

Equity Price Risk and Return: Evidence from the Karachi Stock Exchange

Talha-Bin-Ali Khan*
Ali Khizar Aslam

Abstract

This paper examines the tradeoff between equity price risk and returns obtained through various approaches. Capital asset pricing model (CAPM) and arbitrage pricing model (APT) are considered to be the fundamental building blocks of the portfolio theory, while these models only provide some intuition to risk but they do not account for the probability of adverse moves in the risk factors. Empirically, we have evidence that beta values tend to be insignificant in terms of a multifactor of BIRR model using APT approach. VAR values seem to have fitted in the BIRR model very well and have improved the stability in terms of explaining the returns acquired through APT approach. Therefore, we have also affixed the returns obtained through arbitrage pricing model with the value at risk (VAR) values such as to measure the downside risk. The theory that is proposed is distinctive and its empirical application has been presented in the paper.

Keywords: Beta (risk), market risk premium, risk factors, capital asset pricing model, arbitrage pricing model, value at risk model.

1. Introduction

1.1 Background

Risk refers to a chance that some unfavorable event may occur. Risk occurs only when we cannot be certain about the outcome of a particular activity or event, so we are not sure what will occur in the future. In terms of equity price risk, we can define risk as the chance of receiving an actual return other than expected, which simply means there is variability in the returns or outcomes from the investment.

Equities, or common stocks, represent the ownership of shares in a corporation. Due to the uncertainty in their cash flows and discount rate, the equities are much more difficult to value

* Mr. Talha-Bin Ali Khan is an MS student at Shaheed Zulfikar Ali Bhutto Institute of Science and Technology (SZABIST), Karachi, talhaali71@yahoo.com

Mr. Ali Khizar Aslam is working as an adjunct faculty at Shaheed Zulfikar Ali Bhutto Institute of Science and Technology (SZABIST), Karachi.

than fixed income securities. One must take into account that the tools used for analyzing fixed income securities are not applicable when it comes to equity valuations (Schweser, 2004).

1.2 Economy of Pakistan: A Brief Overview

Pakistan's recent economic performance has been impressive, with most indicators showing significant improvement and, more importantly, elements of sustainability. The gestures shown by the international community after 9/11 have helped Pakistan overcome the problems created in the past by successive governments.

The new government is facing serious dilemmas like shortage of wheat and increase in the price of basic commodities. High oil prices yet have to filter through to the domestic economy and are contributing heavily to a widening fiscal deficit and inflationary pressures. The trade gap has also increased over the first six months of the fiscal year and pushed the balance of payments into negative territory, highlighting the dependence on foreign investment flows. Short-term pressure on Pakistan's currency may require State Bank of Pakistan's intervention or stronger foreign inflows over the next six months to neutralize the impact.

1.3 Equity Market in Pakistan

There are three stock exchanges in Pakistan, the Karachi Stock Exchange (KSE), Lahore Stock Exchange (LSE), and Islamabad Stock Exchange (ISE). While the smaller exchanges are just a replication of the KSE, a number of LSE and ISE companies are not listed on the KSE. Therefore, the main focus of stock market is the KSE. The KSE has shown substantial growth during the last five years, though witnessing an increasing volatility in recent periods. The KSE 100 Index is up by 866% since 2000, with 40.0% up over 2007, significantly outperforming other major regional indices. The KSE 100 Index remains sorely undervalued trading at a mere 11.4x FY08E PER or at an estimated 25.0% discount to the region. The strength was visible in the substantial increase of the average daily traded volume and the capitalization of the market. The index started the year at 10,020 basis points, broke the barriers by breaching the highest level of 14,908, and closed at 14,077 basis points. However, the market faced three bearish trends and faced a loss of 14% each time, but the market recovered drastically, thus highlighting its firmness (Ali, 2007). The sharp rise in the market was attributable to strong corporate earnings, and an overall optimistic economic environment.

1.4 Literature Review

The purpose of this paper is to contribute to the literature on emerging stock markets. The approach taken in this paper compares international single-factor model, capital asset pricing model (CAPM) with a multi-factor model, arbitrage pricing theory (APT) that encompasses conditional risk factors. Even today, CAPM has been extensively tested, both domestically and internationally, and the general consensus is that the CAPM shows no statistically

meaningful relationship between systematic risk (beta) and returns (Fama and French, 1996). Moreover, there is more evidence from the New York Stock Exchange (NYSE) that there is no relationship between systematic risk (beta) and returns proved the same evidence that there is no relationship between systematic risk (beta) and returns from some of the smaller stock markets (Jong D et al., 1992). Garrett I. (1998) also suggests that beta risk tends to be insignificant in terms of a multi-factor model, but he did not provide any remedy apart from the risk factors that had already been proved empirically by the APT model.

