Analysis on Factors that Affect Stock Prices: A Study on Listed Cement Companies at Dhaka Stock Exchange

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Abstract

This study investigates on identifying the main forces that affect share prices in the capital market of Bangladesh. For this, the study considers a panel data set of 7 companies of cement industry listed in the Dhaka Stock Exchange (DSE) for the period 2006-2015.The investigation approach is designed with Ordinary Least Square (OLS) regression with fixed effects and random effects models. Six fundamental and technical issues namely Earning Per Share (EPS), Net Asset Value Per Share (NAVPS), Price Earnings (P/E), Gross Domestic Production (GDP), Consumer Price Index (CPI) and Interest Rate Spread (IRS) have been brought in light as the major determinants of prices in cement industry. The findings claim that these variables are instrumental in affecting the share prices in the Bangladesh market as far as the cement industry is concerned. Among these factors EPS, NAVPS, P/E and CPI have been found significantly instrumental for cement industry in Bangladesh contexts while other variables were not found noticeably significant. A moderate R square (0.1142-.4567) found in both the Fixed and Random models justify the considerable impact of these variables on the market price of shares. Hence, the study recommends present and potential investors to consider these factors prior to trade and inject funds on securities as the study witnessed volatility in share prices by the fluctuations of these factors.

Key Words: Capital Market, Share Price, Dhaka Stock Exchange.

1. Introduction

Stock Market is considered one of the major indicators of an economy. After independence, our stock market has witnessed several debacles without any rational reason. Recently, the consistent manipulations and interventions of different gambler and regulatory authorities fueled the major damage of 2010 in Bangladesh Capital Market. Hence, the confidence of investors was shattered and most of small and midcap investors refrained themselves from the market. For this a study on capital market and its related exposure was necessary. Current investors are lacking confidence amid clear market directions from regulatory and concerned parties. Recently it has been noticed that the market turnover is concentrated to some particular industries like Pharmaceuticals, Fuel & Power, Cement and Engineering. The newly Issued IPO's often create some potential short term momentum but that hardly last for longer period of time and sometimes fail to short term gain also. The market is highly volatile and investors are highly interested in booking short term profits. For this, consistent offloading of shares forced most of the scarps to lose value. In light of these facts, the present study attempts to investigate the impact of six major variables on the market price of shares of firms of Cement Industry listed in the Dhaka Stock exchange.

Despite turmoil in capital market, some potential investors are relying on the capital market as Bangladesh economy lacks investment opportunity. Besides, the share investment enables to create diversification of funds and to generate a better yield than money market instruments. It is a generally accepted phenomenon that investors are risk averse and they concern about the volatility of their funds. From the view point of an investor, it is recommended that they have potential knowledge and awareness about the market movements and determinants of the movements. Scholars have attributed several internal factors and external factors as factors affecting stock price of cement or any other industries. The major internal factors are company performance, governance, asset and liquidity position, dividends and earnings. The external factors include governmental regulations, business cycle, investor's attitude, market conditions, natural calamities and political uncertainties like strikes, blockades etc. Investors have also been recommended to have an eye on the "Value Investing Strategy" an investment mechanism proposed by Graham and Dodd (1934). Advocates of the strategy claim that this has been successful in global crisis and investors often outperform that growth stock of the market. This is another successful investment strategy resorted to especially after the global financial crisis and according to this strategy the investor has to examine firms with a low price earnings stocks, low price-to-cash-flow ratio or low price to book ratio stocks as it is assumed that these stocks may outperform growth stocks. Sharma (2011) suggests that there are two approaches namely the fundamental approach and technical approach for predicting share prices. For the fundamental factors the Earning Per Share, Net Asset Value Per Share and Price Earnings have been recommended while the technical factors highlighted the Gross Domestic Product, Consumer Price Index and Interest Rate Spread as the determinants of stock prices globally. The earlier one predicts share price on the basis of financial, environmental and managerial factors, whereas the latter studies the past trends in predicting future share price. Therefore, it is imperative for investors to be talented about the different approaches and factors surrounding their investment decisions.

2. Objectives of the Study

The prime objective of this study is to examine the determinants that affect stock prices in Dhaka Stock Exchange. The objective of this study is to determine the impact of fundamental factors (EPS, NAVPS, and P/E) on market prices and the impact of technical factors (GDP, CPI & IRS) on market prices.

The study also aims at creating awareness among present and potential investors to consider these factors prior to trade and inject funds on securities to avoid unexpected loss by the fluctuations of these factors.

3. Research Questions

As a result of the objectives stated above the following research questions will be asked. These are:
- ✓ To what extent do the fundamental factors (EPS, NAVPS & P/E) of Cement Companies listed on the Dhaka Stock Exchange have positive significant impact on their stock prices?
- ✓ To what extent do the macro-economic factors (GDP, CPI & IRS) have positive significant impact on their stock prices of Cement Companies listed on the Dhaka Stock Exchange?

4. Research Hypothesis

The research questions raised above therefore led to the formulation of the following hypothetical statements. These are:

- ✓ EPS does not have positive and significant impact on stock prices of Bangladeshi Cement Companies.

- ✓ NAVPS does not have positive and significant impact on stock prices of Bangladeshi Cement Companies.

- ✓ P/E does not have positive and significant impact on stock prices of Bangladeshi Cement Companies.

- ✓ GDP does not have positive and significant impact on stock prices of Bangladeshi Cement Companies.

- ✓ CPI does not have positive and significant impact on stock prices of Bangladeshi Cement Companies.

- ✓ IRS does not have positive and significant impact on stock prices of Bangladeshi Cement Companies.

5. Model Specification

Prior to given input, the summary statistics was developed. The regression model was run for dependent variable against the independent variable. The independent variables for fundamental factors are Earnings Per Share (EPS), Price Earnings (P/E) and Net Asset Value per share (NAVPS) in line with works of Nishat and Irfan (2002). This provided a crude test of the fundamental factors that affect the stock prices. Thus, in line with the various hypotheses stated, the models were as follows:

$$\text{Stock Prices: } \beta_0 + \beta_1 (EPS) + \beta_2 (NAVPS) + \beta_3 (P/E) + \varepsilon.$$

The variables in the model have been used as the fundamental factors. The study later made a broad discussion on the technical factors that affect the stock Prices as well. Following Table provides an overview of the variables used, definition of variables employed and the hypothesized sign.

Fundamental Factors of Stock Prices

Variables	Definition	Symbols
Earnings Per Share	Net profit after Tax/ Total Share Outstanding	EPS
Price Earnings	Market price/Earnings per share	P/E
Net Asset Value Per Share	Net Asset/ Total Share Outstanding	NAVPS
Stock/Share Price		
Constant		β_0
Standard Errors		ε

The equation for technical factors would be following in the analysis:

$$\text{Stock Prices: } \beta_0 + \beta_1 (RGDP) + \beta_2 (CPI) + \beta_3 (IRS) + \varepsilon.$$

Following Table provides an overview of the variables used, definition of variables employed and the hypothesized sign.

