

Forecasting Stock Market Returns: An Empirical Investigation for United Kingdom

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Abstract

Stock markets play a vital role in the economic development as a transmission mechanism through which savings are mobilized and adequately circulated across various economic sectors with a view to realize comprehensive growth. The current paper aims at identifying those factors that predict the stock market returns. For this purpose, a multivariate panel regression approach is employed. The empirical econometric model of the study is developed at two levels- firm level and macroeconomic level indicators. The annual panel data is constructed for 50 non-financial firms that are listed at London Stock Exchange during the period 2008-2017. We have employed robust Least Square estimation method. The findings showed that among financial performance factors, only net profit margin has significant predicting power for stock market returns. It presented signaling effect of net profit margin that attracts more investments. Moreover, we found that the selected set of macroeconomic factors have significant predicting power for stock market returns. Our paper contributes in the field of corporate finance as point of reference in the literature for the factors that predicts the stock market returns in the context of United Kingdom. In addition, it will eventually attract the attentions of academics, managers, policymakers, and investors.

Keywords: Financial performance, Macroeconomic conditions, Stock market returns, Panel regression and Least Squares.

JEL Codes: D22, G15 and F52.

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1 INTRODUCTION

European markets have been center of attentions for investors, fund managers and researchers from all over the world. These markets have witnessed a rapid growth which in turn has provided vast opportunities for the economists to focus on the risk level that is inherent within these markets. For the fund managers, the investment decisions are entirely based on the risk of outflow and the expected returns. The capital asset pricing model, which is abbreviated as CAPM, is the most common approach for estimating the risk-adjusted expected returns on capital markets [for more see, Sharpe (1964), Lintner (1965), Mossin (1966), and Black, Jensen and Scholes (1972)]. According to CAPM, investment risk is classified into two broad categories i.e. the systematic risk which is measured through β , the beta; and the unsystematic risk which is apparently eliminated using diversified investment portfolio. So therefore, the systematic risk is primarily considered in measuring the expected returns on stock portfolios. Hence, the risk and return relationship in the literature of CAPM is impeccable [see, Roy and Shijin (2018)]. However, the CAPM puts forward certain assumptions to achieve market equilibrium. For instance, CAPM states that asset beta for a firm remains constant over the time. This assumption is criticized by Jagannathan and Wang (1996) who argued that the relative risk in the cash flows of firms are likely to vary during different business cycles; and hence, such variations leads to the dependency of the expected returns and betas on the nature and availability of information at a given point in time which in fact also varies. Despite the critiques, CAPM has transformed into multiple factor models that captures the variations in asset returns in response to risk that is measured through its covariance with several factors affecting the stock prices. Merton (1973) proposed that asset's risk should be measured through its covariance with investors' marginal utility. Friend and Blume (1975) identified that price of risk is the coefficient of relative risk aversion of representative investor. Roll and Ross (1980) used the factor analysis of covariance matrix of returns for estimating the risk. In addition, numerous empirical studies have examined the performance of CAPM for explaining the cross-sectional variations present in the average returns [see, Banz (1981), Reinganum (1981), Gibbons (1982), Basu (1983), Shanken (1985) and Bhandari (1988)]. The findings showed uniform conclusion that CAPM fails to elucidate the cross-sectional variations in average returns.

The most predominant three factor model is presented by Fama and French (1993) which is extension of their two-factor model¹. The three-factor model became the benchmark model for pricing the variations in the cross-sectional asset returns. In their studies Fama and French (1992 and 1993), they presented weak but positive association between systematic risk and average returns. This challenged the central assumption of CAPM and suggested that a flat relationship is present between the market beta and average returns. Later, Fama and French

(2015a) developed a five-factor model by incorporating factors such as investment and profitability in their three-factor model. The five-factor model outperformed all other multiple-factor models in the equity market globally, see Chiah *et al.* (2016). On the other hand, Kubota and Takehara (2018) demonstrated that the five-factor model of Fama and French is underperformed for assessing the variations in the asset returns. However, Fama and French (2015b, 2016 and 2017) professed the inability of five-factor model to capture the variations in the stock returns of small firms. Campbell (1996) preferred the size and value strategies along with the human capital component. Interestingly, Kim *et al.* (2011) established that the human capital component includes the predictive power for size and value strategies, respectively. Similarly, Mayers (1972) recognized the role of human capital component in prediction of asset returns wherein approximately three-fourth of the consumption arises on the labor income covering human capital as an invaluable element of the aggregate wealth.

