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Testing the Validity of Capital Assets Pricing Model: Evidence from Palestinian Exchange Market

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This study aims at investigating the relationship between risk and return for the listed stocks in Palestinian exchange market. Moreover it also examines the validity of capital assets in Palestinian stock market. Thus, ordinary least square (OLS) is used to analyze data variables and to test the research hypotheses. The empirical result reveals that the intercept term of individual companies is insignificantly different from zero and the slope is equal to the excess return of market index. This result proves significant relationship between risk and return. Moreover, the findings conclude that the higher beta is not associated with higher level of individual stock return. This indicates that the securities market line has non-linearity relationship between risk and return. It means that CAPM is not a good predictor for stock prices in Palestinian exchange market over the selected sample period. Therefore, this relationship is not quite enough to compensate investors for their market risk because systematic risk shows a nonlinear relationship with returns during the period of study. Thus, this paper recommends other sound assets pricing model in predicting future stocks returns.

Key words: CAPM. Palestinian exchange market, Beta coefficient. Security market line

1. Introduction

The formulation of capital assets pricing model was developed and constructed by Sharpe (1964), Linter (1965) and Mossin (1968) based on Markowitz portfolio theory. They stated a relationship between stock excess return and market excess return. This model of capital market argues that financial securities should be priced according to their risks (systematic risks) and variances of returns in stock markets. They also assumed that (1) all investors are single period risk averse and prefer to maximize their utility of terminal wealth; (2) they also can choose their portfolios based on the mean and variance of return in each investment, (3) there are no tax or transaction costs, finally they assumed that (4) all investors can borrow and lend at a given risk-less rate of interest.

The main idea behind CAPM is that investors require to be compensated from time value of money (risk free rate) and risk (the rewards from bearing any additional risk). This means that the expected required of return resulted from the investor's compensation for placing their money in any investment over period of time and the compensation amount for investors whom need to take any additional risks.

Actually, this model is used to estimate the required rate of return based on the inherent risk level for any investment. Further, it is also widely used in financial applications such as cost of capital estimation and the measurement of certain portfolios performance (Jarlee, 2007).

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In fact, testing this theory has been performed by many scholars in different stock markets worldwide such as Grossman, et al (1981), Fama and French (1996), Mobarek and Mollah (2005), Wang and Amalia (2007), and Basu and Chawla (2010). However, there is still a wide debate on applicability of CAPM in financial literatures. Furthermore, most of scholars argued that the CAPM empirical problem probably invalidate to use in applications. This paper argues that Palestinian stock market is less efficient and too small size listed stocks compared with other capital markets in the world. For this case, the systematic risks of financial securities in Palestinian capital market are might be less rational than other capital markets securities. Therefore, this research attempts to draw a meaningful conclusion by applying the same tests of Sharpe (1964) on Palestinian exchange market.

The purpose of this article is to test the validity of assets pricing model on different sectors in Palestinian exchange market. So, this paper attempts to examine whether systematic risk can explain the variability of stock returns in PEX. In this context, the applied pricing model can contribute to the soundness of company operations and help the policy makers in their investments decision. Thus, this study attempts to confirm that CAPM is able to explain the risk and return relationship in Palestinian exchange market (PEX).

The remainder of this paper is organized as follows. The next section explains the previous studies of CAPM as literature review. The third section formulates the research methodology and develops the study hypotheses. The fourth section analyzes the data variables and discusses the research findings. The last section concludes the research.