Technical Factors of Stock Prices

Variables	Definition	Symbols
RGDP	Growths in Gross domestic Production	GDP
Inflation	A benchmark of the variation in prices paid by typical consumers for goods and other items in different times.	CPI
Interest Rate Spread	The Deviation between the deposit rates and rate of loans and advances	IRS
Stock/share Price		
Constant		β_0
Standard Errors		ε

6. Literature Review

There are several factors that have been instrumental as determinants of stock prices. The investigation on determinants of stock prices was first initiated by Collins (1957) for the US market and he identified dividend, net profit, operating earnings and book value as the prominent factors affecting share prices in the US. Ever since, a significant body of theoretical and empirical literature has evolved that considers the determinants of market price of shares. After that several studies have been undertaken empirically by several researchers. Among these, Irfan and Nishat (2002) identified factors exerting impact on the share prices in Karachi Stock Exchange for the period between 1981 and 2000. The study employed cross-sectional weighted least square regression and analyzed the impact of six variables viz. dividend yield, price earnings, earnings per share, leverage and earning volatility on share prices. Of these the payout ratio, size, leverage and dividend yield emerged as the significant factors affecting the stock market prices in Karachi. This suggests that firm specific factors have a significant impact on market price of shares, cited in Sharif et al. 2015.

In Asian Subcontinent, Das and Pattanayak (2009) undertook an investigation constituting 30 shares of Bombay Stock Exchange to find out the major determinants of stock price movements in India. The analysis evidenced that higher return on investment; future growth potentials and economic sustainability often influence the share price movements in India while uncertainties and price volatility infer negative impacts. Following them, Ramachandran et al (2011) used panel data and examined three sectors namely auto, healthcare and public sector undertakings over the period 2000-2009 in order to infer the main factors affecting share prices in India. The study employed the fully modified ordinary least squares method and results revealed that dividend, price-earnings ratio and leverage are major determinants of share prices for all the sectors under consideration cited in Anike and Esther Amuche (2014).

A more focused study was initiated to investigate the impact of dividend and other control mechanism on share prices by Islam and Jahan (2012) on the Bangladesh Capital Market. The study considered 30 commercial banks and their dividend policies for the time 2007-2011 and ferreted out how the dividend polices influence the share price. The study also refereed the earning per share as a dominant variable to influence the share price while equity base as future potential for price movements.

Balkrishnan (1984), Zahir and Khanna (1982) and Sharma (2011) conducted investigation on book value per share and market price per share of the stock. They asserted that higher book value per share indicates financial soundness and promotes a healthy statement about the owner's fund. They stated that investor believe that a firm with higher financial base will generate higher EPS in future. Thus, most of them took a long position expecting consistent performances from the firm.

From African Context Somoye, Akintoye, and Oseni (2009) conducted a survey on 130 companies traded in the Nigerian stock exchange between 2001 and 2007 in order to analyze the impact of various macro-economic factors on the market price of shares. The study employed OLS regression and Regressed stock prices on earnings per share, dividend per share, oil price, gross domestic product, lending interest rate and foreign exchange rate on stock price. All the variables revealed a positive correlation to stock prices with the exception of lending interest rate and foreign exchange rate cited in Sharif et al. 2015. Although the studies of Zhao (1999) on Chinese economy presented a negative relationship among Consumer Price Index (CPI), Industrial Outputs and the share prices.

In Middle East the Gross National Production (GNP), Consumer Price Index (CPI), Interest Rate had been found instrumental in influencing the stock prices by the study of Al-Qenae et al. (2002). The researcher considered the time period 1981-1997. Among the studied variables, GNP and Earnings were found positive while CPI and Interest Rate showed a negative impact on stock prices of Kuwait. The researcher alleged that the investors are sentimental and emotionally unstable that forced them to be influenced by external factors while they undertake an investment Decision.

Despite the studies showed an emergence on the issue, the findings were quite mixed in different market of different regions. This is probably because of the geographical differences that portray different culture, investors' education rate, market analysis capacity and way of thinking. For this, the researcher here cannot decide on a general statement whether all these factors are either positively or negatively related to stock prices. There were not that many studies highlighting the issue of factors that affect stock prices on the Bangladesh

capital market. This paper, therefore, will reduce the gap by studying six major variables and their extent of dominance on the stock prices of Cement industry in Dhaka stock exchange.

7. Research Methodology

The report shows the credibility of investment opportunities to decide on the best investment style. About 7 listed cement companies were selected and their prices for last 10 years at the end of each quarter along with EPS, NAVPS, P/E has been used to determine how significantly these factors influence the stock prices of cement industry. Besides, an equation has been formed for investigating the impact of several macro-economic factors GDP, CPI, IRS on stock prices of the concerned industry. Several statistical tools have been undertaken to interpret the results.

7.1 Nature and Sources of Data

This study relied extensively on secondary data which was handpicked from the annual report and statement of account of selected cement companies listed on the Dhaka Stock Exchange for the period 2006-2015. These data have been collected from the official websites of Dhaka Stock Exchange and from the respective companies. Some of the year's data couldn't be managed from the respective company. For this, the recorded statement of Dhaka Stock Exchange has been used as an authentic source of evidences. Price data was taken from the DSE library index Statistical Bulletin of the Dhaka Stock Exchange over earlier specified ten-year period. These data were designed in excel form both for the day end and month end format. Researchers considered the month end adjusted price data for the selected companies. A total number of 120 month's end price information has been used.

7.2 Population and Sample size

The population of the study consists of all the quoted cement companies in Bangladesh. The DSE listed security chart presents that only 7 (among them 5 companies are local & 2 companies are multinational) companies are listed in DSE as per the rules of Bangladesh Securities and Exchange Commission. The companies are Aramit Cement (ARAMITCEM), Confidence Cement (CONFIDENCEM), Meghna Cement (MEGHNACEM), Premier Cement (PREMIERCEM), M.I Cement (MICEMENT), Heidelberg Cement (HEIDELBERCEM) & Lafarge Surma Cement (LAFSURMACEM). The research sample in this study was determined on the availability of data from the quoted companies in the Dhaka Stock Exchange and ample data on the targeted variables to determine the major factors of Stock Prices was found.

