ANALYSIS AND FORECASTABILITY OF MARKET MODEL: EVIDENCE FROM PAKISTANI MARKET INDEX AND EMERGING MARKET INDEX

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Abstract

Purpose of the Study: This study examines and analyzes the influence of the Market Model on the Market Level Return (KSE-100 index) and the Emerging Market Level Return (MSCI Index).

Methodology: The study has employed the sample data of the companies' representatives of the Oil and Gas Sector of Pakistan from July 2001 to June 2018 respectively. For estimation, the Panel Regression techniques are employed followed by the Forecast Error Statistics for the in-sample forecast ability of the variables under study.

Main Findings: The results of the study depict that the Market Model comprising of the Market Value Financial Ratios strongly influences the returns of the Emerging Market Index relative to the Market Level Return respectively. Similarly, the predictive power of the Market Model is more influential at the Emerging Market Level Return but not less at Market Level Return.

Application of the Study: The findings of the study suggest that the domestic and foreign investors may consider the Market Value Financial Ratios for the valuation and estimation of asset prices. Moreover, the local authorities may take robust steps to continuously reforms in the Energy Mix policy to enhance local as well as foreign investment.

Novelty/Originality of this study: The prime novelty of the study is to analyze the market model based on Market Value Financial Ratios to forecast the Market Level Return and Emerging Market Index Returns using three standard symmetric measures; root mean square error (RMSE), the mean absolute error (MAE), the mean absolute percentage error (MAPE) and the Theil inequality coefficient (TIC) respectively.

Keywords: Market Model, Market Level Return, Emerging Market Level Return, Oil and Gas Sector, Panel Regression Technique, In-Sample Forecast Ability.

INTRODUCTION

Financial reports show financial ratios that reflect the company's financial position among its stakeholders especially the investors. The most prominent key financial ratios include market ratios that play a significant role in determining the prices of stocks in the financial market. Investors give their particular attention to market ratios in the analysis of the current price and the estimation of future prices of the stocks respectively. The valuation of shares of a company is based upon its internal and external information and its financial statements are the source for providing internal information to its investors [Pan et al.,\(2020\)](#).

According to [Rapach & Zhou \(2013\)](#), investors need both internal and external information for investment in stocks. Therefore, the factors that determine stock prices continue to be the topic of interest in the literature of finance. Many studies [Emamgholipour et al., \(2013\)](#), [Mirfakhr et al., \(2011\)](#), [Zeytinoglu et al., \(2012\)](#), and [Eitan and Oleemat \(2015\)](#) have used market ratios to determine the valuation of stocks in the financial market. [Aono & Iwaisako \(2011\)](#) and [Wijesundera et al.,\(2015\)](#) have used financial ratios in forecasting stock returns in developed markets respectively. It has been found that emerging markets usually have high stock returns as compared to developed markets due to noise, less transparent information, and expected market liquidity ([Paddrik and Tompaidis 2019](#)).

[Mallikarjuna & Rao \(2019\)](#) explains that the forecastability enhances the real value of the stock and if significant, the investors buy the stocks to get a high return. Therefore, forecasting of the stock returns using market ratios is considered significant for investment decisions.

According to the literature, two different mindsets are available to predict stock price movements. These are fundamental analysis and technical analysis. Financial analysis of companies is done to forecast future returns in fundamental analysis. Technical analysis uses historical prices to predict future returns ([Levy,1967](#)). Several studies have been conducted in this perspective that stock prices are predictable ([Eitan and Oleemat,2015](#); [Aono & Iwaisako,2011](#); [Wijesundera et al., 2015](#)) and the profitability of an investment is associated with the predictability of stocks movement ([Wieland, 2015](#)). Different models including the dividend discount model, Earnings multiplier model, price earning model, and log-linear book to the market model are used for the valuation of securities.

Research Objectives and Significance

The current study attempts to add to the literature by analyzing and evaluating the impact of the market model comprised of market ratios termed as dividend yield (DY), earning per share (EPS), price to earnings (PE) ratio, and book to market value (BM) of the representative companies of the Oil and Gas sector of Pakistan on the Market Level Returns of the Karachi Stock Exchange-100 (KSE-100) Index and the Morgan Stanley Capital International (MSCI) Emerging Market Index over a time period of 2001-2018 respectively.

