# Whether Capital Asset Pricing Model Matters: Pakistani Banking Sector

Umar Nawaz Kayani*, Syed Bashir Hussain†, Sumaira Nawaz‡

**Abstract:**

This study examines the rationality of utilizing the capital asset pricing model in Pakistani banking sector. The estimated return on banking sector is used as a proxy for measuring the best possible estimate of the stock return on banking sector in Pakistan. For conducting this study, the data was collected from 20 banks in total covering the period of 2006-2017 for which the time series yearly based pooled was applied. The capital asset pricing model is applied for the size and book to market portfolios. The excessive return is taken as dependent variable reflects that the investors required excessive return over the above Rf in order to take any additional risk, while independent variable used in study is market risk premium. The study shows that capital asset pricing model reflects more precisely the expected return.

***Key Words:*** Capital asset pricing model, Market portfolio, Banking sector, Risk Premium, Fama & French 3 Factor Model

## Introduction

The financial crisis in United States accompanied with fall in world economies has led to rippling effects of different degrees. The melting down of stock prices and higher rates of unemployment are some of the many indicators of the fearful outcomes of recession. Due to market volatility (measure of variation of price of a financial instrument in a market), many financial institutions failed and others had no option but to get their-self merged with financially strong firms that can survive through the period of crunch. These new developments have attracted the attention of regulators and researchers because many large financial institutions were afraid of becoming victim to market risk, large systematic risk, and declining business moralities (Elyasani et al., 2007).

In asset valuation especially derivatives and portfolio management (management of different investments), the volatility phenomena take much importance (Ara, 2005). Consumer behavior is also largely influenced by volatility. This background has resulted into immense research to discover the root causes of systematic and unsystematic financial risk, so that the interests of stakeholders can be secured. For past few decades, interest rate compassion (useful tool for borrowers to compare cost of interest on various types of loan) usually

*Assistant Professor, Capital University of Science and Technology, Islamabad.

†Professor, Head of Department Economics, National University of Modern Languages, Islamabad.

‡ Lecturer Foundation University Islamabad

called as beta (a measure of volatility of a portfolio in comparison to market), takes the leading concern for numerous financial bodies and empirical exploration suggests a resilient connection between bank equity earnings and interest rates. Exchange rate (value of currency of one's country in comparison to other country) danger, really, is another menace met by financial bodies alike many other businesses and has deep effect on it processes having dealings in external currencies and foreign jobs (Chamberlan, 1997).

In 2000, Damodaran A. defined cost of equity as rate of return that an investor is expecting over the investment in a firm. The market value of an asset helps in determining the expected rate of return. Market data is the source for determining the estimated return (price of a financial instrument reported by stock exchange or by some financial institution) because the indirect cost of the company's equity should base on the market price instead of book value of the company. The market value of cash flows from various investment can be estimated using cost of equity which represents the market's expectation. Thus, cost of equity is a way forward to find out the measures based on expected return which in return drive the market. Typically, the expected inflation is also included while measuring the cost of equity Javid, A. Y., & Ahmad, E. (2008).

The reason of the monetary crises was that the banks were not holding common equity at large and the excessive leverage granted to stakeholders. The banks can withstand the losses if they can hold sufficient common equity in their capital structure. However, to invest in common equity is considered as a costly form of capital because investors in return do expect higher returns. Since the start of monetary crisis riskiness to invest in banking sectors have seen tremendous increase. In 2009 King, determines that the banking stocks and bank bonds did experience the fall in price. He further, also confirmed that the cost of equity for banks changed due to change in the risk free rate of interest and increase in bank's premium happened due to bank riskiness.

In view of these banking endeavors to uncertainty, numerous researches piloted in the US and in West proven a connection amid risk and return and discrete investigations were also completed with respect to scopes of units and bulk of maneuvers. Similarly, relationship between financial relationships and market parameters of risk have been explored in several research projects and it has been found that the variation in the financial procedures influenced the market beta. To check the relationship, usually capital asset pricing model is used in estimating the marketplace beta and regressed on concurrent prices of certain accounting variants and the regression found a robust association between the two variables underneath study.

