The Pakistan Development Review
40 : 4 Part II (Winter 2001) pp. 929–949

Industry Risk Premia in Pakistan

MOHAMMED NISHAT

1. INTRODUCTION

Industry characteristics is one of the main factors that determines a firm's business risk [Kale, Hakansson, and Platt (1991)], and a single information can affect more than one security price change, perhaps even the whole market. Lessard (1974, 1976) explains that industry plays an important role in explaining national market volatility. One of the reasons for stock index behaviour are attributed to industrial composition as some industries are internally more volatile than the other [Grinold, Rudd, and Stefek (1989)]. Moreover, some sectors show a high degree of global integration, for example, the finance sector [Roll (1992)]. Similarly, consumer goods, fuel and energy, and transportation sectors are extremely important for any country index. King (1966) suggests that if a significant difference in industry risk premia is observed, then we need to isolate the market risk premia and industry risk premia. He observed that the industry components of variance showed much less change from sub-period to sub-period. Significant differential impact of regulatory policy on cost of capital across various sectors was also observed [Isimbabi (1994); Prager (1989)].

The industry specific policies in Pakistan are observed either as a part of the reform package during 1988 and early 1990s, or as an additional policy measure to further boost the private investments in priority sectors. These policies included incentives for foreign investment through permission for repatriation of profits, the easing of investment and banking sector regulations and easy access to loans and tax exemptions on priority sectors like power, exports and agriculture based industries. In addition, the government encouraged equity participation to avoid instability through growing leverage. Some sectors like Islamic and institutional investors were regulated to make the investment more competitive during the reform period. For borrowers as well as lending units these policies are important for estimating the alternative cost of capital and comparing it with the risk premium of the firms to value their future cash flows [for details see Nishat (1999)]. Many industries enjoyed tax exemptions/holidays, additional fiscal

Mohammad Nishat is Professor and Chairman, Department of Finance and Economics, Institute of Business Administration, University of Karachi, Karachi.

benefits and access to concessional loans like agricultural based industries, *Modarabahs* and power projects. To boost foreign exchange earnings government provided concessional export funding to export dominated firms, and relief on import duties on machinery and raw materials.[1] To attract the foreign investors, a legal framework and security on capital investment was provided which included permission to remit profit and capital and relief on double taxation in the case of specific countries. In addition, foreign investors were allowed to negotiate the terms and conditions of foreign currency loans without government intervention. I expect a higher level of risk premia in industry portfolios during reform period. However, there is a possibility that industry characteristics being high or less volatile continues over time, and government policies and reforms either induce more movements in prices in all industries, or only in specific once, which are more sensitive to opening of financial market to foreign investors. On the other hand, there is evidence that in some countries the movements in stock prices are stabilised after liberalised policies [De Santis and Imrohoroglu (1997)].

The other important factor, which identifies the industry portfolio in Pakistan, is the extent of leverage observed across industries due to preferential sectoral debt policy prevailing in Pakistan. For example, the industries based on locally manufactured machinery are given loans at the interest rate almost half of the market interest rate. Moreover, during the non-reform period it was easier and cheaper to get capital from financial institutions than raising through capital market. As a result, the extent of the debt-equity ratio has been higher across industries during both the non-reform and reform period. Due to poor performance of industrial sector, in general, the loan recovery rate had been very low. This resulted in higher debt-equity ratio in the KSE, particularly during the non-reform period. The financial reforms during the 1990s attempted to reduce the extent of leverage across firms and encouraged equity participation in Pakistan. It is argued that the higher level of leverage causes higher volatility in returns of the firms [French, Schwert, and Stambaugh (1987)]. Leverage is one of the factors causing volatility in industry returns in the KSE [Nishat (2001)].

For investors the factors identified above are important to consider while calculating cost of capital and discount rates to evaluate their investments and to value the expected future cash flows. For policy-makers and lending institutions, it is vital to incorporate the risk prevailing in that sector to charge the cost of capital, which is comparable to expected risk premia or discount rate of the firms in that

[1]These concessional loans consist of export financing of both pre-shipment and post shipment finances for locally manufactured machinery. The incentives and additional tax exemptions are part of the industrial package announced in most national budgets to boost the sectoral priorities to uplift the industries, which have both forward and backward linkages in the economy. During the reform period particularly industrial packages were announced to boost the industries in rural areas. Special emphasis has been given on export oriented industries. Recently the power and energy sectors are on the priority list and have an additional fiscal incentive compared to other industries.

sector. This will help them to justify the economic costs and benefits of subsidy involved in certain sectors. Moreover, opening of the stock market also resulted in an inflow of risky foreign capital in industries like chemical, food and allied, fuel and energy, and engineering. Similar funding also came through export oriented firms, who in many cases got advance payments from their overseas clients. I expect that the financial reforms and changing industry specific policies could be another reason causing the change in individual industry risk premium share in the total market risk premia overtime. I also expect difference in risk premia pattern for the firms competing in export market, multinationals, and the industries which are domestically protected.

In this paper the following alternative hypotheses are tested:

- The industries subject to differential policies and reforms have higher risk premia.
- The share of the industry risk premium in market risk premium varied during the non-reform and reform periods.
- Export, multinational and most growth industries, had higher risk premia, and contributed more in total market risk premium than other industries.
- The relation between industry risk and return, if exists, is different during the non-reform and reform periods.
- The industry portfolio returns are more volatile and predictable during the reform period than the non-reform period.

2. ECONOMETRIC MODEL AND ESTIMATION METHOD

I estimate the industry risk factors using the standard CAPM model:

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

where R_{it} is the value-weighted return on industry portfolio i in period *t*, *t* = 1, 2, 3, ….*T*. R_{mt} 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*. β_i is the risk factor of industry portfolio i and α_i is the intercept.

I used the same model to estimate the risk factor for Islamic industry. As 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 cannot be realised in the form of interest. It can only be an implicit part of the outcome of a real economic transaction [Khan (1991, 1996)]. In Islamic framework, we would have a good indicator of risk free return, as argued in literature, if we had efficiently and competitively operating Islamic bank [Khan (1991)]. 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 depositors can be considered a close proxy for the pure time value and 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 same risk free return to estimate the risk premia of Islamic stocks as I use for industries.