2. Literature Review

Several empirical studies are tested capital assets pricing theory in order to provide the estimation basis for the investment in financial securities. Initially, Sharpe (1964) and Linter (1965) were mainly developed capital pricing model based on risk and return relationship for individual security. It argued that the required rate of return for all efficient portfolios is perfectly correlated and provided a justification for arbitrarily selecting any of them. However, Miller and Scholes (1972) found that there are statistical problems when using individual securities returns in test applicability of the CAPM. They used portfolios returns rather than security returns in testing validity of CAPM. They reported a linear relationship between the average excess return of portfolio and the beta factor. Similarly, Fama and MacBeth (1973) used a linear relationship between portfolios return and beta in formulating CAPM. Nevertheless, Fama and French (1992) found weak empirical evidence on that relationship; they argued that CAPM could not be used in prediction portfolios returns. Laubscher (2002) also concluded that CAPM is not applicable and the arbitrage pricing theory which is developed by Ross (1976) represents better prediction for portfolio returns than CAPM. Moreover, other prior studies such as Baten (2006), BurcKayahan, (2007) revealed that CAPM is not supportive in high risk securities and it is not valid in stock markets. Simultaneously, Gursoy and Rejepova (2011) found no meaningful relationship between beta coefficients and risk premiums in Turkey stock market. Choudary K and Choudary S (2010) also examined the capital assets pricing model for the Indian stock market between period of 1996 and 2009. Their findings are not sustaining the theory basic result that higher risk (beta) is associated with higher levels of portfolio returns.

Recent studies, Hasan et al (2013) investigated whether the CAPM is satisfied in the portfolio or not in Canada. They proved the practical incompleteness of CAPM and the unique risk has no effect on the expected portfolio returns. Furthermore, Džaja and Aljinović

(2013) tested CAPM model on central and southeastern Europe market. They revealed that the CAPM is not adequate for assessing the capital markets on observed central and Southeastern European emerging markets. Moreover, Qamar et al (2014) examined the applicability of capital assets pricing model (CAPM) in Pakistan stock markets. They argued that the CAPM is not valid and the beta has no impact on the expected returns in Karachi Stock Exchange. Similarly, Obrimah et al (2014) used CAPM for testing market efficiency of the Nigerian stock exchange market. They found that the conventional specification of CAPM is inappropriate to test the efficiency of Nigerian stock market.

The limitations of previous studies are almost used portfolios returns rather than securities returns for testing the validity of CAPM. It argued that CAPM can be strong evidence in predicting assets prices with portfolios rather than individual securities. Actually, this study is primarily focused on the relationship between the expected returns and betas of individual listed stocks in PEX. Indeed, there were no studies in Palestine that mainly examined the validity of CAPM. Therefore, this paper intends to analyze the relationship between returns and betas and to examine whether CAPM is applicable in assets pricing for listed companies.

2.1 Research Hypotheses Development

When we are testing the applicability of CAPM in stock markets, there are two important issues that should take into consideration; first, stability of beta is important for predicting future stock returns, since beta measures systematic risk. Second, there is a positive linear relationship between beta and return on risky assets. More specifically, the validity of CAPM explains stock market return. Therefore, the research hypotheses are conceptualized and formulated as follows:

H_1: There is a statistically significant relationship between Beta and market return index.
H_2: The relationship between beta and individual security return is linear.
H_3: Capital assets pricing model is applicable in PEX.

3. Research Methods and Data Collection

The main objective of this research is to examine whether capital assets pricing model can assist investors in pricing their securities and give them reliable decisions in their investments. The data was taken from Palestinian exchange market for the period of January 2010 to December 2014. This indicates that the data observations were obtained 60 months as an estimation period (Fama and French, 1996). Monthly data for closing stock prices and market value weighted index (Al-Quds index) are selected in order to estimate the required rate of return and beta for each security. Furthermore, the selected companies represent at total of 19 out of 49 listed stocks from different sectors in PEX. Further, it represents 38.8% of listed companies Therefore; this sample is large enough to get some meaningful statistical results. However, financial and insurance sectors are excluded from this research due to their natural financial activities. Moreover, this study also excluded those companies that new born listed in PEX in order to get good prediction results. Finally, the total of sample is 19 listed stocks.

This section also describes the parameters of CAPM that are used in the study. The following is a briefly description of the variables that employed to estimate required rate of return in CAPM:

1. Risk free rate (R_f)
It represents the rate of return that generated from putting money as time deposit in the bank. This riskless investment is considered as fixed income rate and the standard deviation in variability of this rate of return would be zero. In this study, most banks in Palestine are using London interbank offering rate (LIBOR) as a risk free rate because it is actively used rate in the Palestinian money market. Thus, this rate is zero systematic risk and highly degree of certainty.

