Co-integration and Causality amongst Micro-economic Factors and Stock Returns: An Empirical Analysis from Pakistan Stock Exchange

Ms. Hina Qayum *
Dr. Muhammad Ibrahim Khan **
Dr. Burhan Ali Shah ***

Abstract

This paper empirically examined the co-integration and direction of causality amongst micro-economic factors and stock returns for Pakistani listed firms over the period from 2006 to 2017. In total 100 firms were shortlisted across the sectors on the basis of market capitalisation. The selected micro-economic variables are returns on equity, earnings per share, debt to equity ratio, price to book ratio, price to earning ratio and net profit margin. We employed a unit root test, co-integration test, VECM and Granger causality test to inspect the co-integration and causal direction amongst micro-economic factors and stock returns. Evidence from study revealed statistically positive short-run and long-run relation of stock return with net profit margin, price to earnings ratio, earnings per share, returns on equity, and negative relation with debt to equity ratio. The VECM Granger causality test result reports no causal relationship of EPS and ROE with stock returns. Unidirectional causality was reported from NPM, PER and DER towards stock returns. Similarly, bi-directional causality is reported amongst PBR and stock returns. Thus it is concluded from the findings that investors can make substantial gains by using the trend of firm micro-economic factors to forsee the stock returns trend rejecting the very notion of market efficiency.

Key words: Micro-economic factors; Cointegration; Causality; Stock Returnss; Pakistan Stock Exchange

Introduction

Stock market is the pillar of any country financial infrastructure and play a leading role in the functioning of its economy. On one hand it provides centralized access to the companies for raising finance and on the other hand investors find an opportunity to buy unit of ownership in the listed firms against the potential returns. Considering the stock market significance for the investors, the search for identifying factors that

* MS Student: hinaqayum343@gmail.com
** Assistant Professor, Institute of Business Studies & Leadership: AWKUM: ibrahimkhan@awkum.edu.pk
*** Assistant Professor, Quaid-i-Azam University, Islamabad: burhanali@qau.edu.pk

predict stock movement has grabbed the researcher attention more than ever. The performance of stock is reported to be associated with both micro and macro-economic factors. The firm specific factors that can be managed internally are referred as micro-economic factors whereas external factors that are beyond the control of management is known as macro-economic factors (Hunjra et al., 2014). The sensitivity of each factor in driving the stock returns is prerequisite for the investors to understand in selecting the stock that may provide them competitive advantage over others to realize optimum gain. In this regard academician around the world conducted research to identify the micro-economic factors that predict the stock returns. However, these studies mostly focused on the developed capital markets providing dearth in the literature on emerging capital markets like Pakistan.

To address the dearth in the literature, the current study attempts to check the long run as well as short run causal relation among the stock returns and the selected market-oriented micro-economic factors for the Pakistani listed firms over the year 2006 to 2017. The selected micro-economic factors include returns on equity (ROE), debt to equity ratio (DER), price to earning ratio (PER), earnings per share (EPS), price to book ratio (PBR) and net profit margin (NPM). From methodological perspective, we have employed ARDL bounds testing to examine the co-integration and employed OLS and ECM methods under the ARDL framework to investigate the long-run and short-run relationship amongst the micro-economic factors and stock returns for selected Pakistani listed firms. Furthermore, the causal relationship of selected micro-economic factors with stock returns is examined by the VECM Granger causality test; thus, contributing novelty by employing extensive statistical techniques in the context of emerging market like Pakistan. The paper is comprised of introduction section, followed by literature review, data methodology, results and discussion. In the last section, the paper discusses the conclusion and practical implications.

Literature Review

Investment in stock market could either results in capital gain or loss due to change in stock prices and is known as stock return. The variation in stock price is determined based on demand and supply which is influenced by firm micro-economic factors (Akinlesi, 2011). Therefore, it is important to critically evaluate the existing literature to determine the gap that will be addressed by this study. For ease of understanding, the literature is divided into two sections. The first section evaluates the literature on

the effect of micro-economic factors on the stock returns and the second section focus on co-integration amongst micro-economic factors and stock returns.

