# Experience of Equity-based Islamic Shares in Pakistan

Mohammed Nishat

## 1. INTRODUCTION

*Modarabah* and leasing stocks, which are listed on the Karachi Stock Exchange (KSE) since 1985, operate on the Islamic concept of financing under a well defined contractual framework supervised by the State Bank of Pakistan (SBP). The Islamic stocks had mushroom growth during the first sub-period of reforms[1] and were exempted from various taxes during the initial 3 years of their operation. For investors these shares were a very attractive opportunity to build a quality portfolio and earn high returns. Due to bureaucratic and non-professional approach of banks in Pakistan these firms became popular alternatives lenders to medium and small sized business borrowers. The turn around time and efficient handling of the proposals made them more attractive.

Practically all these Islamic firms in Pakistan are undertaking financing activities on a mark-up basis, rather than profit and loss sharing. Under the mark-up system the return is predetermined and their risks are minimised. These Islamic stocks are operated similar to other firms that do not work on Islamic principles. In the case of *Modarabah*, the predetermined rate of return and even the agreed ratio of profit shares when calculated, the market rate of interest with other characteristics of party in contract are also taken into consideration [Khan (1987, 1989); Saeed (1996)]. The flurry of interest in floating *Modarabahs* was in part explained by the higher return to investors, and that when the provisions permitting tax exemptions

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[1]After 1988 a series of regulatory changes were introduced which included the divestment of public sector firms to the general public, privatisation and denationalisation of financial institutions, and unrestricted access of foreign investors to the stock market. There were also amendments to prudential regulations and changes in tax policies to boost the inflow of capital into Pakistan. In general, due to these policies the KSE improved both in terms of its breadth and depth as Pakistan's stock market has been among the top six emerging markets during 1990s.

were generalised to other forms of business the interest in *Modarabah* could decline. The announcement of taxes[2] also constituted an adverse influence on the stock prices of the existing *Modarabahs*. In the beginning *Modarabahs* were widely deregulated, but later Corporate Law Authority (CLA) and State Bank of Pakistan (SBP) intervened. These stocks could not match with the interest of certificate holders after SBP and CLA intervention and were termed as over-regulated. A slide in performance of *Modarabahs* was possibly due to increasingly tight regulations that tended to stifle the entrepreneurial spirit, and hence the prospects for unusually high profit. For example, withdrawal of tax exemption status from *Modarabahs* during the later period of reform directly affected the likely distribution to the certificate holders. As a result the impact on prices of *Modarabahs* was adverse [CLA (1992)]. In addition, these stocks had liquidity problems and their performances suffered badly due to irregular flows of funds. I examine these stocks to see if these factors which distinguish them from non-Islamic stocks have different impacts in terms of their performance, risk and return relationship or their volatility in returns during the overall (July 1988 to June 1991) and the two sub-periods of reforms (July 1988 to June 1991 and July 1991 to December 1994).

This paper is organised as follows. The second section compares the Islamic and non-Islamic stocks and highlights the provisions of risk premia in Islamic stocks. The hypotheses to be tested are also described in this section. The econometric models and estimations methods for risk and return relationship and its behaviour are discussed in section three. Empirical results and discussions are presented in section four. The final section summarises the main conclusions.

## 2. RISK PREMIA IN ISLAMIC STOCKS

The Islamic equity-based shares *Modarabahs* and leasing offer a range of new financial instruments and arrangements that lie outside traditional banking. These Islamic stocks are different than non-Islamic stocks in the sense that for operation of Islamic business the exchange of monetary value for monetary value is prohibited and a transaction involving capital must be linked to a real transaction.[3] Moreover, in Islamic operations all capital suppliers must share the risks faced by the capital user [Kuran (1995)].[4] In the case of loss to borrowers, the lenders must participate

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[2]New *Modarabahs* were exempted for a three-year tax holiday. Prior to 1992, entire income was exempted from corporate tax if 90 percent of profits were distributed among *Modarabah* certificate holders. Afterward a profit tax of 25 percent was levied which reduced to 12.5 percent during later period. However, the corporate tax rate for non-Islamic stocks during the same period varied between 39 percent to 44 percent.

[3]The focus of Islam economics is neither on ways to keep interest rates within bounds nor keeping financial markets competitive. Rather it is on the eradication of interest.

[4]Literature on Islamic banking does not specify how a depositor and his bank or borrowers are to apportion risk. It states only that each party to a financial contract must bear some share of the risk.

in that loss through a reduction of principal [Cummingham (1990); Zineldin (1990); Rahman (1964); Rodinson (1973)]. However, there is still a provision that it is better if the lender gives the borrower a chance to make up the loss.

The other important issue which distinguishes the Islamic financing system from non-Islamic system against interest rules out the existence of debt, and all capital resources (short-term and long-term) in Islamic financing are equity-based. It has been argued that if the borrower is risk averse, the profit loss sharing is Pareto-superior to fixed interest rate scheme and full equity is also superior to any combination of debt and equity, since equity spreads risk more optimality than debt [Khan (1996)]. This has a major implication on the financing of investment [Cornelisse and Stefelaar (1995)]. The debt and equity structure has different governance for ownership and control. In the non-Islamic system the debt and equity are alternative corporate governances, rather than merely financial instruments with different tax implications. In equity based financing the only provision is retained earning or equity (reduces the debt-equity ratio) and the shareholders retain control of the investment decisions. Whereas, the debt holders have no direct control in the firms except for various types of indenture provisions in the bond that may constraint the decision-making of shareholders.

It can be argued that under Islamic system the fluctuations in equity market value correspond to fluctuations in the expected rate of entrepreneurial profits [Siddiqi (1973)]. Fluctuations in share prices reflect genuine changes in the rate of profits expected on various shares. Moreover, apart from natural existence, speculative activity also depends on the presence some regulatory measures for trading practices.[5] Furthermore, Islamic shares also assume that perspective financing poses much more stringent information requirements than are commonly required under a debt-based arrangement. Presley and Session (1994) demonstrate that when information is symmetric the optimal control with either interest based or *Modarabah* financing yields an identical level of investment, syndicate return and project outcome. The excessive use of credit and higher leverage is also a potential source of speculative trading[6] and is not allowed in the case of Islamic shares [Metwally (1984)]. In this case the volatility in returns may not be caused by leverage, as established in the last chapter. Rather the return volatility may be induced/stabilised by liberalisation policies, which are more regulatory and tighter tax policies towards Islamic shares, particularly during the later period of reforms.

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[5]*Badla* tradings though not exactly a regulated margin requirement, works as a proxy for margin requirements with the existing set up at the KSE.

[6]However, market crashes are not entirely caused by speculative trading deterioration in economic conditions. Purely psychological factors with no rational basis could prompt such crashes. In the Islamic system, with a view to eliminating the wild swings in stock values under speculative surges, the stock market will have to be protective through market stabilisation funds [Qureshi (1981)].

Given the conditions required for Islamic shares, we expect that these shares are less risky, investors seek low risk premium for these stocks and the returns of these stocks are less volatile than the non-Islamic stocks.[7]

The other factor which differentiates the Islamic stocks from non-Islamic stocks in the KSE is that these stocks offered better terms to fit to the needs of the shareholders like exemptions in taxes and high returns and more control. Leasing firms are also different than *Modarabah* due to their capacity to raise funds from investors in terms of certificate of investment. Some of these firms also have credit lines for financing and have institutional investment too. Moreover, *Modarabah* firms also ventured into the leasing business, as these firms have flexibility in their operations and then switched the forms of their business from manufacturing to financial activities. Leasing businesses have been hit by a declining demand for leasing financing activities, and a gradual weakening of the position on the front of resource mobilisation. Due to general law and order situations and poor economic conditions leasing businesses have faced difficulties in rental recoveries too, which impacted their liquidity particularly without strong cash streams. These factors have a negative effect on performance of these firms, particularly during the later period of reforms.