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

$$R_{it} - R_{ft} = a_i + b_i(R_{mt} - R_{ft}) + s_i(SMB) + h_i(HML) + \mu_{it} \quad \ldots \quad \ldots \quad (2)$$

where $R_{it} - R_{ft}$ is the return on portfolio i in excess of the risk free rate in period *t*, t = 1, 2, 3, …..*T*. $R_{mt} - R_{ft}$ is the excess return on market portfolio in period *t*, t = 1, 2, 3, ….*T*. SMB is the difference between the returns on a portfolio of small stocks and returns on a portfolio of high stocks in period *t*, t = 1, 2, 3, ……*T* and *HML* is the difference between returns on portfolios of high and low book-to-market stocks in period *t*, t = 1, 2, 3, ….*T*. b_i, s_i and h_i are the slopes in the above time series regression. a_i is the intercept.

Time-varying Risk Premia

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

- the disturbances, ε_{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 β_i'*s* in regression (1) should be time invariant.

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

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

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

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

Note that y_t is the excess return on industry 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 reform period, and 0 otherwise) is included in Equation (5) to capture the impact of institutional developments and 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 non-reform and reform periods. I also test for the difference between second sub-period of reform and non-reform period to distinguish the impact of aggressive and frequent policy measures observed during the later period of reforms.

Within the framework of the basic GARCH-M model any institutional or reform news may affect directly the level of share prices/industry returns through an independent news effect. Or it may affect the variance of the industry 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 α indicates the ARCH effect and β explains the non-synchronous trading effect in the model. An estimate of $\alpha + \beta$ close to 1 indicates a 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 industry returns affects the forecasts of volatility in industry 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 and industry level policy have changed, I expect that the risk-return trade-off will also change, as will the investors' preference towards risk.

3. DATA

The firm level weekly share prices, dividend, capital issues, and paid-up capital data on KSE is collected and computerised by the author using the original "Daily List" and "List of Daily Trading Documents" published by the KSE during January 1980 to December 1994. The data consists of weekly share prices adjusted for dividend and capital issues. The value-weighted industry returns are calculated for non-reform (January 1980 to June 1988) and reform period (July 1988 to December 1994) to test the hypothesis of differential industry risk premia in Pakistan. For comparison industry returns are also calculated for two non-reform sub-period (January 1980 to June 1985 and July 1985 to June 1988) and reform sub-

periods (July 1988 to June 1991 and July 1991 to December 1994. For further details [see Nishat (1999)].

4. EMPIRICAL RESULTS AND DISCUSSION

In this section I present the estimated results to highlight the changing behaviour of industry risk return relationship which could either be due to industry characteristics or induced by reforms, or due to both factors. The risk returns relationship are compared during non-reform and reform periods. The industry risk premia is also compared during above periods. The time-varying risk premia and return relationship estimated through GARCH-M process is presented in this section.

Industry Risk and Returns

In order to test that the industry returns are significantly different during non-reform and reform periods, we consider the null hypothesis of no difference in industry returns before and after the institutional development and reforms. The *t*-tests conducted to see if returns on industry portfolios during the non-reform and reform periods are significantly different. On the basis of *t*-tests at 0.05 significance level, we can not reject the null hypothesis and therefore conclude that the mean returns of most industry portfolios are statistically the same during the non-reform and reform period. The *t*-tests are also conducted to compare if the returns on industry portfolios during non-reform period and the second sub-period of reforms are different. On the basis of *t*-tests at 0.05 level, we reject the null hypothesis for several industry portfolios and therefore accept the alternative hypothesis that for these industry portfolios the average return are different during the second sub-period of reforms and the non-reform period. In most cases the industries with growth firms, foreign equity component and export-based firms have higher average returns than the industries with domestic firms.

Table 1 compares the industry returns and risk factors for the overall study period, January 1980 to December 1994. The expected average returns indicate a lot of variation across industries. The average weekly return varies from 0.157 to 0.836 percent. The maximum expected return is observed in the food and allied industries, and the minimum average return is observed in the jute industry. The industries dominated with multinational and export-based firms have higher average returns than the industries with domestic base. The correlation between industry size and industry return is positive (0.380). The correlation between industry risk beta and industry return is positive (0.588). The results support the theoretical relationship that high returns are associated with risky industries during the overall study period. The risk return relationship is more significant (indicated by higher *t*-statistics values for risk parameter beta) for industries with growth firms, foreign equity component and export-based firms than the industries with domestic firms. The intercepts for industry portfolios are not different than zero as the α_i*'s* are statistically

Table 1

Industry Portfolio Average Weekly Returns and Other Characteristics

This table presents the average weekly returns and other characteristics for value-weighted industry portfolios of the KSE during overall period, January 1980-December 1994. The following model gives the estimates for intercept and risk factor beta $R_{it} - R_{ft} = \alpha_i + \beta_i (R_{mt} - R_{ft}) + \varepsilon_{it}$ where R_{it} is the industry portfolio return, R_f is the risk free return on 6-month bond and R_m is the return on value-weighted market portfolio.

