

# Value Relevance of Accounting Information: Evidence from Fuel and Energy Sector of Pakistan

Muhammad Farhan Malik<sup>1</sup>, Bakhtiar Ali<sup>2</sup>

<sup>1</sup>Research Scholar at Shaheed Zulfikar Ali Bhutto Institute of Science and Technology Islamabad Campus, Pakistan

<sup>2</sup>Associate Professor at Shaheed Zulfikar Ali Bhutto Institute of Science and Technology Islamabad Campus, Pakistan

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## ABSTRACT

This study examines the impact of accounting fundamentals on stock price and explains how the studied variables are capable of determining the stock price with respect to Fuel and Energy Sector companies listed in Karachi Stock Exchange (KSE). The study also intends to answer how a firm can increase its share value by focusing on the most value relevant drivers within the activities of financial management. The sample of the study consists of 21 public listed companies of Fuel and Energy Sector on KSE whose share has been traded within the study period; from 2001 to 2009. We basically employed two statistical models; the pooled ordinary least squares regression (OLS) and panel data fixed effects regression to rank the studied variables according to their stock price relevancy. But the Restricted F-test and Hausman Test shows that the fixed effects estimators are efficient to pooled OLS and random effects. The results suggest that financial leverage and speed of asset turnover shows the highest capability in defining the deviations in stock prices. Moreover the study suggests that firms should optimize their assets efficiency and maintain an efficient capital structure to increase the market value of shares.

**KEYWORDS:** Stock Price Relevance, Value Determination, Accounting Variables

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## 1. INTRODUCTION

One of the major tasks in finance is to increase the shareholders' wealth, by applying different tools and techniques related to firm's operations, investments and financing affairs. However from these activities the main goal remains the same i.e. to increase the value of a firm. From the past few decades considerable research is found on this issue which tested the relationship between accounting and financial variables with stock prices or stock returns (also known as fundamental analysis). Ball and Brown (1968) tested this relationship for the very first time. They considered the accounting variables as relevant to stock price and found a significant relationship.

The earnings capitalization is one of the widely used technique through which accounting performance measures are considered as the determinant of market value (Beaver, 1989; Watts & Zimmerman 1986; Papadaki, & Siougle, 2007). These performance measures however are also criticized for their inefficiency in defining the deviations in stock prices studies report (Fisher & McGowan, 1983; Stern Stewart & Co.; Morad, 2009). However empirical results, but a recent development in the theoretical framework of value relevance has found significant relationship.

### 1.1 VALUE DETERMINATION

In the context of value determination there are basically two forms of analyses that can be employed to ascertain the stock value; one is technical analysis and the other is fundamental analysis. The former is related to predict the stock prices on the basis of past trends and the later discusses that the stock prices can be determined by employing fundamental performance measures. The fundamental analysis however has great importance in the literature of stock price determination and different models proposed in this respect include Dividend Discount Model (DDM), Binomial Pricing Model, Linear Information Model, Ohlson (1995) model, and Black Scholes Option Pricing Model (BSOPM). These models are basically derived on the basis of market efficiency and claim that the stock prices are reflected in all the available information in the stock market. Aboody, Hughes, and Liu (2002) argued that semi-strong form of efficiency is needed for studying the stock price relevancy and to generate reliable results. However in developing economies the main goal of most studies is to ascertain whether the performance measures are relevant to firm value. Even in an inefficient market the investor decisions are significantly influenced by fundamental variables.

## 1.2 RESEARCH PROBLEM AND OBJECTIVES

The present study discusses the relationship between accounting fundamentals and stock prices. Most of the researchers have focused on the value relevance of earnings and dividends. While this study employs a wide range of independent variables extracted from the previous literature.

Research regarding stock price relevancy has been greatly studied in other countries such as Jordan, Greece, USA, UK etc. (e.g. Shubita, 2010; Florou & Chalevas, 2010; Gallizo & Salvador, 2006; Ismail, 2006), but very less literature is found on this issue with respect to Pakistan. The available literature is mostly focused on the value relevance of dividends, based on dividend discount model (DDM). The latest literature available contradicts this model and argues that there are other variables which must be employed while valuing the firms' stock. Therefore the major objectives of this study are as follows:

- To find the relationship between accounting fundamentals and stock price with respect to Pakistani capital market.
- To rank the studied variables according to their power of determination of the stock price.
- To explain the factors that is necessary to increase the shareholders' wealth.