For fifty years, Pakistan has emerged as a business-friendly economy with promising returns especially in the energy sector respectively. This sector of Pakistan has successfully boosted the economy by exploring large gas discoveries in Pakistan. With the expansion in the Oil and Gas sector exploration developments, much confidence has been gained among the local and foreign investors with significant interest in investments. The major development came in the history of Pakistan after the establishment of the Oil and Gas Development Company Limited (OGDCL) in the year 1961¹ which paved the way for the successful discovery of the reserves in Pakistan. Oil and Gas resources are the key sources of energy generation in Pakistan and amongst Oil and Gas; Oil is the major consumption resource respectively. Along with other major indices, Pakistan has a separate index for the Oil and Gas sector with the name of Oil and Gas Tradable Index (OGTi)² respectively. Due to its major consumption, therefore to fulfill the consumption needs, Pakistan imports oil at a larger scale respectively. The import market is majorly comprised of Saudi Arabia along with other Middle East countries respectively.

Figure 1: Oil Consumption

The developing economies, Pakistan being one of them, have emerged as the potential hub for global investors as a result of liberalization, risk diversification, and capital gain opportunities. For investment purposes by the global investors, the representative index of the emerging market was created in 1988³ with the name of Morgan Stanley Capital International (MSCI) Emerging Markets Index. The Index comprises twenty-six emerging economies; Pakistan being one of them, which represents the market performance of the respective economies listed in the index. The pie chart below represents the countries that compose the Emerging Markets Index;

Figure 2: MSCI Emerging Market Index Composition

¹<https://www.researchgate.net/publication/278751135>

²<https://www.psx.com.pk/psx/resources-and-tools/listings/listings-history>

³<https://www.msci.com/emerging-markets>

Keeping in view the role of the emerging economies to attract and reward global investment, the present study aims to analyze and model the impact of the Market Value Financial Ratios of the Oil and Gas Sector of Pakistan on both the Market Level Returns and the Emerging Market Level Return of the respectively.

As explained earlier, the Oil and Gas sector in Pakistan has been prominent for boosting foreign direct investment and generating tax income in a country, therefore the findings of the study may contribute to analyzing and modelling the explanatory power of the Market Value Ratios to evaluate the Pakistani Market Index (KSE-100) as well as the Emerging Market Index (MSCI) respectively. The present study also contributes in analyzing the forecastability of the Market Value Financial Ratios to predict the returns both at the Market Level (KSE-100 Index) as well as the Emerging Market Level (MSCI Index) by employing the Forecast Error Statistics on Panel Regression of the Oil and Gas Companies listed in the stock exchange of Pakistan.

Specifically, the present study addresses two problems. The first problem focuses on the explanatory power of the Market Model of the Oil and Gas sector of Pakistan. This Market Model tends to explain the regression relationships between the Market Index of Pakistan and the Market Index of the Emerging Economies by employing the Panel Regression Econometric Technique respectively. The second problem is the predictability of the Market Value Financial Ratios to analyze and model that which index is more influenced by the financial information incisive within the listed sector of Oil and Gas sector of Pakistan respectively.

LITERATURE REVIEW

In the finance literature, various models exist for the valuation of stocks. The most commonly used models are the dividend discount model and Earnings multiplier model or price earning model. The dividend discount model measures the stock value by computing the present value of the expected future dividends paid by the company. This model was criticized by Modigliani and Miller in 1961. They argued that the Dividend discount model has very strict assumptions so it is not possible to measure an accurate dividend for the valuation of stocks. [Basu \(1977\)](#) explained that the price earning model is the easiest model for the valuation of securities. As dividend is a part of the earning of the company, therefore, it is better and easy to compute the expected growth in earnings as compared to expected growth in the dividend.

[Voulteenaho \(2000, 2002\)](#) proposed another model log-linear book-to-market model for the valuation of securities. This model describes the relationship of profitability of the company to its expected profitability, excess equity returns, and interest rate. The model demonstrates that if the company expected future cash flows are high then book to market ratio of that company would be less. The attractive feature of the log-linear book-to-market model is that it does not depend upon the dividend policy of the company.