On the contrary, many researchers found significant relationship between beta and market returns. Hodoshima, Garza-Gomez and Kunimura (2000) provide a detailed analysis of the Japanese stock market and find a significant conditional relationship between beta and returns. They also find that the model fits better in down markets than in up markets. Hsieh, Jerris and Kross (1999) found authenticity in the application of beta risk and proposing that beta risk can be legitimately used as a surrogate for price change variance. Their result showed that shift in risk is smaller for large firms but is greater for small firms. Isakov (1999) studied the conditional relationship between realized returns and beta in the Swiss stock market and finds support for a conditional relationship.

Similarly several attempts have been made to empirically investigate, the relationship between risk and return on individual stocks such as samples from the KSE, the main equity market of Pakistan.

Attiya Y. Javid and Eatnaz Ahmad (2008) empirically found the capital asset pricing model to be statistically insignificant for the KSE. The critical condition of CAPM, that there is a positive trade-off between risk and return, is rejected, while the residual risk was found to be useful in pricing risky assets. Previously Iqbal and Haider (2005) had examined the validity of arbitrage pricing theory with evidence from the KSE. The explanatory factor analysis approach was used to derive the two factors governing stock returns, which were anticipated and unanticipated inflation and dividend yields.

2. Sample Description and Methodology

2.1 Data

The data for this present study consists of adjusted daily closing prices of the KSE with the sample taken from the listed banking sector equities. Our sample consisted of 25 listed equities on KSE, out of which three banks were eliminated because they did not comply with the minimum one year daily adjusted data requirement. Our final sample consisted of 22 banks, of which the daily adjusted prices were used in the CAPM and APT models' application. The data is available with the Bloomberg Financial Services and covers the period from January 1, 2004 to March 14, 2008 for a total of 1090 daily observations with no missing entries. For comparison purposes, results are also presented as models using weekly data and monthly data. Moreover, data has also been collected from international

financial statements and the State Bank of Pakistan's publications for estimation of required rate of return using APT model

2.2 Empirical Methods

The following methods were used to analyze the risk associated with the equities:

- Capital Asset Pricing Model (CAPM)
- Arbitrage Pricing Theory (APT)
- Value at Risk (VAR)

2.2.1 Capital Asset Pricing Model (CAPM)

Capital asset pricing model (CAPM) is an equilibrium model that relates the required return on equity to the risk-free rate and to its risk in comparison with the overall market. It is considered to be a single factor model as it uses beta as its sole measure of risk (Brigham & Gapenski, 1997).

The beta risk values and required rate of return were estimated through the following model:

$$E(R_i) = R_f + \{\beta_i * [E(R_m - R_f)]\} \quad (1)$$

Where:

R_i = the required return on stock i

R_f = risk-free rate of return on a six-month treasury bill

β_i = beta coefficient or index of non-diversifiable risk for asset i

R_m = the return on the market portfolio of assets

CAPM Model (1)

CAPM Model (1) is the equation for CAPM equilibrium pricing, and generally is called the security market line (SML). The figure highlights the following points:

- Required rates of return are shown on vertical axis, while risk as measured by beta is shown on the horizontal axis.
- Riskless securities have $\beta=0$; therefore, R_f appears as the vertical axis intercept. The slope of the SML reflects the degree of risk aversion in the economy: the greater the average investor's aversion to risk, the steeper the slope of the line.

Figure 2 (a)