For investors, the equity-based shares in the KSE are just one of the alternatives in their pool of investment for efficient diversification of their risks, which provided tax exemptions and less regulations during initial years by the authorities, which led to lots of inefficiency and high returns. The Islamic concept allows several degrees of risk and returns trade off, and motivates the contracting parties to adopt any suitable risk reduction techniques for avoiding a greater degree of risk. For example, under *Modarabah* contracts an investor may lie down some conditions to be complied with by the *mudarib* with a view to reducing risk (such as not to take the funds to risky places and not to deal with debts or sell on credits, etc.). Should the agent violate these conditions, he shall be solely liable for the risk, which would not become the responsibility of the investors. These factors may reduce the risk associated with business and ensure the positive outcome of their investment ventures.

On the basis of the above described differences in Islamic and non-Islamic stocks in terms of their built-in monitoring, provision for minimisation of risk through contractual obligations and with no provision for debt financing, I expect lower magnitude of risk premia and less volatility in Islamic stock returns than the non-Islamic stocks. I also expect that due to regulatory measures and tax impositions, the second sub-period of reform induced adverse effects on their

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[7]In Pakistan, additional fiscal incentives are also provided for Islamic shares, which include exemptions on corporate income and dividend, and concessions on withholding tax.

performances, risk and return relationship and their volatility in returns during the two sub periods; July 1988 to June 1991 and July 1991 to December 1994.[8] I test the alternative hypotheses that:

- The regulatory measures and tax impositions during the second sub-period of reforms induced adverse effects on the performances of Islamic stocks.
- The risk premia of Islamic stocks are lower than for non-Islamic stocks.
- The risk-return relation is efficient for Islamic stocks than for non-Islamic stocks.
- The Islamic stocks returns are less volatile than for non-Islamic stocks.

## 2.1  Econometric Models and Estimation Methods

In this section I discuss the models and estimation methods used to determine the risk premia and analyse its behaviour during the reform period and compare the same during two sub-periods of reforms.

### 2.1.1  *Risk Premia in Equity-based Islamic Stocks*

To compare the risk returns relationship and risk premia in *Modarabah* and leasing stock portfolios with non-Islamic portfolios the following models are estimated:

$$R_{it} - R_{ft} = \alpha_i + \beta_i (R_{mt} - R_{ft}) + \varepsilon_{it} \qquad ... \qquad ... \qquad ... \qquad ... \qquad (1)$$

where $R_{it}$ is the value-weighted return on Islamic portfolio i in period *t*, *t* = 1, 2, 3,…..T. $R_{mt}$ is the return on market portfolio *m* in period *t*, *t* = 1, 2, 3,….T and $R_{ft}$ the risk free rate in period *t*, *t* = 1, 2, 3,……T. $\beta_{it}$ is the risk factor of Islamic portfolio *i* and $\alpha_i$ is the intercept. The models for *Modarabah* stocks and for leasing firms are estimated for the reform period and compared with non-Islamic portfolios. The Islamic stocks are also compared with non-Islamic portfolios during two sub-periods of reform.

There is no concept of risk free rate of interest in Islamic finance. $R_f$ is pure time value of money or compensates for time preference, and it is represented by market rate of interest. Though it is permissible in Islamic perspective to have a compensation for time value of money, it can not be realised in the form of interest. It can only be an implicit part of the outcome of a real economic transaction [Khan (1986); Khan and Mirakhor (1990)]. In Islamic framework, we would have a good indicator of risk free return, as argued in literature, if we had efficient and

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[8]I have chosen July 1988 to December 1994, to compare Islamic and non-Islamic stocks as before this period not many *Modarabah* and leasing stocks were listed due to reluctance of investors and required clarification for the initial few years. Moreover, during this period various reforms and deregulatory policies were observed with respect of these stocks, particularly during July 1991 to December 1994.

competitively operating Islamic bank [Khan (1986)]. Islamic banks are supposed to manage risk to the minimum possible level through diversification of their investments. The rate of return paid by them to the depositors can be considered a close proxy for the pure time value hence the risk free return. The rates of return on saving deposits of Islamic banks however are not readily available currently. Moreover, an Islamic portfolio is one of the alternatives for investors in Pakistan and is open for all investors. I, therefore use the return on 6-month treasury bond issue by SBP as the risk free return to estimate the risk premia of Islamic stock.

### *Three Factor Model*

As argued in literature many of the CAPM average return anomalies are related. They are captured by the three factor model of Fama and French (1996) and largely disappear except for the contribution of short run returns. I estimate the following three factor model to estimate the Islamic and non-Islamic portfolios risk premia.

$$R_{it} - R_{ft} = a_i + b_i(R_{mt} - R_{ft}) + s_i(SMB_t) + h_i(HML_t) + \mu_{it} \qquad \ldots \qquad \ldots \qquad (2)$$

where $R_{it} - R_{ft}$ is the return on an Islamic portfolio in excess of risk free rate in period $t$, $t = 1, 2, 3, \ldots T$. $R_{mt} - R_{ft}$ is the excess market return in period $t$, $t = 1, 2, 3, \ldots T$. $SMB$ is the difference between the returns on a portfolio of small stocks and returns on a portfolio of large stocks in period $t$, $t = 1, 2, 3, \ldots T$ and $HML$ is the difference between returns on a portfolio of high BE/ME stocks and returns on a portfolio of low BE/ME stocks in period $t$, $t = 1, 2, 3, \ldots T$. $b_i$, $s_i$ and $h_i$ are the slopes in the above time series regression and $a_i$ is the intercept. The methodological issues regarding CAPM and three factor model are discussed in Fama and French (1996) and Nishat (1999).

## 2.2. Time-Varying Islamic Stocks Risk Premia

In the CAPM estimation described earlier I assumed that the Islamic and non-Islamic portfolio risk premia are stationary, normally distributed and serially uncorrelated, in which case the error process will be $NID(0,\sigma^2)$. I analyse the empirical performance of the CAPM and test for the following implications:

- the disturbances, $\varepsilon_{it}$, in regression (1) should be serially uncorrelated, homoskedastic and normal,
- the systematic relationship between portfolio return and market returns should be linear, and
- the $\beta_i$'s in regression (1) should be time invariant.

For examining the Islamic and non-Islamic portfolio risk premia during the non-reform and reform periods, the following GARCH-M model is estimated:

$$y_t = \gamma_0 + \gamma_1 x_t + \theta h_t^{1/2} + u_t \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (3)$$

$$u_t = \varepsilon_t - \phi \varepsilon_{t-1}, \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (4)$$

$$h_t = \alpha_0 + \sum_{i=1}^{p} \alpha_i \varepsilon_{t-i}^2 + \sum_{i=1}^{q} \beta_i h_{t-i} + \delta D_t . \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (5)$$

Note that $y_t$ is the excess return on a Islamic portfolio on week $t$, $t$ = 1, 2, 3,.....$T$ and the single explanatory variable $x_t$ is the excess return on market portfolio on week $t$, $t$ = 1, 2, 3,.....$T$. The error term $u_t$ is assumed to be MA(1). A dummy variable ($D_t$ =1 for first sub-period of reform period, and 0 otherwise) is included in Equation (5) to capture the impact of differential policy announcements on Islamic portfolios during second sub-period of reforms on risk return relation in GARCH-M framework. A significant coefficient for the dummy variable will identify a shift in reward for risk across first sub-period and the later sub-period of reform.