[Wijesundera et. al. \(2015\)](#) argue that investors determine the current market price and forecast the real value of the securities through financial ratios. [Din \(2017\)](#) examined the influence of financial ratios including earning per share, firm size, return on sales, and Tobin's Q on stock returns of an emerging market of Pakistan. F-Limer test has been applied in panel data set that discloses the significant relationship between stock returns and financial ratios. [Emamgholipour et al \(2013\)](#) analyzed that change in future earnings of stocks is affected by three market indicators Price to earnings ratio, earnings per share, and Market to book value in Tehran stock exchange. The study selected 80 listed firms and had a period of five years started from 2006-2010. Regression results reported a positive and negative relationship between market indicators and future earnings. Similarly, [Musallam \(2018\)](#) also found a positive and significant relationship between market ratios and stock returns of listed firms in the Qatar Stock Exchange.

[Zeytinoglu et. al. \(2012\)](#) attempted to test the effect of market ratios on the stock returns of the insurance sector in the Istanbul stock exchange. It includes earnings per share, the book to market value, and price to earnings ratio as market ratios to find out the current and future relationship between market ratios and stock returns of the insurance sector during 2000-2009. The findings of the research show that a positive and significant current and future relationship exists between the market to book value and stock returns of the insurance sector. [Wijaya \(2015\)](#) explored the relationship between financial ratios and stock returns of manufacturing companies listed in the Indonesian stock index. The study reported that earning yield, dividend yield, and book-to-market have a significant impact on stock returns of the manufacturing sector during 2008-2013.

[Akhtar \(2021\)](#) compared developed and emerging markets in the context of market multiples and stock returns. GMM has been applied to a sample of 4725 firms for 15 years. The results of the study showed that stock returns of developed markets are positively affected by market multiples. In addition to that, the negative impact of market multiples on stock returns of emerging markets has been observed. Similarly, another study conducted by [Eitan and Oleemat \(2015\)](#) analyzed the long-term and causal relationship among financial ratios and Amman Stock Exchange indexes during 2010 and 2014. The study selected four indexes including the financial sector index, industrial sector index, general Amman stock exchange index, and service sector index of Amman Stock exchange. The four financial ratios; Price to earnings ratio, market to book value, market to operating cash flow, and dividend yields have been selected in the study. Based on the Johansen Co-integration and Granger Causality test, the results indicated a long-term and causal relationship between financial ratios and indices performance in Amman Stock Exchange.

The studies conducted to forecast stock returns using financial ratios are limited. [Chipunza et. al., \(2020\)](#) investigated the dividend and earnings yield in predicting the stock returns of South African markets at the sectorial and aggregate levels. The findings of the study support that price discovery in the financial market of the Johannesburg stock exchange is possible through valuation ratios. [McMillan \(2021\)](#) used financial ratios in addition to other variables for predicting stock returns in the U.S.A. The finding of the study is that financial ratios and other predictor variables are not able to beat the historical mean model. In contrast to [McMillan \(2021\)](#), [Anandasayanan \(2018\)](#) found that financial ratios including dividend yield, earnings per share, and earnings yield are strong predictors of stock returns in the Colombo stock exchange.

The present study contributes to the existing literature by analyzing and forecasting the regression relationship between the Market Value Financial Ratios of the representative companies of the Oil and Gas Sector of Pakistan and the Market Level Indices throughout 2001-2018 respectively.

RESEARCH METHODOLOGY

To examine the impact of the Market Value Financial Ratios on the Market Level Indices; KSE-100 Index and MSCI Emerging Market Index, the present study has attempted to employ the Market Value Financial Ratios of the Oil and Gas sector of Pakistan from 2001 through 2018 respectively. For the analysis purpose, the Panel Regression Econometric Technique is employed to test the significance of the variables under study. The present study has further extended the analysis to the in-sample forecastability of the regressed model to evaluate the Market Value Financial Ratios of the Oil and Gas Sector's predictability concerning the Market Indices respectively.