## 2. LITERATURE REVIEW

### 2.1 THEORETICAL FRAMEWORK

The debate on the stock price relevance was discussed for the very first time by Ball and Brown (1968). They challenged the claim that accounting fundamentals are irrelevant to the firm value but found a positive significant relationship between accounting fundamentals and stock price. From the inception of research in value relevance, the researchers are trying to find out this gap in different contexts such as accounting fundamentals, economic indicators, international financial reporting standards (IFRS) and earnings management (e.g. Al-Tamimi, 2007; Azeem & Kouser, 2011).

Gallizo and Salvador (2006) took a large sample of 2,164 firms listed on NYSE and explains the value relevance of accounting variables in terms of evolution of firm's stock price, specifically the influence of cash flows and book value. By employing hierarchical Bayesian analysis their empirical results reveal that asset turnover and firm size are most value relevant. They related their results with the theory of company life cycles. Similar results are also reported by (Chen & Zhang, 2007). Their study investigates the cross-sectional relationship between accounting performance measures and stock returns and claim that earnings yield, capital investment, profitability, growth opportunities and discount rates are related to stock returns. Moreover their study suggests that the profitability-related information is more efficient in explaining deviation in stock returns than firm's cash flow related information. Furthermore (Chen & Zhang, 2007) suggest that in order to search common-factor-based anomalies, it is more beneficial for the investors to find and analyze the fundamental characteristics of firms' operations.

Florou and Chalevas (2010) investigates the impact of operational, investment and financial management ratios on stock return. By studying 861 firm-year observations from Athens Stock Exchange, and employing the cross-sectional analysis they found that operational performance (return on asset, leverage, asset turnover and net profit margin), growth opportunities and ability to generate sales affect the stock returns. Papadaki and Siougle (2007) by using simple earnings capitalization model report that there is a negative relationship between share prices when a firm is facing loss and a positive relation when the firm is having profits. They suggest that the usefulness of accounting variables to investors and the price-earnings relationship is not uniform for loss and profit reporting firms.

Economic indicators are also found to have a significant impact on the stock price. Sadorsky (2003) found the impact of macroeconomic determinants on US technology stock prices that are measured using Pacific Stock Exchange Technology 100 Index. He claims that the conditional volatilities of oil prices, the term premium and consumer price index significantly affect the conditional volatility of technology stock prices. Infrequent volatility of oil price is positively related to infrequent business cycles mostly when technology stock prices are concerned. The study of Sadorsky (2003) further recommends that managers must incorporate oil price risk in financial engineering. Advocates of EVA<sup>1</sup> claim it is more efficient in explaining the deviations in share value such as O'Byrne (1996) suggests that EVA<sup>®</sup> provides a better predictor than other operating performance measures and recommends that positive EVA<sup>®</sup> is the sign of future growth and negative EVA<sup>®</sup> reduces the market value. Lehn and Makhija (1997) using a sample of 452 firms report that EVA<sup>®</sup> has stronger correlation than conventional accounting measures.

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<sup>1</sup> EVA is the registered trade mark of Stern Stewart and Co.

## 2.2 ANALYSIS OF VARIABLES AND THEIR RELATIONSHIPS

The independent variables are accounting fundamentals whereas dependent variable is stock price. Following are the operational definitions of the selected variables. All the variables are taken on annual basis for the study period of 2001 to 2009 at year end 31<sup>st</sup> December. Mostly all the ratios are industry specific which means a particular firm's performance can be measured with respect to its industry only. So the sample consists of public listed companies in fuel and energy sector of KSE.

### 2.2.1 INDEPENDENT VARIABLES

#### **Net Profit Margin**

This ratio shows how much profit a company makes for every rupee it generates in revenue. It is calculated as:  $Net\ profit\ margin = Net\ profit\ after\ tax/Sales$ . The higher the net profit margin, the better (Gitman, 2006) and this ratio also shows connection between firms profitability and its operating activities (Florou & Chalevas, 2010). Their study supports the findings of Chen and Dodd (2001) and Biddle et al. (1997) who claims that stock prices are more sensitive to earnings than economic value added and residual income. Moreover Chen and Dodd (2001) claim that explanatory power of regression could be increased by focusing on satisfaction of employees and customers, increase in market share, product quality, research and development spending. All of these factors ultimately increase the earnings capability of the company. Net profit margin shows a significant relationship with stock price as investors are attracted towards the firm's earnings capability (Shubita, 2010). Furthermore the study of Shubita (2010) also claims that net profit is one of the most value relevant variables of stock returns. Christopher et al. (2009) also found the strong determination power of earnings.