Impact of Micro-Economic Factors on Stock Returns

Numerous studies documented empirical evidence on the behavior of stock returns and stock market efficiency through employing firm fundamentals (micro-economic factors) but with contradictory findings. Such as Kheradyar et al. (2011) reported the effect of three micro-economic factors such as dividend yield, the book to market ratio, and earnings yield on the stock returns of firms registered in Malaysian. By using generalized least squares technique on panel data set, the study revealed book to market ratio as most appropriate ratio to anticipate the stock returns. Moreover, his findings observed rise in the explanatory proficiency of financial ratios when run on multiple regression model. Similarly, Khan et al. (2012) reported significant positive relation of dividend yield and earnings yield with the stock returns and negative relation of book to market ratio with the stock returns for the firms listed in Pakistan. In another study, Sarwar (2013) employed the fixed regression model and established that stock return is in significant positive relation with the volatility, market premium, discretionary accrual, dividend and in significant negative relation with book to market ratio and leverage ratio. The variation in the explanatory power of various financial ratios could be due to the reason that each one of them carry explicit information.

Reddy and Fu (2014) adopted multiple regression analysis and found substantial positive effect of debt to equity ratio and negative effect of net revenue margin on the stock returns for the Australian listed firms. Wijesundera et al. (2015) used ordinary least square technique and revealed positive association of book to market ratio, equity returns and earnings per share with the stock returns for the Srilanka listed firms. Likewise, Wijaya (2015) documented significant positive impact of price to book values, equity returns, dividend yield and earnings per share on the stock returns of 20 manufacturing firms registered in Indonesia. Similarly, Anwaar (2016) investigate the effect of return on assets, earning per share, quick ratio, return on equity, and net profit margin on the stock return of FTSE-100 Index through panel regression technique. The study recorded that as earnings per share rise the stock returns decrease and as net profit margin and return on equity rise the stock returns increase. The review of the above studies provides inclusive evidence about the

micro-economic factors relation with the stock returns, which suggest that later can be predicted through adoption of effective statistical techniques.

Co-integration among Micro-Economic Factors and Stock Returns

There is limited literature available on testing the co-integration and causality among micro-economic factors and stock returns across developed and developing economies. Such as Maysami and Koh (2000) highlighted the long-run equilibrium relation of micro-economic factors with the Japan, Singapore, and US stock index using the VECM technique. Their study observed a substantial positive co-integrating relation among earnings per share, exchange rates and stock price. Similarly, Ali (2012) examined the co-integration and causality effect of multi micro-economic factors of dividend yield, price earnings ratio, market capitalization (estimated as monthly average) and share trading volume with the stock price of firms registered on the Dhaka stock exchange. Using the unit root tests, Johansen and Juselius co-integration test and the Granger causality test, the study reported substantial long-run and causal relation among the share prices and all selected micro-economic factors.

Likewise, Rahaman et al. (2013) also found strong co-integration amongst stock prices and returns on assets, price-earnings ratios, and cash flow per share for Bangladesh listed Islamic Bank. In short, overwhelming evidence is recorded in the emerging economies regarding share price association with the market oriented micro-economic factors. In case of Ghana stock exchange, Dimmua (2015) employed unit root test, Johansen and Juselius (1990) co-integration test, VECM, and Granger causality test and showed substantial co-integration in addition to the bi-directional causal relation amongst dividend per share and share price. While in case of Austria stock exchange, Ligocká and Stavarek (2018) detected significant long-run equilibrium relation and causality amongst the stock returns, current ratio and returns on equity. Thus, suggest that micro-economic factors are substantially effective in predicting the stock returns.

