



Forecasting Stock Returns by Financial Ratios in Pakistani Stock Market

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Abstract: This paper investigates the use of firm's financial information in forecasting the stock returns in Pakistan during 2006 to 2017. For this purpose, the study selects 100 companies from all thirty-five sectors of Pakistan stock exchange. The power of financial ratios from different categories such as solvency (total debt/total equity), profitability (net profit margin, returns on equity, earnings/share) and valuation (price-earnings ratio, price-book ratio) are tested for predictability of stock returns. The study applies a generalized method of moment (GMM) techniques to forecast the stock returns in Pakistan by using of financial information of company. The empirical result suggests a significantly negative impact of total debt/equity ratio on stock returns. In contrast, a significantly positive impact of net profit margin, price-book ratio and returns on equity has been noted for stock returns. The practical implications of this study covers investors, policy makers, governments, stock market regulators stock market analysts, and multinational corporations that can make decisions on their different field based on Pakistani context.

Keywords: Stock return predictability; financial ratios; GMM regression; Pakistan stock exchange.

1. Introduction

The stock market role is mainly to encourage and facilitate the fund's mobilization, to provide ample liquidity for the investors, to bring efficient economic activities and to promote the establishment of large-scale enterprises. Every investor wants to maximize returns/profit while investing in a firm's stock. Thus stock returns are an important factor in selecting the sound investment decision. The investor needs to investigate the past data of firms such as its income statement, balance sheet, industry outlook, annual report and firm's dividend declaration statement for the financial health and stability of firms before making sound investment decisions[1-2]. Forecasting stock returns is up to some extent instigated by the misunderstanding of investors to firm's information or illogical preference, such as representativeness bias, disposition effect, over confidence and herding[3].

In past few years, researchers have used numerous financial information of a firm i.e., its price/earnings, dividend yield, interest rate, book/market, debt/equity, return of asset, inflation, price book value, past sales growth and momentum to forecast stock returns[4]. This study also aims to investigate firm's financial information to fore see that stock returns in Pakistan. For this purpose, 100 firms are selected from the overall sector of Pakistan stock exchange in order to confirm that this financial information can forecast stock return in Pakistani market. The study has collected financial information from three different categories such as solvency (total debt/ total equity), profitability (net profit, returns on the equity, earnings per share) and valuation (price/earnings, price/book) to predict stock returns in Pakistan stock market. The linkage of these monetary information and stock returns resulted in eight hypotheses that are proved by applying generalized method of moment (GMM) regression model.

This paper will discuss introduction in section first, followed by literature review in section two; third section report the data and methodology; forth section discuss results and discussion; and at last fifth section deliver conclusion of the study.

2. Literature review

Within literature the linkage between the firms' fundamentals and stock returns was first introduced by [5] followed by many researcher around the world. They have identified different variables like the price-earnings ratio, debt/equity, return of equity, price/net tangible assets and earnings growth that can forecast stock returns. For example, Ersita and Rully (2003) inspected the predictive power of earnings per share and price-earnings ratio on stock price in the pharmaceutical industry of Indonesia. Their results indicate a linear linkage between selected variables and stock price in Indonesia. In another study, [6] witnessed a significantly negative impact of earnings per share and dividend per share on stock return. Similarly, Kabejh, et al (2012) found the predictive power of return on the assets and on return on investment and the return on equity on the stock returns in Jordan. Their study indicates strong positive impact of returns on investment and returns on assets on stock returns while weak positive impact of returns on equity on stock returns in Jordan stock exchange.

Likewise, [7] select companies from Nigerian Stock Exchange where they inspected the prognostic power of earning per the share on the stock prices. The results of linear the regression of model indicate that insignificant linkage between the earning per of share and the stock prices, as a result decided that there exist no predictive power of earning per share for the stock prices. The same investigation was conducted by [8] where they examined the influence of earning per share on the stock price of listed cement companies on Pakistan Stock Exchange. Their study confirmed the predictive power of earning per Share on stock returns. [9] witnessed the impact of bookkeeping variable on the stock price of 100 firms listed on the Colombo Stock Exchange (CSE). The findings of the Single and the Multiple regression examination confirmed significantly positive influence of accounting variables on stock price.