In this study, the Market Model of the present study comprises four Exogenous Market Value Financial Ratios which are the Dividend yield (DY), Earnings Per Share (EPS), Price to Earnings Ratio (PER), and Book to Market Value (BMV), and two Endogenous Variables which are the Market Return of Karachi Stock Exchange-100 (KSE-100 Index) and the Market Return of the Morgan Stanley Capital International (MSCI) Emerging Market Index throughout July 2001 to June 2018 respectively. The mathematical computations of these variables are reported in table 1.

Table 1: Mathematical Computation of Variables

Exogenous Variables	Formulae
Dividend yield (DY)	$\frac{\text{Dividend per share}}{\text{Market Price per share}}$
Earnings Per Share (EPS)	$\frac{\text{Net income} - \text{Preferred dividend}}{\text{No of shares outstanding}}$
Price to Earnings Ratio (PE)	$\frac{\text{Market price per share}}{\text{Earning per share}}$
Book to Market Value (BMV)	$\frac{\text{Market Capitalization}}{\text{Common shareholders equity}}$
Endogenous Variables	
MarketLevelReturn (KSE-100 Index)	$R_m = \ln(p_t) - \ln(p_{t-1})$
Emerging Market Return Index(MSCI)	$R_{emi} = \ln(p_t) - \ln(p_{t-1})$

Methodological Framework: Panel Regression Analysis

The present study has employed the Panel Regression Econometric Technique comprising both the time series data and the cross-sectional data respectively. The cross-sectional data comprises of the listed companies of the Oil and Gas Sector of Pakistan respectively. The time-series data of the respective study comprises the annual fiscal year extended from July 2001 to June 2018. The general model of the Panel Regression Econometric Technique can be expressed as;

$$Y_{it} = \alpha + \beta_0 X_{it} + u_{it} \quad (1)$$

Where, Y_{it} denotes the endogenous variable, X_{it} denotes the exogenous variable followed by an intercept β_0 and u_{it} is the disturbance term during a particular point of time.

To run the Panel Regression Technique, the above model is specifically employed as;

$$R_m = \beta_0 + \beta_1 DY_{it} + \beta_2 EPS_{it} + \beta_3 PE_{it} + \beta_4 BM_{it} + u_{it} \quad (2)$$

$$R_{emi} = \beta_0 + \beta_1 DY_{it} + \beta_2 EPS_{it} + \beta_3 PE_{it} + \beta_4 BM_{it} + u_{it} \quad (3)$$

Where, DY_{it} is the Dividend Yield Ratios, EPS_{it} are the Earnings Per Share Ratio, PE_{it} is Price to Earnings Ratio and BM_{it} is the Book-to Market Ratio over the time period from July 2001 to June 2018. These Market Value Financial Ratios are the exogenous variables in the Panel Regression Econometric Technique. The symbol u_{it} represents the error term and the symbols R_m and R_{emi} represent the Market Indices respectively.

The Panel Regression Analysis comprises of the Fixed Effect model and the Random Effect model. The Hausman test is priority applied to test the null hypothesis whether to adopt the fixed effect model or the random effect model respectively. If the results show the p-value less than 5% then the null hypothesis is rejected and the alternative hypothesis is accepted by adopting the fixed effect model (Tao and Brooks, 2019) respectively. The output contains the significance of cross-section F-statistics and cross-section Chi-square respectively. The present study has followed the steps mentioned above for the estimation of the variables under study.

Forecasting Performance

After empirical regression analysis of the Market Indices, the present study attempts to investigate the in-sample forecasting performance of the Market Indices respectively.

The in-sample forecasting is evaluated by using three standard symmetric measures; root mean square error (RMSE), the mean absolute error (MAE), the mean absolute percentage error (MAPE), and the Theil inequality coefficient (TIC) as expressed below;

$$RMSE = \sqrt{\frac{1}{T} \sum_{i=1}^T (\hat{\sigma}_i^2 - \sigma_i^2)^2} \quad (4)$$

Thus, $\hat{\sigma}_i^2$ represents the forecast error.