Methodology

Data

Monthly data is acquired for a shortlisted sample of 100 firms registered on the Pakistan stock exchange over the years 2006-2017. The firms were shortlisted on the basis of following criteria; first the selected firms should be largest firms in terms of market capitalisation, second the firm must be registered on the PSX before the start of study period that is January 2006, third the data must be avaiable for all selected

factors across the study time period, fourth no selected firm may have delisted over the period of the study. The selected micro-economic factors data is acquired from the COMPUSTAT. Table 1 reports the list of micro-economic factors and their measurement method.

Table1: Factors estimation method

Factors	Measurement method	References
SR	$Ln(\frac{Pt}{Pt-1})$	(Liem & Basana, 2012)
DER	Total Debt/ Total Equity	(Sayeda & Ghazali, 2017)
EPS	Net income/Number of common share outstanding	(Wasim, 2017)
NPM	Net profit/ Sales	(Martani, 2009)
PBV	Market price per share / Book value per share	(Shafana, 2013)
PER	Market price per share/ EPS	(Liem& Basana, 2012)
ROE	Net income/Shareholder's equity	(Reddy & Fu, 2014)

Note: This table reports all the factors and their measurement technique where SR stands for stock returns and used as dependent factors. While independent factors include DER (debt to equity ratio), NPM (net profit margin), PBR (price to book ratio), EPS (earnings per share), PER (price to earnings ratio) and ROE (returns on equity).

Methodology

This study has employed an auto regressive distributed lag (ARDL) and error correction techniques to investigate the short and long run co-integration amongst selected micro-economic factors and stock returns (Pesaran et al., 2001). The reason for using ARDL technique stem from its adaptability to the series that are purely stationary at *1*(0), or at *1*(1) or at mixture of *1*(0) and *1*(1) (Meo & Chowdhury, 2018; Faisal et al., 2018). The study used natural logarithms to reduce the abnormality in the data. Empirical illustration of the model adopted by the study is expressed as below:

$lnSR_t=\beta_\circ + \beta_1 lnDER_t + \beta_2 lnEPS_t + \beta_3 lnNPM_t + \beta_4 lnPBR_t + \beta_5 lnPER_t + \beta_6 lnROE_t + \epsilon_t$ **(1)**

Where SR_t represent stock returns at time t, DER is the firm debt to equity ratio, EPS refers to firm earnings per share, NPM represents the firms net profit margin, PBR is the share market to book price ratio, PER is the share market price to earnings ratio and ROE refers to firm returns on equity, $\beta_\circ$ is the constant term and ϵ_t is the error term.

Unit Root Test

The data is tested for stationary by applying unit root test. The rational for applying unit root test stem from the fact that time series are prone to non-stationary that gives spurious result when applying regression analysis. Besides, the unit root test result also informs the researcher to select the appropriate model for analysis. This study adopts Phillips and Perron (1988) and Augmented Dickey-Fuller (1979) test to inspect unit roots in all factors.

Bounds Testing Technique

After checking the series for stationarity, the study then employs the ARDL bounds testing technique recommended by Pesaran et al. (2001). The bounds test is more applicable because it allows *I*(1), *I*(0), or mixed order of series, whereas other co-integration tests such as Johansen and Juselius (1990), Gregory and Hansen (1996) and Engle and Granger (1987) need a unique order of integration. Furthermore, the ARDL procedure is appropriate for the finite or small sample size to investigate the long-run association by selecting optimal lag length, hence making it superior than Johansen and Juselius method (Pesaran et al., 2001). Besides, Wald test (F-statistics) is practiced for evaluating the presence of a long-run association amongst the factors expressed in the equation:

$$\Delta lnSR_t = \beta^{\circ} + \sum_{i=0}^{p} \beta_i \, \Delta lnSR_{t-i} + \sum_{k=0}^{q} \beta_k \, \Delta lnDER_{t-k} + \sum_{l=0}^{r} \beta_l \, \Delta lnEPS_{t-l} + \sum_{m=0}^{s} \beta_m \, \Delta lnNPM_{t-m} + \sum_{n=0}^{t} \beta_n \, \Delta lnPBR_{t-n} + \sum_{o=0}^{u} \beta_o \, \Delta lnPER_{t-o} + \sum_{p=0}^{v} \beta_p \, \Delta lnROE_{t-p} + \lambda_{SR} lnSR_{t-1} + \lambda_{DER} lnDER_{t-1} + \lambda_{EPS} lnEPS_{t-1} + \lambda_{NPM} lnNPM_{t-1} + \lambda_{PBR} lnPBR_{t-1} + \lambda_{PER} lnPER_{t-1} + \lambda_{ROE} lnROE_{t-1} + v_t \quad \textbf{(2)}$$

