An Empirical Analysis of Market and Industry Factors in Stock Returns of Pakistan Cement Industry

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Abstract
This paper applies multi-index model to Pakistan cement industry firms to find out the relationship of Pakistan cement industry firms to selected market and industry variables. The seven firms selected for this analysis were on the basis of data availability, profitability and performance on the KSE 100 index. The data for the stock prices for the selected cement firms and market and industrial variables were obtained for the period of July 1998 to July 2004. This paper concludes that the return on the KSE 100 index is the only independent variable significant at 0.05 level, while the industry variables are insignificantly related to the stock returns of cement industry but they do increase the explanatory power of the model.

1. INTRODUCTION

Investing in stock has become very popular in Pakistan in recent days. People invest in stock in order to get return on it. The return on stock is dependent on many factors, the exact number of factors is not yet known. Also the returns on securities are interdependent. The degree of interdependence between a pair of securities can be measured by covariance and correlation. This interdependence of returns led to the Capital Asset Pricing Model (CAPM). This model posits a positive and linear relationship between the beta of a security and its expected return.

An alternative to the CAPM, called the Arbitrage Pricing Theory (APT) or Multi factor model has been developed more recently. The differences between the two models stems from the APT's treatment of interrelationship among the returns on securities. The APT assumes that returns on securities are generated by a number of industry-wide and market-wide factors.[1]

According to Multi factor model the stock returns are dependent upon many factors. One factor is market return and other various factors which are grouped into industry-wide factors. The industry-wide factors may be different for different firms. The total number of these industry-wide factors is not yet known. The commonly used industry factors are Industrial Production Index., Consumer Price Index, Risk Free Rate of Return, Announcements, surprises and many unexpected events about the firms.

There are very few published studies concerning the testing of multi-index models on specific industries. Stock prices for firms in the same industry exhibit a common movement that goes beyond the market effect. This was proved by a study using monthly closing prices for 63 firms in six industries during the June 1927 to December 1960 period, this study concluded that while 50% of the stock prices movement could be explained by movement in the market index, 20% of the residual variance was accounted for by industry affiliation. [2]

Most of the researches were done in the utility industry to find out factors other than market affecting the stock returns. As Melicher studied returns of 84 electric utility firms for the period 1967-71, analyzing 28 variables using factor analysis to determine their significance, only seven out of those seemed to affect the stock returns [3]. These seven variables were financial leverage, size, earnings trend, operating efficiency, financing policy, return on investment, and market activity.

Volatility factor models are based on the presumption that the co variances between the security returns are attributable to the fact that security's prices respond to varying degrees to leverage, size, earnings trend, operating efficiency, financing policy, return on investment, and market activity.

According to Bae and Gregory a multi-index CAPM using selected economic and industry variables provides additional power in explaining the variability of U.S. Aerospace stock returns over a single index model using the market index alone [4]. Several other studies also confirm that factors other than the market do explain the variability of stock returns, that is multi-index model is a better tool in explaining the variability of stock returns [5][6][7].

In Pakistan very little published research is found concerning the testing of multi factor model on specific industries. A study was conducted to check out the impact of dividend policy on stock prices in Pakistan. The result suggests that both dividend policy measures (dividend yield and payout ratio) have significant impact on the share price volatility. [8]

This paper attempts to develop a multi-index model for the cement industry of Pakistan. The model consists of five predetermined market and industry variables which are likely to affect stock returns of cement firms. The independent variables are Return of Karachi Stock Exchange (KSE) 100 index, Consumer Price Index (CPI), Industrial Production Index (IPI), Risk Free Rate of Return (RFR) and Cement Exports (EXP). The model is tested on seven major participants in cement industry to check out

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their explanatory power in explaining the variability of the stock returns of selected firms.