8. Variables Analysis

8.1 Earnings Per share

The following chart shows the Earnings per share of all the cement companies for the last ten years, 4 quarters in every year. The synopses of the EPS of all the securities are following.
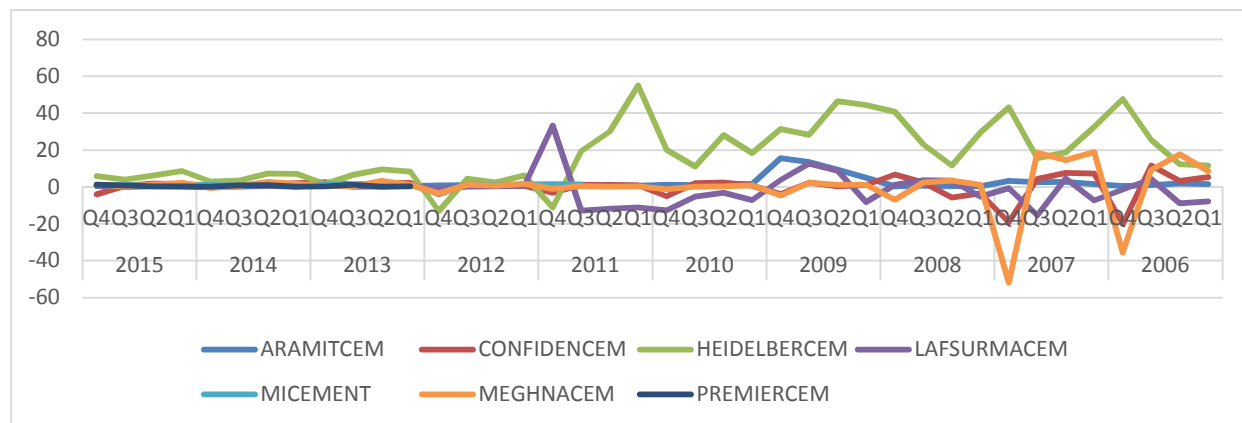
Figure: Quarterly EPS of cement Companies (2006-2015)

8.2 Net Asset Value per Share

The net asset value per share of all the cement companies has been determined by dividing the total equity by the number of securities of the company for respective quarters of each year. The synopsis of data for net asset value per share is following.
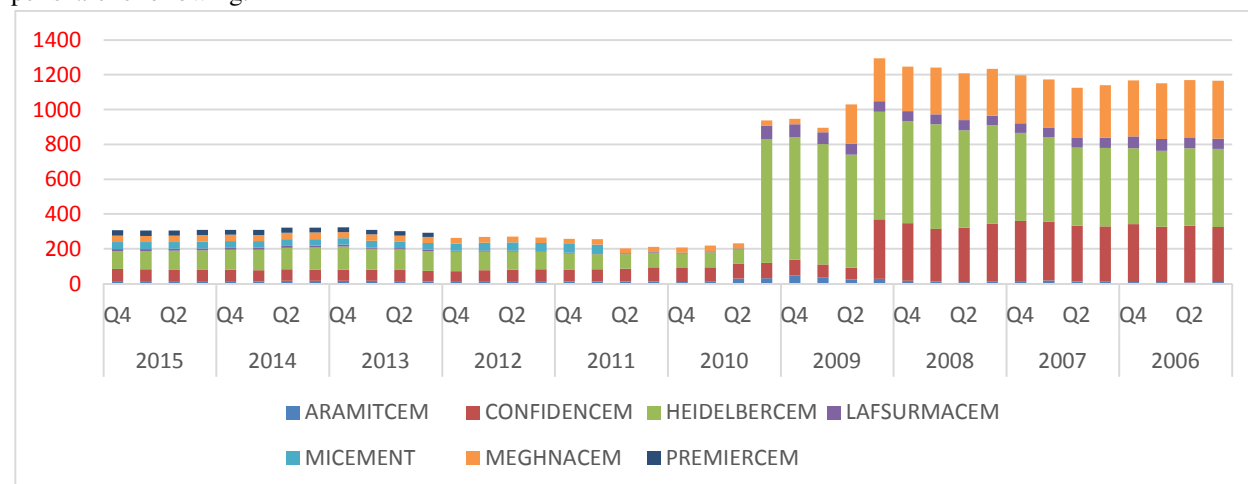
Figure: Quarterly NAVPS of cement Companies (2006-2015)

8.3 Price Earnings

The price earnings (P/E) of all the stocks have been calculated by dividing the quarterly average market prices of the company with the respective year's earnings per share. The summary of Price Earnings has been outlined following.
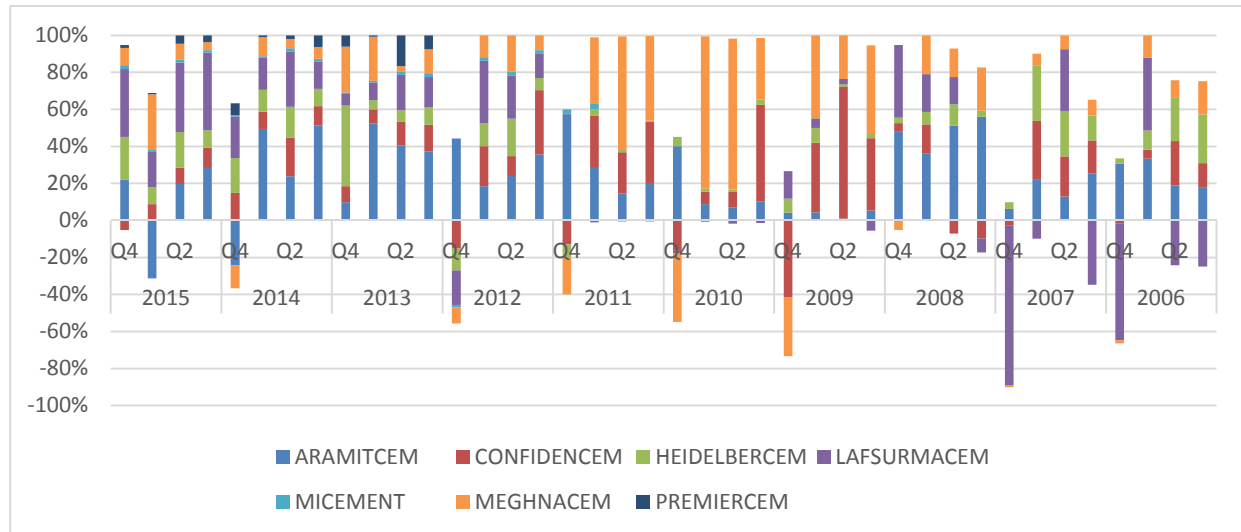
Figure: Quarterly P/E of cement Companies (2006-2015)