2. Market rate of return (R_m)
Market return represents the rate of return that investors are requested on their market portfolio investment and commonly used as market stock index. In this research, Al-quds market index was selected as a benchmark of Palestinian exchange market (PEX). Accordingly, this research calculated the market rate of return based on monthly percentage changes in market stock prices.

3. Beta (β)
Beta stands the systematic risk or the risk factor of CAPM. In this research, beta was computed by dividing the covariance of monthly stock returns in the relation with the market return of index over five periods (2010 to 2014), divided by the variance of stock return in the same period. Therefore, Beta coefficient is calculated according to the following equation:

$$\beta i = \frac{Cov\ (Ri, Rm)}{{\sigma_m}^2}$$

Where $Cov\ (i, m)$ is the covariance between securities i and the market index. Further, ${\sigma_m}^2$ is the variance of market portfolio index.

4. The required rate of return (R_i)
The rate of return of particular stock was calculated for each month using change in stock prices (the difference between the opening price and closing price divided by the opening price. In particular, in order to test the validity of CAPM model for PEX. It's necessary to calculate the expected return. Therefore, the following function is used in estimating the expected return for each security:

$$E(Ri) = \frac{\sum_{t=1}^{m} Ri}{m}$$

Where m is the number of data observation, and R_i is the number of monthly rates of return for security i.

After that, OLS regression analysis is carried out in order to estimate the relationship between the expected return and beta(β). Further, ordinary least square is a method for estimating unknown parameters in a linear regression model. Fama and MacBeth (1973) is used this technique to estimate parameters for capital assets pricing model. Therefore, this research paper estimates the parameters of CAPM (Return and beta) as follow:

1. First regress each stock price against market value weighted index to determine that stock beta for that risk factor.

2. The use of regression analysis for all stocks returns during the selected period against the estimated betas to determine the risk premium for each factor.

The research also used CAPM as methodology of sharp (1964). Therefore, systematic risk (beta) of individual stocks is measured and beta coefficients were calculated for formation periods (2010 to 2014). Regression analysis between monthly percentage return and market index is used in order to find the beta coefficients for each security in the research model as shown below:

$$E(R_i) = R_f + \beta i\,(R_m - R_f)$$

Where, R_i is the rate of return for each stock at time t, R_f is the risk free rate at time t, βi is slope for each stock at time t and R_m is the market index at time t. Here, if the CAPM is true in PEX, the average percentage return and beta are linearly related with each other.

Actually, there were no previous studies tested the validity of capital assets pricing model in Palestine. However, many previous studies in other counties did such as India (Choudary K and Choudary S, 2010), Candia (Hasan et.al, 2012), Europe market (Džaja and Aljinović, 2013), Pakistan (Qamar et al, 2014), Nigeria (Obrimah et al (2014). But, we extend the methodology of prior studies by adding strong evidence against CAPM through testing the CAPM from different market sectors in the Palestinian exchange market.

4. The Findings and Discussion

This section analyzes the parameters of CAPM by using ordinary least square. Hence, descriptive statistics, beta coefficient estimates and regression model are used to conduct the empirical results for this research.