The literature moreover advocated that this connection happens not only in financial sector, but also in other businesses, for example drug trade where a resilient association prevailed between Yield on Assets (ROA) and Uncertainty (Bettis and Hall, 1982).

The researchers have explored many variables that impact the bank stocks returns. The identified variables i.e. market risk, interest rate risk and the size of firm. This impact also differs depending on the companies with different class of ordinary share i.e. private and public. The financial sector companies including banks, insurance companies, unit trusts and property companies also react differently to these determinants of firm's risk and return. The size premium and value premium were also identified, where small market capitalization stocks help in driving the value of the premium.

It has also been shown that capital asset pricing model is used to adjust the market risk for maintaining the persistent value of the premium. Whereas, on the disparity of risk-based clarifications that characterize the higher risk of value stocks in comparison to growth stocks, which also have higher returns for value stocks regardless of their market beta. The researchers also argue that the size effect of the market arises endogenously by using the theoretical models which base on firm level investment decision, stock market liquidity, and investors behavior. However, the experiential evidences show that the size effect had disappeared since early 1980.

The researchers also argued that it is too early to say that due to noisiness and standard errors around the premium size at large scale has caused the size effect to go away. Therefore, it is not easy to conclude that the size effect is large or small as compared to before it used to be. Hence the question for the study can be defined as; How capital asset pricing model is helpful in investigating the financial strengths of financial institutions in Pakistan by considering an empirical investigation for Pakistani banking sector.

## Literature Review

In 1972, Black, Jensen and Scholes conducted the work to study the relationship for stock portfolios based on risk and return relationship and as a result of the study it was found that the excess return and portfolio beta for monthly basis has a positive linear relationship among them. The initial work of Breen & Lerner (1973) provided some insight about the corporate decision variables and the market betas and recognized a sturdy connection between market volatility and accounting variables. Additionally, expanding that guessing the factors of beta can have deep inferences both for capital markets and corporate financial theory

De Bondt and Thaler (1985) find out whether the overreaction

of people to unexpected and dramatic news events have any effect on stock market. The empirical evidence based on the monthly return, shows that the portfolios of prior losers outperform prior winner. The losing stocks earned 25% more than the winner, 36 months after the portfolio formation even though the winner portfolio was significantly riskier. In 1988, Bhandari conducted a study and determined that the high debt-equity ratios are also useful in determining the cross section average returns while taking beat and size into account. Cozier and Rahman in 1988 conducted a study in Canada regarding the relationship of stock returns and inflation. The result proves that real stock return and inflation in Canada has an inverse relation. In 1990, Baillie and Degennaro introduced an alternative approach and by using the GARCH in mean (GARCH-M) examined the relationship between mean returns on a stock portfolio and its conditional variance. The study found that mean returns and its own variance has a weak relationship between them. The study also guided the investors that an alternative risk measures should be preferred in comparison to the variance of the portfolio returns.

In 1991, Kwan used two index model on random basis for banking sector. The selected banks were controlled for the time-varying interest rate sensitivity depending on the bank profile base on maturity. In 1991, Zimmer and McCauley conducted a study to determine the cost of equity of six countries by taking 34 International banks for the period of 1984-1990. The rate of return was considered as a proxy for calculating the cost of equity. The results were surprisingly shocking as there were significant difference in the equity cost for banking sector across the countries. The results also depicted that the banks having high cost of capital faced many difficulties while competing in low margin business. Choi et al., (1992) calculated bank equity returns of 48 US large commercial banks over a period of 1975 to 1987 using return -generating model for calculating the interest rate, exchange rate and market risks. Their research results recommended that foreign exchange risk was significantly negatively correlated with stock returns prior to 1979, however after that time, the rapport turned positive. This was possibly due to overall banking institutions fall from currencies net positive position to net negative positions in the 1980s. The interest rate risk and market risks also obstructed the banks stocks, thus endorsing the results of previous studies. In another study conducted by Westrnore 86 Brick (1994) during the periods of 1986 to 1991 on the US financial institutions, concluded that exchange rate had significant effect on bank portfolios. In 1994, McCue and Kling through their study found that that the prices, nominal rates and investment decisions did influence the returns of real estate. They also determined that economy of the state contributed about 60%