#### **Asset Turnover**

This is an efficiency ratio which shows the efficiency of firm's assets in generating sales. It is calculated as:  $Asset\ Turnover = Sales/Total\ Assets$ . Higher the ratio more efficient the firm's assets are in generating sales. As the earnings directly attract the investors and a high asset turnover leads to higher profits, so this ratio seems to have a positive relationship with stock price. Biddle et al. (1997) claim that the key variable in explaining the stock return is cash flow and it is highly related to firm's size and its assets turnover. Moreover they also suggest that book value is important when the firm is old and asset turnover is more value determinant for young firms and for these firms a lower volume of investments to achieve the given level of revenues is necessary. The results of Biddle et al. (1997) suggest that firms in electronics industry, whose asset turnover is high, significantly determine the share value. Gallizo and Salvador (2006) studied the impact of accounting variables on stock prices by taking a large sample of 2164 firms from NYSE for the time period of 1992 to 2000. Their results suggest that speed of assets turnover is the most relevant to firm's stock price. Moreover they claim that the stock price of old firms is determined by book value and for young firms, the high asset turnover is necessary in determining the stock prices. The results of Gallizo and Salvador (2006) support the findings of (Kothari, 1992; Bao & Bao, 2001) who relate their findings with the theory of company life cycles. According to this theory, the company growth is reflected in different values by accounting performance variables and the market response to these variables that fluctuate depending upon these values.

#### **Financial Leverage**

Financial leverage is the degree to which an investor or business is utilizing the borrowed money. It is calculated as:  $Financial\ Leverage = Assets/Owners\ Equity$ . The efficient utilization however decreases expense and increases firms' ability to generate profits and also affects its stock price significantly. The relationship between firm's value and its capital structure is a conflicting debate; some researches show positive relation while others show negative relation. Prior researches such as conducted by Myers (1984) and Rajan and Zingles (1995) show a negative relationship between firm value and its capital structure. While the results of (Ward & Price, 2006; Sharma, 2006; Firer et al. 2004) show a positive relationship between these two variables. One explanation of this positive relationship is that these studies are mostly conducted on American and European markets which are considered to be mature markets. The optimal capital structure is difficult to establish but the ranges are available through which efficient leverage utilization could increase the market value (De Wet 2006). But this range varies across industry to industry. Moreover recently the study by Florou and Chalevas (2010) found a significant relationship between leverage and stock return.

#### **Return on Equity (ROE)**

ROE measures the net profit earned on the shareholders equity. It is a profitability measure which measure show much a firm earns with the shareholders invested money. ROE is calculated as:  $Return\ on\ Equity = Net\ Income/Shareholder's\ Equity$ . Palliam (2006) studied the information content of different accounting variables with respect to EVA and non EVA users, the results indicate that the ROE significantly determines the stock price. Moreover the ROE of EVA users is not greater than the ROE of non EVA users. Palliam (2006) also

suggests that performance measures such as return on investment, return on equity, return on assets and earnings per share has received a lot of attention in contemporary research on value relevance. This assertion confirms the findings given by Gravey and Millbourn (2000).

### **Current Ratio**

This is a liquidity ratio that measures a firm's ability to pay its short-term debts. It is calculated as: *Current Ratio = Current Assets/Current Liabilities*. This ratio is used in this study to measure the financial management performance. A higher current ratio is positively related with stock prices because it is less likely for a firm to face liquidity troubles as this ratio increases (Florou & Chalevas, 2010). A significant relationship between working capital components and firm's value has also been found such as Alam et al. (2011) report that efficient working capital management is significantly correlated with firm's value and claim that profits of Pakistani firms is greatly dependent upon the current assets. In addition their study indicates that firms have to invest in current assets to meet their current maturities resultantly decline in profits.

### **2.2.2 DEPENDENT VARIABLE**

#### **Stock Price**

In this study the stock price is the closing price of a share at 31<sup>st</sup> December taken from KSE website on annual basis for each firm. Market value per share is taken as the dependent variable in literature of stock price relevance such as (Palliam, 2006; Al-Tamimi, 2007; Christopher et al. 2009).