The cement industry of Pakistan is witnessing a tremendous growth in recent years. The production capacity has doubled from 8.9 million tones to 17.7 million tones during the last 6 to 7 years and exports of cement have increased by 160 %. The fiscal year 2003-04(FY04) is a truly monumental year for the local cement sector. During the year, cement dispatches of the industry grew by 14.16% (9.78 tons) up to the month of March and likely to touch 12.969 mill tons during the year 2004. [9]

Housing is the biggest and recurring consumer of cement in Pakistan. Evidence and estimates suggest that more than 50% of total cement demand emerges from the housing industry. Besides housing, there is evidence of mounting cement consumption by the government-sponsored projects. Lyari Expressway, Northern Bypass, and Gawadar Port are some of the projects that are in different phases of construction and are generating demand for cement and along with these some upcoming mega projects in the public sector like Kalabagh Dam and Bhasha Dam and reconstruction activities in neighboring countries like Afghanistan and Iraq. Keeping these settings in minds the cement industry of Pakistan becomes a very lucrative investment opportunity for investors.

This paper also finds out which, if any, of the market and industry variables are of use in explaining the stock returns variability of cement industry. This paper further explores if the inclusion of extra variables worth the effort and expense of including them, or is a single index model using only a market index adequate to explain variability of stock returns of cement industry and also to check out is the model is significant for all the firms or not.

2. REVIEW OF THE LITERATURE

Investors demand a premium for bearing risk; that is the higher the security's risk the higher it's expected price or return in order to induce investors to buy that security. An important tool which is used in analyzing risk and return relationship is Capital Asset Pricing Model (CAPM).The primary conclusion of the CAPM is this The risk of a portfolio that is held by an investor is measured in terms of its standard deviation or variance, while the relevant risk of an individual stock is its contribution to the risk of a well diversified portfolio. This contribution can be measured by the beta factor for the stock. It is a relationship between the ex-ante expected returns on the individual assets and the market portfolio.

The fundamental problem with capital asset pricing model is that it may not be possible to support or contradict the model with empirical evidence, and, in any case the empirical evidence that we have doesn't support even a contained (say, to us marketable securities) version of the model. This problem has stimulated interest in an alternative model of asset pricing called the Arbitrage Pricing Theory (APT). [10]

The fundamental assumption of the APT is that the co variances that exist between security returns can be attributed to the fact that the securities respond, to one degree or another, to the pull of one or more factors. These factors cannot be specified exactly but it is assumed that the relationship between the security returns and the factors is linear, as in the case of a multi factor model.

Single Factor Model was developed in 1963 to predict security's returns. The major characteristics and the primary shortcoming of the Single Index Model is that the only factor influencing a security's return is its sensitivity to changes in the market portfolio return.

The Single Factor Model is the extension of one period mean-variance portfolio models of Markowitz and Tobin, which in turn are built on the expected utility model of von Nuemann and Morgensten. The Markowitz mean variance analysis are concerned with how the consumer investor should allocate his wealth among the various assets available in the market, given that he is one period utility maximizer. The Single Factor Asset Pricing Model then uses the characteristics the consumer wealth allocation decision to derive the equilibrium relationship between risk and expected return for assets and portfolios. [11]

A few more authors also provide the evidence about the importance of multifactor-models. As Steven studied 120 companies and concluded that there were strong industry effects [12].

Another study used 50 companies in 10 industry groups and studied monthly returns from January 1966 through June 1970. This study also found strong co movement among stocks in the same industry, and concluded that 18 % of residual variance was due to industry effects. These findings that factors other than market are important in predicting the securities return, led to the development of multi-index models [13].

Several other studies also confirmed that factors other than market are important in determining the variability of stock returns. As Sharpe studied monthly returns for stocks of 2,197 firms from 1931 through 1979 [14]. This study showed that dividend yield, company size and bond beta have significant explanatory power in explaining the variability of stock returns along with market returns.

Another study conducted a test using 2090 firms for the period 1975 to 1980 using Arbitrage Pricing Theory Model (APT). Their findings suggested that price volatility of energy, interest rate risk and market index have an influence over stock returns. [15]

The predictive power of APT was tested with the following set of factors:

- The monthly return to treasury bills.
- The difference between monthly returns on long- and short-term Treasury bond.
- The difference between the monthly returns on long-term treasury bonds and low grade corporate bonds of the same maturity.
- The monthly changes in consumer price index.
- The monthly changes in US industrial production.
- The beginning of the month dividend to price ratio for the S&P 500 index.