8.4 Stock prices

The quarterly adjusted stock prices of all the selected companies are summarized in the following chart. The stock prices have been calculated by summarizing the month end data for last 120 months and make average of them. The broad scenario of adjusted prices is shown in the appendix part of the report.
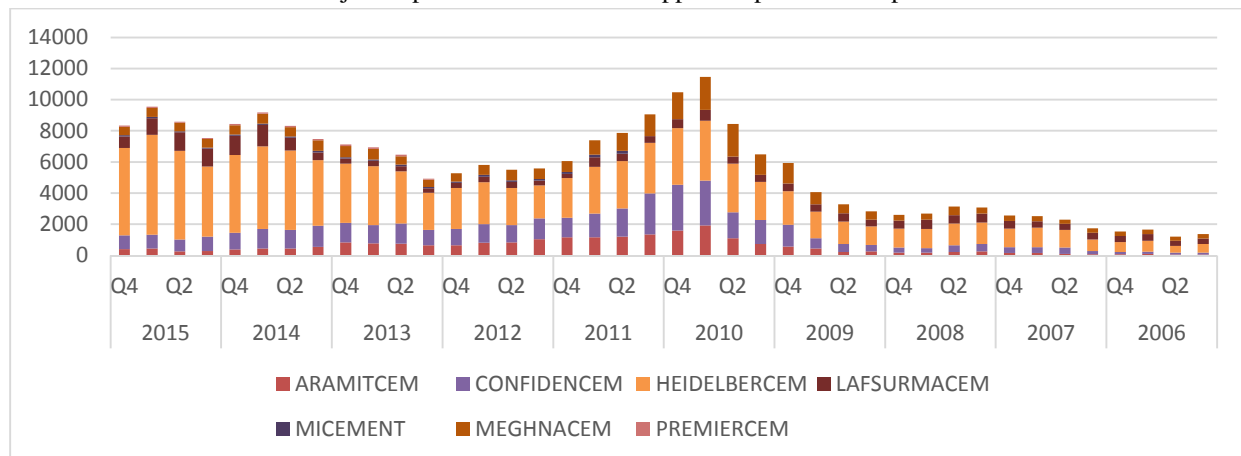
Figure: Quarterly Stock Prices of cement Companies (2006-2015)

8.5 Technical Factors

As already mentioned, the researchers developed a technical model to show the regression relationship between the variables. For the lack of availability of data and information, this model was developed based on quarterly data of last five years (2011-2015). The data summary is presented on the following chart.
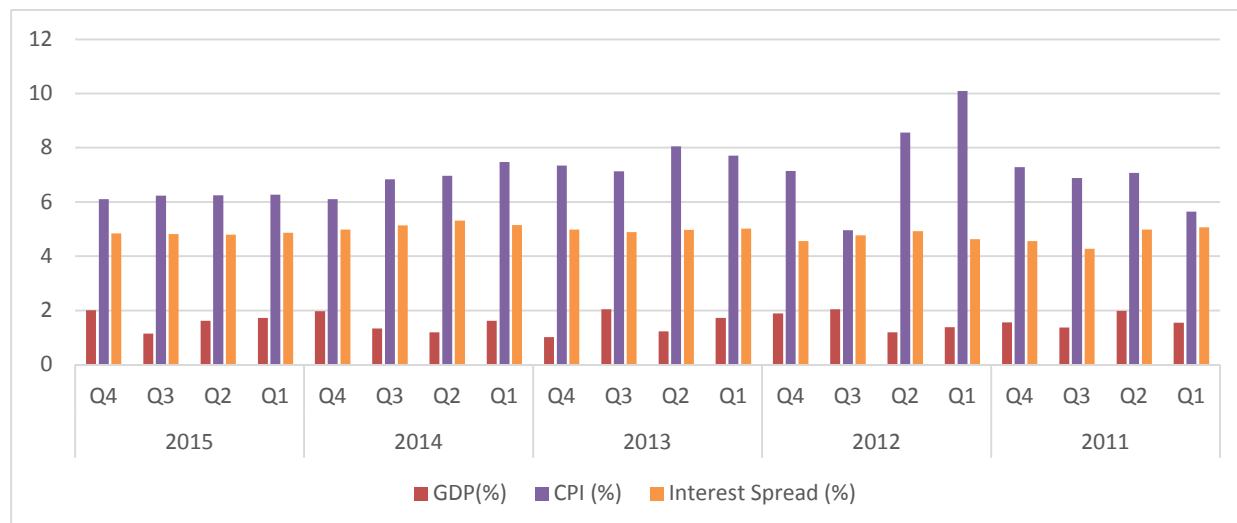
Figure: Technical Factors of Stock Prices

9. Model Justifications

This research work was based on the methodology of the Nishat and Irfan (2002) that conducted a study on the impact of dividend policy and stock price volatility in Pakistan stock exchange's securities and showed a noticeable relationship between dividend and price volatility. The researcher showed an average coefficient of 13.23 times which indicates that the price is changed by 13.23 times for each unit changes in dividend with a healthy confidence rate. The relationship was not reduced even after controlling for the above mentioned factors. This suggests that dividend policy affect stock price volatility and it provides evidence supporting the arbitrage realization effect, duration effect and information effect in Pakistan. Hence, the researchers used EPS, NAVPS and P/E as proxy variables of independent variable of their model and stock price as the dependent variable in fundamental equation while GDP growth rate, CPI and Interest Rate Spread have been replaced as independent variables as proxy of dividend yield of Nishat's model and stock price was fixed as dependent variable.

10. Data analysis techniques

For the analysis of the collected data, Pearson's Product-Moment Correlation Coefficient was first used. In this study, the variables are already mentioned where EPS, P/E & NAVPS have been considered as (x) and the corresponding market prices per share (y). Secondly, Pooled OLS regression technique was used to examine the relationship of between the independent variables (x) with dependent variable (y) and to know the effect of independent variables on the dependent variable. Fixed Effect model of linear regression was explored to determine the relationship between predictor and outcome variables within an entity (Price, EPS and NAVPS etc.). Each entity has its own individual characteristics that may or may not influence the dependent variables. Besides the random effect model has been formulated to show the variation across entities that are random and uncorrelated with the predictor or independent variables. The Hausman test hypothesis has been run to decide on which test provides the best plausible result. MS excel and STATA applications have been used to analyze the price related data and information.

11. Ethical Issues

Ethical issues were watched out carefully. Researchers collected all the data to reduce distractions, manipulations and distortions. Hence, these data are not expected to put a significant deviation on the result analysis process. Apart from this, no data has been distorted and manipulated by the researchers. All the data and information has been collected from the authentic sources like DSE reports and publications.

12. Results Analysis

The regression results of the analysis have been developed. Here will be presenting both the fundamental and technical equations to show how the stock prices are influenced by these factors.

12.1 Fundamental Factors of Stock Prices

The fundamental factors of stock prices have been determined earlier which were the Earning Per share (EPS), Net Asset Value per share (NAVPS) and price Earnings (P/E). Researchers coded six cement companies as ARAMITCEM (111), CONFIDENCEM (222), HEIDELBERGCEM (333), LAFARSCEM (444), MICEMENT (555), MEGHNACEM (666) and PRIMIERCEM (777). Total 280 observations (40 observation for each firm) of seven companies of different periods (quarterly, from 2006-2015) have been paneled for testing. By cumulating all these data, the Pooled linear regression model was developed followed by Fixed Effect and Random Effect regression testing.

Model Analysis

The study also summarized the fixed and random effect model as well. The outcome is following of pooled, fixed and random effect model is following.