In accordance to Gregoriou, Healy and Gupta (2015) '*stock prices essentially reflect the discounted value of expected future cash flows of publicly traded business units*'. However, the stock prices are influenced through various factors including financial policies and macroeconomic conditions, see Nasimi *et al.* (2019). A large number of empirical studies have identified several financial variables that have explanatory power for asset returns with greater precision [see, Mukherji *et al.* (1997), Shiller (2000), Ball and Brown (2001), Lev (2001), Rapach *et al.* (2005), Chang and Wang (2008), Menaje (2012) Al-Shawawreh (2014) and many others]. Similarly, several empirical studies such as Gordon (1959), Bower and Bower (1969) and Zahir (1992), have found that asset returns are highly sensitive to the macroeconomic conditions and suggested that there are number of firm-specific factors namely earnings, firm size, dividends, risk leverage, book-to-market ratio, right issue, bonus and many more that explain the behavior of stock returns. Moreover, few studies indicated the empirical significance of both political and macroeconomic uncertainties [for instance see, Nasimi *et al.* (2018)] and financial performance [see, Anwaar (2016)] for the stock returns in United Kingdom. However, some indicators showed positive while others showed negative association with the stock returns.

Lewellen (2004) presented further insights on use of the financial ratios for predicting stock returns and stated that the ratios are low when stocks are overpriced as '*they predict low future returns as prices return to fundamental*'. Further, firms' financial performance is useful to the stockholders since they can be used to measure firms' future growth prospects [see, Nasimi (2016)].

Yet, we are not clear that whether the firm level factors and macroeconomic indicators have influence on the stock market returns in the United Kingdom, or not. If yes, which factors have the most significant explaining power for the stock market returns? Moreover, at what magnitude and direction does it effect? Therefore, this paper intends to empirically identify the factors that predict the stock market returns. More specifically, we aim to examine the influence of firms' financial performances and the macroeconomic conditions in predicting the stock market returns in the context of United Kingdom. Therefore, we construct a multivariate regression model which includes various variables that articulates the firms' financial performance and macroeconomic conditions. We have used robust Least Squares (LS) estimation technique. The annual panel data are collected for 50 non-financial firms that are listed at Financial Times Stock Exchange, FTSE-100, for period of 10 years during 2008 to 2017.

Most of empirical studies investigated the relationship between financial factors and stock returns using the CAPM to determine the stock returns; and hence, they used the expected stock returns as dependent variable. By measuring the actual stock market returns, we will capture the actual influence of financial factors on stock market returns, and not on the future returns. Eventually, our paper will contribute as a point of reference in the literature for UK firms and will attract the attention of the academics, investors, executives and managements.

The remaining part of this paper is structured as follows: Second chapter describes the theoretical background. It explains the various theories that form foundation for the study. Third chapter explains the empirical arguments. Fourth chapter elaborates the empirical framework and models, estimation method, and data. Fifth chapter discusses the empirical results. Sixth chapter presents the conclusions and policy implications.

2 THEORETICAL BACKGROUND

Irungu (2013) states that '*a theory consists of a coherent set of general propositions that offer an explanation of some phenomena by describing the way other things correspond to this phenomenon*'. We can say that theory is a formal process to test the explanations of certain events on how things relate to each other. Moreover, a theory is built from reviewing the previous findings, logical deductions, and/or knowledge of applicable theoretical area on hand [see, Zikmund, Babin and Griffin (2010)]. According to the natural scientific aspirations, in particular, the social theory predicts an event prior it happens; more precisely, it builds the cause-effect linkages.

This section describes the theories that construct foundation for the behavior of stock markets. The two major theories, namely signaling theory and the efficient market theory, builds the foundation on how financial performance affects the stock returns in the stock markets.