In GARCH-M model framework any institutional or reform news may effect directly the level of share prices/portfolio returns through an independent news effect. Or it may affect the variance of the portfolio return through a GARCH process and then only affect the level through the effect of the variance on the mean via the notion of a risk premia effect. Conventional likelihood ratio or Wald tests may be constructed to test for the significance of these effects. Under the mean-variance hypothesis, $\theta > 0$, so that large values for the conditional variance are expected to be associated with large returns. The coefficient $\alpha$ indicates the ARCH effect and $\beta$ explains the non-synchronous trading effect in the model. The estimate of $\alpha + \beta$ close to 1 indicates the high degree of persistence in volatility movements, that is the long run effect of unit innovation shock, in $h_t$. This shows that today's volatility in portfolio returns affects the forecasts of volatility in portfolio returns into the indefinite future. The persistence phenomenon is important in pricing options and futures as well as consumption/savings and portfolio decisions. The GARCH-M model is used to estimate time-varying conditional second moments and a mean/variance ratio. This ratio is a proxy for the risk-return trade-off or the market price of volatility. Since over time the incentives for investment opportunities in Islamic portfolios and general policies have also changed, the risk-return trade-off will also change, as will the investors' preference towards risk. The advantages of ARCH process are discussed in Engle (1982), Mandlebrot (1963) and Engle, Lilien and Robins (1987).

## 3. DATA

The firm level weekly share prices data on KSE is collected and computerised by the author using the original "Daily Quotation List" and "List of Daily Trading Documents" published by the KSE during July 1988 to December 1994. The value-weighted portfolio are made for equity-based Islamic, *Modarabah*, and leasing stocks for the overall reform period (July 1988 to December 1994) and two sub periods of reforms, July 1988 to June 1991 and July 1991 to December 1994. A non-Islamic value-weighted portfolio is also made separately for comparison during the same period [for details see Nishat (1999)].

## 4. RESULTS AND DISCUSSION

In this section I discuss the estimated results to highlight the difference in behaviour of Islamic and non-Islamic stocks during reform period. This section has three subsections. The first subsection provides the summary statistics of Islamic and the non-Islamic stocks. The second subsection compares the risk premia during overall and the two sub-periods of reforms. The time-varying risk premia and risk return relationship for these stocks are presented in subsection three.

### 4.1. Islamic Stocks Risk and Return

Summary statistics about Islamic and non-Islamic stocks in the KSE are presented in Table 1. A statistical test is also conducted to see if the mean returns on Islamic stocks are significantly different than non-Islamic stocks during overall and two sub-periods of reforms. I also test to establish the impact of regulatory policies and tax imposition on mean return during the two sub-periods of reforms. The specific alternative hypothesis tested is:

- The regulatory measures and tax impositions during the second sub-period of reforms induced adverse effects on the performances of Islamic stocks.

In order to test the above hypothesis *t*-tests are conducted to observe any difference in means returns of Islamic and non-Islamic stocks during overall and two sub-periods of reforms. On the basis of *t*-tests at 0.05 level we can not reject the null hypothesis of no difference in mean returns of *Modarabah* and non-Islamic stocks during overall reform period. However, in case of leasing stocks, on the basis of t-tests at 0.05 level we reject the null hypothesis and therefore are lead to accept the alternative hypothesis that the average return on leasing and non-Islamic stocks are different during the reform period. As evident from the data in Table 1, the average return on *Modarabah* (0.461 percent) is lower than the mean return on non-Islamic stocks (0.641 percent) during the overall reform period, but statistically the *Modarabah* and non-Islamic stocks mean returns are not significantly different.

Table 1

*Summary Statistics for Islamic and Non-Islamic Stocks*

All returns are weekly percentages. The Islamic Portfolios are formed on the basis of SBP classification of *Modarabah* and leasing. The non-Islamic portfolio consists of all stocks in the KSE except considered in *Modarabah* and leasing portfolios.

| Period | Statistics | *Modarabah*[a] | Leasing[b] | Non-Islamic |
|---|---|---|---|---|
| Overall Period | | | | |
| July 1988 to Dec. 1994 | Mean Return | 0.461 | 0.181 | 0.641 |
| N = 348 | Std. Dev. | 2.708 | 1.286 | 2.581 |
| | Median | 0.022 | 0.043 | 0.490 |
| | Skewness | 2.022 | 2.086 | 0.387 |
| | Kurtosis | 12.468 | 18.257 | 2.183 |
| | Maximum | 20.233 | 10.741 | 11.112 |
| | Minimum | −9.230 | −5.483 | −8.203 |
| Sub-Period I | | | | |
| July 1988 to Jun 1991 | Mean Return | 0.863 | 0.263 | 0.469 |
| N = 152 | Std. Dev. | 3.622 | 1.714 | 1.899 |
| | Median | 0.553 | 0.172 | 0.329 |
| | Skewness | 1.409 | 1.427 | 1.344 |
| | Kurtosis | 6.554 | 10.345 | 6.658 |
| | Maximum | 20.233 | 10.741 | 11.112 |
| | Minimum | −9.220 | −5.483 | −4.678 |
| Sub-Period II | | | | |
| July 1991 to Dec. 1994 | Mean Return | 0.114 | 0.110 | 0.789 |
| N = 176 | Std. Dev. | 1.458 | 0.739 | 3.047 |
| | Median | −0.032 | 0.023 | 0.689 |
| | Skewness | 2.015 | 3.994 | 0.071 |
| | Kurtosis | 11.191 | 29.161 | 0.809 |
| | Maximum | 7.764 | 6.059 | 9.555 |
| | Minimum | −4.808 | −2.460 | −8.203 |

[a] *Modarabah* is defined as a sharing contract where the return to lenders is in accordance with an agreed ratio to the profit-loss outcome of the project in which investors have invested.
[b] Leasing firms are undertaking Islamic financing which includes *Modarabah* financing.

However, the mean returns on leasing stocks (0.181 percent) are significantly lower than both the *Modarabah* and non-Islamic stocks. The standard deviation is higher for *Modarabah* stocks than for the non-Islamic stocks which is contradictory to what is expected. The leasing stocks have smaller standard deviation than the non-Islamic stocks. Both skewness and kurtosis are higher for *Modarabah* and leasing

firms than the non-Islamic stocks. Similar patterns were observed during the first sub-period of reforms, as the average return on *Modarabah* stocks (0.863 percent) is higher than both the leasing (0.283 percent) and non-Islamic stocks average returns (0.469 percent). Statistically the mean returns for these stocks are not different. The standard deviation is higher for *Modarabah* than the non-Islamic stocks but lower for leasing stocks.

The *t*-tests at 0.05 level reveal that during the second sub-period of reforms the mean returns for both *Modarabah* (0.114 percent) and leasing stocks (0.110 percent) are significantly lower than the average returns of non-Islamic stocks (0.789 percent). This result supports the hypothesis that after regulatory measures and tax impositions during the second sub-period of reforms induced adverse effects on the performance of Islamic stocks. The skewness and kurtosis are higher for both *Modarabah* and leasing stocks but much lower for the non-Islamic stocks. The standard deviations are lower for both *Modarabah* and leasing stocks than the non-Islamic stocks.

The above analysis indicates that for investors there is no significant difference in Islamic and non-Islamic stocks during the overall reform period. A significant difference observed was during the first sub-period of reforms where investment in Islamic stocks (*Modarabah*) provided higher mean returns than the non-Islamic stocks. This may have been related to these stocks being exempted from taxes. My results support the alternative hypothesis that during the second sub-period of reforms the performance of these stocks declined significantly as compared to the non-Islamic stocks, mainly due to their poor performances and less interest by investors in Islamic stocks after imposition of taxes and strict regulatory policies.

## 4.2. Islamic Stocks Risk Premia

In this subsection I test the alternative hypothesis that:

• The risk premia of Islamic stocks are lower than for non-Islamic stocks.

In order to test the above hypothesis I estimate the risk premia on Islamic and non-Islamic stocks using cross-sectional regression procedure.