Table: Coefficients of Fundamental Factors in different circumstances

	Pooled			Fixed			Random		
	Coefficients	Probability	Std Error	Coefficients	Probability	Std Error	Coefficients	Probability	Std Error
EPS	22.16	0.002*	6.955	-10.25	0.01*	3.968	-3.72	0.444	4.875
NAVPS	0.731	0.143	0.4979	-3.66	0*	0.3147	-2.73	0*	0.3795
P/E	0.1804	0*	0.042	0.098	0*	0.022	0.1164	0*	0.028
Adjusted R Square	0.1142			0.4582			0.894		

Hence, the model under pooled OLS looks like

Stock Prices= 576.82+22.16 (EPS) +.1804(P/E) +.731(NAVPS) +78.14

This indicates that there is constants value of 576 of stock prices. For 1 taka EPS, the stock prices of cement companies enhanced by 22.16 taka while only .73 and .18 taka price increases for every 1 taka of NAVPS and P/E respectively. All the variables except NAVPS have probability below 5% that indicates the model is well formulated as these variables are significant. The adjusted R square .1142 which indicates that the model explains the variability of the responses of data around the mean with 11.42% confidence level. The detailed outcomes are posted in Appendix I under pooled regression model.

For the fixed effect model analysis, the data set had to be declared as panel data by the x-test command in STATA. This helped to make the model strongly balanced. When using fixed effect, it has been assumed that something within the individual may impact or bias the predictor or outcome variables and the study needs control over this. This is the rationale behind the assumption of the correlation between entity's error term and predictor variables. Fixed effect removed the effect of different time-invariant characteristics from the dependent variables so that the researchers can consider the net effect of the dependent variable.
Here all coefficients have significant values (not equal to zero) and the probability is less than 5%. This supports that the model is vibrant to explain the changes in outcome variables. The equation of the model will be,

Stock Prices= 1115.64-10.25 (EPS) +.098 (P/E) – 3.6659(NAVPS) + 45.2071

The co-efficient constant is 1115.64 and by reducing the individuality and heterogeneity effect by fixed model now it has been found that 1 taka EPS lowers the stock prices by 10.25 taka in DSE which was positive 22.16

taka in pooled model while NAVPS reduces the prices by 3.66 for every unit. Only P/E provided a positive relationship with the stock prices.

Finally, Random effects assumed that the entity's error term is not correlated with the variables which allows for time-invariant variables to play a role as explanatory variables. The summary of the results goes following. In this model, the probability of EPS is greater than 5% that indicates all the other variables are significant to explain the model while EPS was significant in other two models.

Stock Prices= 1002.12-3.72 (EPS) +.1164(P/E) -2.73(NAVPS) + 122.19

The co-efficient constant is 1002.12 and by reducing the individuality and heterogeneity effect by fixed model now it has been found that 1 taka EPS lowers the stock prices by 3.72 taka in DSE while NAVPS reduces the prices by 2.73 for every unit.

The Hausman Test

Historically, Fixed Effect Model provides statistically better results than Random Effect Model. The EPS and NAVPS both are negatively related to stock prices in both cases although in reality the stock prices are enhanced because of EPS. This is probably because of time variant as researchers considered the estimated time of EPS and stock prices at the period while EPS is normally declared later and stock prices are influenced at that particular period. Now it is to be estimated that which model in this set is suitable. For this researchers had to test the model through Hausman hypothesis test. This has also been done using STATA by storing the values of both the random and fixed model.

Hausman Test on Fundamental Factors

	Coefficients			
	(b) Fixed	**(B) Random**	**(b-B) Differences**	**Sqrt (diag(V_b-V_B)**
EPS	-10.25	-3.72	-6.53	-
NAVPS	-3.66	-2.73	-0.93	-
P/E	0.098	0.1164	-0.0184	-
b=consistent under H0 and H1;Obtained from xtreg				
B=Inconsistent under H1, Efficient under H0; Obtained from xtreg				
Test: H0: Difference in coefficients not symmetric				

The above table is the summary of Hausman model where the null hypothesis (H_0) was that the random effect model is appropriate and alternative (H_1) hypothesis was about the fixed effect model. Here, the random effect model is effective under the null hypothesis. Hence, the random effect model is effective to explain the changes in share prices. In the random effect model, the EPS is only insignificant while other variables are significant to explain the changes successfully.

12.2 Technical Factors of Stock Prices

For the technical factors of stock prices, the study selected Gross Domestic Product, Inflation Rate and Interest Rate Spread for the last five year's each quarters. Again, the pooled model of regression has been developed to see the overall impact of variables on stock prices. The summary of pooled regression, fixed and random model is following.

Coefficients of Technical Factors in different circumstances

	Pooled			Fixed			Random		
	Coefficients	Probability	Std Error	Coefficients	Probability	Std Error	Coefficients	Probability	Std Error
GDP	-216.34	0.575	385.19	-216.34	0.172	157.44	-216.34	0.169	157.44
CPI	-119.44	0.304	115.68	-119.44	0.013*	47.28	-119.44	0.012*	47.28
Interest Spread	213.67	0.666	493.25	213.67	0.291	201.6	213.67	0.289	201.6
Adj R Square	0.0112			0.0107			0.0107		

Hence, the model under pooled OLS looks like

Stock Price=1175.66-216.33 (GDP)-119.44 (CPI) +213.67(Interest Spread)

This indicates that there is constants value of 1175.667 of stock prices. For 1% GDP changes, the stock prices of cement companies reduced by 216.33 taka while 119.44 taka in price is reduced for every 1% changes of Consumer Price Index and 213.67 taka price is increased for 1% interest spread is reduced between the deposit rate and advance rate. The coefficient values for all the models are same as there were no significant differences in the independent variables over the time. All the variables have probability over 5% under pooled system while only Consumer Price Index (CPI) has less than 5% probability in random and fixed effect model. The adjusted R square is significant that indicates that the variables are not good enough to explain the variability in stock prices. The standard error had different values in different methods.

Although the coefficients are same like the pooled regression model, the RSquare is significant to explain the variability of stock prices through these variables under fixed effect model. The probability of Consumer Price Index is significant as it is below 5%.

As said, the random effect model renders identical coefficient for variables as the variables are all equal for all the firms. Again, the Consumer Price Index is the only significant variables to explain the variability of share prices as the probability is sharply below down to 5%. The overall R square is only 1% that explains the variability of stock prices around the mean.

The Hausman Test

The Hausman test of technical factors in respect to the stock prices of cement industry is following.

Hausman Test on Technical Factors

	Coefficients			
	(b) Fixed	**(B) Random**	**(b-B) Differences**	**sqrt(diag(V_b-V_B)**
GDP	-216.34	-216.34	-2.67E-12	0.00000151
CPI	-119.44	-119.44	-5.97E-13	3.16E-06
Interest Spread	213.67	213.67	-3.41E-12	0.0000237
b=consistent under H0 and H1;Obtained from xtreg B=Inconsistent under H1, Efficient under H0; Obtained from xtreg Test: H0: Difference in coefficients not symmetric				

The above table is the summary of Hausman model where the null hypothesis (H_0) was that the random effect model is appropriate and alternative (H_1) hypothesis was about the fixed effect model. Here, the random effect model is effective under the null hypothesis. Hence, the random effect model is effective to explain the changes in share prices. In the random effect model, only CPI is significant whereas other variables are insignificant to explain the changes successfully.