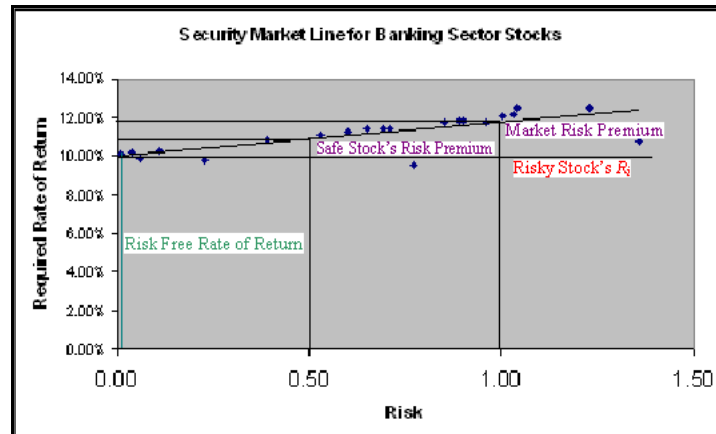


Figure 2 (a) explains the current scenario of the equities trading at the KSE. The 12 months T-bills (risk-free rate) are 10.075% as on March 13, 2008. Moreover, we have divided the equities into two categories which are safe stocks and risky stocks. Theoretically, a stock should yield enough return that the investors are ready to bear and must trade above the risk-free rate. The trend line is basically the regression line which shows the best linear function that explains the individual stock's return in terms of KSE100 index returns. There are four stocks in our sample that can be categorized as unattractive due to their low yield or high beta values, stocks like ATBL, BIPL and BOK are trading below the risk free rate of return and JSBL is having a high beta value (1.36) along with low expected return (10.80%) as compared to other volatile equities, therefore, we consider them as unattractive stocks. Equities like ACBL (10.16%) and BOP (10.16%) required returns are slightly higher than the risk-free rate with low beta values and stock MEBL has a very low beta value (0.01) and a higher expected return (10.10%); therefore they are considered to be attractive stocks for risk-averse investors.

Equities having a beta value of less than 1 are considered as safe stocks. In our sample, there are 12 equities which fall under the category of safe stocks with higher required returns. Following are the names of equities along with their expected returns (details available from Table.2a): BAH (11.42%), HMB (11.14%), KASB (10.84%), MYBL (11.26%), NIB (11.84%), PICB (11.75%), PRCBL (11.44%), SNBL (11.46%), SPCB (11.82%), ABL (10.26%), MEBL (10.10%) and UBL (11.79%). Surprisingly stock FABL has a beta value of exactly 1 which explains the characteristic of the stock that it moves up and down with the broad market averages and it will be as risky as the averages. Equities having a beta value of more than one are considered to be as risky assets that may yield a higher return or loss. Such stocks are considered to be as volatile as an average stock so a portfolio of such stocks will be more risky than an average stock like FABL. Following are the names of the stocks along with their required returns: BAFL (12.46%), CCBL (12.10%), MCB (12.51%) and NBP (12.50%). Table

2 (a) also illustrates that the market risk premium increases with the increase in beta value. For example stock ACBL has a beta value and market risk premium of 0.04 and 0.08%, where as MCB stock's beta value and required return is 1.23 and 12.51%. This scenario can be explained in a way that if one stock was twice as risky as another, its risk premium would be twice as high, and conversely, if its risks were only half as much, its risk premium would be half as large. (Brigham & Gapenski, 1997)

Figure.2 (b) explains the scenario of beta coefficient and risk premium as a product for individual stock. We will further elicit a regression model of the beta coefficients and risk premium obtained through CAPM to illustrate the authenticity of the model.

Figure.2 (c) reveals that the required returns on equities do not increase in the same pattern as the beta values increases. Theoretically, investors must be compensated for bearing the risk—the greater the riskiness of a stock (beta), the higher its required rate of return. Empirically, we have demonstrated that CAPM shows a weak positive relationship between market risk (beta) and required rate of returns. Out of the 22 selected samples, 5 samples which included ACBL, BIPL, ATBL, BOK and JSBL required rates of returns decreased as the beta values increased. Therefore, our first hypothesis is to test the validity of the beta values being the sole measure of market risk.

Table 2 (a): Results Obtained from CAPM (Single Factor Model)

Stock	Beta	R _m	RP _m *β	CAPM(R _i)	Stock	Beta	R _m	RP _m *β	CAPM(R _i)
ACBL	0.04	12.19%	0.08%	10.16%	NIB	0.9	12.04%	1.77%	11.84%
BAFL	1.04	12.37%	2.38%	12.46%	PICB	0.85	12.04%	1.67%	11.75%
BAHL	0.65	12.13%	1.34%	11.42%	PRCBL	0.69	12.04%	1.36%	11.44%
BOP	0.04	12.21%	0.09%	10.16%	SNBL	0.71	12.04%	1.40%	11.46%
CCBL	1.03	12.10%	2.09%	12.16%	SPCB	0.89	12.04%	1.75%	11.82%
FABL	1	12.10%	2.03%	12.10%	ABL	0.11	11.82%	0.19%	10.26%
HMB	0.53	12.10%	1.08%	11.14%	ATBL	0.23	8.90%	-0.27%	9.80%
KASB	0.39	12.04%	0.77%	10.84%	BIPL	0.06	5.60%	-0.27%	9.81%
MCB	1.23	12.04%	2.42%	12.51%	BOK	0.77	9.35%	-0.55%	9.52%
MYBL	0.6	12.04%	1.18%	11.26%	JSBL	1.36	10.61%	0.73%	10.80%
NBP	1.23	12.04%	2.42%	12.50%	MEBL	0.01	13.92%	0.04%	10.10%
Treasury Bill Rate:10.075%					UBL	0.96	11.86%	1.71%	11.79%

Figure 2 (b)