disparities in Real Estate returns. In 1995, Madura and Zarruk (1995) conducted the study to find the relationship between the sensitivity of banks stock returns over the interest rate. The study comprised of 29 banks selected from Canada, Japan, Germany and US over the period from 1988 to 1993. The study found that the interest rate has variations among all countries and that was due to the reason that different bank regulations and managerial customs varies in these countries.

In 1996, Fama and French conducted the study and came up with an argument that beta is not only the factor in explaining the changes in expected return, there are number of other variables including different ratios like price earnings, cash flows, etc. also help in explaining the expected return. The study also predicted that the capital asset pricing model may fail in empirical terms due to poor proxies selected for market portfolio. Hence, the selection of the proxies for market and expected return can alter the results in any direction. In 1997, Fama and French conducted the study and argued that equity cost estimate's based on capital asset pricing model were vague at an alarmingly position. The work also stated that in case of capital asset pricing model the standard errors are expected at the rate of three percent per year. Whereas, the individual firms and projects are even more rough and vague in terms of cost of equity. The study concluded that the main reason for imprecise cost of equity is due to uncertainty is due to risk factors imprecision either in premium risks or in loadings of industries.

Fama and French in 2004 confirmed that the market beta and expected return has unrelated variations among them. Fama and French (2006) suggested that capital asset pricing model can explain the value premium for specific period but in the later period growth stock had larger market beta than value stocks which contradicts with capital asset pricing model. Agusman et al., (2008) studied 26 Asian banks in ten Asian countries over time span of 1998 to 2003. Their research established that total return on-asset and loan-loss-reserve to gross loan ratio is positively and significantly correlated with total risk. Nevertheless, these variables have significant correlation with non - systematic risk. Their research also clinched that Asian countries financial institutions have more unsystematic risk rather than systematic risk and accounting based financial ratios primarily reflect the capital market risk. Nawazish in 2008, evaluated the performance of Karachi Stock Exchange by using three factor model of Fama and French. The research was conducted on a bull market and may not show similar results in bearish market.

In 2009 Mouselli suggests that in contrast of risk-based explanations that attribute value premium to the higher risk of value stocks compared to growth stocks, value stocks have higher returns

irrespective of their market beta. Hassan and Javed (2011) studied more than 250 stocks listed on KSE to examine the relationship among size and value premium and equity returns in Pakistani equity market for the period of June 1998 to June 2007. Average returns of size sorted portfolios indicate small portfolios are high risk and high return portfolios but average of SMB factor reports opposite result. The explanatory power of model is 63 to 82% whereas that of capital asset pricing model is 24 to 66%.

## Research Methodology

This study aims to determine the market risk of the banking sector operating in Pakistan over a period of 10 years i.e. 2006-2017 in relation to accounting variables. For measuring the market risk (defined as risk of losses due to market price movements) which includes; interest rate risk, market risk, and exchange rate risk of the banking sector, the estimates of cost of equity for 20 banks have been taken. The banks have been divided into two categories viz. public sector banks and private sector banks. The division has been made on the basis of the financial performance of the banks during recession period. The cost of the equity of the selected banks for ten-year period has been examined by using capital asset pricing model. The State Bank of Pakistan (SBP) is retrieved for data on long term interest rates and exchange rate indices. Further, the web sites of relevant banks were retrieved and personnel visits was made to get audited annual reports for information on accounting variables contained in the financial statements.