The period for the test was 1980 through mid year 1997. The stock population tested was roughly about 3000 US stocks. The actual performance of the stock with the expected performance was compared and found that APT does have some predictive power but falls short of the multi index model. [16]

All of the above cited studies show that factors other than market which are industrial factors are important in predicting the stock return volatility. It can be inferred from the above studies that 10% of the total variance is due to industry factors. Among the important factors in predicting the stock returns other than the market factors are company's size, bond beta, dividend yield, price volatility of energy, interest rate risk, inflation and industrial production index.

4. METHOD

4.1 Data

This research is primarily based on secondary data. The cement industry firms selected for this study were the top performers at KSE 100 index. These firms were Cherat Cement, DG Khan Cement, Essa Cement, Fauji Cement, Fecto Cement, Maple Leaf Cement and Lucky Cement. These companies were historically more successful companies in terms of consistent growth in profit. The financial highlights of the selected firms are given in Appendix I. The data for each firms closing monthly stock prices and the KSE 100 index were obtained from the websites of Karachi Stock exchange and Business Recorder's website for the period of July 1998 to July 2004. The data for consumer price index, risk free rate and industrial production index were obtained from the website of State Bank of Pakistan and Federal Bureau of Statistics. Cement exports data was obtained from Export Promotion Bureau. The data on stock prices, CPI, IPI and risk free rate is monthly whereas exports data is monthly from 2001to 2004 and beyond 2001 the exports data is on annual basis because monthly figures for cement exports were not available. So the monthly changes in cement exports were calculated and converted from the yearly data as has been done by Sharpe [5].

5. PROCEDURES

5.1 Treatment of data

After getting monthly closing stock prices for KSE 100 index and seven selected firms of cement industry monthly returns were calculated using continuously compounded return formula. The returns were calculated as the logarithmic difference between the two consecutive prices in a series yielding continuously compounded returns. Its equation is

$$\text{Ln}\,(Pt / Pt - 1) \quad \text{----------} \quad (1)$$

Whereas;

Pt = current closing prices
Pt – 1 = previous closing prices
Ln = Natural log

Monthly returns were calculated by taking log difference between two consecutive month prices using Microsoft excel.

The model which is used consists of monthly observation of six independent variables for 73 months, starting from July 1998 to July 2004. The independent variables selected are descriptive of the market and economic conditions of the economy. The independent variables are described in some details below along with the Multi Index Model to be tested.

$$Kit = b0 + b1KSE + b2CPIt + b3RFRt + b4IPIt + b5EXPt + ei \quad \text{……. (2)}$$

The dependent variable Kit represents the monthly stock returns of the firm i, in month t. The bi measures the sensitivity of cement stock returns to each independent variable.

There are five independent variables which are to be tested. Four of them are macro economic variables which are KSE, IPI, CPI and RFR, and the other one is industry specific which is EXP.

The KSE variable measures the relative change in KSE 100 index, which is used as a measure of market return. The regression coefficient b1 measures the variation in cement stock due to market movement.

The CPI variable is a measure of inflation. The data for Consumer Price Index is obtained from the Federal Bureau of Statistics. Increase in CPI means high rate of inflation which adversely affects firm's earning. So 'k' is expected to be negative related to the CPI.

The RFR measures the relative changes in risk free rate of return as depicted by six month Treasury bill yield. K is expected to be positively related to the RFR because as risk free rate of return increases investors will demand high risk adjusted return.

The IPI variable is measure of monthly relative change in industrial production index. This variable is a measure of overall economic activity. This variable is expected to be positively related to our dependent variable k.

The variable unique to cement industry is used representing industry condition which is EXP representing monthly exports data of cement industry. This variable is expected to be positively related to cement industry stock returns because high cement exports mean high profitability of cement firms.

6. RESULT AND DISCUSSION

6.1 Multivariate regression

Before constructing the cross sectional regression models, script (software to measure normality of data) was run in the SPSS to check the normality of the data and the results suggest that data was normal. The pair-wise correlation coefficients for the independent variables were examined. The correlation coefficient analysis shows the strength of the linear relationship between two variables. It can be used to detect the presence of multicollinearity, which may affect the true relationship of an independent variable with the dependent variable. The results from this analysis, which for brevity's sake are not reported here, show that correlation among the independent variables is not a problem. The results from multivariate regression for each firm are presented in each of the following tables.