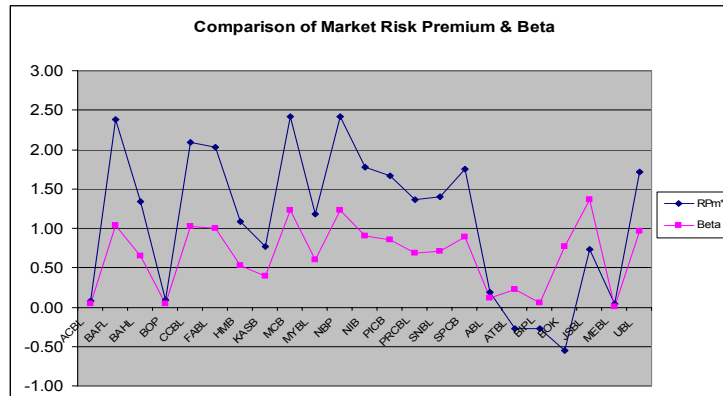
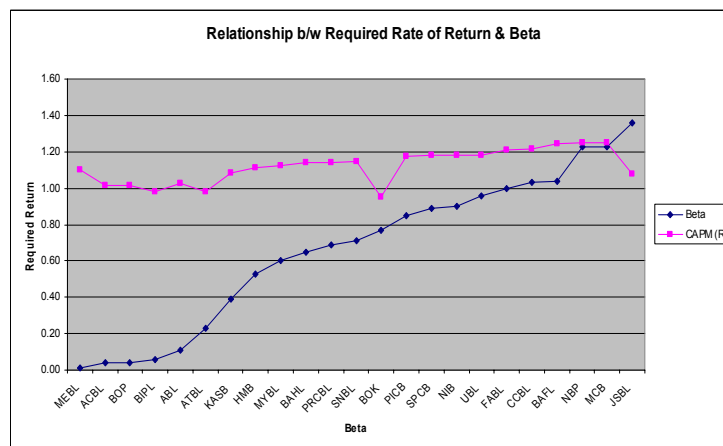


Figure 2 (c)



2.2.2 Arbitrage Pricing Theory (APT)

The arbitrage pricing theory (APT) uses asset's sensitivity to a variety of risk factors in order to determine the risk premium. We have used an empirical version of Burmeister, Edwin, Roll, and Ross's (1994) BIRR model in this research to estimate the required return on equity. The BIRR model estimates the cost of equity, calculating the value of each factor (historical) and using the regression analysis to determine the sensitivity of the asset to each factor (Schweser, 2004).

Therefore, our model comprises of four macroeconomic factors, as proposed in BIRR model

(1994):

$$E(R_i) = R_f + (\text{Risk Premium of IC})_1 + (\text{Risk Premium of INF})_2 + (\text{Risk Premium of THF})_3 + (\text{Risk Premium of MTF})_4 \quad (2)$$

APT Model (2)

Figure.2 (d) explains the relationship between expected returns and beta (risk) with expected rate of return shown on vertical axis, while risk as measured by beta is shown on the horizontal axis. The SML line is a benchmark, above which are those stocks which are mispriced, so we anticipate heavy buying in these equities in a way that their expected returns decrease. In fact, the investment strategy in general involves some risk. This act of buying when a stock is mispriced means 'arbitrage in expectations' because the investor is locking in a positive expected payoff, not a positive guaranteed payoff. Figure.2 (d) reveals that there are 11 equities that are above the SML line and are under-priced; while the remaining 12 equities are over-priced on the basis of their expected returns. While Figure.2 (e) shows that the required returns were supposedly to increase as the value of beta increases along the horizontal axis, surprisingly we were unable to identify any strong relationship, as we can witness that as the value of beta increases the required returns behave randomly, with few stocks such as CCBL and FABL having higher expected returns as compared to other stocks with higher value of beta. The notion that as the beta of the stocks increases the required returns also increase in a frail pattern but significant, as long as the beta value remains below 0.6, as soon as the beta value of any stock reaches 0.6, its required returns tends to behave randomly. Therefore, our third hypothesis checks the significance of beta values in terms of a multi-factor model.