4.1 Descriptive Statistics

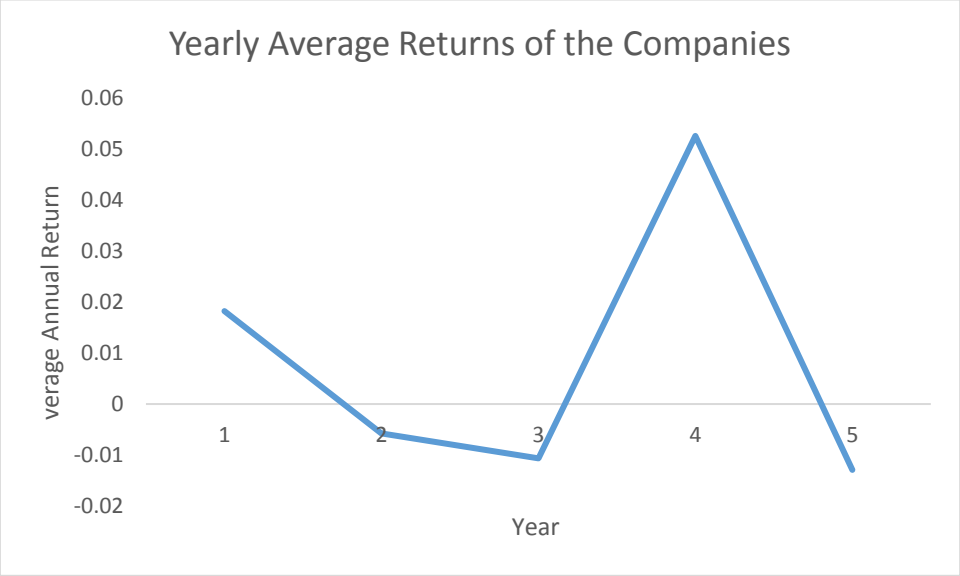
Table 1 represents the descriptive statistics of data variables as average return and beta. It shows that the mean value of average return during the period was 2%. Further, the maximum and minimum values of average return were respectively of 16.5% and -0.5% with standard deviation of 3.97%. Meanwhile, it also shows that the mean of stocks beta was 0.97% and deviated by 37.9%. The maximum beta was 82.5% and the minimum beta was -79.6%. This means that average return of stocks and its standard deviation are relatively very low. Whereas, beta of stocks is high variation between stocks return and market return of index.

Table 1: Descriptive Statistics of Research Variables

	Average return	Beta
Mean	0.0203	0.0098
Standard deviation	0.0387	0.3790
Maximum	0.1647	0.8660
Minimum	-0.005	-0.7950

Figure (1) shows the annual average returns of the sample selected stocks during the period of 2010 until 2014. It is found that average return was fluctuated during the studied period and it is sharply depreciated between the year 2013 and 2014. Thus, the variability of returns for listed stocks is relatively high a cross the period of study.

Figure 1: Annual Average Return of the stocks in PEX (2010-2014)



4.2 Individual Stocks Beta Estimates

The result in table 2 indicates that the range of the estimated betas for individual listed stock in PEX was between 0.866 and -0.795. This table is ranked beta coefficients from highest beta value to the lowest beta. The highest beta achievable stock was “Al Aqariya” (β = 0.866) and the lowest beta stock was “APC” (β = -0.795). In addition, the highest average return attainable company was “BRAVO” (AR = 16.5%) and the lowest return company was “ARE” (AR= - 0.50%). However, CAPM theory stated that higher beta for individual stock associated with higher level of return. Thus, the result didn’t support this theory. This means that the highest beta of “Al Aqariya” (β = 86.6%) did not achieved the highest rate of return (AR = 0.17 %), and the lowest beta of ‘’APC” (β = -79.5%) did not get the lowest return (AR= 0.21%). The result indicates that all p-values of individual companies are greater than the level of significance 5% and all t-value is less than the rule of thumb 1.96. Therefore, all the betas for 19 individual stocks were statistically insignificant at 5% level significance. Finally, the result from table 2 reveals that the higher risk (beta) is not associated with higher level of return for individual companies. This means that relation between risk and individual stocks returns did not support linearity.