2.1 Signaling Theory

Signaling theory was presented by Brennan and Copeland in 1988, see Aduda and Chemarum (2010). The theory

states that financial information performed as channel through which information is passed from the managers to stockholders of the company. The stock split models of signaling theory presented that stock splits served as costly signals of managers' private information because the trading costs raised as stock prices fell. It supports the hypothesis of Fama et al. (1969), who proposed that by announcing the stock splits, a company could diminish the information asymmetries that might be present between management and shareholders. Moreover, the signaling hypothesis proposed that new information is conveyed into the market by announcement of stock dividends [see, Pathirawasam (2009)].

Pathirawasam (2009) examined the work of Foster and Vickrey (1978) who studied daily returns around the announcement dates. The primary goal was to see whether announcements of stock dividend changed the expectations of investors regarding firms' future prospects or not. They considered the daily-market model residuals around announcement days for 82 stock dividend announcements over the period of 1972 – 1974. The sample was also controlled for cash dividend and news announcements within three days of the announcement date. They postulated that the mean of the declaration day residuals is greater than zero due to information content of stock dividend. The results are consistent with the hypothesis of signaling theory.

Similarly, Dhar and Chhaochharia (2008) proposed that managers use signaling theory to issue bonus shares and stock splits, particularly, in the undervalued firms. This expresses the confidence of managers in the operations of company which attracts more shareholders for the company. In this way, the announcement of bonus shares is a signal of profitability to company and hence attracts more investments. Moreover, the bonus shares announcement is a signaling effect as it delineates the better performance of a company [see Mishra (2005) and Arthurs, Busenitz, Hoskisson and Johnson (2009)].

2.2 Efficient Market Hypothesis

The Efficient Market Hypothesis (henceforth, EMH) is an investment theory that got popularized in the late 1960's. The theory states that earning profits above the average returns is impossible from trading in stock markets. This implies that all new information is already reflected in the current share prices and thus, no investor can outperform the stock market, see Dhar and Chhaochharia (2008).

However, Malkiel and Fama (1970) categorized EMH into its three forms such as weak-form, semi-strong form, and the strong form. Weak-form of EMH specifies that the current share prices reflect all historical information and hence, it is not possible to predict the future prices and earn abnormal returns based on the past data. Semi-strong form of EMH specifies that the current share price reflects not only the historical information but also the publicly available information. Thus, this new information cannot be used to earn abnormal returns. Strong form of EMH specifies that the current share prices reflect all available information whether it is public or private. Likewise, it is not possible to earn abnormal returns using the insiders' information [see, Khan and Ikram (2010)]. Additionally, Fama (1965) witnessed change in the intrinsic value of the shares over the time as a result of new information.

According to the EMH, markets should be classified as semi-strong form if announcement of the public information is reflected in current stock prices instantaneously and without bias. Empirical studies have found that Indian stock markets form semi-strong market efficiency see, Khan and Ikram (2012). Generally, the studies on strong form market efficiency is limited to the stock markets of well-developed countries like United Kingdom [see, Barnes and Ma (2002)].

3 EMPIRICAL REVIEW

A considerable number of empirical and theoretical researches has been directed to the financial sector, specifically, on the behavior of stock markets. In this respect, the past era has been dominated by important researches pertaining to the behavioral finance that resulted in a number of distinct and notable thought of schools. The CAPM identified that the expected returns for a single security or portfolio of securities can be explicated by the expected market risk premium and the degree of sensitivity which was termed as beta of the security or portfolio. Later it was acknowledged that the expected stock returns might be sensitive to more than one factor, and thus the concept of multi-factor models such as Intertemporal CAPM [see, Merton (1973)] and the Arbitrage Pricing Theory [see, Ross (1976)] were developed.

Basu (1977) established that stocks with lesser price to earnings (P/E) ratios carried greater risk-adjusted returns than the stocks with higher P/E ratios. Similarly, Banz (1981) reported higher risk-adjusted returns for the stocks of small size firms as compared to the larger size firms' stocks. Similar anomalous patterns of stocks have been found with respect to other fundamentals factors, for instance, leverage [see, Bhandari (1988)]; and the book-to-market equity [see, Stattman (1980) and Rosenberg *et al.* (1985)]. Fama and French (1992) implemented the cross-sectional regression methodology of Fama and MacBeth (1973), and found significant role of firm size and book-to-market equity in explaining stock returns. Also, Dijk (2011) revised the literature on effect of firm size around the world and found its effect has been stated in most of the empirical studies. There has been evidences on the disappearance of size effect over time, however, the author argued it to be immature to conclude that the

size effect was dead.