I use the cross-sectional regression method similar to that described by Fama and MacBeth (1973) and estimate the following two-parameter model:

$$R_{pt} = \hat{\gamma}_{0t} + \hat{\gamma}_{1t}\beta_p + \hat{\eta}_{pt} \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad \ldots \qquad (6)$$

where $R_{pt}$ is the return on portfolio $p = (1,2,\ldots\ldots.P)$ in period $t$, $t = 1,2,\ldots\ldots T$ and is obtained as the sample average of all securities returns in portfolio p in week $t$, $t= 1,2,\ldots..T$. $\beta_i$'s in portfolio $P$, estimate over each sub period , $t = 1,2,\ldots..T$. as described below. To estimate the coefficients $\gamma_{1t}$ and $\gamma_{0t}$ in Equation (6) the standard two step procedure is followed as discussed in the following paragraphs.

In the firm step, the $\hat{\beta}_p$ are obtained using weekly return data for individual securities for each sub-period. I used CAPM to estimate the $\hat{\beta}_i$s for the individual security, defined as:

$$R_{it} - R_{ft} = \hat{\alpha} + \hat{\beta}(R_{mt} - R_{ft}) + \xi_{it} \qquad \dots \qquad \dots \qquad \dots \qquad \dots \qquad (7)$$

where $(R_{mt} - R_{ft})$ is the excess return on security $i$ in period $t$, $(R_{mt} - R_{ft})$ is the excess return on market portfolio in period $t$. The estimated $\hat{\beta}_{it}$ is the risk factor beta for security $i$ during $t = 1,2,\dots T$. and $\hat{\alpha}_i$ is the estimated constant. $\hat{\xi}_{iyt}$ is the residual in period $t$, $t = 1,2, \dots T$. The above (7) first-pass time series OLS regression of excess return for each security $(R_{mt} - R_{ft})$ on excess market return, $(R_{mt} - R_{ft})$ and a constant term $\hat{\alpha}_i$ over $t = 1,2,\dots T$, gives the $\hat{\beta}_i$'s. The betas for each securities are themselves updated yearly to allow for new listing and delisting of securities. These initial betas ($\hat{\beta}_i$'s) from individual securities are used to obtain the portfolio betas $\hat{\beta}_p$, $p = 1, 2, \dots P$ in each testing sub-period.

The explanatory variables for cross-sectional regression are obtained for each week $t$, $t = 1, 2, 3,\dots T$ through CAPM and three factor model given earlier in Equations (1) and (2). The results in Table 2 indicate that the CAPM seems to capture more cross sectional variation in average stock returns of Islamic stocks, as in all cases $\overline{R}^2$ is higher than the $\overline{R}^2$ of three factor model. The risk factor betas for Islamic and non-Islamic stocks are statistically significant at 0.05 level, but $t$-statistics are much higher in the case of non-Islamic stocks (significant at 0.01 level). The magnitudes of risk premia based on CAPM and three factor models are presented in Table 3. During the overall reform period the risk premia for *Modarabah* and leasing stocks are 0.067 and 0.055 percent respectively. The risk premium for the non-Islamic stocks was significantly higher (0.488 percent per week) than both types of Islamic stocks during this period.

I conducted Chow tests of whether the risk premia estimated during the two sub-periods of reforms are governed by the same relationship. The null hypothesis is that there is no difference in coefficients of CAPM regressions between two sub-periods. The $F$-statistics (reported for CAPM case only) indicate that the risk premia estimated for *Modarbah* and non-Islamic stocks follow a different relationship during the two sub-periods. However, estimated risk premia for leasing stocks follow the same relationship during both sub-periods.

# Table 2

## *The Following CAPM and Three Factor Models are Estimated*

This table present the results for CAPM and three factor models to determine the risk premia during the overall reform period and the two sub-periods of reforms. The following CAPM and three factor models are estimated:

$$R_{it} - R_{ft} = \alpha_i + \beta_i(R_{mt} - R_{ft}) + \varepsilon_{it}$$

$$R_{it} - R_{ft} = a_i + b_i(R_{mt} - R_{ft}) + s_i(SMB_t) + h_i(HML_t) + \mu_{it}$$

The risk premia are calculated from above OLS regressions. The $R_m - R_f$, SMB and HML capture the risk premium, firm size effect and book to market effect of portfolio returns respectively. $R_i - R_f$ is the excess return on portfolio $i$. $R_f$ is the six-month bond rate observed at the beginning of June and December. The explanatory portfolios returns SMB and HML are formed as at the end of December of each year $t$, KSE stocks are allocated to two groups (small and big, S or B) based on whether their December equity (ME, stock price times shares outstanding) is below or above the median ME for KSE stocks. KSE stocks are allocated in an independent sort to book to market equity (BE/ME) groups. Value-weighted weekly returns on the portfolios are calculated from January to December. SMB is the difference each week, between the average of the returns on three small stock portfolios and the average of the returns on the three big stock portfolios. HML is the difference between the average of the returns on the two high BE/ME portfolios. The market return Rm is the value-weighted return on all stocks registered in the KSE. The Chow-test is conducted to establish any significant difference in risk premia during non-reform and reform periods.

| Period | Portfolio | CAPM | | | | | Three-factor | | | | | | | | |
| | | α | t(α) | β | t(β) | R²-adj | a | t(α) | b | t(β) | s | t(s) | h | t(h) | R²-adj. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Overall Period** | *Modarabah*[a] | 0.263 | 1.742 | 0.140 | 2.383 | 0.014 | 0.262 | 1.716 | 0.138 | 2.233 | −0.002 | −0.009 | −0.004 | −0.075 | 0.017 |
| July 1988 to Dec 1994 | Leasing[b] | −0.005 | −0.065 | 0.115 | 4.178 | 0.048 | 0.009 | 0.13 | 0.122 | 4.248 | −0.013 | −1.158 | 0.03 | 1.337 | 0.056 |
| N = 348 | non-Islamic | 0.022 | 1.256 | 1.014 | 143.728 | 0.984 | 0.014 | 0.805 | 1.003 | 140.493 | 0.005 | 1.988 | −0.028 | −5.001 | 0.985 |
| **Sub-Period I** | *Modarabah* | 0.616 | 2.114 | 0.407 | 2.401 | 0.03 | 0.162 | 2.063 | 0.409 | 2.28 | 0.007 | 0.125 | 0.001 | 0.005 | 0.017 |
| July 1988 to Jun 1991 | Leasing | 0.047 | 0.341 | 0.198 | 2.471 | 0.032 | 0.075 | 0.542 | 0.219 | 2.61 | −0.025 | −1.038 | 0.052 | 1.053 | 0.031 |
| N = 152 | non-Islamic | 0.024 | 0.752 | 1.089 | 57.412 | 0.956 | 0.017 | 0.544 | 1.067 | 55.503 | −0.003 | −0.559 | −0.038 | −3.397 | 0.959 |
| **Sub-Period II** | *Modarabah* | −0.069 | −0.637 | 0.084 | 2.414 | 0.027 | -0.056 | −0.511 | 0.084 | 2.307 | −0.016 | −0.876 | 0.021 | 0.603 | 0.02 |
| July 1991 to Dec 1994 | Leasing | −0.056 | −1.054 | 0.095 | 5.641 | 0.151 | -0.052 | −0.982 | 0.098 | 5.518 | −0.003 | −0.325 | 0.01 | 0.592 | 0.142 |
| N = 176 | non-Islamic | 0.017 | 1.121 | 0.995 | 201.798 | 0.996 | 0.009 | 0.663 | 0.987 | 207.034 | 0.007 | 3.143 | −0.025 | −5.561 | 0.996 |

[a] *Modarabah* is defined as a sharing contract where the return to lenders is in accordance with an agreed ratio to the profit-loss outcome of the project in which investors have invested.
[b] Leasing firms are undertaking Islamic financing which includes *Modarabah* financing.