Where v_t indicates the white noise error term. The F-statistics value is compared with the lower and upper bounds value at 90%, 95% and 99% significance level. If the lower and upper bounds critical value are lower than the estimated value of F-statistics, than H0 get rejected and accept the evidence of a long-run association.

Test for Short-run and Long-run Coefficient

In the next step, short-run and the long-run dynamic relationship is estimated through Error Correction Mechanism (ECM) version of ARDL and Ordinary Least Square (OLS) by using equation 3 and 4respectively.

$$ln\Delta SR_t = \gamma_{\circ} + \sum_{i=1}^{p} \gamma 1_i \, \Delta lnSR_{t-i} + \sum_{k=1}^{q} \gamma 1_k \, \Delta lnDER_{t-k} + \sum_{l=1}^{r} \gamma 1_l \, \Delta lnEPS_{t-l} + \sum_{m=1}^{s} \gamma 1_m \, \Delta lnNPM_{t-m} + \sum_{n=1}^{t} \gamma 1_n \, \Delta lnPBR_{t-n} + \sum_{o=1}^{u} \gamma 1_o \, \Delta lnPER_{t-o} + \sum_{p=1}^{v} \gamma 1_p \, \Delta lnROE_{t-p} + ECT_{t-1} + u_t \quad \textbf{(3)}$$

$$lnSR_t = \alpha_1 + \sum_{i=1}^{p} \beta 1_i \, lnSR_{t-i} + \sum_{k=1}^{q} \beta 1_k \, lnDER_{t-k} + \sum_{l=1}^{r} \beta 1_l \, lnEPS_{t-l} + \sum_{m=1}^{s} \beta 1_m \, lnNPM_{t-m} + \sum_{n=1}^{t} \beta 1_n \, lnPBR_{t-n} + \sum_{o=1}^{u} \beta 1_o \, lnPER_{t-o} + \sum_{p=1}^{v} \beta 1_p \, lnROE_{t-p} + u_t \quad \textbf{(4)}$$

Where ECT_{t-1}stands for error correction term, that must be negative. The negative sign indicates the system stability to revert to its usual position after a short-run shock.

Diagnostic and Stability Test

To test the reliability of the ARDL model, some diagnostic tests were implemented to observe the existence of Heteroscedasticity, serial autocorrelation, and any other model misspecifications. Furthermore, the study used the test of CUSUM (cumulative sum) and CUSUMSQ (cusum square) proposed by Brown et al. (1975) to check the stability and model coefficient.

Robustness Check

The study employed VECM Granger causality test to inspect the robustness of estimated results. This statistical test will gauge the nature of causality among the micro-economic factors and stock returns.

Results and Discussion

Descriptive Statistics

Below table 1 illustrate the statistical summary of stock returns and the selected micro-economic factors. The result reports the highest mean value of 2.0484 for PER with a standard deviation of 1.1076, suggesting that overall data is not widely dispersed. Similarly, a maximum value of 8.4584 is reported for PER and the minimum value of -8.8428 is documented for net profit margin. The kurtosis statistics is reported positive and higher than 3 for all factors, indicating leptokurtic distribution. The results also show that SR, PBR, and PER are positively skewed and DER, EPS, NPM, and ROE are negatively skewed indicating right and left skewed distribution respectively. Overll the statistical summary suggest data normality across the factors.