Empirical studies of Bhandari (1988) showed that debt-to-equity ratios have positive association as far as predicting the stock returns were concerned. Interestingly, the findings supported the studies of Fama and French (1988), Kheradyyar and Ibrahim (2011), and Kothari and Shanken (1997) who stated that the dividend yield ratio is particularly important in predicting the stock returns. Moreover, the authors claimed that dividend yield ratio holds a certain characteristic which allows to efficiently predict the expected returns in over thirty-six international markets. More recent studies such as Wang and Iorio (2007), Deaves *et al.* (2008), and Chen and Shen (2009) demonstrated that dividend yield is strong predictor for stock returns in most developed markets like the USA, China and Canada.

Azhagaiah and Sabari (2008) found that the stock market price is determined by retained earnings and dividend. Similar results are reported by empirical studies of Friend and Puckett (1964); Naamon (1989); Nishat (1992) and Pradhan (2003). Though, it was contradicted by Harkavy (1953). Salih (2010) presented that the market value of a firms is affected by its dividend policy. Similar findings are reported by Gordon (1963). However, the findings showed inconsistency with studies of Miller and Modigliani (1961); Baker *et al.* (1985); and Farrelly *et al.* (1986).

Senthikumar (2009) examined the relationship of stock returns with the fundamental financial indicators namely firm size and book-to-market value of equity for the selected sample of Indian companies during 2000 to 2006. The study provided an agreement with the empirical studies on the developed markets that small firms earn more returns as compared to large size firms. Similarly, Nazir, *et al.* (2010) presented a positive relationship between dividend policy and stock price volatility in Pakistan. The findings supported the arbitrage realization effects, informational effect and duration effect in the context of Pakistan. Novy-Marx (2013) provided that profitability holds similar explanatory power for the variations in average stock returns as to that of book-to-market ratio. Furthermore, Hou *et al.* (2015) proposed that both investment and profitability also played vital roles in unfolding the variations in stock returns.

Levis (1989) found evidence on the existence of irregularities in the stock prices of UK firms and stated that size effect is not the only and most dominant anomaly. Also, investment policies that are based on the P/E ratios, dividend yield, and share prices appeared as profitable. Though there is a huge degree of interdependency among all four effects, it is still apparent that P/E ratios and dividend yield subsumed the effects of size and share prices. Brammer, Brooks and Pavelin (2008) found that multiple-factor models can be rationalized to identify the association of social and financial performance for clarifying the cross-sectional variations present in the returns of UK firms. Hussainey *et al.* (2010) showed a significant negative association between the payout ratio and the stock price volatility and positive association between dividend yield and stock price volatility for the sample of UK firms during the period from 1998 to 2007. Overall, the findings suggested that larger the payout ratio the lesser volatile a stock price would be. Further, the payout ratio is found to be the key determinant for the volatility of stock prices. Similarly, Anwaar (2016) examined the effect of firm performance on stock returns for the UK firms during 2005 to 2014. The findings showed that financial performance has explanatory power for the stock returns in the UK. However, differential impacts were observed. Similarly, Nasimi *et al.* (2018) empirically explored the effect of political and macroeconomic risk on stock returns in the United Kingdom. The authors constructed a multivariate model to explore behavior of stock returns under political risk and macroeconomic uncertainty. The annual panel data of our study comprised of 23 UK firms listed at London Stock Exchange for period covering 2005-2016. The study utilized robust two-step system GMM. The findings of the study showed significance of uncertainties for predicting the stock returns. However, macroeconomic uncertainty showed pronounced impact on the stock returns as compared to political risk.