Table 3

*Islamic and Non-Islamic Weekly Risk Premiums (%)*

This table presents the risk premia for Islamic and non-Islamic portfolios during overall reform period and for the two sub-periods of reforms. The following CAPM and three factor models are estimated:

$$R_{it} - R_{ft} = \alpha_i + \beta_i (R_{mt} - R_{ft}) + \varepsilon_{it}$$
$$R_{it} - R_{ft} = \alpha_i + \beta_i (R_{mt} - R_{ft}) + s_i (SMB_t) + h_i (HML_t) + \mu_{it}$$

The risk premia are calculated from above regressions. The $R_m - R_f$, *SMB* and *HML* capture the risk premium, firm size effect and market effect of porfolio returns respectively. $R_i - R_f$ is the excess return on portfolio *i*. $R_f$ is the six-month bond rate observed at the beginning of June and December. The explanatory returns portfolios *SMB* and *HML* are formed as at the end of December of each year t, KSE stocks are allocated to two groups (small or big, *S* or *B*) based on whether their December equity (ME, stock price times shares outstanding) is below or above the median ME for KSE stocks. KSE stocks are allocated to book to market equity (*BE/ME*) groups. Value-weighted portfolios are calculated from January to December. SMB is a the difference, each week, between the average of the returns on three small stock portfolios and the average of the returns onthe three big stock portfolios. HML is the difference between the average of the returns on the two high BE/ME portfolios and the low BE/ME portfolios. $R_m$ is the value weighted market return.

| Period | Parameter | *Modarabah*[a] | Leasing[b] | non-Islamic |
|---|---|---|---|---|
| **Overall Period** | risk premium CAPM | 0.067 | 0.055 | 0.488 |
| July 1988 to Dec. 1994 | risk premiumTFM | 0.067 | 0.059 | 0.487 |
| N = 348 | SMB | 0.000 | 0.005 | −0.002 |
| | HML | 0.002 | −0.012 | 0.000 |
| | F-stat[c] | 6.305* | 1.670 | 16.364* |
| **Sub-Period I** | risk premium CAPM | 0.090 | 0.044 | 0.245 |
| July 1988 to Jun. 1991 | risk premiumTFM | 0.091 | 0.049 | 0.245 |
| N = 152 | SMB | 0.004 | 0.014 | 0.002 |
| | HML | 0.000 | −0.019 | −0.001 |
| **Sub-Period II** | risk premium CAPM | 0.059 | 0.067 | 0.700 |
| July 1991 to Dec. 1994 | risk premiumTFM | 0.059 | 0.069 | 0.700 |
| N = 176 | SMB | −0.003 | −0.001 | −0.465 |
| | HML | −0.008 | −0.004 | −0.001 |

[a]*Modarabah* is defined as a sharing contract where the return to lenders is in accordance with an agreed ratio to the profit-loss outcome of the project in which investors have invested.
[b]Leasing firms are undertaking Islamic financing which includes *Modarabah* financing.
* Significant at 0.05 level.
TFM = Three factor model.
[c]*F*-statistics are obtained under the hypothesis that the relationship to determine risk premia are same during the two sub-periods of reforms.

As presented in Table 3 the risk premia for *Modarabah* and leasing stocks are 0.090 and 0.044 percent respectively whereas the risk premia for non-Islamic stocks are significantly higher (0.245 percent) during the first sub-period of reforms. A

similar pattern is observed for risk premia estimated through the three factor model. The average risk premia for *Modarabah* and leasing stocks during the second sub-period of reforms are 0.059 percent and 0.067 percent respectively. However, the risk premium for non-Islamic stocks is significantly higher (0.700 percent) during this sub-period of reform. The risk premia based on the three factor model indicate no difference in magnitude to those estimated on the basis of CAPM model. The above results support the hypothesis that the risk premia of Islamic stock are lower than the non-Islamic stocks, particularly during the later period of reforms when the exemption on taxes was withdrawn and the firms were regulated by Corporate Law Authority and intervened by State Bank of Pakistan. As a result, these Islamic stock were considered as over-regulated and could not match the interest of certificate holders.

### 4.3.  Time-Varying Risk Premia

In above Section I established that the risk premia of Islamic stocks are significantly lower than the non-Islamic stocks during overall and the two sub-periods of reforms. However, in estimating the risk return relationship I assumed that the risk factor is invariant of time. Now by using the GARCH-M model, I allow the conditional expected portfolio return to vary over time (and hence market risk premia and market betas also to vary over time). In this case the conditional volatility depends on lagged residuals. I expect that the relationship between the expected returns and their predicted volatilities are different in Islamic and non-Islamic stocks during the overall and two sub-periods of reforms. I also expect that the Islamic portfolio returns are less volatile and do not show big surprises of either sign during the overall and two sub-periods of reform. Moreover, I expect a lower degree of persistence in volatility in Islamic stocks than non-Islamic stocks. The specific alternative hypotheses tested in this section are:

- The risk-return relation is more efficient for Islamic stocks than non-Islamic stocks.
- The Islamic stocks returns are less volatile than non-Islamic stocks.

The descriptive statistics presented in Table 4 indicate evidence of non-linearity, non-normality and parameter non-constancy in *Modarabah*, leasing and non-Islamic portfolios during overall and the two sub-periods of reforms. This is probably a reflection of the view that betas are time-varying and are better modelled within the ARCH model framework. The ARCH framework explicitly models the time-varying conditional variances by relating them to variables known from previous period. In order to test the above hypotheses that *Modarabah* and leasing stocks and the non-Islamic stocks exhibit a similar relationship between risk and return during the overall and the two sub-periods of reforms, the GARCH (1,1)-M

Table 4

*Estimates of CAPM Regression and Specification Tests*

This table presents the results of specification tests on CAPM regression given as follows:

$$R_{it} - R_{ft} = \alpha_i + (R_{mt} - R_{ft})\beta_i + \varepsilon_{it}$$

where $R_i$ is the return on portfolio $i$, $R_f$ is the risk free return, and $R_m$ is the market return. We investigate the empirical performance of CAPM through  pecification test for the following implications that the residuals of the regression should be serially uncorrelated,  homoskedastic and normal, the systematic relationship between $R_i$ and $R_m$ should be linear, and estimates of beta should be time invariant.

| Period | Parameters | *Modarabah*[a] | Leasing[b] | Non-Islamic |
|---|---|---|---|---|
| **Overall Period** | $\alpha_0$ | 0.263 | −0.005 | 0.713 |
| July 1988 to Dec. 1994 | se($a_0$) | (0.151) | (0.077) | (0.018) |
| N = 328 | $\beta$ | 0.140 | 0.115 | 1.014 |
| | se(b) | (0.058)* | (0.027)* | (0.007)* |
| | $R^2$-adj | 0.014 | 0.048 | 0.984 |
| | D.W. | 2.171 | 2.359 | 2.172 |
| | NONLIN | 0.188 | 3.011 | 4.919 |
| | NORM | 2029.82* | 5046.63 | 114913.00* |
| | ARCH | 4.811 | 19.582* | 0.005 |
| | HET | 3.583 | 0.865 | 11.221* |
| **Sub-Period I** | $\alpha_0$ | 0.616 | 0.047 | 0.024 |
| July 1988 to June 1991 | se($a_0$) | (0.291)* | (0.138) | (0.032) |
| N = 152 | $\beta$ | 0.407 | 0.198 | 1.088 |
| | se(b) | (0.169)* | (0.080)* | (0.018)* |
| | $R^2$-adj | 0.030 | 0.032 | 0.955 |
| | D.W. | 2.251 | 2.531 | 1.982 |
| | NONLIN | 3.528 | 6.070* | 1.572 |
| | NORM | 184.78* | 740.87* | 17273.80* |
| | ARCH | 1.519 | 8.201* | 0.029 |
| | HET | 6.977* | 0.031 | 44.659* |
| **Sub-Period II** | $\alpha_0$ | −0.069 | −0.056 | 0.017 |
| July 1991 to Dec 1994 | se($a_0$) | (0.108) | (0.053) | (0.015) |
| N = 176 | $\beta$ | 0.084 | .095 | 0.995 |
| | se(b) | (0.034)* | (0.017)* | (0.004)* |
| | $R^2$-adj | 0.027 | 0.151 | 0.995 |
| | D.W. | 2.070 | 1.788 | 2.468 |
| | NONLIN | 9.234* | 2.155 | 0.689 |
| | NORM | 962.707* | 4822.60* | 27.731* |
| | ARCH | 23.409* | 26.564* | 2.766 |
| | HET | 10.349* | 20.239* | 10.171 |