Industry Portfolio	Mean Weekly Return (%)	α_i	β_i	$t(\beta_i)$	$\bar{R}^2$	Mkt. Cap. (Rs Mill)
Islamic	0.581	0.215	0.545	6.694	0.081	178091
Inv Co. and Banks	0.487	0.097	0.774	9.210	0.097	122203
Insurance	0.476	0.148	0.575	7.294	0.062	222649
Textile	0.533	0.178*	0.661	15.082	0.227	486205
Woolen	0.273	0.086	0.117	2.305	0.004	14061
Syn. and Rayon	0.685	0.242	0.947	10.838	0.131	145647
Jute	0.157	–0.107	0.365	6.288	0.046	35943
Sugar	0.374	0.087	0.441	9.466	0.102	212436
Cement	0.637	0.214	0.883	12.716	0.172	190665
Tobacco	0.373	0.089	0.433	5.421	0.034	65046
Fuel and Energy	0.530	0.050	1.068	22.778	0.403	728564
Engineering	0.587	0.173	0.855	11.258	0.140	125540
Cab. and Electric.	0.521	0.173	0.638	7.315	0.063	188156
Tran. and Comm.	0.525	–0.051	1.378	13.035	0.179	233315
Chem and Pharm	0.491	0.057	0.916	21.623	0.326	626427
Paper and Board	0.455	0.133	0.554	7.876	0.072	85208
Vana. and Allied	0.447	0.198	0.320	5.187	0.031	26522
Constructions	0.402	0.103	0.481	4.321	0.021	8389
Leather and Tan.	0.726	0.513	0.202	1.281	0.001	92580
Food and Allied	0.836	0.152	1.731	13.197	0.183	577142
Glass and Cera.	0.552	0.210	0.621	8.152	0.077	56805
Miscellaneous	0.493	0.168	0.564	10.217	0.117	57115
Correlation	(r, beta) [a] =	0.588	correlation	(r, size) [b] =	0.380	

* Significant at 0.05 level.

** Significant at 0.10 level.

[a]Correlation between average industry return and the respective risk factor beta.

[b]Correlation between average industry return and the size (ME) of the industry.

insignificant at the 5 percent significance level, except for textiles for which the intercept is positive and statistically significant. This indicates that for most of the industries portfolio pricing is in equilibrium. For the textile case the zero-beta portfolio return is higher than the risk free return which supports the zero-beta version as suggested in other markets [Jensen (1968)].

The magnitude of industry returns during the first sub-period of non-reform is lower than the overall period (see Table 2). The highest average return during this

Table 2

Industry Portfolio Average Weekly Returns and Other Characteristics

This table presents the average weekly returns and other characteristics for value-weighted industry portfolios of the KSE during non-reform sub-period I, January 1980-June 1985. The following model gives the estimates for intercept and risk factor beta $R_{it} - R_{ft} = \alpha_i + \beta_i (R_{mt} - R_{ft}) + \varepsilon_{it}$ where R_{it} is the industry portfolio return, R_f is the risk free return on 6-month bond and R_m is the return on value-weighted market portfolio.

Industry Portfolio	Mean Weekly Return (%)	α_i	β_i	t(β_i)	$\bar{R}^2$	Mkt. Cap. (Rs Mill)
Islamic	n.a	n.a	n.a	n.a	n.a	n.a
Inv Co.and Banks	0.178	n.a	n.a	n.a	n.a	9610
Insurance	0.556	0.289	0.547	3.319	0.034	69959
Textile	0.240	–0.026	0.534	8.027	0.185	135421
Woollen	0.142	–0.072	0.224	1.947	0.009	12173
Syn and Rayon	0.514	0.191	0.883	6.226	0.118	15923
Jute	0.304	0.003	0.746	8.355	0.198	33338
Sugar	0.412	0.144	0.554	5.726	0.102	112356
Cement	0.422	–0.011	1.538	9.775	0.253	71930
Tobacco	0.228	–0.074	0.748	6.048	0.112	38138
Fuel and Energy	0.290	–0.035	0.888	12.611	0.361	324331
Engineering	0.568	0.231	0.971	5.540	0.095	64304
Cab and Electric.	0.201	–0.126	0.895	9.455	0.240	166387
Tran and Comm	0.391	0.040	1.040	7.394	0.161	129773
Chem and Pharm	0.345	0.004	0.982	13.384	0.389	247712
Paper and Board	0.493	0.177	0.837	5.303	0.082	53455
Vana and Allied	0.533	0.223	0.804	5.919	0.108	19849
Constructions	0.245	–0.079	0.882	3.881	0.041	15751
Leather and Tann	-0.653	0.369	0.492	2.549	0.019	29546
Food and Allied	0.521	0.022	1.932	9.163	0.229	170084
Glass and Cera	0.266	–0.084	1.037	8.656	0.209	26556
Miscellaneous	0.275	–0.026	0.746	5.963	0.109	35201
Correlation	(r, beta)[a] =	0.447	correlation	(r, size)[b] =	0.005	

*Significant at 0.05 level.

** Significant at 0.10 level.

[a]Correlation between average industry return and the respective risk factor beta.

[b]Correlation between average industry return and the size (ME) of the industry.

period is for engineering (a growth industry which also has higher weight in KSE) that is 0.568 percent, and the lowest is in the leather/tanneries industry that is –0.653 percent. The correlation between industry return and industry risk factor is positive (0.447). In many cases industry risk factor betas are higher for industries which yield higher average returns. However, some industries have the higher value for risk factor beta but are not compensated with higher average returns. In this sub-period we do not find much difference in domestic and multinational firms' risk factors. The risk returns relationship during this sub-period is less strong than the overall

study period (indicated by t-statistics of beta). No correlation is observed between industry size and industry return as the coefficient of correlation is negligible. All intercept terms are not different from zero, which indicates that industry portfolio stock pricing is in equilibrium during this period.

The correlation between industry return and beta (risk factor) is very low (0.047) during the second sub-period of non-reform. The higher returns are not attributable to higher risk factors (see Table 3), which is not consistent with theory.

Table 3

Industry Portfolio Average Weekly Returns and Other Characteristics

This table presents the average weekly returns and other characteristics for value-weighted industry portfolios of the KSE during non-reform sub-period II, July 1985-June 1988. The following model gives the estimates for intercept and risk factor beta $R_{it} - R_{ft} = \alpha_i + \beta_i (R_{mt} - R_{ft}) + \varepsilon_{it}$ where R_{it} is the industry portfolio return, R_f is the risk free return on 6-month bond and R_m is the return on value-weighted market portfolio.