Similarly, [10] examined the predictive power of different economic and control variables on stock price of companies in Pakistan. The results confirmed significantly positive impact of all variables on stock returns except earnings of per share, asset turnover ratio, inflation, interest rate and GDP. In the same way, [2] identified the predictive power of profitability ratios, leverage ratios, market-based ratios and liquidity ratios on stock returns in Pakistan. Data were collected for 115 of non-financial and companies that are listed on Pakistani stock market from 2007 to 2017. By utilizing penal regression techniques, the results directs that the company's financial of information can forecast stock returns in Pakistan.

3. Data and methodology

3.1. Data

This paper considers stock returns¹ as the dependent variable while financial ratios as the independent variables. The penal data set of stock price, book value per share, total liability, shareholder equity, net income, total outstanding shares, earning per share and net sales for listed firms on Pakistan Stock Exchange (PSX) are required for calculation of dependent and the independent variables as reported in the Table 1. This data is extracted from the Compustat database during 2006 to 2017. The study than select 100 firms from all listed companies whose variables data is available before 1 January 2006, and didn't delisted during the whole sample period.

Table 1: List of financial ratios and their measures

Financial ratios	Category	Measurement
Total Debt/ Total Equity	Solvency	Total Debt/Total Shareholders' Equity
Net of Profit Margin	Profitability	Net Income/ Net Sales
Returns On Equity	Profitability	Net Income /Shareholder's Equity
Earnings Per Share	Profitability	Net Income/ Average Outstanding Shares
Price Earnings	Valuation	Market Price of Stock/ EPS
Price Book	Valuation	Market price of stock/ Book price of stock

¹Stock returns are calculated as current price at (Pt) / current price at the (Pt-1)

3.2. Methodology

Different panel regression techniques were used previously to find the predictive power of the financial ratio on the stock returns as shown in Table 2. This paper will use the *Generalized Method of Moments (GMM)* regression techniques to examine in what manner the stock returns are affected by selected firms' financial ratios. The following mathematical equation as expressed by the Hansen (1982) can be used for GMM regression model:

$$Y_{it} = \alpha_1 + \beta_1 * Y_{i(t-1)} + \beta_2 * X_{it} + \varepsilon_{it}$$

Where Y_{it} present firms' stock returns, α_1 is a constant, coefficient t represents the time period and ε_{it} is a random variable. Independent variable is the delayed value of the previous year $Y_{i(t-1)}$ and X_{it} represents all independent variables that firms' fundamental attributes, and β_1 and β_2 are estimated coefficients. The reason for adopting the GMM model is that it works to eliminate Heteroscedasticity and covers endogeneity problems.

Table 2. Regression model for calculation of stock returns predictability

Study	Market	Duration	Ratios	Empirical Model
Charles, Darné, & Kim (2017)	Global	2000-2014	DY, P/E, dividend-price, dividend-payout	Augmented regression method, Wild bootstrap
Wasim (2017)	Pakistan	2001-2014	turnover ratio, debt ratio, ROS, EPS,	Random Effect Model
Anwaar (2016)	London	2005-2014	EPS, QR, ROA, ROE, NPM	Panel regression analysis
Wijesundera, et al. (2015)	Sri Lanka	2004- 2013	ROE, EPS, MV/BV	multiple regression models
Reddy & Fu, (2014)	Australia	2001-2013	DER, EPS, NPM, ROE, PBV	Multiple Regression Analysis
[7]	Nigeria	2005-2009	EPS, the stock price	Linear regression model
Bilal et al. (2012)	Pakistan	2005 -2011	EY, DY, B/M	GSL and panel data models.
[11]	Malaysia	2000-2009	DY, EY, B/M	GSL and panel data models.

4. Results

Table 3 confirms the mean, standard deviation, kurtosis, skewness, maximum and minimum for stock returns and all selected variables during 2006 to 2017. The stock returns mean value is reported as 0.012 with a standard deviation of 0.063. The earnings per share and price/earnings resulted in highest mean value among all independent variables i.e., 1.79 and 2.04 respectively. The higher values of standard deviation for total debt/total equity (2.11) and price/book (1.20) indicate that the data are highly scattered around the mean value in case of total debt/total equity and price-book ratio. The data for all variables are normally distributed as confirmed from the result of kurtosis and skewness.

