the variable type. All variables must be metric or categorical with two categories.

Table 2 : Descriptive Statistics

Independent Variables	During financial market crisis (simple period 2008-2009)				Post financial market crisis (simple period 2010-2012)				Tolerance 1/VIF	VIF
	Mean	Min	Max	St. de	Mean	Min	Max	St. de		
RISK	0.89	-0.65	1.12	0.12	0.72	0.49	1.03	0.18	0.35	1.26
SIZE	179.99	122.05	292.00	102.97	201.53	145.06	305.12	113.82	0.77	2.19
ASSET	0.07	0.05	0.52	0.09	0.12	0.10	0.62	0.08	0.81	2.10
INVEST	1.08	-0.66	2.55	0.63	89.78	-0.42	1.00	0.48	0.42	2.09

Source: Data and Summary Statistical Analysis 2014

There are two common tests to assess the existence of the multicollinearity; they are the Variance Inflation Factor (VIF) and its inverse; the Tolerance value. The VIF values range from 1.060 to 1.231, all well below 10, the value suggested by Myers (1990). Tolerance values range from 0.35 to 0.81 (see Table 2). None should be below 0.1, since tolerance = 1/VIF, also, Menard (1995) suggests that values below 0.2 are cause for concern. The average of the VIF values = 1.91. It is suggested by Bowerman and O'Connel (1990) that this should be no greater than 1. Therefore, this is indicating that *multicollinearity* problems may occur in this backward elimination model. As Table 2 shows, there is no high correlation between any of the independent variables and also from Table 2 it can be seen that the values of VIF do not exceed the acceptable level of 10, with no values of tolerance below the recommended level of 0.1. Accordingly, there is no evidence to be found for the existence of multi-collinearity. Such coefficient does not matter since it is less than 0.5 and not significant at conventional levels. Findings from Table 3 illustrate that, *risk* and *asset* correlation were found to be significant and positively correlated to portfolio return. These results imply that portfolio return is higher wherever there is high risk; high asset correlation stock comes from different sectors. However, *size* and *investment* shown a significant and negative effect to return since high number of stock reduces the portfolio risk. This is consistent with Elfakhani and Zaher (1998). This means that a possible explanation for this higher risk-adjusted returns than a portfolio with high volatility equities (like illiquid penny stocks).

[1] Normality provides the degree to which distribution of sample data corresponds to *a normal distribution*, where normal distribution is a theoretical probability distribution in which the horizontal axis represents possible values of variables and the vertical axis represents the probability of those values occurring. Scores on the variables are clustered around the mean in a symmetrical, abnormal pattern known as the symmetrical bell-shaped or frequency curve (Hair *et al.*, 2005: 38).

Table 3 : Correlation Matrixes

	RETURN	RISK	SIZE	ASSET	INVEST
RISK	0.231**	1.000			
SIZE	-0.710*	-0.029	1.000		
ASSET	0.089**	-0.264**	-0.290	1.000	
INVEST	-0.144**	-0.098**	-0.019	-0.023	1.000

*Note: **Significant at $p<0.01$ and $p<0.05$ [Sig. (2-tailed)].*
Source: Data and Summary Statistical Analysis 2014.

b) Hypothesis Testing

The aim of this section is to *present* the overall multiple regression model and, accordingly, explain the types of financial indicators (independent/predictor variables) and determinant of portfolio return performance (outcome variables). The output of the *SPSS* test, as depicted in Table 4, reveals very significant information about the model fit under study with those accepted and rejected hypotheses. In this context, the t-test is derived in order to ascertain whether a B value (between brackets) is significantly dissimilar from zero. Consequently, t-tests are considered as measures of whether the predictor is making a significant contribution to the model based on level of significance (α). Critical t-values can be expressed based on the type of test used. Therefore, direction relationships are based upon the hypothesis of addressing the effect on predictors as to the extent of compliance with planning standards. For the 0.05 a significant level, the critical t-values are greater than 1.645 for a one-tailed test and 1.96 for a two-tailed test. Indeed, a two-tailed test of significance was utilised for this study.