### **2.3 HYPOTHESIS OF THE STUDY**

H<sub>1</sub>: Accounting variables positively and significantly determine the stock price.

## **3. RESEARCH DESIGN**

### **3.1 SAMPLING METHODOLOGY**

The population of the study is the public listed companies of Fuel and Energy Sector in Karachi Stock Exchange (KSE). This sector has been considered for the research because companies listed in Fuel and Energy Sector has shown frequent trading and has the highest market capitalization than other sectors' companies. This sector is most widely considered as the market mover of KSE 100 index. The sample includes all the companies whose shares are traded within the study period [2001 to 2009]. Moreover the 9 years secondary data for the sample is used. The data for the selected variables has been gathered from annuals reports of the companies and Balance Sheet Analysis for nonfinancial public listed companies issued by State Bank of Pakistan (SBP). The data regarding the stock price is gathered from the website of KSE.

### **3.2 DATA ANALYSIS TECHNIQUE**

The two models tested are:

$$SP_{it} = \beta_0 + \beta (X_{it}) + u_{it} \quad (\text{Model 1})$$

$$SP_{it} = \beta_0 + \beta (X_{it}) + \alpha_i + e_{it} \quad (\text{Model 2})$$

Whereas  $SP_{it}$  represents the dependent variable i.e. stock price taken on annual basis for each company in the sample. For statistical analysis first of all Pearson correlation coefficient between variables is calculated. Then pooled ordinary least squares regression (model 1) and panel data fixed effects regression (model 2) is applied to ascertain the determination power of each independent variable and collective determination power of high R-squared variables. The Restricted F-test and Hausman test are also used to choose the correct model for generalization of results. In fixed effects regression  $X_{it}$  is the time as well as cross-sectional variant regressor and  $\alpha_i$  is the fixed parameter, it is done by including dummy variables for n-1 cross-sectional units, this is also known as least squares dummy variables (LSDV) method. The  $e_{it}$  reflects the random error term.

## **4. STATISTICAL RESULTS**

This section provides the empirical results of the study. First the descriptive statistics is presented in Table I for the selected variables and then a correlation matrix is provided in Table II which shows whether there exists statistically significant correlation between the dependent and independent variables. After knowing the correlation coefficient the results are purified by using pooled ordinary least square regression for each independent variable which is shown in Table III. In Table IV diagnostic tests are performed on the high R-squared variables from Pooled OLS which show that Fixed Effects Estimators are efficient instead of Pooled OLS and Random Effects. The results of Fixed Effects (LSDV) regression is given in Table V. Moreover for the purpose of comparison, the result of Random Effects regression is provided in appendix I.

<b>Table I. Descriptive Statistics</b>						
	<b>Current Ratio</b>	<b>Asset Turnover</b>	<b>Financial Leverage</b>	<b>Net Profit Margin</b>	<b>Return on Equity</b>	<b>Stock Price</b>
Mean	2.00	1.57	16.31	-5.07	135.42	96.19
Median	1.10	0.87	7.01	3.10	33.13	25.90
Standard Deviation	3.36	1.69	18.49	48.25	326.66	134.8
Minimum	0.19	0.00	1.30	-409.30	-1572	0.70
Maximum	27.07	6.91	93.03	51.10	1301	792
Count	189	189	189	189	189	189

Descriptive statistics is given in Table I; demonstrate that ROE has the highest mean of 135.42 followed by stock price, financial leverage, current ratio, asset turnover, and net profit margin. ROE also has the highest median of 33.13. Moreover it also represents the highest standard deviation of 326.66. After displaying standard deviation the next two rows in Table I show minimum and maximum values in the data. ROE shows the minimum and maximum value of -1572.19 and 1301.59 respectively in the data.

<b>Table II. Correlation Matrix</b>					
	<b>Current Ratio</b>	<b>Asset Turnover</b>	<b>Financial Leverage</b>	<b>Net Profit Margin</b>	<b>Return on Equity</b>
Asset Turnover	-.182*				
Financial Leverage	-.183*	.695**			
Net Profit Margin	-.135	.158*	.148*		
Return on Equity	-.070	.542**	.339**	.207**	
Stock Price	-.125	.689**	.620**	.218**	.550**

\*\* , and \* denote significance level of 1%, and 5% respectively.