6.1.1 Cherat Cement

The table 6 presents the result from time series, cross sectional regression analysis of Cherat Cement Company. The value of R square is 0.35 for Cherat Cement the F-value which is 7.36 suggests that the model is significant at the .05 confidence level. The variables when compared on individual basis, the only variable significant at .05 level is KSE 100 index. These results confirm the logic behind the single index mode. The regression coefficient for KSE is 0.73 which suggest that stock returns of Cherat Cement are slightly less sensitive than the average stock to changes in the market return. The surprise element in this model is that the regression coefficients for Risk Free Rate of return and exports are negative but with quite less significance. The relationship between IPI and Cherat cement is positive as expected but is also not significant. Similarly the relationship between CPI and Cherat cement is negative as expected but still not significant.

6.1.2 DG Khan Cement

In table 7, the value of R-square is slightly improved in case of DG Khan Cement which is 0.38 and F-value is 8.076. KSE here too is the only variable significant at .05 level of significance. The multiple regression coefficient for KSE is 1.87 which suggests that stock returns of DG Khan Cement are highly sensitive than the average stock to changes in the market return. It should also be kept in mind that DG Khan is the market leader in cement industry in terms of stock price. The relationship of DG Khan stock returns with IPI and RFR is positive as expected but with no significance. The relationship with CPI and EXP is negative with no significance.

6.1.3 Essa Cement

The regression analysis of the Essa cement (table 8) shows that R square is 0.409 and F-value is 9.15 at .05 level of significance which shows that the model is significant. The only independent variable significant at .05 level is KSE. The multiple regression coefficient for KSE is 1.14 which shows that stock returns of KSE are slightly above average sensitive to the market returns. The RFR and EXP variables are negative here as well to our surprise but without any significance. The IPI variable is positive and

Table 6: Correlations, Multiple Regression Coefficients, t values in brackets, p values in parenthesis and Italic F-statistics in Italic.

Dependent variable	Intercept	KSE	CPI	IPI	RFR	EXP	R-square	F statistics
Cherat Cement	1	0.58	-0.14	.099	-0.10	-.004	.35	*7.36*
	5.188E-0	.73	-9.167E-0	1.857E-0	-1.653E-0	-4.648E-0		
	[1.03]	[5.70]	[-.78]	[1.07]	[-.36]	[-.28]		
	(.30)	(.00)	(.43)	(.28)	(.71)	(.77)		*(.000)*

The results are based on the 73 monthly observations for the period from July 1998 through July 2004; KSE- monthly return in KSE 100 index, CPI- monthly changes in consumer price index, IPI- monthly changes in industrial production index, RFR- monthly changes in 6 month Treasury bill, EXP- monthly cement exports.

Table 7: Correlations, Multiple Regression Coefficients, t values in brackets, p values in parenthesis and Italic, F-statistics in Italic

Dependent variable	Intercept	KSE	CPI	IPI	RFR	EXP	R-square	F statistics
DG Khan Cement	1	0.603	-0.15	0.076	-0.073	-0.018	.38	*8.076*
	8.77E-0	1.87	-2.767E-0	3.291E-0	3.813E-0	-6.915E-0 [-		
	[.730]	[6.067]	[-.988]	[.799]	[.035]	.180]		
	(.468)	(.000)	(.327)	(.427)	(.972)	(.858)		*(.000)*

The results are based on the 73 monthly observations for the period from July 1998 through July 2004; KSE- monthly return in KSE 100 index, CPI- monthly changes in consumer price index, IPI- monthly changes in industrial production index, RFR- monthly changes in 6 month Treasury bill, EXP- monthly cement exports.

Table 8: Correlations, Multiple Regression Coefficients, t values in brackets p values in parenthesis and Italic, F-statistics in Italic.