Table 2: The Betas Coefficient Estimates Results

No.	Company Symbol	Average Return	Beta	t-value	P – value
1.	**Al AQARIYA**	0.0017	0.866	1.599	0.119
2.	**BRAVO**	0.1647	0.595	0.122	0.804
3.	**AHC**	0.0490	0.413	0.665	0.509
4.	**JCC**	0.0041	0.295	0.897	0.375
5.	**PALTEL**	0.0023	0.256	1.453	0.153
6.	**ABRAJ**	0.0053	0.261	0.827	0.414
7.	**LADEN**	0.0287	0.237	0.390	0.699
8.	**NCL**	0.0421	0.139	0.093	0.927
9.	**GMC**	0.0133	-0.025	-0.025	0.980
10.	**JPH**	0.0076	-0.071	-0.205	0.838
11.	**BPC**	0.0021	-0.101	-0.333	0.741
12.	**PADICO**	0.0091	-0.112	-0.311	0.757
13.	**WATANIYA MOB**	-0.0096	-0.169	-0.659	0.513
14.	**VOIC**	0.0198	-0.131	-0.480	0.433
15.	**GUI**	0.0178	-0.212	-0.659	0.513
18.	**GCOM**	-0.0299	-0.339	-1.125	0.206
16.	**ARE**	-0.0053	-0.359	-0.541	0.541
17.	**AZIZA**	0.0346	-0.396	-0.299	0.766
19.	**APC**	0.0285	-0.795	-1.565	0.128

4.3 Ordinary Least Square Results

Table 3 shows the result of ordinary least square in order to estimate whether the entire listed stocks (overall stocks index) would provide strong evidence against CAPM. The computed t –statistic concludes a significance level of 5% at which the intercept value is near to zero. Additionally, high R –squared value implies that 73.5% of variation in the actual return explained by risk (beta). But, F-statistic is 47 and significant at 0.27% less than the significance of level 5%. Table 3 also reveals that the result of analysis strongly supported the research hypothesis. Intercept term overall the period of study equals zero and insignificant. Further, the five period betas were equal the excess return of market index. The table also found that beta coefficient for all companies was 0.37, t–value greater than 1.96 and p-value is 0.27% less than 5% the level of significance. Hence, the result of OLS supports the research hypothesis. As a result, there is significant strong relationship between beta and return. However, this relation is non-linear. Thus, CAPM inappropriate for testing the efficiency of Palestinian exchange market. Therefore, this indicates that the result is statistically inconsistent with CAPM.

Table 3: The result of OLS regression

Parameters	coefficient	Standard Error	t- statistic	P- value
C (intercept)	-0.0083	0.0055	-1.4779	0.1577
Beta (β)	0.3713	0.0540	6.8667	0.0027
R – squared	0.7350			
F- statistic	47.152			
Prob (F-test)	0.0027			

As shown in table 2 and 3, the results of test hypotheses are relied on t-statistic and p-value. Therefore, we can summarize the results as follows:

1. In analyzing the risk – return relationship, R squared shows high value of 0.735 and indicates that 73.5% in variation of stocks returns explained by the relationship with market index. This means that there is a strong relation between risk and return. H_1 is accepted.
2. For testing SML and Linearity support, the result gave inconclusive evidence in favor of CAPM during the period of study. Further, it is found that higher beta is not associated with higher level of stock returns to the investors. Thus, H_2 is rejected.
3. As result, CAPM is inappropriate for predicting future stock returns in PEX. H_3 is rejected. Furthermore, table 4 summarizes the hypotheses testing results as follows:

Table 4: CAPM Hypotheses Testing Results

Hypothesis	Alternative Hypothesis	Significant level
H_1	Accepted	5%
H_2	Rejected	5%
H_3	Rejected	5%

5. Conclusion

In this research, a sample of 19 listed companies was examined through data panel regression model to determine whether CAPM is valid. Ordinary least square is applied to find out the empirical relationship between beta and return for public shareholding companies that listed in Palestinian exchange market. The study was based on monthly data from January 2010 to December 2014. Thus, this research aims at investigating whether CAPM holds truly in Palestinian exchange market. The research hypotheses are developed and formulated in order to conduct the research results. The study findings are consistent with Fama and French (1992) and other prior studies that document unable to prove any evidence against CAPM. The results conclude that the intercept term is insignificant and equals to zero and that inconsistent with CAPM hypotheses. This indicates that beta is not a reliable instrument for predicting Palestinian stock market returns. Therefore, this study added new evidence to previous finance literatures through proving that CAPM is not a good predictor for future stock return in PEX.

Finally, the only one limitation of this study is that the selected sample is limited to construct a prefect CAPM model. Therefore, further research is recommended for assets pricing model such as arbitrage theory model (APT).