Table 3. Descriptive Statistics

Variables	Mean	Std.Dev	Kurtosis	Skewness	Min	Max
Stock Returns	0.01	0.06	4.47	1.32	-0.25	0.54
Total Debt/ Total Equity	-0.90	2.11	3.41	-1.79	-8.75	3.42
Net Profit Margin	-0.82	1.17	3.33	-0.56	-8.44	3.74
Returns on Equity	-1.62	1.01	3.71	-0.81	-8.38	3.46
Earnings per Share	1.79	1.47	4.86	-1.24	-6.55	5.32
Price/Earnings	2.04	1.09	4.00	0.88	-2.22	8.33
Price/Book	-0.42	1.20	-0.24	0.03	-3.29	8.33

Note: The standard deviation estimates mean, the standard deviation, kurtosis, skewness, minimum and the maximum of stock returns, total debt/total equity, net of profit margin, returns on equity, earnings per share, price/earnings and price/book in the mentioned table.

This paper examined the six hypotheses with the help of predictive regression models in the panel data sets. The data is the first test for multicollinearity issues. In the Multicollinearity situation the extreme linkage exist between independent variables. Table 2 and 3 report the correlation analysis and multicollinearity issue among independent variables with the help of correlation analysis and *Variance Inflation Factors (VIF)* methods.

Table 2.Correlation Analysis

Independent Variables	Total debt/ total equity	Earnings per share	Net profit margin	Price/Book	Price/ earnings	Returns on equity
Total debt/ total equity	1.000					
Earnings per share	-0.157 (0.000)	1.000				
Net profit margin	-0.068 (0.017)	0.329 (0.000)	1.000			
Price/book	-0.206 (0.000)	0.231 (0.000)	0.038 (0.1809)	1.000		
Price/ earnings	-0.002 (0.926)	-0.279 (0.000)	-0.486 (0.000)	0.393 (0.000)	1.000	
Returns on equity	0.032 (0.000)	-0.578 (0.000)	0.272 (0.000)	0.009 (0.189)	0.214 (0.000)	1.000

Note: The table illustrates the linkage of independent variables. The *P* values are presented in parenthesis

Table 2 shows that the total debt/total equity is significant and negative linked with the earnings per share, net profit margin and price/book. In the same way, earnings per share are significant and positive linked with price/book and net of profit margin whereas significant and negative linked with price/earnings. The maximum association among all independent variables is 0.393 that point out that the Multicollinearity issue doesn't exist among all the independent variables.

Table 3.Variance Inflation Factors (VIF)

Independent Variables	VIF	1/VIF
Total debt/total equity	1.06	0.940
Earnings per share	1.31	0.761
Net profit margin	1.45	0.687
Price/book	1.55	0.643
Price/earnings	1.88	0.532
Returns on equity	1.01	0.991
Mean VIF	1.34	

Note: The table illustrates the Multicollinearity issue among independent variables.

The above Table 3 reports the results of collinearity for tested variables. It indicates that the VIF results for variables are less than 10 while tolerance is greater than 0.2, thus confirmed that the multicollinearity issue among all independent variables does not exist. Below Table 4 shows the result of GMM regression technique.

Table 4.GMM regression

$Y_{it} = \alpha_1 + \beta_1 * Y_{i(t-1)} + \beta_2 * X_{it} + \varepsilon_{it}$				
Stock return	Co-efficient	Std. Err.	z	P-value
Stock return	.0238	.0092	2.58	0.010
Total debt/total equity	-.0353	.0015	2.32	0.020
Earnings per the share	.0634	.0004	-1.47	0.143
Net profit margin	.0652	.0002	2.97	0.003
Price / book	.0276	.0007	3.85	0.000
Price/earnings	-.0155	.0001	-0.78	0.433
Returns on equity	.0106	.0028	3.78	0.000
_Cons	.0286	.0026	0.11	0.913
Wald chi2(7)= 48.64 P > chi2 = 0.000				