Figure 2 (d)

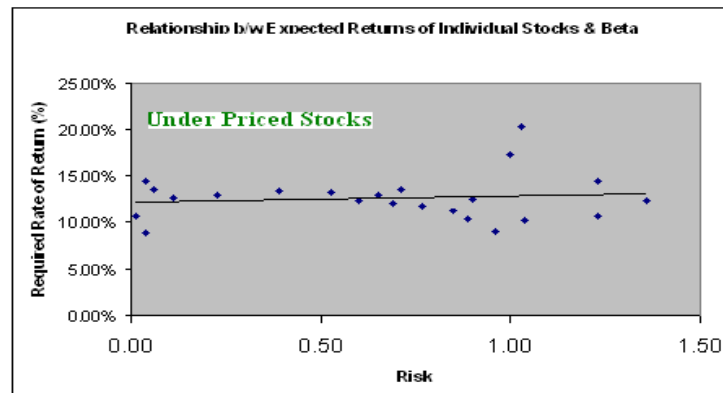
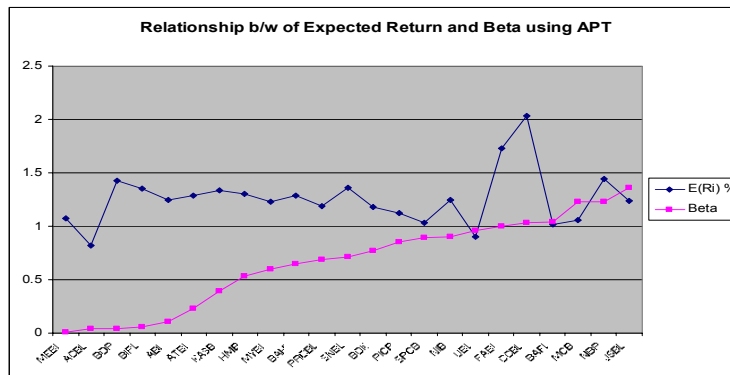


Figure 2 (e)



2.2.3 Value at Risk (VAR)

Value at Risk (VAR) is a modern technique for measuring market risk. Its explanatory power is more than the traditional risk measurement methods. Value at risk (VAR) model measures the worst expected loss under normal market conditions over a specific time interval at a given confidence level (Beder, 1996). With the help of this method, we are able to gauge the amount of loss an investor has to face on his investment over a specified horizon, VAR takes into account the risk across the whole portfolio, taking into account leverage and diversification and providing a risk measure with an associated probability (Benninga and Wiener, 1998). The method used for calculating the VAR value for all the equities in our sample is historical simulation.

The calculation of VAR requires the following steps:

- Computing the returns of every stock and KSE100 index: Daily changes in these rates are used to construct hypothetical values of the market factors used in the calculation of hypothetical profits and losses. For this purpose, we have calculated daily returns of our sample from the year 2004-2008.
- We subject the current portfolio to the changes in the market rates and prices and then we can calculate the VAR for 1, 5, 10, 20, 50, 100, 200 and 250 business days.
- A VAR value can be used for calculating the daily profits and losses that would occur if comparable daily changes in the market factor are experienced and the current portfolio is marked-to-market based.
- We have also calculated the standard deviation (SD) which is a simple summary measure of the distribution. VAR inherits all properties of the standard deviation. The disadvantage of the standard deviation is that it is symmetrical and cannot distinguish between large losses or gains.

VAR Model (3)

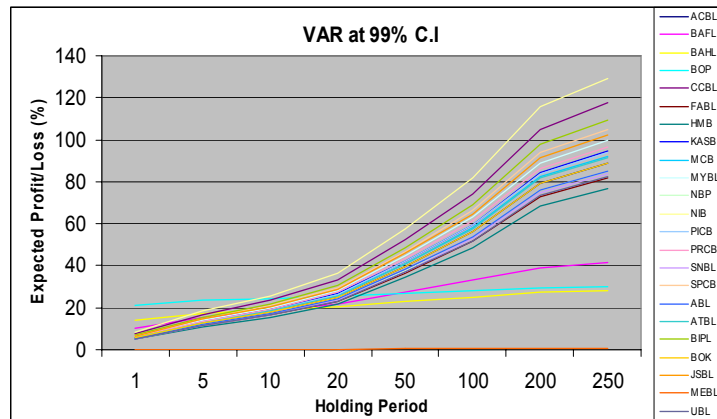
VAR model was basically used for analyzing the maximum losses which can occur during the trading on a given day for all the equities. Several inferences can be drawn from the Table.2.c which highlights the relationship between VAR and standard deviation of all the stocks. The higher the standard deviation of a given equity, the higher its VAR. The reason for calculating VAR is to provide the value of losses or profits in terms of rupees on average in a single day. The most significant finding was that the standard deviation (risk) and VAR value of KSE100 index is 1.45 for the former and 2.401 for the latter. Therefore, we were able to distinguish between a risky and a safe stock and the required rate of return on the stocks calculated through APT can be incorporated to select those stocks that are providing higher returns and are also categorized as safe stocks. An interesting finding is that almost all the stocks VAR values were higher than the KSE index VAR, with MEBL being the only safe stock with an ordinary return of 10.71% which is just 0.635% above the six months T-bill rate which makes it less attractive. It means that a risk averse investor will prefer investing in bonds or T-bills but not in an MEBL stock.