References

Basu, D and Chawla, 2010, '*An empirical test of CAPM-the case of Indian stock market*', Global Business Review, vol.11, pp. 209-220.

Baten, M, 2006, '*An Empirical Testing of Capital Asset Pricing Model in Bangladesh', Research (Science)*, Bahauddin Zakariya University, Multan, Pakistan, pp. 225-234.

BurcKayahan, S, 2007, *'Testing the Capital Asset Pricing Model with Local Maximum Likelihood Methods.* Mathematical and Computer Modeling, vol. 46, no. (1/2), pp. 138-150.

Choudary, K and Choudary, 2010, '*Testing Capital Asset Pricing Model: Empirical Evidences from Indian Equity Market'*, Eurasian Journal of Business and Economics, vol. 3, no.6, pp. 127-138.

Džaja, J and Aljinović, Z 2013, *'Testing CAPM model on the emerging markets of the central and Southeastern Europe'*, Croatian Operational Research Review (CRORR), vol. 4, pp. 164–175.

E.R. Laubscher, 2002, '*A review of the theory of and evidence on the use of the capital asset pricing model to estimate expected share returns'*, Meditari Accountancy Research, vol. 10, no.1, pp.131 – 146.

Fama E, and French K, 1996, *'Multi-factor explanations of asset pricing anomalies'*, Journal of Finance, vol. 51, pp. 55-84.

Fama, E, and French, R, 1992, *'The Cross-Section of Expected Stock Returns'*, Journal of Finance, vol. 47, pp. 427- 465.

Fama, E. F, MacBeth, J. D, 1973, '*Risk, Return, and Equilibrium: Empirical Tests'*, Journal of Political Economy, vol. 81, no. 3, pp. 607-636.

Grossman, Sanford, and Shiller, Robert J, 1981, *'The determinants of the variability of stock market prices'*, The American Economic Review, vol. 2, pp. 222-227.

Gursoy, C, and Rejepova, G, 2011, 'Test of capital asset pricing model in Turkey', Doğuş Universities Dergisi, vol. 8, no.1, pp. 47-58.

Hasan, M, kamil, A, and Mustafa, A 2013, *'Analyzing and estimating portfolio performance of Bangladesh Stock market'*, American Journal of Applied Sciences, vol. 10, no. 2, pp. 139-146.

Jarlee, S 2007, *'An Empirical Test of the Capital Asset Pricing Model: Studying Stocks on the Stockholm Stock Exchange'*, Mälardalen's University Institution for Mathematics and Physics Västerås, Sweden.

Lintner, J, 1965, *'The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets'*, Review of Economics and Statistics, vol. 47, pp. 13 - 37.

Miller, Merton, and Myron Scholes, 1972, '*Rates of Return in Relation to Risk: A Reexamination of Some Recent Findings*,' Studies in the Theory of Capital Markets, Michael C. Jensen, Ed. New York: Praeger, pp. 47–78.

Mobarek, A and Mollah, 2005, *'the general determinants of share returns: An empirical investigation on the Dhaka stock exchange'*, Rev. Pacific Basin Fin. Markets Policies, vol. 8, pp. 593-612.

Mossin, J, 1968, *'Optimal multi-period portfolio policies',* Journal of Business, vol. 4, no. 6, pp. 341-60.

Obrimah, o, Alabi, J, and Ugo-harry. B 2014, *'How relevant is the Capital Asset Pricing Model for test the market efficiency of Nigerian stock exchange'*, African development review, Vol. 27, No. 3.

Qamar, M, Rehman, S, and Shah, S 2014, '*Applicability of Capital Assets Pricing Model (CAPM) on Pakistan Stock Markets*', International Journal Management of Business Research, Vol. 4, no. 1, pp. 1-9.

Ross, S, 1976, *'The arbitrage theory of capital asset pricing'*, Journal of Economic Theory, Vol. 13.

Sharpe, W. F, 1964 *'Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk*', Journal of Finance, vol.19, no. 3, pp. 425–442.