$$MAE = \frac{1}{T} \sum_{i=1}^T |\hat{\sigma}_i^2 - \sigma_i^2| \quad (5)$$

The bias proportion, variance proportion, and covariance proportion are the three proportion components of the mean squared error (MSE). These proportionate errors tend to be equal to 1 as the total forecasting error expressed as;

$$Bp = \frac{(\bar{\hat{r}}_t - \bar{r}_t)^2}{\frac{1}{t} \sum_{t=1}^t (\hat{r}_t - r_t)^2} \quad (6)$$

$$Vp = \frac{(s\hat{r}_t - Sr_t)^2}{\frac{1}{t} \sum_{t=1}^t (\hat{r}_t - r_t)^2} \quad (7)$$

$$Cp = \frac{2(1-p)s\hat{r}_t - Sr_t}{\frac{1}{t} \sum_{t=1}^t (\hat{r}_t - r_t)^2} \quad (8)$$

The Theil Inequality forecasting statistic is expressed as;

$$TIC = \frac{\sqrt{\frac{1}{T} \sum_{i=1}^T (\hat{\sigma}_i^2 - \sigma_i^2)^2}}{\sqrt{\frac{1}{T} \sum_{i=1}^T (\hat{\sigma}_i^2)^2} \sqrt{\frac{1}{T} \sum_{i=1}^T (\sigma_i^2)^2}} \quad (9)$$

The forecasting error statistic of TIC lies between zero and one with zero a perfect fit.

EMPIRICAL RESULTS

Table 2: Summary Statistics

	Mean	S.D	Skewness	Kurtosis	JB-test	P-value	Obs
KSE-100 Index (Market return)							
RM	0.13	0.43	-0.85	3.74	20.73	0.00	144
Emerging Market index Return							
REMI	0.03	0.31	-0.83	3.66	19.24	0.00	144
Financial Ratios							
DY	-1.25	2.18	-0.14	1.39	16.07	0.00	144
EPS	2.49	1.25	0.43	1.87	12.09	0.00	144
PE	3.03	0.45	-0.01	2.31	2.85	0.24	144
BM	-0.09	0.77	-1.41	4.98	71.39	0.00	144

The present study examines the impact of the Market Value Financial Ratios of the Oil and Gas sector of Pakistan on the Market Indices; KSE-100 Index and MSCI Emerging Market Index over the time period of 2001-2018 respectively. For the analysis purpose, the Panel Regression Econometric Technique has been employed to test the significance of the variables under study. The present study has further extended the analysis to the in-sample forecastability of the

regressed model to evaluate the Market Value Financial Ratios of the Oil and Gas Sector's predictability with respect to the Market Indices respectively.

The results section reports the Summary Statistics (Descriptive) of the sample data, the Panel Regression, and Forecastability estimation results respectively. Before estimation, the descriptive (summary) statistics of the variables are explained below;

The mean value of the Market Level Return depicts that the KSE-100 index on average earned the return of 13% with a variation of 43% respectively whereas the MSCI Emerging Market Index on average earned 3% with a variation of 31%. The MSCI Emerging Market Index represents 13% of the global market capitalization respectively. It has been explained earlier that these emerging markets due to their vulnerability as volatile markets, therefore the high capitalized companies or investors are hesitant to make investments due to the fear of uncertainty of returns.

However, the mean values of the Market Value Financial Ratios depict the mean value greater than 1 except for book-to-market value with less variation in the mean values which indicates that the Oil and Gas Sector of Pakistan pays promising returns to its investors hereby retaining the investors' confidence.

As the time series data is time-dependent and possesses random-walk properties, therefore the distribution of the sample data is leptokurtic and the skewness is either negatively and positively skewed thereby confirming the asymmetric nature of the sample data respectively.

Figure 3: Distribution of the Sampling Data

The data visual representation as given in figure 3 indicates the data is heteroskedastic in nature and possesses non-normal distribution respectively. The blue portion in the graph depicts the spread of the data from the mean value thereby confirming the non-Gaussian nature of the time-series data extended over the time period of July 2001 to June 2018.

Table 3 reveals that the correlation among exogenous variables is within tolerable limit. Therefore, data series contain no correlation so further processing of analysis can be smoothly done.