In an another study, Nasimi *et al.* (2019) explored the sensitivity of stock market returns to macroeconomic environments in Brazil, Russia, India, and China. In order to achieve the objective, the authors utilized data for major macroeconomic factors namely exchange rate, inflation rate, interest rate and oil price for the sample period starting from May 2007 to April 2017. The authors have utilized OLS estimation technique to estimate the empirical models. The findings of show no significant relationship between respective exchange rate, inflation rate, interest rate and oil price on market returns of either BRIC economy. However, the regression analysis reveals insignificant positive relationship of exchange rate, inflation rate and interest rate with stock market returns while oil prices has insignificant negative relationship. This suggests influence of other domestic and international macroeconomic factors on stock market returns. Furthermore, in the collective panel regression model of BRIC economies, it is found that inflation rate has significant influence on stock market returns of BRIC economies.

4 RESEARCH METHODOLOGY

4.1 Empirical model

In order to identify the factors that predict the stock market returns in the context of UK, we estimate the empirical regression model, presented in equation (1). The multivariate regression model of our study is comprised of firm level variables that articulates the firms' financial performance and the macroeconomic indicators.

$$RM_t = \beta_0 + \beta_1 CR_{it} + \beta_2 EPS_{it} + \beta_3 GPM_{it} + \beta_4 NPM_{it} + \beta_5 ROA_{it} + \beta_6 ROE_{it} + \beta_7 QR_{it} + \beta_8 \ln GDP_t + \beta_9 \ln CPI_t + \beta_{10} EXR_t + f_t + f_i + \varepsilon_{it} \quad (1)$$

where RM_t is the dependent variable of the study and represents stock market returns at time t . CR_{it} denotes the current ratio. EPS_{it} stand for the earnings per share. GPM_{it} and NPM_{it} stands for gross profit margin and net profit margin, respectively. ROA_{it} is the return on assets whereas ROE_{it} is the return on equity. QR_{it} is the quick ratio. GDP_t is the gross domestic product at time t . CPI_t the consumer price index at time t . EXR_t denotes the exchange rate at time t . However, it represents the i^{th} firm at time t . β_0 is the slope of intercept and it is constant. β_1 to β_{10} represents the coefficients of slope for the explanatory variables. Further, f_t and f_i represents the year-fixed and firm-fixed effects, respectively. ε_{it} is the error or disturbance term and has a finite variance and zero mean value.

4.2 Data, estimation technique and variables

The quantitative data for the study are obtained from the secondary source. The annual panel data is constructed from financial statements of 50 non-financial firms that are listed at Financial Times Stock Exchange, FTSE-100, for period of 10 years from 2008 to 2017. We use the panel data because it has several advantages. First, combining the time-series and cross-sectional data provides an edge to examine the marginal effects of the independent variables in two dimensions, that is, time-series dimension and cross-sectional dimension; hence, this provides more accurate estimation of the parameters, see Hsiao (2007). Second, the panel data reduces the problems of collinearity among the variables and has more degree of freedom and sample variability which increases the efficiency [for more details see, Hsiao et al. (1995) and Hsiao (2007)].

We employ the robust least squares estimation method developed by Huber (1973) to estimate the empirical model. The stock market returns are regressed on the number of financial indicators that articulates the firms' financial performances including current ratio, earning per share, gross profit margin, net profit margin, return on asset, return on equity, quick ratio; and macroeconomic conditions such as gross domestic product, consumer price index and exchange rate. The explanatory² variables of our study are followed by the various empirical literatures [see, Nazir, et al. (2010) Novy-Marx (2013), Anwaar (2016), Nasimi (2016), and Nasimi et al. (2019)]. Table I provides the measurement for the variables used in the study.

5 EMPIRICAL FINDINGS

5.1 Descriptive Statistics

Table II presents the descriptive statistics of variables over ten-years sample used in our study. We present the descriptive statistics to ascertain the allocation distinctiveness of various variables used in the study model. As it is evident that highest mean value is depicted by the gross domestic product. While, stock market returns showed the lowest value of mean. Similarly, current ratio exhibited highest value of standard deviation which indicates that almost 174.82 % of the data are spread around the mean value. Also, we can see that exchange rate showed lowest standard deviation, which implies that almost 5.91% of the data are spread around its mean value. Additionally, the Table II contains values of minimum and maximum for variables of the study. From the values presented in Table II, we can see that considerable variation is present in variables of our study.