Table 1: Descriptive statistics

	SR	DER	EPS	NPM	PBR	PER	ROE
Mean	0.0123	0.9041	1.7999	0.8282	0.4255	2.0484	1.6234
Median	0.0011	0.4078	1.8645	0.7115	0.3529	1.9372	1.4976
Max	1.5936	3.4238	5.3269	6.8428	5.3794	8.4584	3.4651
Min	-0.6799	-8.7555	-6.5596	-8.8428	-3.9032	-2.2962	-8.3809

Std. Dev.	0.1423	2.1187	1.4832	1.2057	1.2295	1.1076	1.0112
Skew	1.3487	-1.7922	-1.2484	-0.2790	0.0673	0.8460	-0.8096
Kurt	11.3748	6.3849	7.7930	7.2328	3.8148	6.8297	6.6993
JB	46449.1***	14602.3***	17524.6***	10937.1***	31.46**	10518.1**	9784.2**
Obs.	14400	14400	14400	14400	14400	14400	14400

Note: This table shows the summary statistics both dependent and independent factors from 2006 to 2017.

Unit Root Test

Table 2 presents the Phillips Perron (P.P) unit root and Augmented Dickey-Fuller (A.D.F) test results respectively to assess the stationarity of stock returns and micro-economic factors. The unit root was tested at the level and at the 1st difference by using both Intercept and intercept- trend. The result from unit root test displays that lnSR, lnPBR and lnPER are stationary at the level. However, the lnDER, lnEPR, lnNPM and lnROE are stationary at the 1st difference. The recorded mixed co-integration results of factors validate the use of ARDL approach (Pesaran et al., 2001).

Table 2: Unit root test

Penal A: P.P unit root test

	At level		At 1st difference		Decision
	Intercept	Intercept & Trend	Intercept	Intercept & Trend	
LnSR	39.613***	35.7653***	29.633***	24.19520***	*1*(0)
LnDER	34.241	82.2401	44.179***	35.3032***	*1*(1)
LnEPS	84.023	97.1100	11.287***	36.7065***	*1*(1)
LnNPM	33.798	26.7426***	23.604	36.7021***	*1*(1)
LnPBR	28.655***	20.5351***	40.86.33***	38.3516***	*1*(0)
LnPER	19.844***	16.4335***	40.57***	22.3138***	*1*(0)
LnROE	30.252	92.1408	42.482***	64.3615	*1*(1)

Penal B: A.D.F unit root test

	At level	At 1st difference	Decision		
	Intercept	Intercept & Trend	Intercept	Intercept & Trend	
LnSR	82.366***	32.2402***	64.92***	26.7801***	*1*(0)
LnDER	15.691	10.5821	30.244***	59.7312***	*1*(1)

LnEPS	89.0855	10.807	43.1914***	86.951***	*1*(1)
LnNPM	34.487	22.9881***	27.54	12.5171***	*1*(1)
LnPBR	39.025***	17.1786***	12.38.67***	10.3425***	*1*(0)
LnPER	24.085***	17.7594***	36.19***	33.868***	*1*(0)
LnROE	48.223	11.0974	17.252***	77.180***	*1*(1)

Note: P.P and A.D.F refer to Phillips Perron and Augmented Dickey-Fuller respectively. *** represent significance at the 10% level. The optimal lags were selected by Schwarz information criterion (SIC) criteria.

Results of Bounds Test

The study applied bounds testing to observe the presence of co-integration amongst estimated factors. Using equation 2, the bound tests result for co-integration is mentioned in below Table 3. The Akaike information criterion (A.I.C.) is used for optimal lag length and is illustrated in the second row. The estimated F-statistic value of 21.81 exceeded both upper bounds and lower bounds critical values; thus, evidently proved that the selected factors in the model are in a long-run relationship and reject the null hypothesis that state there is no co-integration.