Industry Portfolio	Mean Weekly Return (%)	α_i	β_i	t(β_i)	$\bar{R}^2$	Mkt. Cap. (Rs Mill)
Islamic	0.630	0.469	0.033	0.113	0.000	31197
Inv Co. and Banks	0.785	0.536	0.541	1.475	0.007	23382
Insurance	0.229	–0.241	1.647	6.853	0.230	342106
Textile	1.051	0.727*	0.925	5.339	0.151	254612
Woollen	0.179	0.028	0.019	0.204	0.000	17656
Syn and Rayon	0.640	0.422	0.375	0.917	0.001	23786
Jute	0.196	–0.040	0.450	2.747	0.040	40775
Sugar	0.564	0.395	0.118	0.588	0.004	223400
Cement	0.629	0.416	0.347	1.924	0.017	171230
Tobacco	0.226	0.034	0.227	1.058	0.005	66104
Fuel and Energy	0.404	0.132	0.639	5.684	0.168	686148
Engineering	0.424	0.119	0.815	3.639	0.074	129548
Cab and Electric.	0.587	0.354	0.445	1.015	0.005	197243
Tran and Comm	0.614	0.187	1.444	3.405	0.064	279845
Chem and Pharm	0.460	0.174	0.712	5.727	0.171	687795
Paper and Board	0.220	–0.082	0.791	4.608	0.116	85636
Vana and Allied	0.330	0.096	0.445	2.301	0.026	37438
Constructions	0.029	–0.247	0.651	2.523	0.033	7454
Leather and Tann	0.268	0.108	0.065	0.304	0.000	57403
Food and Allied	0.305	–0.083	1.230	3.781	0.079	244670
Glass and Cera	0.223	0.020	0.284	1.655	0.011	86544
Miscellaneous	0.409	0.094	0.863	4.698	0.120	54981
Correlation	(r, beta) [a] =	0.047	correlation	(r, size) [b] =	0.006	

*Significant at 0.05 level.

** Significant at 0.10 level.

[a]Correlation between average industry return and the respective risk factor beta.

[b]Correlation between average industry return and the size (ME) of the industry.

The reason could be that there was less opportunity to diversify the risk during this sub-period than the reform period. The risk return relationship is weaker during this sub-period than the overall period as the *t*-statistics for risk beta (risk factor) are lower than the overall study period. The correlation between industry size and respective average returns is positive but very low. During this period the α_i'*s* are also not different from zero except textiles, which supports the hypothesis that the pricing of the industry portfolios is in equilibrium.[2]

During the overall reform period the average industry returns are higher than during both the sub-periods of non-reform (see Table 4). The risk return relationship is stronger and more consistent with theory during reform period than the two sub-periods of non-reform. The industries with high (low) risk factors have high (low) average returns. The correlation between industry returns and risk factors is positive. The coefficient of correlation between risk and returns is higher (0.511) during the reform period than the non-reform period. However, some industries are exceptions during this period like transport and communications for which the average return is low but the risk factor is higher. Similarly, for leather and tanneries the average return is higher but the attributed risk factor is lower than expected. Industry size and industry returns have a positive relationship but the coefficient of correlation is only 0.369. All intercept terms are not different from zero (except for miscellaneous firms portfolio) which indicates equilibrium pricing for industry portfolios during the reform period. The coefficient for miscellaneous industries is positive and almost two times the borrowing rate, which supports the zero-beta portfolio during the reform period.

As presented in Table 5, in most cases the average returns on industry portfolios during the first sub-period of reforms are lower than the overall reform period, except for food and allied industries. However, the correlation between industry risk and returns are higher (0.765) than the non-reform period. This indicates that the empirical relationship between risk and return is stronger during this sub-period than the non-reform period. There are some cases where the theoretical relationship is not observed. For example, the transport and communication portfolio has a high beta but a negative return. Similarly, construction and vanaspati and allied have very low beta factors but the average returns are comparatively higher. The correlation between industry size and portfolio returns is low (0.382) during this sub-period but higher than in the non-reform period. All intercept terms are statistically not different from zero except for Islamic

[2]For textiles the intercept is positive and statistically significant. The size of the coefficient of textile industry is much larger than the risk free return and could be interpreted as the support for zero-beta version only if the borrowing rate in the market is substantially higher by a very large margin. The intercept value suggests a borrowing rate of five times the risk free rate of return, which is not plausible at least during this period. Therefore, there may have been some degree of non-equilibrium pricing of textile stocks during this period [Jensen (1968)].

Table 4

Industry Portfolio Average Weekly Returns and Other Characteristics

This table presents the average weekly returns and other characteristics for value-weighted industry portfolios of the KSE during overall reform period, July 1988-December 1994. The following model gives the estimates for intercept and risk factor beta $R_{it} - R_{ft} = \alpha_i + \beta_i (R_{mt} - R_{ft}) + \varepsilon_{it}$ where R_{it} is the industry portfolio return, R_f is the risk free return on 6-month bond and R_m is the return on value-weighted market portfolio.

Industry Portfolio	Mean Weekly Return (%)	α_i	β_i	$t(\beta_i)$	$\bar{R}^2$	Mkt. Cap. (Rs Mill)
Islamic	0.577	0.159	0.607	8.431	0.178	251539
Inv Co. and Banks	0.605	0.009	0.972	11.522	0.282	242372
Insurance	0.521	0.184	0.433	4.420	0.053	271642
Textile	0.534	0.084	0.665	11.735	0.294	824163
Woollen	0.427	0.254	0.090	1.324	0.002	13898
Syn and Rayon	0.847	0.215	1.047	10.832	0.261	288819
Jute	0.012	–0.237	0.245	2.859	0.021	35791
Sugar	0.250	–0.102	0.461	9.910	0.228	275445
Cement	0.819	0.327	0.755	8.931	0.193	280989
Tobacco	0.564	0.262	0.359	2.985	0.024	83290
Fuel and Energy	0.791	0.095	1.180	16.400	0.449	1015099
Engineering	0.676	0.149	0.827	9.127	0.200	170081
Cab and Electric.	0.758	0.351	0.579	5.692	0.087	20438
Tran and Comm	0.594	-0.247	1.478	10.295	0.242	293811
Chem and Pharm	0.626	0.052	0.925	15.335	0.416	853824
Paper and Board	0.531	0.193	0.433	4.792	0.063	107775
Vana and Allied	0.428	0.223	0.157	2.150	0.011	27655
Constructions	0.709	0.425	0.323	2.086	0.010	3500
Leather and Tann	0.999	0.814	0.120	0.451	0.000	152482
Food and Allied	1.351	0.391	1.729	8.693	0.179	1004020
Glass and Cera	0.949	0.568	0.526	4.501	0.055	65155
Miscellaneous	0.715	0.365*	0.459	7.343	0.139	72856
Correlation	(r, beta) [a] =	0.511	correlation	(r, size) [b] =	0.369	

*Significant at 0.05 level.