Dependent variable	Intercept	KSE	CPI	IPI	RFR	EXP	R-square	F statistics
Essa Cement	1	0.631	-0.056	0.083	-0.033	-0.072	.409	*9.15*
	7.3E-03	1.14	-1.181E-0	1.942E-0	-1.591E-0	-1.450E-0 [-		
	[.107]	[6.565]	[-.075]	[.840]	[-.263]	.671]		
	(.915)	(.000)	(.94)	(.404)	(.794)	(.504)		*(.000)*

The results are based on the 73 monthly observations for the period from July 1998 through July 2004; KSE- monthly return in KSE 100 index, CPI- monthly changes in consumer price index, IPI- monthly changes in industrial production index, RFR- monthly changes in 6 month Treasury bill, EXP- monthly cement exports

Table 9: Correlations, Multiple Regression Coefficients, t values in brackets p values in parenthesis and Italic, F-statistics in Italic

Dependent variable	Intercept	KSE	CPI	IPI	RFR	EXP	R-square	F statistics
Fauji Cement	1	0.704	-0.177	0.11	-0.131	0.007	.52	*14.53*
	6.494E-0	1.48	-1.832E-0	3.46E-0	-3.09E-0	-6.350E-0		
	[.906]	[8.041]	[-1.097]	[1.408]	[-0.481]	[-.277]		
	(.368)	(.000)	(.277)	(.164)	(.632)	(.783)		*(.000)*

The results are based on the 73 monthly observations for the period from July 1998 through July 2004; KSE- monthly return in KSE 100 index, CPI- monthly changes in consumer price index, IPI- monthly changes in industrial production index, RFR- monthly changes in 6 month Treasury bill, EXP- monthly cement exports.

Table 10: Correlations, Multiple Regression Coefficients, t values in brackets p values in parenthesis and Italic, F-statistics in Italic

Dependent variable	Intercept	KSE	CPI	IPI	RFR	EXP	R-square	F statistics
Fecto Cement	1	0.345	-0.152	0.053	-0.107	-0.044	.149	*2.30*
	9.438E-0	.54	-1.288E-0	1.532E-0	-4.785E-0	-2.05E-0		
	[1.26]	[2.85]	[-.73]	[.59]	[-.71]	[-.84]		
	(.21)	(.006)	(.46)	(.55)	(.47)	(.40)		*(.055)*

The results are based on the 72 monthly observations for the period from July 1998 through July 2004; KSE- monthly return in KSE 100 index, CPI- monthly changes in consumer price index, IPI- monthly changes in industrial production index, RFR- monthly changes in 6 month Treasury bill, EXP- monthly cement exports.

Table 11: Correlations, Multiple Regression Coefficients, t values in brackets p values in parenthesis and Italic, F-statistics in Italic

Dependent variable	Intercept	KSE	CPI	IPI	RFR	EXP	R-square	F statistics
Lucky Cement	1	0.799	-0.109	0.060	-0.095	0.000	.643	*23.84*
	2.053E-0	1.51	-5.903E-0	1.524E-0	-8.939E-0	-6.516E-0		
	[.375]	[10.708]	[-.462]	[.811]	[-.182]	[-.037]		
	(0.709)	(.000)	(0.645)	(.420)	(.856)	(.970)		*(.000)*

The results are based on the 72 monthly observations for the period from July 1998 through July 2004; KSE- monthly return in KSE 100 index, CPI- monthly changes in consumer price index, IPI- monthly changes in industrial production index, RFR- monthly changes in 6 month Treasury bill, EXP- monthly cement exports.

Table 12: Correlations, Multiple Regression Coefficients, t values in brackets p values in parenthesis and Italic, F-statistics in Italic

Dependent variable	Intercept	KSE	CPI	IPI	RFR	EXP	R-square	F statistics
Maple Leaf Cement	1	0.251	-0.211	0.093	-0.174	0.042	.120	*1.797*
	.168	.48	-2.495E-0	3.410E-0	-7.214E-0	-1.165E-0		
	[1.74]	[1.93]	[-1.11]	[1.03]	[-.83]	[-.37]		
	(.087)	(.058)	(.27)	(.30)	(.40)	(.70)		*(.126)*

The results are based on the 72 monthly observations for the period from July 1998 through July 2004; KSE- monthly return in KSE 100 index, CPI- monthly changes in consumer price index, IPI- monthly changes in industrial production index, RFR- monthly changes in 6 month Treasury bill, EXP- monthly cement exports.