Pearson correlation coefficient between all the variables is shown in Table II. Most of the independent variables have a significant correlation with stock price except current ratio. Asset turnover has the highest correlation of 0.689 with stock price which is followed by financial leverage, return on equity, and net profit margin. The current ratio shows a negative correlation of -.125 with stock price having no statistical significance. Moreover the highest correlation between independent variables is shown between asset turnover and financial leverage of 0.695 and the lowest correlation between current ratio and ROE of -0.07. Current ratio also indicates a negative correlation with rest of the other variables.

Table III shows the results using pooled ordinary least squares regression. Asset turnover shows the highest stock price relevance having adjusted R<sup>2</sup> 0.474 and coefficient of 54.873 which shows that the stock price is highly sensitive to asset turnover and has the highest capability in defining deviation in the stock prices. Gallizo and Salvador (2006) also suggests that speed of assets turnover is the most relevant to firm's stock price. After the asset turnover we have financial leverage, ROE, net profit margin, and current ratio respectively in defining the deviation in stock prices.

Table IV shows the diagnostic tests for an efficient panel model selection. Two tests are performed one is Restricted F-test<sup>2</sup> and the other is Hausman test<sup>3</sup>. F-Statistic of 18.62 in Restricted F-test is significant at 1% which concludes that all the cross-sectional units do not share a common intercept. In this case the Fixed Effects Model is preferred to Pooled OLS. Furthermore the Hausman test is used to choose between the Fixed Effects and Random Effects Models. The test statistic developed by Hausman has an asymptotic  $\chi^2$  distribution. In table IV the Chi-square test statistic of 24.59 is significant at 1% level which rejects the null hypothesis and concludes that Fixed Effects Model is preferred to Random Effects Model.

Table V presents the results of model 2 i.e. fixed effects regression. In this model the top three variables are chosen from Pooled OLS having higher adjusted R<sup>2</sup>. The method used in fixed effects regression is Least Square Dummy Variable Regression (LSDV) which is done by adding a dummy variable for n-1 cross-sectional units. The result shows that most of the dummies are significant at 1% level which proves that all the cross-sectional units do not share a common intercept hence the fixed effects estimators are efficient. The R-squared is 0.90 and Adjusted R-squared is 0.89 which shows that collective determination power of independent variables is very high. The coefficients of asset turnover and financial leverage are 0.20 and 0.32 respectively and both are significant at 1% level. Moreover the coefficient of return on equity is quite nominal i.e. 0.02 and it is significant at 5% level. The overall results of fixed effects model indicate that firms must focus on the efficiency of their assets i.e. how well these assets are in generating revenues and maintain an efficient capital structure to increase the value relevancy and ultimately the market value.

<sup>2</sup> The null hypothesis of F-Test here is that all the differential intercepts are equal to zero.

<sup>3</sup> The null hypothesis of Hausman test is that the Fixed Effects Model and Random Effects Model estimators do not differ substantially.

**Table III. Pooled Ordinary Least Square Regression Results**

Dependent Variable	Explanatory Variables	Coefficient (Standard Error)	t-statistics	Adjusted R <sup>2</sup>
Stock Price	Asset Turnover	54.87*** (4.220)	13.01	0.472
	Financial Leverage	4.52*** (0.418)	10.80	0.380
	Return on Equity	0.22*** (0.025)	9.01	0.301
	Net Profit Margin	0.61*** (0.199)	3.04	0.042
	Current Ratio	-5.01 (2.912)	-1.72	0.011

\*\*\*, and \*\* denote significance level of 1% and 5% respectively.

**Table IV. Diagnostic Tests**

Diagnostic Test	F-Statistic	Chi-square Statistic
Restricted F-Test	18.62***	
Hausman Test		24.59***

\*\*\* denote significance level of 1%

**Table V. Fixed Effects (LSDV) Results**

*Dependent Variable:* Stock Price  
*Method:* Least Square Dummy Variable Regression (LSDV)  
*R-squared:* 0.90  
*Adjusted R-squared:* 0.89  
*F-Statistic:* 69.18  
*P-value(F):* 0.000