[a]Correlation between average industry return and the respective risk factor beta.

[b]Correlation between average industry return and the size (ME) of the industry.

Table 5

Industry Portfolio Average Weekly Returns and Other Characteristics

This table presents the average weekly returns and other characteristics for value-weighted industry portfolios of the KSE during reform sub-period I, July 1988-June 1988. The following model gives the estimates for intercept and risk factor beta $R_{it} - R_{ft} = \alpha_i + \beta_i (R_{mt} - R_{ft}) + \varepsilon_{it}$ where R_{it} is the industry portfolio return, R_f is the risk free return on 6-month bond and R_m is the return on value-weighted market portfolio.

Industry Portfolio	Mean Weekly Return (%)	α_i	β_i	$t(\beta_i)$	$\bar{R}^2$	Mkt. Cap. (Rs Mill)
Islamic	0.855	0.580*	0.504	3.526	0.076	193294
Inv Co. and Banks	0.341	0.025	0.699	3.618	0.074	142552
Insurance	0.141	–0.135	0.515	3.442	0.066	357634
Textile	0.441	0.184	0.599	6.130	.0.194	857947
Woollen	0.175	0.011	0.019	0.258	0.000	18792
Syn and Rayon	0.705	0.356	0.864	4.819	0.128	172191
Jute	0.098	–0.162	0.447	2.796	0.043	47004
Sugar	0.273	0.006	0.481	4.716	0.123	367002
Cement	0.157	–0.154	0.676	4.965	0.135	288770
Tobacco	0.382	0.175	0.215	1.014	0.004	110584
Fuel and Energy	0.521	0.194	0.754	7.144	0.249	1125247
Engineering	0.428	0.100	0.758	5.790	0.177	184998
Cab and Electric.	0.171	–0.063	0.331	1.758	0.019	232540
Tran and Comm	–0.021	–0.362	0.803	4.300	0.104	347863
Chem and Pharm	0.512	0.119	1.053	10.856	0.436	876945
Paper and Board	0.253	–0.038	0.590	2.844	0.044	118144
Vana and Allied	0.412	0.251	0.011	0.091	0.000	38608
Constructions	0.828	0.650	0.099	0.248	0.000	4821
Leather and Tann	0.288	0.128	0.002	0.014	0.000	264708
Food and Allied	1.932	0.965	3.669	6.837	0.232	969735
Glass and Cera	0.676	0.394	0.559	2.244	0.025	87472
Miscellaneous	0.410	0.198	0.238	2.189	0.024	84076
Correlation	(r, beta) [a] =	0.765	correlation	(r, size) [b] =	0.382	

*Significant at 0.05 level.

**Significant at 0.10 level.

[a]Correlation between average industry return and the respective risk factor beta.

[b]Correlation between average industry return and the size (ME) of the industry.

portfolios. The value of the intercept for Islamic portfolios is higher than the prevailing markup rate of 15 to 17.5 percent per annum. The other explanation could be that Islamic stocks had some degree of non-equilibrium in their pricing during this period, possibly due to many new flotations of Islamic firms during this sub-period.

Both the average returns and the respective risk factors are higher for most of the industry portfolios during the second sub-period of reform than the non-reform period (Table 6). However, there are cases of low returns attributed to high risk and

Table 6

Industry Portfolio Average Weekly Returns and Other Characteristics

This table presents the average weekly returns and other characteristics for value-weighted industry portfolios of the KSE during reform sub-period II, July 1991-December 1994. The following model gives the estimates for intercept and risk factor beta $R_{it} - R_{ft} = \alpha_i + \beta_i (R_{mt} - R_{ft}) + \varepsilon_{it}$ where R_{it} is the industry portfolio return, R_f is the risk free return on 6-month bond and R_m is the return on value-weighted market portfolio.

Industry Portfolio	Mean Weekly Return (%)	α_i	β_i	$t(\beta_i)$	$\bar{R}^2$	Mkt. Cap. (Rs Mill)
Islamic	0.334	–0.209	0.649	7.507	0.244	309784
Inv Co. and Banks	0.830	0.001	1.037	11.087	0.413	342193
Insurance	0.846	0.465	0.400	3.003	0.049	185651
Textile	0.610	0.028	0.684	9.194	0.326	790379
Woollen	0.641	0.473	0.096	0.979	0.005	9004
Syn and Rayon	0.964	0.094	1.096	8.914	0.312	405448
Jute	–0.061	–0.308	0.201	1.850	0.019	24578
Sugar	0.228	–0.199	0.462	8.573	0.296	183888
Cement	1.383	0.758*	0.752	6.693	0.204	273207
Tobacco	0.718	0.344	0.389	2.485	0.034	55995
Fuel and Energy	1.020	0.018	1.284	13.177	0.498	904951
Engineering	0.885	0.194	0.841	6.720	0.205	155165
Cab and Electric.	1.258	0.726	0.619	4.813	0.117	174335
Tran and Comm	1.121	–0.126	1.632	8.134	0.274	239759
Chem and Pharm	0.720	–0.012	0.898	11.111	0.414	830704
Paper and Board	0.766	0.395	0.386	3.847	0.078	97405
Vana and Allied	0.438	0.202	0.192	1.995	0.022	16703
Constructions	0.603	0.232	0.385	2.558	0.036	2180
Leather and Tann	1.605	1.427	0.118	0.292	0.000	40257
Food and Allied	0.844	–0.170	1.299	8.177	0.276	1038305
Glass and Cera	1.178	0.722	0.511	3.701	0.073	42837
Miscellaneous	0.972	0.520*	0.503	6.215	0.181	61635
Correlation	(r, beta) [a] =	0.275	Correlation	(r, size) [b] =	0.051	

*Significant at 0.05 level.