Table 3: Correlation among Exogenous Variables

	DY	EPS	PE	BM
DY	1	-0.23738	-0.52054	-0.31173
EPS	-0.23738	1	-0.44734	-0.51061
PE	-0.52054	-0.44734	1	0.581396
BM	-0.31173	-0.51061	0.581396	1

To empirically estimate and analyze the Market Value Financial Ratios on the Market Level Return and the Emerging Market Level Return, the present study employed the Panel Regression Random-Effect Model (Hausman Test rejected the fixed-effects model) and the Panel Regression Forecastability technique respectively.

Table 4: Panel Regression Analysis and Forecastability Market Level Return

<i>Market Return (KSE-100 Index)</i>							
PANEL REGRESSION							
<i>Market Value Financial Ratios</i>	<i>Coefficient(α)</i>		<i>t-Stat(β)</i>		<i>P</i>		
C	2.12		5.45		0.00		
DY	0.02		0.87		0.39		
EPS	-0.11		(-2.89)*		0.00		
PE	-0.55		(-4.88)*		0.00		
BM	0.05		0.87		0.39		
Pre-Specification Measures							
<i>R-Squared</i>	0.32						
<i>Adjusted R-squared</i>	0.30						
<i>F-statistic</i>	16.51						
<i>Prob (F-statistic)</i>	0.00						
IN-SAMPLE FORECASTING							
<i>Forecast Error Statistics</i>							
	<i>RMSE</i>	<i>MAE</i>	<i>MAPE</i>	<i>TIC</i>	<i>BP</i>	<i>CP</i>	<i>VP</i>
<i>Market Value Financial Ratios</i>	0.36	0.28	121.20	0.49	0.00	0.28	0.72

*indicates the significance of (β) statistic at 1% level.

The Panel Regressions results show the significant negative relationship of the Market Level Return with the earnings per share (EPS) with (β) statistic of -2.89 and the price-to-earnings (PE) ratio with (β) statistic of -4.88 indicates that the Oil and Gas Sector has a weak impact on the Market Level Return respectively. In line with the empirical work of [Aydoğan & Gürsoy \(2000\)](#), the Market Value Financial Ratios tend to show the low explanatory power to the Market Level Return. It could also be derived that having its index which is the Oil and Gas Tradable index, investors earn more return by investing in the respective index rather than the KSE-100 index respectively.

The insignificant β statistic 0.87 of the book-to-market value indicates no relationship with the Market Return (KSE-100 index) ([Surya and Hasbi, 2015](#)). The low market-to-book value of any company indicates that the stock of that company is undervalued and the investment risk is involved. The results indicate no explanatory power of the book-to-market value on the market return which shows that any impact on the share price of the Oil and Gas Sector of Pakistan will not influence the market return respectively. It could also be intrigued that the KSE-100 index being the composition of various companies from different sectors listed on the Karachi Stock Exchange, therefore one sector's low performance may not influence the overall return earned by the market (KSE-100) respectively.

Similarly, the β statistic 0.87 and the p-value less than 0.05 of the Dividend Yield indicate no relationship with the Market Level Return. The stocks giving low or no dividend is an indication that the company invests in future projects rather paying returns in the form of dividends to the investors. During the period of the fiscal year, July 2001 to June 2018, the Oil and Gas sector of Pakistan went through tremendous development phases with huge investments, as explained earlier, therefore, it could be intrigued from the results that low or no dividends have been declared during the sample data time period respectively.

Figure 4: Forecastability of Market Level Return

Contrary to the regression results, the forecastability measure of the Market Level Return tends to be a perfect fit between the values of 1 and 0 as depicted in Figure 2. The value of the error statistic of the root mean of the in-sample forecasting performance of the Market Level Return is less than 1 and near to 0 which indicates the good in-sample forecasting fit statistic of the Market Value Financial Ratios to predict the Market Level Return. Similarly, the Error Statistics of the Bias Proportion, Covariance Proportion, and the Variance Proportion of the Mean Absolute Error turns out to be 1 which again strengthens the forecastability of the explanatory variables to predict the Market Level Return (Aono and Iwaisako, 2011). The rest of the forecast Error Statistics of Mean Absolute Error, as well as the Theil Inequality, also support predictability of the Market Return by the Market Value Financial Ratios which indicates that the investors may seek information from the Market Value Financial Ratios provided in the Audit Reports before turning in to the stock markets for investment purpose respectively.