Table 4 express the significantly negative impact of total debt/total equity on stock returns (-.0353, $P < 0.05$). The influence of earning per share on the stock return is insignificant positive (.0634, ns). Likewise, a significantly positive impact of net profit margin is noted on stock returns ($\beta = .0652$, $p < 0.05$). Similarly, price/book values has significantly positive impact on stock return ($\beta = .0276$, $p < 0.01$). Correspondingly, price/earnings provides insignificantly negative impact on stock return ($\beta = -.0015$, ns). At last, the impact of returns on equity on stock returns was found to be positive and significant ($\beta = .0106$, $p < 0.01$). Model is found statistically significant (Wald chi2 (7) = 48.65, $p < 0.01$); whereas, the chi2-statistics value is 48.64 and p-value is < 0.05 which confirm that the model is appropriate for the study.

4.1. The tested hypothesis outcomes

Based on the results the following hypothesis can be accepted or rejected.

H1: Debt/total equity is significantly related to Stock returns. **Accepted**

H2: Earnings per share is significantly related to Stock returns. **Rejected**

H3: Net profit margin is significantly related to Stock returns. **Accepted**

H4: Returns on equity is significantly related to Stock returns. **Accepted**

H5: Price/book is significantly related to Stock returns. **Accepted**

H6: Price/earnings is significantly related to Stock returns. **Rejected**

5. Conclusion

This paper focused on the influence of financial information of a company to forecast/predict the stock returns in Pakistan over twelve years from 2006-2017. The paper used financial information from three different categories i.e., the first one is solvency that include total debt/ total equity , secondly profitability such as net profit margin, returns on equity, earnings per share) and third one is valuation such as price/earnings and price/book to forecast the stock returns. By applying *Generalized Method of Moment(GMM)* techniques the paper confirmed that this financial information from income statement and balance sheets of a company has the power to forecast the stock returns in Pakistan. For example, the company *price/book*, *net profit margin* and *returns on equity* have significant and positive affect on stock returns while total *debt/total equity* significantly negatively affect the stock returns in Pakistan. This research can be extended by applying new statistical model and investigating more aspects that have great influence on the stock price in Pakistani stock market.

References

1. Dugalic, V. (2008). Fundamental and technical analyses of share prices. *Megatrend review: the international review of applied economics.-Belgrade*, 1, 103-120.
2. Muhammad, S., & Ali, G. (2018). The Relationship Between Fundamental Analysis and Stock Returns Based on the Panel Data Analysis; Evidence from Karachi Stock exchange (KSE). *Research Journal of Finance and Accounting*, 9 (3).
3. Feng, L., & Seasholes, M. S. (2005). Do investor sophistication and trading experience eliminate behavioral biases in financial markets?. *Review of Finance*, 9(3), 305-351.
4. Jais, M., Jakpar, S., Doris, T. K. P., & Shaikh, J. M. (2012). The financial ratio usage towards predicting stock returns in Malaysia. *International Journal of Managerial and Financial Accounting*, 4(4), 377-401.
5. Graham, B., Dodd, D. L. F., & Cottle, S. (1934). *Security analysis* (pp. 44-45). New York: McGraw-Hill.
6. Mirfakhr-Al-Dini, S. H., Dehavi, H. D., Zarezadeh, E., Armesh, H., Manafi, M., & Zraezadehand, S. (2011). Fitting the relationship between financial variables and stock price through fuzzy regression case study: Iran Khodro Company. *International Journal of Business and Social Science*, 2(11).
7. Umar, M. S., & Musa, T. B. (2013). Stock prices and firm earning per share in Nigeria. *Journal of Research in National Development*, 11(2), 21-33.
8. Jatoi, M. et al (2014). A Regresional Impact of Earning per Share on Market Value of Share: A case study Cement Industry of Pakistan. *International Journal of Academic Research in Accounting*.
9. Menike, M. G., & Prabath, U. S. (2014). The Impact of Accounting Variables on Stock Price: Evidence from the Colombo Stock Exchange, Sri Lanka. *International Journal of Business and Management; Vol, 9* (5).
10. Din, W. u. (2017). Stock Return Predictability with Financial Ratios: Evidence from PSX 100 Index Companies.
11. Kheradyar, S., Ibrahim, I., & Mat Nor, F. (2011). Stock Return Predictability with Financial Ratios. *International Journal of Trade, Economics and Finance*, 2 (5).