13. Conclusions

The study aims at examining the determinants of market price of shares of cement companies listed in the Dhaka stock exchange. Related data was gathered for the period 2006-2015 from the Dhaka Stock exchange Archives. A set of panel data for 7 companies designed that was extended to 280 observations by segregating the data set into quarterly. The analysis is focused on Pooled OLS regression with Fixed Effect and Random Effect models. Thus, the study draws out a relationship of market price of shares with six other variables namely EPS, NAVPS, P/E, GDP, CPI and IRS. The findings are quite instrumental and identical with the empirical findings. The EPS, NAVPS, P/E and CPI has been found most significant while other variables were not that much significant.

This Study renders a clear-cut message to the investors of Bangladesh Capital Market that they should be watching out the financial base and earning growths of a firm. It is also recommended that investors monitor the PE ratio and Macro-economic factors before they expand their portfolio. Bangladesh is an emerging economy and it is imperative to conduct studies which will benefit the investor to make rational investments. The results can be considered reliable as it has included all the listed companies of cement industry in Dhaka Stock Exchange.

There were potential limitations identified by the researcher while the hypothesis testing was going on. The investor's sentiment and biasness have impact on the stock price volatility although there is no set benchmark to measure the investor's sentiment. The infatuations and lack of investment knowledge often lead an investor to invest irrationally in firms that lack potentials and growth probabilities. This study lacks directions for these investors. Otherwise, the authenticity and reliability of data will help the potential investors to decide on right investment vehicles. This study opens an opportunity for future researchers to study the Macro and Micro economic factors comprehensibly in relation with Market Prices of Stocks.

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Appendices

Appendix 01: Quarterly Data of different fundamental and technical Factors

Quarterly EPS of listed Cement companies (2006-2015)

		ARAMITCEM	CONFIDENCEM	HEIDELBERCEM	LAFSURMACEM	MICEMENT	MEGHNACEM	PREMIERCEM
2015	Q4	0.45	-3.98	5.83	0.49	1.02	1.36	1.25
	Q3	-0.08	0.59	4.01	0.32	0.76	0.11	0.81
	Q2	0.27	1.83	6.26	0.66	1.09	1.35	0.27
	Q1	0.18	1.56	8.71	0.5	0.87	2.31	0.32
2014	Q4	-0.18	0.8	2.96	0.61	1.13	-0.54	0.14
	Q3	0.07	1.02	3.46	0.61	0.68	0.47	0.76
	Q2	0.45	1.37	7.3	0.67	1.16	2.8	1.02
	Q1	0.17	2.13	7.16	0.54	0.92	1.75	0.23
2013	Q4	1.52	2.52	1.55	0.97	1.62	0.51	0.29
	Q3	0.13	1.41	6.62	0.31	1.06	0.25	1.18
	Q2	0.34	1.86	9.59	0.31	0.97	3.28	0.12
	Q1	0.57	2.3	8.33	0.6	1.11	1.19	0.33
2012	Q4	0.83	-3.95	-13.08	-1.01	-3.58	-3.46	
	Q3	0.95	1.16	4.56	0.23	1.39	1.14	
	Q2	0.68	2.04	2.34	0.34	0.89	0.67	
	Q1	0.57	0.75	6.18	0.44	1.30	1.65	
2011	Q4	0.65	-3.08	-11.14	33.25	1.45	-1.13	
	Q3	0.89	1.18	19.39	-12.78	1.31	0.56	
	Q2	1.02	1.01	30.00	-11.88		0.23	
	Q1	0.74	0.89	55.02	-11.05		0.34	
2010	Q4	1.11	-4.97	20.12	-12.77		-1.30	
	Q3	1.03	1.98	11.12	-5.15		0.12	
	Q2	1.94	2.34	28.00	-3.12		0.31	
	Q1	1.59	0.65	18.44	-7.18		0.87	
2009	Q4	15.53	-3.79	31.42	3.86		-4.64	
	Q3	13.52	2.35	28.23	12.62		2.31	
	Q2	9.36	0.34	46.53	8.89		1.15	
	Q1	4.94	1.10	44.41	-8.23		1.18	
2008	Q4	0.35	6.79	40.74	1.24		-6.98	
	Q3	0.59	2.34	23.07	3.60		2.34	
	Q2	0.41	-5.67	11.53	3.36		3.45	
	Q1	0.31	-3.46	29.52	-5.16		1.19	
2007	Q4	3.21	-19.11	43.19	-0.73		-51.97	
	Q3	2.56	4.34	15.53	-15.53		18.45	
	Q2	2.69	7.56	18.69	4.61		14.56	
	Q1	1.55	7.21	32.59	-7.23		18.96	
2006	Q4	0.52	-20.13	47.63	-1.35		-35.55	
	Q3	0.97	11.56	25.53	4.23		9.23	
	Q2	1.93	3.23	12.32	-8.95		17.65	
	Q1	1.56	5.34	11.52	-7.85		8.67	

Quarterly NAVPS of listed Cement companies (2006-2015)

		ARAMITC EM	CONFIDENC EM	HEIDELBER CEM	LAFSURMA CEM	MICEME NT	MEGHNACE M	PREMIERC EM
2015	Q4	14.98	69.54	102.27	12.37	39.59	37.28	31.45
	Q3	14.86	68.39	103.46	12.58	39.02	35.62	30.45
	Q2	14.49	65.3	108.62	12.62	38.32	36.42	29.93
	Q1	14.45	64.42	111.82	11.35	39.24	37.51	29.54
2014	Q4	15.49	64.41	115.46	11.41	38.22	36.1	28.62
	Q3	13.34	64.26	117.09	12.21	37.69	35.68	29.08
	Q2	16.54	65.24	123.62	11.78	38.91	36.54	29.43
	Q1	15.53	64.98	127.92	10.39	37.09	37.65	28.75
2013	Q4	16.22	65.11	132.58	9.51	37.67	35.09	27.84
	Q3	15.65	64.34	119.65	8.54	38.76	35.61	26.79
	Q2	14.5	63.72	117.86	7.65	39.74	32.45	25.72
	Q1	13.49	59.49	114.92	6.89	38.91	34.52	23.45
2012	Q4	14.65	56.74	111.49	6.19	40.28	33.81	
	Q3	14.65	62.46	106.72	7.61	44.12	32.29	
	Q2	13.99	66.87	102.32	5.93	47.23	33.42	
	Q1	14.07	68.79	98.72	4.87	46.72	31.23	
2011	Q4	12.79	67.07	93.13	4.44	50.28	30.03	
	Q3	12.87	69.25	87.55	4.56	49.54	31.52	
	Q2	13.08	73.61	82.53	4.53		28.59	
	Q1	12.89	81.23	83.29	4.86		29.56	
2010	Q4	9.443	79.85	84.18	4.767		29.84	
	Q3	11.68	81.56	87.52	5.26		32.59	
	Q2	29.85	85.26	81.86	5.39		28.93	
	Q1	31.52	87.59	712.53	75.87		30.26	
2009	Q4	47.75	89.48	703.05	76.3		29.92	
	Q3	36.52	74.59	690.78	67.49		26.53	
	Q2	24.13	67.53	648.53	62.97		226.45	
	Q1	28.29	341.52	617.52	60.26		247.63	
2008	Q4	16.4	330.67	585.46	59		255.49	
	Q3	12.56	301.25	601.23	57.85		267.53	
	Q2	9.56	312.53	558.95	58.59		268.46	
	Q1	11.25	332.15	567.26	55.39		268.46	
2007	Q4	14.67	345.66	505.6	56.03		275.2	
	Q3	17.54	338.56	485.26	56.03		275.2	
	Q2	13.56	319.52	448.39	56.03		288.59	
	Q1	11.26	317.26	451.83	57.29		301.56	
2006	Q4	8.95	332.93	436.37	68.31		320.42	
	Q3	8.95	318.09	436.37	66.91		321.19	
	Q2	7.56	324.29	445.85	63.54		327.96	
	Q1	9.23	315.26	449.36	58.59		333.61	