CPI variable is negative correlated to the Essa Cement stock but without any significance.

6.1.4 Fauji Cement

The regression analysis of Fauji cement shows that the R square for Fauji Cement is 0.52 and F value is 14.53 which confirm that the model is significant. The value of R square and F-value are considerably high as compared to the above models. The only independent variable significant at .05 level is again KSE. The IPI variable in this model is significant at .16 level but its t value is quite low. The multiple regression coefficient for KSE is 1.48 which shows that stock returns of Fauji Cement are above

average sensitive to the market returns. The IPI variable is insignificantly positive related to the stock return of Fauji Cement, while CPI, RFR and EXP are insignificantly negatively related.

6.1.5 Fecto Cement

The inclusion of all five independent variables does not produce any significant model for Fecto Cement. The R Square is 0.149 and F-value is 2.3 which suggest that the model is less significant. The only significant independent variable is KSE. The multiple regression coefficient for KSE is 0.54 which suggest that the stock returns of Fecto Cement are below average sensitive to changes in the market returns. The rest of the independent Variables are less significant.

6.1.6 Lucky Cement

The results from regression analysis show that the model is significant with R square of 0.643 and F-value of 23.8. The only independent variable significant at .05 level is KSE. The inclusion of all five independent variable does not create any impact on the R square. The multiple regression coefficient for KSE is 1.51 which suggest that the stock returns of Lucky cement are above average sensitive to market returns. While rest of the independent variables are all in significant.

6.1.7 Maple Leaf Cement

The R square for Maple Leaf cement is considerably low which is 0.12 and also the F statistics which is 1.797. The model becomes significant when we use only one independent variable KSE. In this model KSE is slightly insignificant along with the rest of the independent variables. The multiple regression coefficient for KSE is 0.48 which suggest that the stock returns of Maple Leaf cement is less sensitive than an average stock to the market returns.

7. DISCUSSION

The results from the time series cross sectional regression analysis show that the inclusion of all five independent variables does not produce significant models. The value of R square range from a high of 0.643 for Lucky Cement to a low of 0.12 for Maple Leaf Cement. The F- values for all seven companies show that the model is significant at the .05 level. When the independent variables are examined on an individual basis, the only variable significant at the .05 level in all seven models is KSE, the return on KSE 100 index. In fact no other variable is significant even at .01 level. The average regression coefficient of KSE in all seven models, which represents the market beta in the single index model, is 1.107, ranging from 0.48 for Maple Leaf Cement to 1.87 for DG Khan Cement. Hence, the stock returns of cement companies are slightly more sensitive than the average stock to changes in the market return.

CPI is not significant in any model. However it is negatively related to the stock returns in all seven models as hypothesized. The inclusion of CPI does not influence the R square in any model. The reason of the insignificant relationship between CPI (inflation) and stock return is that cement companies utilize mainly real assets, which are not supposedly affected by inflation to the extent financial assets are; hence, a significant relationship between CPI and stock returns of manufacturing firms would not be present. [18] Moreover the stock prices in KSE follow a random walk. That is the reason why the impact of the independent variables on stock returns is insignificant. [19]

The estimated multiple regression coefficients are all positive as expected. The lack of insignificant positive relationship between cement stock and health of the economy (IPI) can be attributed to the same reason which is the random walk of KSE. Moreover KSE is not an efficient stock market. The RFR contrary to our expectations is negatively related to the stock returns in all the seven models. However, the relationship is insignificant in all the models. The lack of significance of risk free rate of return in all the models can again be explained by the types of assets cement companies employ. As stated above, cement companies utilize mainly real assets. Also investors here are also not rational and investment in KSE is basically done on the basis of technical analysis without any fundamental analysis. [20] Moreover the stocks have risk, the actual return on the market over a particular period can, of course, be below $R_{F,}$ or even can be negative. [21]