5.2 Correlation Matrix

Table III presents the correlation matrix which measures the degree of linear dependency among various variables at the same time period. The Pearson's correlation coefficient is the most relevant measure of correlation between variables [see Babbie (2007), Silva and Carreira (2010), D'Espallier and Guariglia (2012), Firth et al. (2012), and Nasimi and Nasimi (2018)] and helps in identifying the multicollinearity problems [see, Nasimi et al. (2018)]

From Table III, we observe the stock market return and its significance level through different variables. It is evident that net profit margin, gross domestic and exchange have significant correlation with stock market returns. However, an insignificant correlation among the variables is also exhibited in Table III. Overall, the correlation analysis provides the preliminary evidence on the relationship between different variables. In order to examine the relationship in detail, we estimate the empirical regression model presented in the previous section. Also, we found that problems of multicollinearity³ does not exist among the variables.

5.3 Regression Analysis

Panel regression analysis of the study begins with opting an appropriate effect model such as fixed effect or random effect model. We applied the Likelihood Ratio Test⁴ and Hausman Test⁵ to determine the best fit model for our study. Table IV presents that Random Effect is the best describe of our empirical model. Regression analysis provides the evidence on the response of dependent variable due to variations in the explanatory variables. Table V presents the regression results for the empirical model of our study. Also, the p-value of Wald Chi2 in the diagnostic test shows the appropriateness of the model.

On observing the impact of firms' financial performance on the stock market returns, we found that only net

profit margin has positive significant impact. This implies that an increase of 1 unit in the net profit margin will raise the stock market returns by almost 1.84%. This is indicative that more profitable firms exhibit higher returns which reflects into their stock prices in the market and thus, increases the stock market value. The finding supports the signaling theory and showed that net profit margin has a signaling effect that attracts more investments. However, the alternative measures of financial performance in our study showed differential but insignificant explanatory power for the stock market returns.

Similarly, when we observed the impact of macroeconomic factors, we discovered that the selected set of macroeconomic conditions have highly significant explanatory power for the stock market returns. The findings showed that gross domestic product has highly significant but negative impact on the stock market returns. This supports the EMH which states that earning profits above the average returns is impossible from trading in the competitive stock markets [see Dhar and Chhaochharia (2008)]. However, consumer price index and exchange rate exhibited positive significant influence on the stock market returns. The positive association of exchange rate and stock market returns are evidenced by many empirical literatures [for instance, see Smith (1992), Solnik (1987), Aggarwal (1981), and Sani and Hassan (2018)]. This implies that increase in the exchange rate attracts the attentions of foreign investors and hence stock prices increases which leads to higher stock markets returns.

5.3.1 Robustness Check

Table VI presents the robustness check for the results of regression model in our study to assure that the results are not affected on how we estimate the model. We performed the robustness check of the above estimation and we found same results. Overall, our results are qualitatively unchanged. Perhaps the only important difference is that the p-value of net profit margin becomes highly significant at 10 percent significance level.

6 CONCLUSION AND DISCUSSION

This paper is an empirical examination for the explanatory power of firms' financial performance and macroeconomic conditions to predict the stock market returns. In order to achieve objective of our study, the stock market returns are regressed on various variables that articulates the firms' financial performance and macroeconomic conditions. We have employed Least Squares estimation technique to estimate the empirical model of our study. In addition, we have performed the robustness check to assure that the results are not affected by the estimation approach. The balanced panel data of the study is constructed from 50 non-financial UK firms that are listed at London Stock Exchange during the period covering 2008-2017.

The results showed that Random Effect is the best describe of our empirical model. The findings showed that among firms' financial performance indicators, only net profit margin has positive significant impact on the stock market returns. This is indicative that more profitable firms exhibit higher returns which reflects into their stock prices in the market and thus, increases the stock market value. The finding supports the signaling theory and showed that net profit margin has a signaling effect that attracts more investments. However, the other measures of financial performance showed differential but insignificant influence for predicting the stock market returns in the context of UK.

Macroeconomic stability and the stock market returns are the two basic economic objectives that every country aims to achieve. This is majorly because the financial position of every economy whether developed or developing can be evaluated from its macroeconomic stability. The findings demonstrated that the selected set of macroeconomic factors have high significant impact on the stock market returns. The findings showed that gross domestic product has highly significant but negative effect on the stock market returns. This supports the EMH which states that earning profits above the average returns is impossible from trading in the competitive stock markets [see Dhar and Chhaochharia (2008)].