Results from the multiple regression analysis, as displayed in Table 4, indicated that models were reflecting a significant relationship between independent and dependent variables in most areas. The conclusion from this analysis is that the coefficient of risk during finical market crisis is significant and negative while after the finical market crisis period, the coefficient of risk turn to be significant and positive to portfolio return. The decrease of low stock price occurred after the formal announcement of the crisis in the U.S. after the mid of 2008. Patro *et al*. (2000) expect that companies with high dividend payments maybe less risky. If a company has their value tied to higher future growth, rather than to current dividends, it may be more sensitive to market performance. The result from aftermath finical market crisis is also supported by Bakhshandeh (1990). Thus, these results support hypothesis *H1*. However, the previous results are inconsistent with this result to that find by Tang and Shum (2003) who indicate that beta does not have significant relation with returns.

Table 4 further shows that the coefficient of size shows that size has a significant negative relationship with determinant of portfolio return performance during and post finical market crisis. The results imply that the higher number of stock in a portfolio reduce the risk of portfolio. Consistent with the portfolio theory, low risky portfolio results in low portfolio return performance thus size in this study show a significant and negative result to portfolio return performance. This result is supported by the finding by Elfakhani and Zaher (1998). These results, therefore, support hypothesis *H2*. The results also indicate that the asset factor shows that during finical market crisis it is significant and negative to portfolio return performance. On the other hand, sector gives a significant and positive estimation result to portfolio return performance. These results are consistent during and post finical market crisis for asset correlation and investment risk, therefore, hypothesis *H3* and *H4* are accepted. Klingebiel *et al*. (2001) found that the stock prices of companies were highly affected due to the Asian financial crisis. Most of stocks of companies dropped due to low exchange in the stock exchange markets. These results are similar to the results found in this research concerning the market stock price of industrial companies. It is interesting that all the different sector In Jordanian finical market, the effect of the international financial crisis was very diminutive because of the limited exporting goods abroad as these companies depend on local market.

Table 4 : Regression Results Analysis

Independent Variables	*t-test*		*Hypothesis*		
	During financial market crisis (simple period 2008-2009)	Post financial market crisis (simple period 2010-2012)			
Constant	0.189 (5.698)**	0.654 (5.722)*	Expected		Comment
RISK	-0.034 (-4.162)**	-0.040 (-5.008)**	H_1	- +	Rejected Accepted
SIZE	-0.192 (-2.542)*	-0.142 (-2.052)**	H_2	- +	Rejected Accepted
ASSET	-0.145 (-1.878)**	-0.196 (-2.587)*	H_3	- +	Rejected Accepted
INVEST	-0.025 (2.427)*	0.019 (2.078)**	H_4	- +	Rejected Accepted
R	0.563	0.671			
R^2	0.389	0.415			
F-value	4.956**	5.592**			
Observations	29	30			

V. Conclusion

The main aim of this paper was to provide a better understanding of the theoretical framework which has been developed from the CAPM that could provide a scientific base for possible causes of impairment application, and presents a conceptual framework showing the determinant of portfolio return performance during and post finical market crisis. Apart from further analysing the findings presented and discussed, this part has considered some significant outcomes of the potential portfolio return performance in the light of various contributions based on prior analysis and the evidence reviewed earlier from the literature. There is reason to believe that risk factor shows a difference pattern to portfolio return performance during these two periods where risk is negative and significant during finical market crisis but positive and significant after the finical market crisis. By employing this empirical methodology, during finical market crisis, risk is more vulnerable. Following this, the higher the portfolio return performance shows a lower risk and this contradicts the risk-return trade-off theory. This could happen due to market players had become over cautious on the market risk and unsystematic risk. Based on the results of this research, the investment risk tolerance asset allocation among the portfolios managed to strike a balance between the risk appetites determined by the investors. Furthermore the investors' maturity and serenity among Jordanian financial market investors help to periodically rebalance the portfolio risk and return despite the sharp decline in share prices.

Further findings of this study provide evidence that determinant of portfolio return performance could vary with the market stability and condition during finical market crisis, portfolio risk is negative to the return implying that the lower the risk the higher the return but when the market turmoil changed, the risk get back to be positively to return. Furthermore, by being aware of the particular type of risk an investment is exposed to, investors can make better decisions on what is appropriate for their situation and portfolio especially in crucial times. The recession of production in most companies did not appear through decreasing the working labour of these companies or the announcement of bankruptcy of any of the industrial companies in Jordan. Further research is needed in order to provide a clear understanding of the framework that should be conducted to analyse the impact of macroeconomic factors on beta value in the long run. Furthermore, paper of the proposed model in other emerging countries could be performed in order to raise further explanation of the model and to reveal more generalised findings. Using the impact of other financial factors such as; earnings variability, accounting beta and liquidity of the shares (trading volume) on beta value.

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