Table 5: Panel Regression Analysis and Forecastability Emerging Market Level Return

<i>Emerging market Return (REMI)</i>							
PANEL REGRESSION							
<i>REMI</i>	<i>Coefficient(α)</i>			<i>t-Stat(β)</i>		<i>P</i>	
C	-1.18			-3.74		0.00	
DY	0.05			(3.03)*		0.00	
EPS	0.06			(1.89)***		0.06	
PE	0.37			(4.05)*		0.00	
BM	0.02			0.50		0.61	
Pre-Specification Measures							
<i>R-Squared</i>	0.13						
<i>5Adjusted R-squared</i>	0.10						
<i>F-statistic</i>	5.18						
<i>Prob (F-statistic)</i>	0.00						
IN-SAMPLE FORECASTING							
Forecast Error Statistics							
	<i>RMSE</i>	<i>MAE</i>	<i>MAPE</i>	<i>TIC</i>	<i>BP</i>	<i>CP</i>	<i>VP</i>
<i>Market Value Financial Ratios</i>	0.29	0.20	75.50	0.68	0.00	0.47	0.53

Table 5 reports the regression results of the MSCI Emerging Market Index. The results indicate that MSCI Emerging Market Index is more significant than the Market Return (KSE-100) index. The panel regressions result with significant β statistic of 3.03 and 4.05 of the Dividend yield and Price to earnings ratio at 1% confidence interval and the p-value less than 0.05 shows the significant positive relationship of the emerging market return (MSCI) with the market value financial ratios except for book-to-market ratio respectively. Similarly, a significant β statistic of 1.89 of the Earnings per Share ratios at 10% confidence interval interestingly highlights that the Emerging Market Index Return depicts a strong positive relationship with the Market Value Financial Ratios except for the Book-to-Market Value Ratio. The positive relationship indicates that the Market Value Financial Ratios have strong explanatory power to influence the MSCI Emerging Market Return respectively.

The Audit Reports depicting the financial position of a company is a tool used by investors seeking investment opportunities. The results indicate that the Financial Ratios in the case of the Emerging Market Index are robust tools before making investment decisions.

The Forecasting Error Statistics of the Emerging Market Level Return turns out to be more robust than the Market Level Return. The market value financial ratios show strong predictability power in the case of the Emerging Market Level Return respectively. The forecast error of the root mean square of the Emerging Market Level Return is less than 1 and near to 0 which indicates the good in-sample forecasting fit statistic of the Market Value Financial Ratios to predict Emerging Market Return (MSCI Index). Similarly, the Error Statistics of the Bias Proportion, Covariance Proportion, and the Variance Proportion of the Mean Absolute Error turns out to be 1 which again strengthens the forecastability of the explanatory variables to predict the market return. Aono and Iwaisako (2011) and Anandasayanan (2018) also found that financial ratios help forecast the returns in Japan stock market and Colombo stock exchange respectively.

The visual depiction of the forecastability graph (figure 5) indicates the perfect forecastability fit of the Error Statistics respectively. The Forecast Error Statistics that fall between 0 and 1 and 0 indicate the perfect Forecastability in-sample fit respectively. Followed by the significant regression results, the Market Value Financial Ratios also show strong predictability for the Emerging Market Level Return. Hence, it becomes evident that the Emerging Market Level Return (MSCI-Index) is more influenced by the Market Model than the Market Level Return (KSE-100 Index) respectively.

Figure 5: Forecastability of Emerging Market Return (MSCI Index)

DISCUSSION

Previous studies including (Wijesundera et al., 2015; Kheradyar and Ibrahim, 2011 and Emamgholipour et al., 2013, San et al., 2010) enlightens the fact that market ratios including earning per share, dividend yield, market to book ratios strongly influence the market returns. The current study keeping in mind the importance of market ratios has examined not only the impact of these ratios on national and international index returns but also examined the market model forecastability.