As the confidence level increases, the VAR value on a given stock increases. Varying the confidence level provides useful information about the return distribution and potential extreme losses. While comparing Figure 2 (f) and Figure 2 (g), that is the VAR at 99% with a 90% confidence interval, we were able to make inferences and explain why a 99% confidence level predicts a scenario with more details when compared to a VAR value at 90% confidence level. VAR at 90% shows that stock MEBL has its own pattern of behaving in the KSE, it can be used as a hedge stock as its correlation with KSE is just 3.7%. At 90% confidence interval, equities like NIB, CCBL and BAHL can be a good bargain for any investor who is a risk taker as their returns on a given a day can be higher than other equities in the banking sector. On the contrary, at 99% confidence interval, Figure 2 (f) elucidates a different picture as the holding period of the stocks increases from 1 to 250 days. The value of VAR of stocks CCBL and NIB increased more than an average stock, making NIB, CCBL and BIPL amongst the most riskiest stocks in the banking sector of Pakistan but a good bargain for any risk taker as their required returns are much higher than an average stock's return in the banking sector. Another significant finding was that stocks BAFL, BAHL and BOP losses did not increase in the same pattern as that of other stocks in the banking sector, thus they were categorized amongst the safest stocks in the banking sector with healthy returns. While all the other stocks maintained their stream of losses/profits as the holding period of the equity increased.

Table 2 (c): Results obtained from VAR Estimation

Description	Std. Dev.	BETA (β)	CORR	VAR	E(Ri) % (APT)
MEBL	0.02	0.01	0.39	0.037	10.71%
KSE	1.45	1.00	1.00	2.401	--
BAHL	1.89	0.65	0.50	3.110	12.96%
HMB	2.08	0.53	0.37	3.431	13.32%
FABL	2.22	1.00	0.66	3.654	17.29%
UBL	2.23	0.96	0.59	3.676	9.01%
SNBL	2.27	0.71	0.45	3.736	13.61%
NBP	2.31	1.23	0.78	3.801	10.58%
ABL	2.31	0.11	0.52	3.816	12.60%
BAFL	2.37	1.04	-0.02	3.909	10.22%
BOK	2.41	0.77	0.46	3.967	11.83%
ACBL	2.41	0.04	0.48	3.971	8.91%
BOP	2.41	0.04	0.72	3.972	14.35%
ATBL	2.48	0.23	0.37	4.089	12.99%
MCB	2.49	1.23	0.72	4.109	14.45%
PICB	2.54	0.85	0.49	4.191	11.21%
KASB	2.56	0.39	0.22	4.225	13.41%
PRCBL	2.62	0.69	0.38	4.323	11.96%
MYBL	2.7	0.60	0.33	4.455	12.37%
JSBL	2.78	1.36	0.54	4.586	12.41%
SPCB	2.85	0.89	0.45	4.688	10.32%
BIPL	2.96	0.06	0.46	4.880	13.53%
CCBL	3.19	1.03	0.47	5.250	20.36%
NIB	3.5	0.90	0.37	5.770	12.53%

Figure 2(f)



3. Development of Hypotheses

Some previous empirical researches found that CAPM shows no statistically meaningful relationship between systematic risks (beta) and returns (Fama and French, 1996). Other researcher found significant evidence that conditional CAPM shows statistically meaningful relationship between systematic risks (beta) and returns (Fletcher, 2000). Therefore, our first hypothesis is to test the viability of required returns and beta using a conditional CAPM approach (single-factor model).

More formally, the first proposition is as follows:

- H1₀:** Equity beta risk has no significant relationship with required returns, while keeping other factors constant
- H1_A:** Equity beta risk has significant relationship with required returns, while keeping other factors constant

Let us suppose that the beta risk is found to have a significant relationship with required returns, but these returns are obtained by a single factor model (CAPM), which uses beta as its sole measure of risk. Researchers believe that the asset-pricing model must not rely only on the market portfolio, but also on other risk factors such as the BIRR model or with approaches related to APT model. Therefore, our next hypotheses assess the credibility of beta values in terms of BIRR model using APT approach.

Therefore, our second proposition is as follows:

- H2.a₀:** Equity beta risk has no significant relationship with required returns obtained through APT model
- H2.a_A:** Equity beta risk has a significant relationship with required returns obtained

thorough APT model

In Section 2.2.2, we have already discussed the notion that as soon as the beta value of stocks increases, the required returns also increase in a weak pattern, as shown in the Figure 2(d). It shows that as long as the beta value remains below 0.6, required returns increase in a frail pattern. But as soon as the beta value of any stock reaches 0.6, its required returns tend to behave randomly. Our third hypothesis checks the significance of high and low beta values in terms of a multi-factor model.