However, consumer price index and exchange rate exhibited positive significant influence on the stock market returns. The positive association of exchange rate and stock market returns are evidenced by many empirical literatures [for instance, see Smith (1992), Solnik (1987), Aggarwal (1981), and Sani and Hassan (2018)]. This implies that increase in the exchange rate attracts the attentions of foreign investors and hence stock prices increases which leads to higher stock markets returns. Moreover, the stock market returns and exchange rate are interconnected due to globalization and trade liberalization. For instance, the foreign investors are busy investing their capital in the stock markets across various countries. This leads to the rapid growth of the international investments and capital moves across all over the world. Hence, exchange rate plays a vital role in predicting the stock market returns, see Sani and Hassan (2018).

6.1 Policy implications and recommendations

Our study provides a point of reference in the literature for determining the factors that predict the stock market returns in the context of the UK. Moreover, the behavior of stock market in response to various factors is a proper appreciation that continues to be overriding interest of many parties. Also, this paper contributes in the field of corporate finance and will eventually attract the attentions of academics, managers, policymakers, and investors. First, it enhances the expertise of investors in selection of stocks by providing them with the knowledge on the

behavior of stock market. Second, the knowledge in relation to the impact of macroeconomic conditions advantages the investors to know the appropriate timing to enter and exit into stock market. It also benefits investors and managers in managing the risk

Our paper paves way for further researches. We recommend that the future researchers shall extend the time period and include more variables to obtain more reliable results. In particular, the future researchers shall incorporate different measure of financial performances including return on capital employed, asset turnover, and dividend yield; and macroeconomic factor such as interest rate.

6.2 Research limitations

In order to achieve objectives of the study, every effort was made, however, there still exists time limitations which worth to be mentioned. The reliability of data is merely upon the firms who set the information as accessible through their financial statements. Therefore, an additional analysis is required for the reliability analysis of data. This requires time that is to be set prior starting the research.

NOTES:

- [1]. See, Fama and French (1992) "The cross-section of expected stock returns", *Journal of Finance*, Vol. 47, pp. 427-65.
- [2]. The word explanatory variables and independent variables are used interchangeably, see Gujarati and Porter (2009).
- [3]. The problems of multicollinearity occurs for the coefficients of correlation at the threshold of 0.80 and 0.90, see Gujarati (2003).
- [4]. In the panel data model, Likelihood Ratio Test is applied to distinguish between common effects model and fixed effects model. In this case, the Likelihood Ratio Test has below hypothesis:
H₀: Common Effect is preferred due to higher efficiency.
H₁: Fixed Effect is preferred as least consistent.
- [5]. In the panel data model, Hausman Test is applied to distinguish between fixed effects model and random effects model. In this case, the Hausman Test has below hypothesis:
H₀: Random Effect is preferred due to higher efficiency.
H₁: Fixed Effect is preferred as least consistent.

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APPENDIX

Table 1: Variable Measurement

Variables	Symbol	Measurement
Stock Market Returns	MR	Current index price to previous index price minus 1
Current Ratio	CR	Ratio of current assets to current liabilities
Earnings per share	EPS	Earnings per share after tax
Gross Profit Margin	GPM	Gross Margin* by total revenue
Net Profit Margin	NPM	Net income to total revenue
Return on Asset	ROA	Net income to total assets
Return on Equity	ROE	Net income to average shareholders' equity
Quick Ratio	QR	Ratio of current assets minus inventories to current liabilities
Gross Domestic Product	GDP	Nature Logarithm of Nominal GDP in domestic currency
Consumer Price Index	CPI	Nature Logarithm of CPI with base year = 2010
Exchange Rate	EXR	Domestic currency per US dollar