[a] *Modarabah* is defined as a sharing contract where the return to lenders is in accordance with an agreed ratio to the profit-loss outcome of the project in which investors have invested.
[b] Leasing firms are undertaking Islamic financing which includes *Modarabah* financing.
* Significant at 0.05 level.
Figures in parantheses are standard errors.
    D.W.: Durbin Watson, critical values ranges between 1.72 to 2.28.
  NONLIN: Ramsey's RESET test for functional form, calculated from the regression of $u_t$ on $x_t$ and $y_t^2$. The critical value for Ramsey test underchi-square asymptotic distribution is 3.84.
  NORM: Bera and Jarque test for normality. This is joint test of whether or not skewness and kurtotis are asymptoticall different from zero. The critical value under the assupmtion that Bera and Jarque statistics has asymptotic chi-square distribution with two degrees of freedom at 5 percent significance level is 5.99.
  ARCH: It is the test for ARCH(1) residuals. ARCH is a regression of squared residual on the lagged squared residual. The critical value for ARCH statistics under asymptotic chi-square distribution is 7.81.
  HET: Test for heteroskedasticity, calculated from the regression of $u_t^2$ on a constant and $y_t^2$. The critical value for the test of heteroskedasticity under asymptotic chi-square distribution at 5 percent level of significance is 3.84.

model is estimated (given in Equations 3 to 5). In this case dependent variable $y_t$ is the return on Islamic or non-Islamic portfolio $i$ on week $t$ and explanatory variable $x_t$ is the return on market portfolio on week $t$.

As described earlier, the GARCH-M model estimates the time-varying conditional second moments and a constant mean/variance ratio. This ratio is the proxy for the risk return trade-off or the market price for risk. We expect that any change in government policies which influences the investment opportunities, or changing preference towards risk either for *Modarabah*, leasing or non-Islamic, have a different pattern due to different characteristics of their business and preferential treatment of the Islamic stocks. The results of the GARCH(1,1)–M model are presented in Table 5. The Box Pierce portmanteau test statistics $Q(12)$ and $Q^2(12)$ are also given for an autoregressive or moving average process of order 12 in residuals, and for an ARCH(12) process of order 12 in squared residuals respectively. Both test statistics are asymptotically equivalent to Lagrange multiplier test statistics and have asymptotic chi-squared distribution with 12 degrees of freedom under the null hypothesis of residuals being uncorrelated. The procedure followed is described in Baillie and DeGennaro (1990).

I have included dummy variable ($D_t = 1$ for the second sub-period of reforms, 0, otherwise) to capture the difference in portfolio risk return relationship through GARCH(1,1)-M process during the two sub-periods of reform. The coefficient of dummy variable for the second sub-period of reform indicated a significant downward shift in risk premia in both Islamic and non-Islamic stocks. During the overall reform period, the risk and return relation for *Modarabah* is statistically significant. It indicates that for bearing risk the investor is rewarded (indicated by parameter θ) with 0.312 percent weekly. The reward for risk bearing for leasing stocks is very low (0.009 percent per week). However, the risk and return relationship for leasing and non-Islamic stocks are statistically insignificant. During the overall reform period the ARCH effect, that is the evidence of volatility in returns, $\alpha_1$, is significantly evident only in the case of leasing stocks. This means that during the overall reform period the conditional variance of leasing stock returns is significantly related to the past variance of the error term and weakly on the past conditional variance. The evidence of significant volatility clustering implies an increase in future volatility in leasing stocks returns during the overall reform period. The coefficient of moving average is only significant for leasing stocks which indicates a significant impact of a non-synchronous trading effect for these stocks during the overall reform period. The degree of persistence in volatility, $\alpha_1 + \beta$, is only evident in leasing stocks returns which indicates that volatility in returns of leasing stocks affects the forecasts of volatility into indefinite future.

During the first sub-period, only *Modarabah* stocks indicate a positive and significant relationship between risk and return. The leasing and non-Islamic stocks

Table 5

*Estimates of Time-varying Risk Premium*

This table presents the results obtained to determine the industry portfolio risk return relationship in GARCH framework which explicitly models the time-varing conditional variances by relating them to variables known from the previous period. The following GARCH(1,1)-M model is estimated for overall reform period and two sub-periods of reforms:

$$y_t = \gamma_0 + \gamma_1 x_t + \theta h_t^{1/2} + \mu_t$$

$$\mu_t = \varepsilon_t - \phi\varepsilon_{t-1}$$

$$h_t = \alpha_0 + \sum_{i=1}^{p} \alpha_1\varepsilon_{t-1}^2 + \sum_{i=1}^{q} \beta h_{t-i} + \delta D_t$$

$y_t$ is the excess return on portfolio $i$ in week $t$, and $x_t$ is the excess return on market portfolio on week $t$. $h_t^{1/2}$ is conditional standard deviation term and $u_t$ is the distribution term. $\theta$ is the time-varying risk premium and proxy for the risk return trade-off or the market price of volatility. $\alpha_1$ is the coefficient of ARCH effect and $\beta$ is the coefficient of moving average. $\alpha_1 + \beta$ is the coefficient of persistence in $h_t$ and a value close to 1 indicates a high degree of persistence. $\delta$ indicates the shift in risk premia during the two sub-periods of reform periods. Likelihood figures indicates the value of the log-likelihood function. Q(12) and $Q^2$(12) are the Box Pierce Portmanteau test statistics applied to the residuals and squared residuals, respectively. They provide a test for the presence of autocorrelation and ARCH effects, respectively, and are asymptotically distributed chi square, with 12 degrees of freedom under the null hypothesis that the residuals are uncorrelated

| Period | Portfolio | $\gamma_0$ | $\gamma_1$ | $\theta$ | $t(\theta)$ | $\alpha_0$ | $t(\alpha_0)$ | $\alpha_1$ | $t(\alpha_1)$ | $\beta$ | $t(\beta)$ | $\delta$ | $t(\delta)$ | Likelihood | Q(12) | $Q^2$(12) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Overall Period** | *Modarabah*[a] | 7.273 | 0.216 | 0.312 | 4.104 | 6.294 | 1.643 | 0.027 | 1.536 | 0.000 | 0.000 | −0.982 | −2.495 | −779.094 | 29.9 | 72.6 |
| July 1988 to Dec. 1994 | Leasing[b] | 3.127 | 0.037 | 0.009 | 0.256 | 0.002 | 1.425 | 0.378 | 7.802 | 0.741 | 32.189 | −0.098 | −4.343 | −357.453 | 26.3 | 24.9 |
| N = 348 | non-Islamic | 0.001 | 1.016 | 0.075 | 0.913 | 0.102 | 0.006 | 0.000 | 0.000 | 0.000 | 0.000 | −0.861 | −92.603 | −93.338 | 13.1 | 0.286 |
| **Sub-Period I** | *Modarabah* | 0.609 | 0.506 | 0.337 | 3.603 | 10.425 | 1.107 | 0.071 | 1.103 | 0.001 | 0.002 | – | – | −409.606 | 22.7 | 27.1 |
| July 1988 to Jun. 1991 | Leasing | 69.568 | 0.227 | 0.064 | 0.639 | 2.629 | 0.481 | 0.022 | 1.419 | 0.006 | 0.003 | – | – | −291.678 | 23.3 | 11.7 |
| N = 152 | non-Islamic | 0.182 | 1.087 | 0.078 | 0.579 | 0.156 | 0.003 | 0.000 | 0.000 | 0.000 | 0.000 | – | – | −75.078 | 7.11 | 0.343 |
| **Sub-Period II** | *Modarabah* | 55.159 | 0.028 | 0.000 | 0.000 | 0.053 | 3.479 | 0.223 | 2.433 | 0.596 | 5.828 | – | – | −166.488 | 51.3 | 221.1 |
| July 1991 to Dec. 1994 | Leasing | 0.000 | 0.040 | 0.000 | 0.000 | 0.019 | 4.173 | 0.216 | 5.759 | 0.484 | 6.035 | – | – | −59.770 | 19.9 | 34.6 |
| N = 176 | non-Islamic | 1.666 | 0.993 | 0.132 | 1.559 | 0.037 | 10.791 | 0.044 | 0.982 | 0.000 | 0.000 | – | – | 35.453 | 30.7 | 13.2 |