Therefore, our third proposition is as follows:

H2.b₀: Low beta values of equities show insignificant relationship when compared to high beta values in a multi-factor model

H2.b_A: Low beta values of equities tend to show a significant relationship when compared with high beta values in a multifactor model

Bansal and Viswanathan (1993) find APT model to be more stable than a conditional CAPM. Therefore, our fourth proposition in the paper suggests that arbitrage portfolio will find risk factors other than β to be significant.

Therefore, our fourth proposition is as follows:

H2.c₀: Risk factors proposed in the BIRR model have insignificant relationship with required returns obtained through APT model

H2.c_A: Risk factors proposed in the BIRR model have a significant relationship with required returns obtained through APT model

We have already discussed the theory related to our fifth proposition that recent researches have evidence that beta values and sensitivity measures do not comprise of all the relevant risk factors (Linsmeier and Pearson, 1996). As standard deviation captures all the effects of risks associated with an individual equity, VAR inherits all the properties to evaluate market risk and standard deviation.

Our fifth proposition is as follows:

H3.a₀: Equity VAR value has insignificant relationship with standard deviation (risk)

H3.a_A: Equity VAR value has significant relationship with standard deviation (risk)

Finally, in terms of the role of the market portfolio, if VAR values have significant relationship with market risk, a rather obvious proposition is to gauge the credibility of VAR values in terms of BIRR model using APT approach.

Therefore, our sixth proposition is as follows:

H3.b₀: Equity VAR values have insignificant relationship with required returns obtained through APT model

H3.b_A: Equity VAR values have a significant relationship with required returns obtained through APT model

4. Results

Results of hypothesis 1 reveal that the beta values and market risk have significant relationship with returns estimated through conditional CAPM. Therefore, the returns obtained through conditional CAPM associated with a security is determined both by the beta risk and market risk premium. Also beta values against the returns obtained through CAPM have a correlation of 83.9% and R^2 of 70.4%, which is not quite high taking into account the fact that it is a simple regression in which we have kept other risk factors constant. Although the t-values and f-statistics are highly significant, thus reinforcing the claim made by many researchers like Hodoshima, Garza-Gomez and Kunimura (2000) who found significant conditional relationship between beta values and returns, we cannot draw any conclusion, as CAPM is a single factor model, which excludes other risk factors and has certain limitations.

Results of hypothesis 2 signifies the claim made by our empirical evidence, as discussed in Section 2.2.2, that the beta values lose their authenticity when applied in a multi-factor model, thus reinforcing the claim made by Garrett (1998). Similarly, we found a weak but insignificant relationship between low and high beta values. Results of Hypothesis 2.b show that the t-statistics are insignificant but the explanatory power of the beta values decreased from 38.03% to 9.17%. Hence, the claim discussed earlier in the context proves to be accurate that beta values developed a frail pattern, but as the beta values increased above 0.5, they behaved randomly.

Results of hypothesis 2.c reveal that risk factors proposed in the BIRR model have a significant relationship with required returns obtained through APT model with high t-statistics and f-statistics values. The correlation amongst the returns and risk factors is 85.76% but R^2 was just 76.45% and the adjusted R^2 was 71.23%, which can be interpreted in a sense that the model still needs some improvements, as the unexplained factors can play an important role in improving the authenticity of the model. Other interesting finding is that the returns generated through APT are inversely related with inflation and time horizon factor and positively related with market timing factor and investor confidence.

Results of hypothesis 3.a reveal the fact that VAR values do inherit all the properties of evaluating market risk and standard deviation as t-statistics are quite high (951.08) along with the correlation of 95.64%.

Finally, in terms of the role of the market portfolio, a rather obvious solution is the one to test

the VAR values in APT model. Results of hypothesis 3.b are distinctive as we affix the returns obtained through arbitrage pricing model with the VAR model such as to incorporate the market risk. Model 3.b is an enhanced version of the BIRR model obtained through the APT model. The t-statistics and f-statistics improved considerably, when compared to the original BIRR model. The correlation between returns and risk factors improved from 85.76% up to 98.01%, along with the adjusted R^2 from 71.23% up to 98.01%. The model's authenticity simply shows that it can be a more stable model when compared to the traditional BIRR model used in the APT approach. Finally, taken together, these results suggest that for each model, the BIRR model incorporating VAR values has a much better fit than the traditional BIRR model obtained through the APT approach.