Quarterly Price listed Cement companies (2006-2015)

		ARAMITCEM	CONFIDENCE M	HEIDELBERCEM	LAFSURMACEM	MICEMENT	MEGHNACEM	PREMIERCEM
2015	Q4	411	867	5621	746	85.4	534.5	76.8
	Q3	433	903	6402	1076	79.8	574.5	87.4
	Q2	254	764	5703	1181	76	555.5	59
	Q1	278	934	4503	1145	66.3	551.5	63.1
2014	Q4	390	1067	4994	1230	72.2	605.5	80.9
	Q3	452	1242	5314	1373	84.3	635.5	84.8
	Q2	450	1191	5085	833	86	589.5	84.8
	Q1	545	1359	4219	497	84.1	688	90.7
2013	Q4	843	1239	3807	335	78.2	714	99.6
	Q3	763	1190	3784	332	90.6	669	101.9
	Q2	759	1295	3350	328	90.5	533	109.9
	Q1	649	995	2371	300	71.3	467.5	75.6
2012	Q4	639	1049	2647	329	82.9	524	0
	Q3	823	1182	2685	365	119.1	634.5	0
	Q2	829	1109	2387	399	108.6	662.5	0
	Q1	1040	1333	2118	301	108.5	678.5	0
2011	Q4	1168	1245	2559	266	110.5	698	0
	Q3	1157.75	1527	3000	614	170.1	923.5	0
	Q2	1194.25	1814	3040	489	176.8	1141.5	0
	Q1	1345.5	2640	3246.25	430.75	0	1392.5	0
2010	Q4	1591	2934	3659.25	563.75	0	1730	0
	Q3	1932.75	2861	3843.75	718.5	0	2099.5	0
	Q2	1098.5	1667	3133.5	444.5	0	2090.75	0
	Q1	740.25	1533.3	2440.25	459	0	1307.25	0
2009	Q4	565.25	1398.25	2152.5	505	0	1304	0
	Q3	441	659	1699.5	488	0	772	0
	Q2	216	515.5	1429.25	542.25	0	579	0
	Q1	251	411.25	1198.25	429.5	0	534	0
2008	Q4	177.5	318.25	1214	513	0	386	0
	Q3	171.75	290.75	1234	589.5	0	393.25	0
	Q2	222.25	427.25	1406.75	523	0	564.25	0
	Q1	251	479.75	1375.75	573.25	0	401.25	0
2007	Q4	150.75	369	1204.75	480.75	0	352.25	0
	Q3	152	375.5	1248.25	415.25	0	330	0
	Q2	87	409.25	1147	385	0	271	0
	Q1	67	219	741.5	427.75	0	273.75	0
2006	Q4	73.25	138.5	647.25	391.75	0	276.75	0
	Q3	85	145.25	700.5	435.75	0	294	0
	Q2	55	118	437.75	328.25	0	255	0
	Q1	50.25	130	553.25	356.25	0	285	0

Quarterly P/E data on Cement companies

		ARAMITCEM	CONFIDENC EM	HEIDELBERCEM	LAFSURMACEM	MICEMENT	MEGHNACEM	PREMIERCEM
2015	Q4	913.33	-217.84	964.15	1522.45	83.73	393.01	61.44
	Q3	-5412.50	1530.51	1596.51	3362.50	105.00	5222.73	107.90
	Q2	940.74	417.49	911.02	1789.39	69.72	411.48	218.52
	Q1	1544.44	598.72	516.99	2290.00	76.21	238.74	197.19
2014	Q4	-2166.67	1333.75	1687.16	2016.39	63.89	-1121.30	577.86
	Q3	6457.14	1217.65	1535.84	2250.82	123.97	1352.13	111.58
	Q2	1000.00	869.34	696.58	1243.28	74.14	210.54	83.14
	Q1	3205.88	638.03	589.25	920.37	91.41	393.14	394.35
2013	Q4	554.61	491.67	2456.13	345.36	48.27	1400.00	343.45
	Q3	5869.23	843.97	571.60	1070.97	85.47	2676.00	86.36
	Q2	2232.35	696.24	349.32	1058.06	93.30	162.50	915.83
	Q1	1138.60	432.61	284.63	500.00	64.23	392.86	229.09
2012	Q4	769.88	-265.57	-202.37	-325.74	-23.16	-151.45	
	Q3	866.32	1018.97	588.82	1586.96	85.68	556.58	
	Q2	1219.12	543.63	1020.09	1173.53	122.02	988.81	
	Q1	1824.56	1777.33	342.72	684.09	83.46	411.21	
2011	Q4	1796.92	-404.22	-229.71	8.00	76.21	-617.70	
	Q3	1300.84	1294.07	154.72	-48.04	129.85	1649.11	
	Q2	1170.83	1796.04	101.33	-41.16		4963.04	
	Q1	1818.24	2966.29	59.00	-38.98		4095.59	
2010	Q4	1433.33	-590.34	181.92	-44.15		-1330.77	
	Q3	1876.46	1444.95	345.66	-139.51		17495.83	
	Q2	566.24	712.39	111.91	-142.47		6744.35	
	Q1	465.57	2358.92	132.33	-63.93		1502.59	
2009	Q4	36.40	-368.93	68.51	130.83		-281.03	
	Q3	32.62	280.43	60.20	38.67		334.20	
	Q2	23.08	1516.18	30.72	61.00		503.48	
	Q1	50.81	373.86	26.98	-52.19		452.54	
2008	Q4	507.14	46.87	29.80	413.71		-55.30	
	Q3	291.10	124.25	53.49	163.75		168.06	
	Q2	542.07	-75.35	122.01	155.65		163.55	
	Q1	809.68	-138.66	46.60	-111.09		337.18	
2007	Q4	46.96	-19.31	27.89	-658.56		-6.78	
	Q3	59.38	86.52	80.38	-26.74		17.89	
	Q2	32.34	54.13	61.37	83.51		18.61	
	Q1	43.23	30.37	22.75	-59.16		14.44	
2006	Q4	140.87	-6.88	13.59	-290.19		-7.78	
	Q3	87.63	12.56	27.44	103.01		31.85	
	Q2	28.50	36.53	35.53	-36.68		14.45	
	Q1	32.21	24.34	48.03	-45.38		32.87	