** Significant at 0.10 level.

[a]Correlation between average industry return and the respective risk factor beta.

[b]Correlation between average industry return and the size (ME) of the industry.

vice versa. The correlation between industry risk factor beta and average return is low (0.275), which indicates a weak theoretical relationship between industry risk and return during this period. The correlation between industry size and industry return is positive, but low. The intercept terms are statistically not different from zero in all cases except cement and miscellaneous industries. For the cement and miscellaneous industries the intercepts are much higher than the risk free return and support the zero-beta version portfolio for these industries. This is probably due to non-equilibrium of cement and miscellaneous stocks pricing during the second sub-period of reforms. The

above analysis indicates that the average returns for most industries are higher during the reform period than the non-reform period, particularly during the second sub-period of reform. However, statistically the average return is higher only for few industries during the overall and the second sub-period of reforms. The theoretical relationship between risk and return, that the higher returns are attributed to higher risk, is stronger during the reform period than the non-reform period, particularly during the first sub-period of reform. Most industries indicated their pricing in equilibrium during both the non-reform and reform periods.

Industry Risk Premia

The market risk premia in the KSE increased significantly after liberalised policies in Pakistan. The volatility is returns is more evident, persistence and more predictable during the reform period than non-reform period [Nishat (2000)]. In this section I compare the industry portfolios if they are equally sensitive to government policies or their industry characteristics prevail during non-reform and reform periods. I test the alternative hypotheses that:

- The industry risk premia are higher during the reform period than the non-reform period.
- The risk premia are higher for industries with foreign capital component than

for the domestic industries.

In order to test the above hypotheses I estimate the risk premia on industry portfolios using cross-sectional regression procedure described in Section 2. The explanatory variables for cross-sectional regression are obtained for each week t, t = 1, 2, 3,….T through CAPM and three factor model, given earlier in Equations 1 and 2. I conducted Chow tests of whether the industry risk premia estimated during the non-reform and reform periods are governed by the same relationship. The null hypothesis is that there is no difference in the coefficients of regressions in the two periods. The acceptance of the alternative hypothesis will establish that there is a significant difference in risk premia during non-reform and reform periods. I also distinguish the second sub-period of reform (July 1991 to December 1994) from the non-reform period to see if there is any significant difference in risk premia due to frequent policy measures observed during later period of reform.

Industry risk premia estimates of the CAPM and the three-factor model[3] are presented in Tables 7 to 12.[*] The Chow test statistics (reported for CAPM case

[3]The estimated results for CAPM and three factor model for 22 value weighted industy portfolios during overall and different non-reform and reform periods (the results are not provided but available on request) indicate that the three factor model does not provide any significant improvement over the CAPM model to explain the industry excess returns either during the non-reform or reform periods as the adj-R^2 are, in most cases, not different for both CAPM and three factor models.

[*]These tables are available with the author.

only) shown in Table 7 indicate that out of 22, 12 industries indicated the risk premia being estimated through different relationship during non-reform and reform periods. Similarly, 8 out of 22 industries indicated that the risk premia estimated during the second sub-period of reforms and non-reform are governed by different relationships.

In most cases the risk premia estimated through both CAPM and three-factor model have almost the same pattern across industries. As presented in Table 7, the export-based industries such as textile and synthetic rayon and growth industries (which are subject to international factors as well as domestic policy changes) have higher risk premia. For example, the food and allied industries indicated a higher risk premium mainly due to couple of large multinational firms in this sector. This supports the hypothesis that the industries with foreign capital component in their operations are more risky and require higher risk premia than the domestic industries. During this period the risk premia estimated through CAPM varies between 0.036 and 0.535 percent per week (three factor model estimates the risk premia between 0.046 to 0.492 percent per week).

As evident in Table 8, during the first sub-period of non-reform the risk premia varies between 0.038 to 0.324 percent per week (0.040 to 0.314 per cent for the three factor model). The food and allied industry contributed the highest risk premia in total market risk premium. A similar pattern is observed during the second sub-period of non-reform (see Table 9). Again the industries which have multinational component in their equity share have higher risk premia and greater contribution to market risk premium during the second sub-period of non-reform. During this period the risk premia varied between 0.006 and 0.328 percent per week.

During the overall and the reform period the risk premia varied between 0.044 to 0.834 percent per week (Table 10). The higher industry risk premia during the reform period supports the hypothesis that due to regulatory policies and institutional development the industry risk premia are higher during the reform period than the non-reform period. Again the industries dominated by exports, growth firms and those with multinational connections have higher risk premia. However, industry risk premia during the first sub-period of reforms are lower than the overall reform period and varied between 0.000 to 0.819 percent per week (see Table 11). The industries with multinational capital, export orientation, and growth have comparatively higher risk premia during the first sub-period of reforms. The risk premia are significantly higher for most of the industries during the second sub-period of reforms as compared to both sub-periods of non-reform (see Table 12). One of the reasons is that the variability in portfolio returns increased significantly after liberalisation. These findings are consistent with the results observed in other emerging markets [Harvey (1995)]. The industry risk premia varied between 0.668 to 1.150 percent per week, and almost all industries indicated higher risk premia during the later period of reforms. Again during this period the industries with export potential, growth and with multinational covering have higher risk premia.

In conclusion, the industry portfolio analysis indicates that industry characteristics prevailed across both the non-reform and reform periods. The results support the hypothesis that liberalised policies have induced a higher risk premia during the reform period than the non-reform period, particularly during the second sub-period of reforms. The results also support the hypothesis that industries with foreign capital component have higher risk premia than the domestic industries during both the non-reform and reform periods.

Time-varying Risk Premia

In the last section while comparing industry risk premia it was established that industry risk premia are higher during the reform period than the non-reform period, particularly during the second sub-period of reform. 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 industry 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 test the alternative hypotheses that:

- The relation between market risk and industry expected returns is different during the non-reform and reform periods.
- The industry portfolio returns are more volatile during the reform period than the non-reform period.