*Gross Margin = Revenue – COGS; COGS denotes Cost of Goods Sold

Table II: Summary Statistics

Variable Names	Symbols	Mean	Std. Dev.	Min	Max
Stock Market Returns	MR	0.0288	0.1428	-0.3130	0.2210
Current Ratio	CR	1.5310	1.7482	0.3500	29.2700
Earnings per share	EPS	0.7998	1.7042	-10.6600	18.3000
Gross Profit Margin	GPM	0.4650	0.2963	-0.0590	1.0030
Net Profit Margin	NPM	0.1571	0.7196	-7.0054	5.3891
Return on Asset	ROA	0.0684	0.0853	-0.3838	0.6711
Return on Equity	ROE	0.2640	0.6951	-4.1276	9.8502
Quick Ratio	QR	1.0610	1.5589	0.1600	28.5600
Gross Domestic Product	GDP	14.3738	0.0941	14.2455	14.5288
Consumer Price Index	CPI	4.6628	0.0596	4.5611	4.7444
Exchange Rate	EXR	0.6700	0.0591	0.6100	0.8100

Table II presents the summary statistics for various variables of the entire sample firms listed at London Stock Exchange during the period from 2008 to 2017.

Table III: Correlation matrix

Variables	Coefficients	Prob. Values
Current Ratio	0.0058	(0.8969)
Earnings per share	0.0122	(0.7847)
Gross Profit Margin	-0.0070	(0.8756)
Net Profit Margin	0.1280	(0.0041)
Return on Asset	0.0408	(0.3628)
Return on Equity	-0.0669	(0.1355)
Quick Ratio	-0.0005	(0.9909)
Gross Domestic Product	0.1556	(0.0005)
Consumer Price Index	0.2929	(0.0000)
Exchange Rate	-0.0423	(0.3452)

Table III presents the correlation matrix of independent variables for the stock market returns. The values in the parenthesis are the p-values which show the level of significance and p-values < 0.1 show that correlation coefficient is statistically different from zero.

Table IV: Correlated Random Effects – Hausman Test

Test Summary	Chi2-Sq. Statistic	Chi2-Sq. d.f.	Prob.
Cross-section Random	3.3	10	0.9733

Table V: Factors affecting stock market returns

Variables	Coefficients	Standard Error	Prob.
Current Ratio	-0.0009	0.0140	0.9500
Earnings per share	-0.0025	0.0045	0.5830
Gross Profit Margin	-0.0075	0.0188	0.6910
Net Profit Margin	0.0184**	0.0092	0.0450
Return on Asset	-0.0719	0.1036	0.4880
Return on Equity	-0.0016	0.0090	0.8600
Quick Ratio	0.0008	0.0158	0.9570
Gross Domestic Product	-3.5651***	0.3273	0.0000
Consumer Price Index	5.5172***	0.4400	0.0000
Exchange Rate	1.1827***	0.1812	0.0000
Constant	24.7628***	2.6488	0.0000

Diagnostic Test

No. of Observations	500
No. of Groups	50
Wald Chi2	208.180
Prob. Value	0.000

Table V presents the empirical results for regression model of the entire sample firms. The study consists of 50 non-financial firms that are listed at London Stock Exchange during the period covering 10 years, that is, from 2008 to 2017. The authors employed Least Squares method to estimate the regression model. ** and *** denotes the level of significance at 5% and 10%, respectively.

Table VI: Robustness check

Variables	Coefficients	Standard Error	Prob.
Current Ratio	-0.0009	0.0054	0.8710
Earnings per share	-0.0025	0.0039	0.5260
Gross Profit Margin	-0.0075	0.0058	0.2000
Net Profit Margin	0.0184***	0.0045	0.0000
Return on Asset	-0.0719	0.0808	0.3740
Return on Equity	-0.0016	0.0049	0.7450
Quick Ratio	0.0008	0.0083	0.9190
Gross Domestic Product	-3.5651***	0.0609	0.0000
Consumer Price Index	5.5172***	0.0890	0.0000
Exchange Rate	1.1827***	0.0154	0.0000
Constant	24.7628***	0.4679	0.0000

Diagnostic Test

No. of Observations	500
No. of Groups	50
Wald Chi2	55872.890
Prob. Value	0.000

Table VI presents the robustness check for the empirical results. The authors employed Least Squares approach to estimate the regression model. The study sample comprised of 50 non-financial firms that are listed at London Stock Exchange during the period covering 10 years, that is, from 2008 to 2017. *** denotes the level of significance at 10%.