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Quarterly Data on Technical Factors (2011-2015)

		GDP (%)	CPI (%)	Interest Spread (%)
2015	Q4	2.01	6.1	4.84
	Q3	1.15	6.24	4.82
	Q2	1.62	6.25	4.79
	Q1	1.73	6.27	4.87
2014	Q4	1.97	6.11	4.98
	Q3	1.34	6.84	5.14
	Q2	1.19	6.97	5.31
	Q1	1.62	7.48	5.15
2013	Q4	1.02	7.35	4.98
	Q3	2.04	7.13	4.89
	Q2	1.23	8.05	4.97
	Q1	1.72	7.71	5.02
2012	Q4	1.89	7.14	4.56
	Q3	2.05	4.96	4.77
	Q2	1.2	8.56	4.92
	Q1	1.38	10.1	4.63
2011	Q4	1.56	7.28	4.56
	Q3	1.37	6.89	4.27
	Q2	1.98	7.07	4.98
	Q1	1.55	5.64	5.07

Appendix 02: Outcomes of STATA
Fundamental Factors

Pooled OLS

```
      Source |       SS       df       MS              Number of obs =     280
-------------+------------------------------           F(  3,   276) =   12.99
       Model | 42147911.6      3   14049303.9          Prob > F      =  0.0000
    Residual |  298548928    276   1081699.01          R-squared     =  0.1237
-------------+------------------------------           Adj R-squared =  0.1142
       Total |  340696840    279   1221135.63          Root MSE      =    1040

------------------------------------------------------------------------------
   shareprice |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         eps |   22.16259   6.955073     3.19   0.002      8.47086    35.85432
       navps |   .7317398   .4979764     1.47   0.143     -.2485747   1.712054
          pe |   .1804016   .0420308     4.29   0.000      .0976599    .2631433
       _cons |   576.8226   78.14776     7.38   0.000      422.9812     730.664
------------------------------------------------------------------------------
```

Fixed Effect Model

```
Fixed-effects (within) regression          Number of obs      =        280
Group variable: companycode                Number of groups   =          7

R-sq:  within  = 0.4582                     Obs per group: min =         40
       between = 0.9191                                    avg =       40.0
       overall = 0.0200                                    max =         40

                                            F(3,270)           =      76.11
corr(u_i, Xb)  = -0.6353                    Prob > F           =     0.0000
```

```
  shareprice         Coef.    Std. Err.       t    P>|t|     [95% Conf. Interval]

         eps     -10.25048    3.968904    -2.58    0.010    -18.06441    -2.43654
       navps     -3.665952    .3147846   -11.65    0.000    -4.285697   -3.046208
          pe      .0986674     .022659     4.35    0.000     .0540567    .1432781
       _cons      1115.648     45.2071    24.68    0.000     1026.645    1204.651

     sigma_u      1340.085
     sigma_e    533.37797
         rho      .863246    (fraction of variance due to u_i)

F test that all u_i=0:     F(6, 270) =    129.90              Prob > F = 0.0000
```

Random Effect Model

```
R-sq:  within  = 0.4436                     Obs per group: min =         40
       between = 0.8938                                    avg =       40.0
       overall = 0.0080                                    max =         40

                                            Wald chi2(3)       =      96.58
corr(u_i, X)   = 0 (assumed)                Prob > chi2        =     0.0000
```

```
  shareprice         Coef.    Std. Err.       z    P>|z|     [95% Conf. Interval]

         eps     -3.728618    4.875876    -0.76    0.444    -13.28516    5.827923
       navps     -2.733432    .3795021    -7.20    0.000    -3.477242   -1.989622
          pe      .1164894    .0280832     4.15    0.000     .0614474    .1715314
       _cons      1002.128    122.1796     8.20    0.000       762.66    1241.595

     sigma_u    231.04311
     sigma_e    533.37797
         rho    .15799108    (fraction of variance due to u_i)
```

Technical Factors

Pooled OLS

```
. regress shareprices gdp cpi interestspread

      Source |       SS       df       MS              Number of obs =     140
-------------+------------------------------           F(  3,   136) =    0.49
       Model | 2605225.48        3  868408.494         Prob > F      =  0.6911
    Residual |  241922625      136  1778842.83         R-squared     =  0.0107
-------------+------------------------------           Adj R-squared = -0.0112
       Total |  244527851      139  1759193.17         Root MSE      =  1333.7
```

```
------------------------------------------------------------------------------
 shareprices |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         gdp | -216.3344   385.1945    -0.56   0.575    -978.08     545.4112
         cpi | -119.4444   115.6805    -1.03   0.304   -348.2096    109.3209
 interestsp~d |  213.6774   493.2534     0.43   0.666   -761.7613    1189.116
       _cons |  1175.667   2889.975     0.41   0.685   -4539.433    6890.768
------------------------------------------------------------------------------
```

Fixed Effect Model

```
Fixed-effects (within) regression          Number of obs      =       140
Group variable: companycode                Number of groups   =         7

R-sq:  within  = 0.0632                     Obs per group: min =        20
       between =      .                                    avg =      20.0
       overall = 0.0107                                    max =        20

                                            F(3,130)           =      2.92
corr(u_i, Xb)  = -0.0000                    Prob > F           =    0.0365
```

```
------------------------------------------------------------------------------
 shareprices |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
         gdp | -216.3344   157.4404    -1.37   0.172   -527.8114    95.14257
         cpi | -119.4444   47.28205    -2.53   0.013   -212.9862   -25.90247
 interestsp~d |  213.6774   201.6072     1.06   0.291   -185.1784    612.5332
       _cons |  1175.667   1181.218     1.00   0.321   -1161.231    3512.566
-------------+----------------------------------------------------------------
     sigma_u | 1301.5699
     sigma_e | 545.13591
         rho |  .85076105   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(6, 130) =   114.01              Prob > F = 0.0000
```

Random Effect Model

```
R-sq:  within  = 0.0000                    Obs per group: min =          20
       between = 0.0000                                   avg =        20.0
       overall = 0.0107                                   max =          20

                                           Wald chi2(3)       =        8.77
corr(u_i, X)   = 0 (assumed)               Prob > chi2        =      0.0326
```

shareprices	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
gdp	−216.3344	157.4404	−1.37	0.169	−524.9119	92.24309
cpi	−119.4444	47.28205	−2.53	0.012	−212.1155	−26.77324
interestsp~d	213.6774	201.6072	1.06	0.289	−181.4655	608.8203
_cons	1175.667	1278.736	0.92	0.358	−1330.609	3681.944
sigma_u	1295.8494					
sigma_e	545.13591					
rho	.84963907	(fraction of variance due to u_i)				