5. Conclusion

In this research, we have limited ourselves to the risk and return relationship; perhaps an idealistic approach takes into account the fundamentals of every bank. The dynamics of operations vary from bank to bank. The strategies adopted by banks change with the conditions they are operating under. For example, Habib Bank, NBP, UBL and MCB together have 62% of all branches in Pakistan, which creates a monopolistic competition in terms of penetration in the market and cheap deposits in the form of current and saving accounts. Therefore, a private bank like SPCB and JSBL will target the markets with different strategies, for example: niche marketing, efficient sales and services. Banks like MEBL and BIPL targeting differ from the conventional banking practices with the implementation of Islamic Banking practices and values. Therefore, the inclusion of liquidity ratios, asset quality ratios, earning ratios and market capitalization can lead to a more decisive decision, when an investor is willing to invest in the KSE for long-term prospects. Prices do not reflect all the relevant risks for analyzing the equities. Our results indicate that stock BAFL is having a negative correlation with KSE returns. Therefore, it can actually be used to hedge against general economic risk, doing well when the economy performs poorly.

The significance of beta risk has been analyzed, which is said to incorporate all the relevant risks associated with equities. The empirical evidence indicates that beta values are significant enough to explain the return on equities, keeping all other risk factors constant. On the contrary, the beta value does not seem to fit the data well in terms of a multifactor BIRR model using APT approach, something that is evident in a previous research by Ian Garrett (1998). Finally, in terms of the role of market portfolio, a rather obvious solution is to use an asset-pricing model that does not rely only on the market portfolio like CAPM does; but to use an APT model that can encompass other risk factors as proposed in the BIRR model. VAR values seem to have fitted in the BIRR model very well and have improved the stability in terms of explaining the returns acquired through APT approach. An interesting area of future research is to find the returns on equities that incorporate the VAR values in the BIRR model using APT approach, as it has been empirically proved in this research as a more stable model than a traditional BIRR model.

References

1. Ali, S. (2007) *Pakistan Equity Strategy*. Karachi: Citigroup Global Markets Inc.
2. Attiya, Y. J. and Ahmad, E. (2008) 'The Conditional Capital Asset Pricing Model: Evidence from Karachi Stock Exchange', *PIDE Working Papers*, Vol. 48.
3. Bansal, R. and Viswanathan, S. (1993) 'Systematic risk and empirical research', *Journal of Business Finance and Accounting*, Vol. 48, pp. 1231-62.
4. Beder, T. (1996) 'VAR: Seductive but dangerous', *Financial Analyst Journal*, September-October, pp. 12- 24.
5. Benninga, S. and Wiener, Z. (1998) 'Value-at-Risk (VaR)', *Mathematician Education and Research*, Vol. 7 No. 4, pp.1-7.
6. Brigham, E.F. and Gapenski L.C., (1997) *Financial Management: Theory and Practice*. 4th edition. Florida: The Dryden Press.
7. Fama, E. & French, K. (1996) 'Multifactor explanations of asset pricing anomalies', *Journal of Finance*, Vol. 51, pp. 55-84.
8. Fletcher, J. (2000) 'On the conditional relationship between beta and return in international stock returns', *International Review of Financial Analysis*, Vol. 9, pp. 235-245.
9. Garrett, I. (1998) 'Discussion of systematic risk and empirical research', *Journal of Business Finance and Accounting*, Vol. 25(9) & (10), pp. 1357-62.
10. Hodoshima J., Garza-Gomez X., and Kunimura, M. (2000) 'Cross-sectional regression analysis of return and beta in Japan', *Journal of Economics and Business*, Vol. 52, pp. 515-533.
11. Hsieh S.J., Jerris, S.I. and Kross W. (1999), 'Quarterly earnings announcements and market risk adjustments', *Journal of Business Finance and Accounting*, Vol. 26(3) & (4), pp. 313-336.
12. Javed, I. and Aziz, H. (2005) 'Arbitrage pricing theory: Evidence from an emerging stock market', *Lahore Journal of Economics*, Vol. 1, pp. 123-140.
13. Isakov, D. (1999) 'Is beta still alive? Conclusive evidence from the Swiss stock market', *The European Journal of Finance*, Vol. 5, pp. 202-212.
14. Jong D.F., Kemna A., and Klock T. (1992) 'A contribution to event study methodology with an application to the Dutch Stock Market', *Journal of Banking and Finance*, Vol. 16, pp. 11-36.

15. Linsmeier, T.J. and Pearson, N.D. (1996) *Risk Measurement: An Introduction to Value at Risk*. University of Illinois at Urbana-Champaign.
16. Roll, S. & Ross, S. (1994) 'On the cross-sectional relation between expected returns and betas', *Journal of Finance*, Vol. 49, pp. 101-122.
17. Schweser Study Program (2004) *Equity Investments*. Kaplan Professional Company.