As expected, in most cases the higher average returns appear to be associated with a higher level of volatility It is also evident that for the market as well as industry portfolios, the average return and volatility is higher during the reform period. Another interesting pattern is identified through kurtosis. The index of kurtosis is considerably higher during the reform period. Moreover, the higher values of kurtosis also suggest big surprises of either sign in industry portfolio returns, at least unconditionally, particularly during the reform period. In the CAPM estimation described earlier, I assumed that the industry 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 residuals of the regression (1) should be serially uncorrelated, homoskedastic and normal, the systematic relationship between portfolio return and market returns should be linear, and the estimate of beta should be time invariant. The results presented in Table 13[*] indicate a greater evidence of non-linearity, non-normality and parameter non-constancy. This is probably a reflection of the view that betas are time-varying and are better modeled within the autoregressive conditional heteroskedasticity (ARCH) model framework introduced

[*]The table is available with the author.

by Engle (1982). The ARCH framework explicitly models the time varying conditional variances by relating them to variables known from the previous period.[4]

In order to test the above hypotheses, the GARCH(1,1)-M model, as described earlier in Equations 3 to 5, is estimated during non-reform and reform period. In this case dependent variable y_t is the excess return on industry portfolio on week *t*, and the explanatory variable x_t is the excess return on market portfolio on week *t*. The results of the GARCH(1,1)-M model are presented in Tables 14 to 19.[*] The Box Pierce portmanteau test statistics Q(12) and $Q^2(12)$ are 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 a dummy variable (D_t =1 for reform period, and 0 otherwise) in Equation 5 to capture the effect of liberalisation on industry risk premia through GARCH(1,1)-M process. I also distinguish the effect of frequent policy measures during the second sub-period of reforms separately. As presented in Table 14 the coefficient of the dummy variable for the reform period indicated a significant shift in risk premia in 5 industries (3 upward and 2 downward). Similarly, four industries indicated a significant increase in risk premia and a decline in one industry during the second sub-period of reform compared to the non-reform period.

In the overall study period, out of 22 industries five indicate a significant relation between risk and return at the 0.05 significance level and one other industry has significant relationship between risk and return at the 0.10 significance level (see table 14). The reward to risk (indicated by parameter θ) varied between 0.000 and 0.173 percent per week during the long run study period. Most of the export oriented and growth industries with multinational equity capital indicated significant and higher coefficient for risk aversion during this period. The industries which do have a significant relation between risk and returns indicated a significant coefficient of volatility, α_1, or ARCH effect which causes an increase in future volatility. The estimated coefficient of the ARCH effect, α_1, is less than one for all industries. Unconditional variance of excess holding yield does not indicate any fat tailed return distribution during this period for any of the industries. None of the industries indicated any significant persistence in volatility movements indicated by $\alpha_1 + \beta$ value. Only one industry indicated a significant impact of non-synchronous trading during this period as the estimated coefficient of moving average, β, is significant for this industry.

[4]In its standard form the ARCH model expresses the conditional variance as a linear function of past squared innovations; in markets where the price changes are innovations, large changes tend to be followed by large changes and small changes are followed by small changes of either sign [Mandlebrot (1963); Engle, Lilien, and Robins (1987)].

[*]These tables are available with the author.

As presented in Table 15, only five out of 22 industries have a significant relationship between risk and return during the first non-reform period. The coefficient of risk aversion varied between 0.000 to 0.232 percent per week across industries. Most of the industries with export and with foreign capital component indicated no significant relationship between risk and return. Locally owned industries with a domestic market indicated a significant relation between risk and return and a higher coefficient of risk aversion during this period. The spread of risk premia across industries is higher than the entire study period. Ten industries displayed a significant ARCH effect, which indicates that these industries have surprises and increased future volatility in returns. The ARCH effect coefficient values for all industries are less than one, which indicates no fat tailed return distribution or stationary process for unconditional variance of excess holding yields. Only textiles, fuel and energy, glass and cement industries have persistence in volatility movements during this period. These industries indicated a significant impact of non-synchronous trading in this period as the moving average component is significant.

In the second period of non-reform only four out of 22 industries indicated a significant relationship between risk and return, as risk aversion coefficients are significant for these industries (see Table 16). These industries are either export based or consist of infrastructural related firms. The magnitude of coefficients of risk aversion is higher than in the overall and the first sub-period of non-reform. Most locally owned industries indicated significant ARCH effects and had surprises and increased future volatility in returns. None of the industries indicated any fat tailed return distribution in unconditional variance of excess return holding yield. Only one industry indicated persistence in volatility movements in returns as the estimated coefficient of persistence, $\alpha_1 + \beta$, is large 0.936. This industry also indicated a significant impact of non-synchronous trading as the moving average component is significant with a estimated coefficient value of 0.826 during this period.

Again during the overall reform period, the pattern of the relationship between industry risk and return is the same as observed during the second sub-period of non-reform. Most locally owned industries indicated a significant relationship between risk and return in this period. Only four industries indicated a significant ARCH effect during the overall reform period (see Table 17). The domestically owned industries displayed an evidence of volatility clustering and indicated big surprises of either sign, which causes an increase in future volatility. The coefficient of the ARCH effect is less than one for all industries, which indicates no fat tailed distribution of unconditional variance of excess holding yield. Only one industry indicated persistence in volatility movements and also impact of non-synchronous trading during this period.

During the first sub-period of reform five industries indicated a significant risk and return relationship (see Table 18). These industries included growth and

Islamic sector firms. As expected, 11 out of 22 industries indicated an ARCH effect or significant impact of conditional variance on excess return. Locally owned industries with a domestic market were more volatile than export or multinational dominated industries during the first period of reform. These industries displayed evidence of more surprises and increased future volatility in returns. The coefficient of ARCH effect is less than one in all cases means no evidence of unconditional variance of excess holding yield during this period. Only two industries indicated a high degree of persistence in volatility ($\alpha_1 + \beta$ of 0.924 and 0.783). These industries also indicated a significant impact of non-synchronous trading in this period.