The following are the list of criterions that was employed to select banks from these sectors. Selected banks are public and private registered with State Bank of Pakistan. For selected banks, annual data was used. The selected banks must have the financial data for the period 2006-2017. Banks having negative equity for the period were ignored, due to the reason the study is conducted to study the behavior of banks towards financial crunch. Whereas, in case of negative equity bank/financial institution is already at the verge of financial crisis as the amount of outstanding loan is more that total assets. Similar sequence of selection was implemented for Private sector banks on the basis of B/M ratio (Book to Market ratio, is obtained on comparing the book value of the firm).

## Econometric Model

The capital asset pricing model is used to describe the relation between the return of an asset with the market as whole and to determine appropriate expected rate of return of the asset theoretically. The model takes into account the asset's sensitivity to market or systematic risk, represented by the quantity beta (β), as well as the

expected return of the market and the expected return of a risk-free asset. The equation for capital asset pricing model is given below; the equation defines the relationship between risk and expected return. The main theme of this equation is to compensate the investor in relation to time and money.

**Ri = Rf + βi (Rm - Rf) (I) Variables**

The dependent variable used is the excess return of the portfolio represented by Rf. whereas, the Independent variables used in study is the market risk premium. Market risk premium is measured as difference between the returns of market portfolio and risk-free rate.

## Conclusion/Results

Capital Asset pricing is one of the models used by financial economists during the past half century as a best model that can be used for identifying rate of return or price mechanism in different markets having different characteristics. During that time many models for asset pricing were developed, some of them have some impact in financial studies while other leave without having any kind of impression. Some area of the world capital asset pricing model performed quite extraordinary while in other parts F and F performs as a best way to determine asset price. Some researchers promote the single factor beta as an important and reliable factor for determining risk factor while other thinks in contrast to this.

This study utilizes capital asset pricing model to evaluate Pakistani banking sector, on the basis of market beta over the period 2006-2017 and analyzing the main reasons for changes in cost of equity in the banking sector. The period considered for this study is from the time 2006 onward in order to track the improvement of the whole financial system while the regulations are updating.

The results using capital asset pricing model show that Pakistani banks are more exposed to market risk, but the exposure has been decreasing over the time period even though $\beta$ increased significantly after Global Financial Crisis. Whereas, the sensitivity to risk premiums, risk-free rate represents about one third of the cost of equity but its influence keeps decreasing; on the other hand, risk premiums, especially market risk premium represent increasingly percentage of the cost of equity.

Public and private sector banks can be combined uniquely in terms of their trends based of equity cost and capital asset pricing model management, that has been increased based on these three factors. Nevertheless, this cost has increased for all banks in 2008 session. This rise has eventually based by inflation in the rate free of risk and beta capital asset pricing model. Financial crises have caused

this inflation in the equity cost for its peak in 2008 that has made bank investment quite risky. A higher equity cost results in high financial crises. This has strengthened further the study reported for some international banks including the gain in equity cost due to financial crises in betas of banks.

Existing study can be stretched in approximately certain methods. The old private sector banks reporting earlier than the financial crises has shown a ground evidence that there is a clear line of difference between the equity costs of all public and private banks. However, results have shown that resultant bank specific premium and Beta are lesser as compared to public sector and some new private banks. Going further, the public banks have gone through severe loss in their equity costs in 2008 but the private banks still remained at an up level in the same session. The structure of banks can effectively be helpful in exploring this equity cost further.

## Recommendations

The study has determined that the presence of size and value of the premium obtained on yearly basis can be replaced with daily, weekly or monthly data. It is also suggested that by increasing the sample size by using the same data and by applying the capital asset pricing model can help in sorting the portfolios and strength of the value of the premium. The results can also be obtained for other time period.

In order to create a robustness for the constant and improved decisions for investment asset pricing is one of major theme in creating the model. However, many issues are faced while analyzing human performance. The number of issues are encountered by the financial economists while assessing the model investor's psychology and the output of that particular time might not be the actual figure of the total investment made in that period of time. In order to track the changes at any point of in time and to comment about the future is very doubtful and complex process, while studying the human mind and its thinking. Therefore, the deviation between practical and theoretical models is due to of these uncertain futures and environmental uncertainty.

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