	Coefficient	Std. Error	t-statistics
const	1.24***	0.10	11.58
Asset Turnover	0.20***	0.07	2.83
Financial Leverage	0.32***	0.10	3.08
Return on Equity	0.02**	0.01	2.37
du_1	-0.25**	0.12	-2.03
du_2	0.11	0.15	0.72
du_3	-0.88***	0.11	-7.82
du_4	-0.01	0.11	-0.14
du_5	-0.71***	0.11	-6.43
du_6	-0.63***	0.11	-5.50
du_7	-0.01	0.11	-0.13
du_8	-0.62***	0.11	-5.62
du_9	0.21	0.13	1.58
du_10	0.32**	0.15	2.19
du_11	0.79***	0.12	6.62
du_12	0.23	0.16	1.45
du_13	0.53***	0.15	3.41
du_14	-0.66***	0.11	-5.60
du_15	0.52***	0.12	4.30
du_16	0.58***	0.16	3.56
du_17	-0.21*	0.11	-1.87
du_18	-0.43***	0.11	-3.92
du_19	-0.13	0.12	-1.10
du_20	-0.27**	0.11	-2.36

\*\*\*, \*\*, and \* denote significance level of 1%, 5%, and 10% respectively.

## 5. CONCLUSIONS

Studies on value relevance examine the factors that are responsible for fluctuations in the value of a firm which ultimately results in the variation in shareholders' wealth. Researches on value relevance with respect to accounting information focus on the financial reports and accounting performance measures that affect stock prices. Similarly the current study investigates the relationship between selected accounting fundamentals and stock price of public listed companies of fuel and energy sector in KSE. In addition we have analyzed the key accounting variables that are critical in the valuation of firms' stock. Moreover the study provides vital dimensions in the existing literature of value relevance with respect to Pakistani capital market. Furthermore practical implications are useful for both managers and investors. For managers it is useful to identify strengths and weaknesses of the firm that could affect the stock prices and help them to manage in a way that could lead

to betterment of their company and shareholders would be in a position to identify the stock value drivers of their shares.

In this study we have analyzed the correlation coefficient between stock price and a set of accounting variables. Furthermore we have purified our results by using pooled ordinary least squares and fixed effects regression. However the Retriected F-test and Hausman test conclude that the fixed effects estimators are efficient. Our results support the previous literature such as (Palliam, 2006; Florou&Chalevas, 2010; Alam et al. 2011) and indicate that all the variables have significant correlation with the stock price except the current ratio which also shows a negative correlation coefficient. This negative correlation can be interpreted as the non-optimal current ratio of the firms which can be improved by efficient management of current assets. Managers must adopt efficient working capital management practices to manage the internal activities of the company. This could also lead to increase in profitability. Shin and Soenen (1998) find a positive relationship between efficient working capital management and shareholder's value. However the results show that asset turnover and financial leverage are the most value driven variables in fuel and energy sector of Pakistan. Our results support the findings of Gallizo and Salvador (2006). They also claim that speed of turnover affects the market value of the firm. Asset turnover ratio shows the efficiency of a firm's assets in generating sales. This ratio must be optimized by increasing the sales and efficient utilization of assets. Sales can be raised by effective marketing operations and assets efficiency can be optimized by proficient management of current and fixed assets. Moreover the financial leverage must be optimized in a way that could minimize the weighted average cost of capital (WACC). The overall findings suggest that firms must focus on the speed of asset turnover, as this ratio represents the efficiency of firm's assets in generating the revenues. Since the earnings directly attract the investors and a high asset turnover leads to higher profits, so this ratio must be optimized to increase the value relevancy. The findings also support the theory of dividend irrelevancy presented by (Miller & Modigliani, 1961). They claim that value of a firm is solely dependent upon its assets and earnings.

However this study investigates the stock price relevancy of some selected accounting fundamentals and focus on the fuel and energy sector of Pakistan. The variations in stock price relevancy are highly dependent on the type of industry, economic events, the time period studied, the variables studied and the models employed such as Ohlson (1995) etc. Further research could study the stock price relevance of macroeconomic indicators such as oil prices, GDP, interest rates, exchange rates etc. Moreover Ismail (2006) claims that the future expectation factors about positive net present value should be incorporated in value determination as it will boost the explanatory power significantly.

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## APPENDIXES

### Appendix I. Random Effects Results

Dependent Variable: Stock Price			
Method: Random Effects, Generalized Least Squares (GLS)			
	Coefficient	Std. Error	t-statistics
const	0.95***	0.11	8.45
Asset Turnover	0.29***	0.06	4.17
Financial Leverage	0.54***	0.09	5.90
Return on Equity	0.02***	0.01	2.80

\*\*\* denote significance level of 1%