[a] *Modarabah* is defined as a sharing contract where the return to lenders is in accordance with an agreed ratio to the profit-loss outcome of the project in which investors have invested.
[b] Leasing firms are undertaking Islamic financing which includes *Modarabah* financing.

also have a positive relationship between risk and return, but in both cases the coefficients are statistically insignificant. The reward to risk bearing for *Modarabah* stocks is 0.337 percent per week during this period (Table 5). None of the *Modarabah*, leasing or non-Islamic stocks indicated any ARCH effect, or significant effect of volatility, during this sub-period. The coefficients of non-synchronous trading effect are also insignificant in all cases during this period.

During the second sub-period neither *Modarabah* nor leasing stocks indicate significant relationships between risk and return. However, the reward for risk bearing is only evident in the non-Islamic stocks. The reward to risk for non-Islamic stocks is higher during this sub-period than the overall and first sub-period of reform. Both *Modarabah* and leasing stocks indicated significant ARCH effects, that is clustering of volatility in returns, which causes an increase in future volatility in their returns. However, non-Islamic stocks indicated no ARCH effects or clustering of volatility in their returns. Both *Modarabah* and leasing stocks indicated significant persistence in their volatility movements which infers that the volatility in Islamic stocks affects the forecasts of volatility into indefinite future during the later sub-period of reforms. The coefficients of moving average for both Islamic stocks and indicate significant impact of non-synchronous trading during this sub-period of reforms.

## 5.  SUMMARY AND CONCLUSIONS

There is a significant difference between Islamic and non-Islamic stocks in terms of their operations, corporate governance and prevailed fiscal incentives. However, for investors in the KSE these Islamic stocks are one of the alternatives for their efficient diversification of risk particularly due to additional tax exemptions on these stocks compared to the non-Islamic stocks. The results support the hypothesis that the risk premia for these stocks have been very low throughout the reform and sub-reform periods.  The analysis supports the hypothesis that a significant decline in returns of Islamic stock is observed during the later period of reforms when the tax exemptions on Islamic stocks are withdrawn and Islamic firms were regulated by corporate law authority. Only leasing stocks indicated significant volatility in returns and increase in future volatility in returns during the overall reform period. The non-synchronous effect and persistence in volatility in returns movements is only evident in case of leasing stocks during the overall reform period.

My hypothesis of efficient mean-variance relationship is only supported by *Modarabah* stocks during the first sub-period of reforms. Neither Islamic nor non-Islamic stocks indicated any volatility in returns or increases in future volatility in their returns during this sub-period.  None of the stocks indicate a non-synchronous trading impact during this sub-period of reforms. No significant mean-variance relationship is evident for the Islamic and non-Islamic stocks during the second sub-

period of reforms. Only Islamic stocks indicated volatility in returns and an indication of increase in future volatility in returns during this sub-period. The results also indicate that volatility in returns of Islamic stocks also affect the forecasts of volatility in returns into indefinite future during the later sub-period of reforms.

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# Comments

This paper presents empirical evidence on the performance of *modarabah* and leasing stocks, or, as the author interprets, of the Islamic stocks on the Karachi Stock Exchange over the period July 1988 to December 1994. The performance of these stocks has also been compared with those of the other stocks, or, as the author interprets, of the non-Islamic stocks over the two reform periods. To examine and compare the performance of *modarabah* and leasing stocks, the author uses the capital asset pricing model as well as a variant of it, incorporating two additional factors; one, the return on portfolios of small stocks, and the other, the return on portfolios of large stocks. The capital asset pricing model, with its variant, is used to determine the degree of sensitivity of the return on *modarabah* and leasing stocks as well as on non-Islamic stocks to the return on market portfolio. The author also examines the existence of time-varying risk premia in these stocks by employing the GARCH-in-mean model of risk premium. For this purpose, weekly data on share prices have been used to construct value-weighted portfolio for *modarabah* and leasing stocks as well as value-weighted portfolio for all other stocks, excluding *modarabah* and leasing stocks.

Results obtained using descriptive statistics have been interpreted as indicating that the mean return on *modarabah* and non-Islamic stocks is not statistically different during the overall period, but it is different over the two reform periods, implying that for investors there is no significant difference between Islamic and non-Islamic stocks during the overall reform period. On the other hand, the mean return on leasing stocks is statistically different from those on *modarabah* and non-Islamic stocks during the reform periods. Results based on the capital asset pricing model and a variant of it have been interpreted as indicating that the betas, reflecting the degree of sensitivity of the returns on portfolios of *modarabah*, leasing and non-Islamic stocks to the return on the market portfolio of all stocks as well as to the return on the market portfolios of small and large stocks, are statistically significant in almost all cases and for all the reform periods. However, it is worth noting that the betas of non-Islamic stocks seem to be much closer to unity, while those of *modarabah* and leasing stocks are much lower than unity, i.e. 0.14 and 0.12 percent respectively during the overall reform period, 0.41 and 0.20 percent during the first reform period and 0.08 and 0.10 percent during the second reform period. These results have been interpreted as indicating that the risk premia in portfolios of *modarabah* and leasing stocks are much lower than those of non-Islamic stocks.

First of all I would like to appreciate that the author has done a commendable task by presenting empirical evidence on the performance of *modarabah* and leasing firms.  The paper does make an important addition and a real contribution to the literature on stocks' relative performance on financial market.  Although the author has given a detailed analysis of the Islamic stocks and employed standard models to examine the performance of these stocks relative to those of the non-Islamic stocks, I have some reservations about the theory of the Islamic stocks, the hypothesis formulation, the empirical testing of the capital asset pricing and GARCH-in-mean risk premia models, the interpretation of the results and the generation of returns on the value-weighted portfolios of *modarabah*, leasing, small, large and non-Islamic stocks.  However, before I turn to my reservations about the theoretical underpinning and empirical testing of the models, let me make first some general comments on the paper.

Overall, the material in the paper is not well organised, and it contains lots of redundant details.  Moreover, the title the paper does not correspond fully to the theme of the paper.  While the paper aims to examine the existence of risk on portfolios of *modarabah* and leasing stocks and compare the risk on the underlying portfolios with those of the portfolios of non-Islamic stocks, the title experience of equity-based Islamic shares in Pakistan does not correspond fully to the general idea underlying the paper.  Therefore, the title needs restructuring. Sections 1–4 of the paper may be shortened by omitting subsections and avoiding redundant details, which have little to do with the theme of the paper.  My suggestion would be to concentrate more on the main features of the *modarabah* and leasing stocks and on how these stocks are different from the other stocks listed on the Karachi Stock Exchange.  Rather than building a case to argue that *modarabah* and leasing stocks are Islamic, whereas the other stocks are non-Islamic, the author may focus on rationalising why *modarabah* and leasing firms have been performing extremely poorly relative to the other stocks for the last many years.  As for discussions whether some stocks are Islamic or non-Islamic may be set aside for consideration in another paper as one can hardly find any consensus of opinion on this issue. Similarly, the author can shorten Section 3 by focusing more clearly on the econometric model and the estimation procedure, omitting the other details, for example the data, which may be put in section dealing with the data, estimation and empirical results.  Similarly, there are lots of repetitions in Section 4 which can be avoided without causing any loss to the text and the theme of the paper.   For example, Tables 2 and 4 present similar results on the CAPM, except that the latter also reports the results about diagnostic checking.  However, as for the results of the variant of the capital asset pricing model, these may be presented in a separate table.