Only one industry had a significant relationship between risk and return during the second sub-period of reform. Five industries, mainly domestically owned, indicated a significant ARCH effect as the coefficients of volatility are significant for these industries and displayed evidence of surprises in their returns which cause an increase in future volatility in returns (see Table 19). The coefficient of ARCH is less than one in all cases and indicates no evidence of fat tailed unconditional variance of excess holding yield during this period. Only one industry indicated a high degree of persistence in volatility with estimated coefficient of persistence, $\alpha_1 + \beta$, as 0.869 in this period. Only two industries indicated significant impact of non-synchronous trading.

As summarised in Table 20,* the industry risk premia estimated through GARCH(1,1)-M process also indicated an upward shift after the liberal policies and financial reforms, particularly during the second sub-period of reforms. The industry portfolio analysis indicates that more industries have significant relationships between risk and return during the non-reform period, but the volatility in industry returns was lesser during this period. The volatility in industry returns was more evident during the reform period after the financial market was opened to foreign investors, particularly during the first period of reform. The impact of non-synchronous trading and the degree of persistence are only significant in a few industries during both the non-reform and reform period. Leverage at the industry level has been historically high in Pakistan, hence the consistent negative and significant relationships between return and volatility change are observed. In most cases, highly levered industries had a stronger negative relationship between return and volatility change than the less levered industries [Nishat (2001)].

5. SUMMARY AND CONCLUDING REMARKS

The above findings based on industry portfolios analysis also support the hypothesis that he opening financial markets resulted in an increase in price movements and higher risk premia rather than stabilising the stock prices during the

*The table is available with the author.

reform period, particularly during the second sub-period of reforms. On average the industry returns are higher during the reform period than the non-reform period. However, only a few industries have statistically different average returns during the non-reform and reform periods. The higher return associated with higher risk phenomenon was stronger during the reform period than the non-reform period, particularly during the first sub-period of reforms. The results indicate that the industry characteristics prevailed during both the non-reform and reform periods. However, liberalised policies induced a higher risk premia in most industries.

The results suggest that when risk factor beta is allowed to be varying over time, more industries showed evidence of the theoretical relationship between risk and return prior to the reform period. The volatility in industry return was more pronounced during the reform period, particularly during the first period of reform. The impact of non-synchronous trading and the degree of persistence in volatility movements were significant only in few industries during both the non-reform and reform periods.

REFERENCES

De Gennaro, R. P. (1990) The Effect of Payment Delays on Stock Prices. *Journal of Financial Research* 13:2, 133–146.

De Santis, G., and S. Imrohoroglu (1997) Stock Returns and Volatility in Emerging Financial Markets. *Journal of International Money and Finance* 16:4, 561–79.

Engle, R. F. (1982) Autoregressive Conditional Heteroskedasticity with Estimates of the Variance of United Kingdom Inflations. *Econometrica* 50:4, 987–1008.

Engle, R. F., D. M. Lilien, and R. P. Robins (1987) Estimating Time Varying Risk Premia in the Term Structure: The ARCH-M Model. *Econometrica* 50, 987–1007.

Fama, E. F., and K. R. French (1996) Multifactor Explanations of Asset Pricing Anomalies. *Journal of Finance* 51, 55–84.

French, K. R., G. W. Schwert, and R. F. Stambaugh (1987) Expected Stock Returns and Volatility. *Journal of Financial Economics* 19, 3–29.

Grinold, R., A. Rudd, and D. Slefek (1989) Global Factors: Fact or Friction. *Journal of Portfolio Management* 16:1, 79–89.

Harvey, C. R. (1995) Predictable Risk and Returns in Emerging Markets. *Review of Financial Studies* 8, 773–816.

Isimbabi, M. J. (1994) The Stock Market Perception of Industry Risk and the Separation of Banking and Commerce. *Journal of Banking and Finance* 18, 325–349.

Jensen, M. (1968) The Performance of Mutual Funds in the Period 1945–1964. *Journal of Finance* 23, 389–416.

Kale, J. K., N. H. Hakansson, and G. W. Platt (1991) Industry vs. Other Factors in Risk Prediction. Walter A Haas School of Business Research Programme in

Finance Working Paper Series, Institute of Business and Economic Research, University of California at Berkley. (Finance Working Paper No. 201.)

Khan, M. F. (1996) Cost of Capital for an Islamic Firm: The Case of Islamic Development Bank (IDB). *Islamic Studies* 4:1, 67–72.

Khan, M. S. (1993) *The Securities Market in Pakistan.* Karachi: Royal Book Company.

King, B. F. (1966) Market and Industry Factors in Stock Prices Behaviour. *Journal of Business* 39, 139–190.

Lessard, D. R. (1974) World, National, and Industry Factors in Equity Returns. *Journal of Finance* 29:2, 379–391.

Lessard, D. R. (1976) International Diversification. *Financial Analyst Journal* 32, 32–38.

Mandlebrot, B. (1963) The Variation of Certain Speculative Prices. *Journal of Business* 36:4, 394–419.

Nishat, M. (1999) The Impact of Institutional Development on Stock Prices in Pakistan. Unpublished Doctoral Dissertation, Auckland Business School, University of Auckland.

Nishat, M. (2000) Institutional Development and Risk Premia in Pakistan. Paper presented at Asia-Pacific Finance Association Conference 2000, held in Shanghai, China, July 2000.

Nishat, M. (2000) The Systematic Risk and Leverage Effect in the Corporate Sector of Pakistan. *The Pakistan Development Review* 39:4, 951–962.

Prager, R. A. (1989) Using Stock Price Data to Measure the Effects of Regulation: The Interstate Commerce Act and the Railroad Industry. *Rand Journal of Economics* 20:2, 280–293.

Roll, R. (1992) Volatility in US and Japanese Stock Market: A Symposium. *Journal of Applied Corporate Finance* 5:1, 25–35.

The comments on the paper were not received in time for press. *Ed.*