The estimated coefficient for cement industry specific variable EXP which represents cement exports is negatively related in case Fecto, Essa, Cherat and DG Khan cement. EXP is positive related in case of Lucky, Fauji and Maple Leaf Cement. The relationship between cement exports is insignificant in all the models. The lack of significant relationship between cement exports and stock returns can be explained by the fact that cement exports historically have been quiet less. Moreover cement exports data have not been made public through monthly statistical bulletin or other periodicals that is why investors do not have any information of cement exports. Similarly the random walk of KSE and investors rationale are the factors due to which relationship between cement exports and cement industry stock return is insignificant. Moreover the data for cement exports is on the monthly basis from 2004 to 2001. The data for cement exports beyond 2001 was not available on the monthly basis hence, the yearly data was converted into monthly data by adjusting for the monthly changes, and this process may have obscured the true validity of the data.

8. CONCLUSION

At least on the basis of analysis it has proved that stock returns of Pakistan cement industry can be explained using single index model. But using multi index model adds

additional explanatory power to the model as there is a slight improvement in the R square (R^2). KSE 100 index is the only independent variable significant at .05 level in all the seven models. These results confirm the logic behind the single index model.

The industrial production index (IPI) is insignificantly positive related to the stock returns in all the models as expected. The Consumer price index (CPI) is insignificantly negative related in all the seven models to the stock returns. The risk free rate and cement exports have shown a mixed response in explaining the stock return but still insignificant. The lack of significant relationship of independent variables other than KSE and stock returns can be attributed to the fact that KSE follows random walk and investment in KSE does not take place on the basis of fundamental analysis. Moreover the lack of documented information on monthly cement exports and the nature of cement industry (manufacturing) are the factors responsible for the lack of significant relationship between stock returns and independent variables (EXP, CPI ,IPI and RFR).

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APPENDIX – I

Table 1: Contribution to National Economy by Cement Sector

Direct and indirect taxes	Rs.17.50 Billion
Value of fixed assets Deployed	Ras.66.21 Billion
Loans from financial institutions	Rs.41.53 Billion
Shareholders equity	Rs.26.67 Billion
Employment (Direct & Indirect)	90000 (Approximately)

Source: Experts Advisory Cell Pakistan.

Table 2: Pakistan Cement Production (Million Tones)

Year	Cement production
1991 (June)	7.649
1992 (June)	8.115
1993 (June)	8.348
1994 (June)	8.158
1995 (June)	8.159
1996 (June)	9.458
1997 (June)	9.539
1998 (June)	9.29
1999 (June)	9.546
2000 (June)	9.969
2001 (June)	9.876
2002 (June)	9.988
2003 (June)	11.4564

Source: Experts Advisory Cell Pakistan.

Table 3: % Share in worlds productions

Country	Production 2002	% share in world's production
China	640 Million Tones	37.2 %
India	100 Million Tones	5.8 %
Indonesia	32 Million Tones	1.86 %
Turkey	31 Million Tones	1.80 %
Thailand	28 Million Tones	1.63 %
Iran	28 Million Tones	1.63 %
Pakistan	*11.45Million Tones*	0.66 %

Source: Experts Advisory Cell Pakistan.

Table 4: Pakistan major export of cement products

Year	Value (Million Rs.)
1995-96	3
1996-97	61
1997-98	69
1998-99	32
1999-00	75
2000-01	47
2001-02	281
2002-03	292

Source: Experts advisory cell Pakistan.

Table 5: Financial Highlights of the Selected Firms

Firms	Sales PKRS Millions	Net Income PKRS Millions	EPS in PKRS	Debt Ratio	Current Ratio	ROE
Cherat cement	2084.96	425.69	8	44%	1.56	21%
Essa cement	573.7	1.85	0.05	35%	1.37	0.19%
Fauji cement	2,296.231	314.148	0.15	66 %	1.1	2.35%
Fecto cement	1381	92	2.03	46.6%	0.964	3.67%
Luckey cement	2908	686	2.8	30.20%	2.11	15.92%
DG Khan cement	3882.7	829.8	4.74	44%	1.1	8.80%
Mapple Leafe cement	3375.8	487.5	2.7	30.90%	1.03	8.39%

Source: Annual Reports 2004 of the respective companies, provided by Securities & Exchange Commission of Pakistan.