Now I will turn to my reservations about theoretical underpinning, empirical testing and the results of the models.  My first concern relates to the author's classification of *modarabah* and leasing stocks as Islamic stocks. While the author

makes this interpretation on the grounds that the firms issuing these stocks undertake financial operations on the mark-up basis, link capital flows involved in these business transactions to real flows, make all capital suppliers to share the risk encountered by the capital users and avoid interest-based dealings by precluding the use of debt in these operations, these grounds alone may not be sufficient to classify *modarabah* and leasing stocks as Islamic stocks. This is because there is agreement that these conditions are necessary to make a particular business operation Islamic. For example, in their decisions, Federal Shariah Court and Supreme Court Appealent Bench have declared that transactions based on mark-up basis of by-back arrangement are not Islamic. Moreover, *modarabah* or leasing arrangements may indeed be one of the several forms of financing which may be Shariah compatible, but this does not suffice to make them Islamic unless they are perfectly Shariah compatible. This concern of mine is also strengthened as the author himself admits in Section 1 that "Islamic stocks are operated similar to those of other firm that do not work on Islamic principles" and also by, among others, Khan (1987, 1989) who argue that the market rate of interest is also taken into account while calculating the predetermined rate of return and even the agreed ratio of profit shares on *modarabah*.

My second concern relates to some of the hypotheses that the author formulates for empirical testing. For example, consider the second hypothesis in which case the author tests the hypothesis that the risk premium on Islamic stocks is lower than that on non–Islamic stocks. An important question that is pertinent is: what about the return on Islamic and non-Islamic stocks? Obviously, the lower the risk on Islamic stocks the lower will be the return on them, but this hypothesis contradicts with the third hypothesis that the risk-return relationship is efficient for Islamic stocks than for non-Islamic stocks. If this reasoning is correct, that the lower the risk on Islamic stock the lower the return on them, it is also correct that the higher the risk on non-Islamic stocks the higher will be the return them, then there is no good reason to believe that only the risk-return relationship for Islamic stocks, and not for the non-Islamic stocks, is efficient. Moreover, there is no much difference between the second hypothesis that the risk premia is lower on Islamic stocks than on non-Islamic stocks and the last hypothesis that the return on Islamic stocks is less volatile than return non-Islamic stocks. This is because volatility or variability of return on stocks also indicates the degree of risk associated with the return on stocks.

My third concern relates to empirical testing of the capital asset pricing and the GARCH-in-mean risk premium models. The author gives a little rationale why he employs the capital asset pricing model and the variant of it to examine the performance of *modarabah* and leasing stocks. Moreover, there are some problems not only with the construction of the GARCH-in-mean (1,1) model but also with the interpretation of its parameters. For example, while the author may have tested

GARCH-in-mean (1,1) model to examine for the presence of risk on the stocks under investigation, he has wrongly formulated  the mode.[1]  I am also suspicious of how the author interprets the parameters of the underlying model to test the hypothesis of relating to the risk premia.  For example, the author is not clear about the slope parameters of the portfolios of small and low stocks and confuses by using abbreviation of BEME stocks or BE/ME stocks in the text, which never appear in the models.  The GARCH-in-mean model was introduced by Bollerslev (1986) as a generalised class of the ARCH-in-mean models on several grounds. On the other hand, Domowitz and Hakkio (1985) were the first to apply the ARCH-in-mean model to examine the presence of risk premium in the foreign exchange market by arguing that the forward forecast errors follow an ARCH process in which case the conditional variance of the forecast error is a function of the past information, which include the past squared forecast errors. They put forward several reasons for choosing this particular representation.[2] Testing for the existence of the risk premium in the stock market can be carried out using ARCH-in-mean and GARCH-in-mean models respectively as follows.

$$R_i - R_f = \gamma_0 + \gamma_1(R_m - R_f) + \upsilon_t$$

$$\upsilon_t = \Phi_0 + \Phi_1 h_t$$

$$\upsilon_t \sim N\left(0, h_t^2\right)$$

$$h_t^2 = \theta_0^2 + \sum_{i=1}^{n} \theta_i^2 \upsilon_{t-i}^2 + u_t$$

Testing the hypothesis $\Phi_0 = 0$ and $\Phi_1 = 0$ implies that there is no risk in the market.  Acceptance of this hypothesis will imply that there is absence of risk in the market.  On the other hand, rejection of this hypothesis implies that there is presence of risk in the market.  The GARCH-in-mean model (1,1) is given by the following set of equations.

$$\rho_t = R_i = R_m$$

$$\rho_t = \Phi_0 + \Phi_1 h_t + \varepsilon_t$$

$$h_t^2 = \Theta_0^2 + \Theta_1 h_{t-1}^2 + \Theta_2 \varepsilon_{t-1}^2$$

Rejection of the hypothesis $\Phi_1 = 0$ and $\theta_2 = 0$ indicates the existence of a time-varying risk premium, and the error term follows and ARCH process.

My fourth concern is that while there are too much redundant details and repetitions in the paper, only little attention has been focused on elaborating the

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[1]See the risk premium model with Table 5.
[2]See Moosa and Bhatti (1987, pp. 83–88) for a detailed survey and a use of several-risk premia model, including the ARCH and GARCH models.

results obtained by fitting the CAMP, together with its variant, and the GARCH-in-mean model. For example, these models have been reproduced several times within the main body of the text and with all tables, causing enormous repetitions, which have damaged the sequence and the consistency in the paper. Moreover, I have some reservations about how the author empirically tests these models and how he interprets his results. There are indeed several problems with empirical testing as well as with interpretation of the results. More specifically, I have following observations and reservations about empirical testing and the results of the models that the author has fitted.

First, there is little explanation as to how the author has generated data on the return on the portfolios consisting of *modarabah*, leasing, small, large and what the author interprets Islamic and non-Islamic stocks. Of course the author must have constructed value-weighted index of all such stocks and then generated return on each portfolio by taking the first difference of the underlying series.

Second, while it is often the case that first difference of log value of the stock price is used to generate the stock return the author is not clear about this issue. Therefore, he has to be explicit about whether or not he has made use of logarithms while fitting his models.

Third, while the author has said much about the statistical significance of the numerical estimates of the beta for the underlying portfolios, he has avoided commenting on the results from diagnostic checking of the models knowing that there are several econometric problems causing suspicions about reliability of the estimates. For example, the Durbin Watson statistic is a serial correlation test, which is applicable only when the residuals follow first order autoregressive process and is appropriate when the annual data are used. The author has to rationalise the use of this test for weekly data. Moreover, the author has not able to indicate clearly whether his results in Tables 2 or 3 suffer from serial correlation. It does not suffice to only mention the ranges of the Durbin Watson test. Even if we admit that the lower and upper ranges that have been reported for the Durbin Waston statistics are applicable and correct, while this is absolutely erroneous, as regard to weekly data, the results are inconclusive, except for leasing stocks in which case the Durbin Waston statistic is greater than its upper band, significantly accepting the null of no serial correlation in the model. Therefore, the beta estimates of the portfolios of the *modarabah* and non-Islamic stocks are not reliable because they are no longer BLUE.

Fourth, the data used by the author are overlapping, causing moving average problem in the residuals of the estimated models. For example, the author has used six month (six-period) interest rates on Federal bonds and weekly returns on the underlying portfolios. This causes a problem of multi-period expectations because the interest rate on six month interest is not equal to first difference of the portfolio price index, which gives us a weak, and not a six

month return, but equal to the twentieth difference of the price of the underlying portfolio. Therefore the return on each portfolio is sum of the returns realised at time t+1–t+20, or t–t–20. Thus the disturbances are likely to follow a twentieth-order moving average process.

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