The findings of the study reveal that the influence of the oil and gas sector on the Market Level Return is weak. On the other hand, the regression results of the MSCI Emerging Market Index are more significant than the Market Return (KSE-100) index. The positive significant relationship at 1 percent significance level illustrates that the Market Value Financial Ratios have strong explanatory power to influence MSCI Emerging Market Return.

Contrary to the regression results, the forecastability measures including root mean square error (RMSE), the mean absolute error (MAE), the mean absolute percentage error (MAPE), and the Theil inequality coefficient (TIC) indicate good in-sample forecasting fit statistic of the Market Value Financial Ratios to predict the Market Level Return. Similarly, the error statistics of the Bias Proportion, Covariance Proportion, and the Variance Proportion of the Mean Absolute Error strengthened the forecastability of the explanatory variables to predict the Market Level Return respectively. Conclusively, the Forecasting Error Statistics of the Emerging Market Level Return outperformed the Market Level Return based on in-sample fit forecastability. The forecast error statistics are found to be dynamically efficient forecast errors to predict the stock returns (Mallikarjuna and Rao, 2019; Caldeira et al., 2020; Clark et al., 2020)

Hence, it becomes evident that the Emerging Market Level Return (MSCI-Index) is more influenced by the oil and gas sector than the Market Level Return (KSE-100 Index) respectively.

Therefore, investors should consider a market model in the valuation of securities. Moreover, domestic and international investors may employ a market model in forecasting the stock returns while designing portfolios for hedging (Ademmer and Boysen-Hogrefe, 2019).

CONCLUSION AND POLICY IMPLICATIONS

The present analyzes, models, and evaluates the explanatory power of the Market Model of the Oil and Gas sector of Pakistan on two the Market Level Indices respectively. The Market Model of the present study comprises of four Exogenous Market Value Financial Ratios which are the Dividend yield (DY), Earnings Per Share (EPS), Price to Earnings Ratio (PE) and Book to Market Value (BMV), and two Endogenous Variables which are the Market Return of Karachi Stock Exchange-100 (KSE-100 Index) and the Market Return of the Morgan Stanley Capital International (MSCI) Emerging Market Index throughout July 2001 to June 2018 respectively. The present study has employed the Panel Regression Econometric Technique comprising both the time series data and the cross-sectional data respectively. The results of the study are in line with the studies of Eitan and Oleemat (2015) and Anandasayanan (2018) that financial ratios explain and forecast the market returns respectively. The in-sample forecasting is evaluated by using three standard symmetric measures; Root Mean Square Error (RMSE), the Mean Absolute Error (MAE), the Mean Absolute Percentage Error (MAPE), and the Theil Inequality Coefficient (TIC). The Market value Financial Ratios tend to show the low explanatory power to the Market Level Return (KSE-100) Index. It could also be derived that having its own index which is the Oil and Gas Tradable index, investors earn more return by investing in the respective index

rather than the KSE-100 index respectively. Hence, it becomes evident that the Emerging Market Level Return (MSCI-Index) is more influenced by the Market Model than the Market Level Return (KSE-100 Index) respectively. As the energy sector of Pakistan contributes 80% share to total energy requirement in the country, this makes Oil and Gas sector inevitable for investment at the local and international level respectively. Therefore, investors either domestic or foreign may consider financial ratios for the assessment of stocks while designing portfolios.

LIMITATIONS OF THE STUDY

The current study is limited to the Emerging Market Index; however, the comparative study may also be conducted in the future by including other sectors and market indices both domestic and foreign. Moreover; Rolling windows are not applied in the Panel data setting for robust testing of the market model in the context of forecastability of indices. A future study may be directed to analyze the Rolling window forecastability in time series data for testing the validity of findings of the current study.

AUTHORS' CONTRIBUTION

- 1) Dr. Fauzia Mubarik: The author contributed to the write-up of the methodology and data, computation of the regression results, and the write-up of the results.
- 2) Dr. Sadia Saeed: The author contributed to the write-up of the introduction section, literature review, and discussion.
- 3) Dr. Hina Shahab: The author contributed to the write-up of the conclusion, policy implications, and limitations of the study.

All the authors equally contributed to format and draft the research article and write-up of the references.

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