Table 3: Bounds test for ARDL Co-integration

Model	F_{LnSR}= (LnSR/LnDER, LnEPS, LnNPM,LnPBR,LnPER,LnROE)			
O.P.L length (A.I.C)	(4,0,0,0,0,0,0,)			
F. statistics (Bounds test)	21.81045* at k=6			
C.V	1%	2.5%	5%	10%
U.B.C.V	4.24	3.84	3.5	3.13
L.B.C.V	2.96	2.06	2.32	2.03

Note: This table reports the optimal lag length (O.P.L), critical values (C.V), upper bounds critical values (U.B.C.V) and lower bounds critical values (L.B.C.V). A.I.C. information criteria are used for selecting the optimal lag. * indicates the level of significance at 1%.

Results of Long-run and Short-run Relation

The long-run and short-run coefficient amongst micro-economic factors and stock returns are computed using equations 3 and 4 under the ARDL framework. The results are demonstrated in table 4 and 5 respectively.

Table 4: Long-run (OLS) results under ARDL framework

Dependent variable: LnSR			
Long-run results			
Factors	Coefficient	Standard Error	t. Statistics
C	-0.06749	0.003413	-1.977400***
LnDER	-0.15599	0.002172	-2.578420**
LnEPS	0.04934	0.000996	-2.948804**
LnNPM	0.02101	0.002226	9.437567**
LnPBR	-0.01001	0.001822	5.495878
LnPER	-0.04319	0.000811	5.326263**
LnROE	0.01100	0.005853	-1.880853**
R^2	0.8872	F. Statistics	32.9738***
$Adj.R^2$	0.8925	D.W	1.7738

Note: **, *** represents significance level at 5% and 10%.

The results in table 4 demonstrate number of findings. Firstly, significant negative long-run equilibrium association is reported among DER and SR in accord with the study of Ulzanah (2015). It can be seen in table 4 that a 1% rise in DER will reduce the SR by 0.15%. Secondly, the results reported significant positive co-integration of earnings per share with stock returns as previously reported by Maysami and Koh (2000). The results imply that a 1% rise in EPS will results in 0.05% rise in the SR. Thirdly, the co-integration amongst NPM and SR indicates that a 1% rise in NPM will cause 0.02% rise in the SR. Thus, reported significant positive relation amongst NPM and SR in accord with the findings of Piri and Asadollahi (2017) in Iran and Nurhakim et al. (2016) in Indonesia. Fourthly, insignificant negative co-integration is reported amongst PBR and SR in accord with the findings of Utama and Santosa (1998) and Fama & French (1992). Fifthly, the results demonstrated significant negative co-integration amongst the PER and SR as previously reported by Liem & Basana (2012). It can be seen in table 4 that a 1% increase in PER will results in 0.04% decrease in the stock returns. Sixthly, there is co-integration amongst ROE and SR, which means that a 1% rise in ROE will result in a 0.01% rise in SR. Seventhly, the sign of coefficient for micro-economic factors in the short-run are same as the sign of coefficient in the long-run relationship. Such as DER, PBR, and PER reported significant negative while NPM, EPS and ROE reported significant positive short and long run connectivity with SR. Thus, short run results corroborate long run results under ARDL framework. The negative sign of

error correction term (-0.562) indicates the speed with which the stock return adjusted from the short-run equilibrium path to the long-run equilibrium path.

Table 5: Short-run (ECM) results under ARDL framework

Dependent variable: LnSR			
Short-run results			
Factors	Coefficient	Standard Error	t. Statistics
ΔLnDER	-0.219673	0.007179	-18.52153**
ΔLnEPS	0.031216	0.003590	7.027021**
ΔLnNPM	0.081768	0.004757	22.77399**
ΔLnPBR	-0.177470	0.004711	37.31042
ΔLnPER	-0.179250	0.003717	38.05310**
ΔLnROE	0.022795	0.007140	6.132278**
C	0.119938	0.010064	11.91739**
ECM t-1	-0.562329	0.013004	-5.16287**
R^2	0591428	S.E. of regression	0.120057
$Adj.R^2$	0.590888	Sum squared residual	207.2098
D.W	1.973300	F. Statistics	314.3861*

Note: *, ** demonstrate the level of significance at 1% and 5%.

Diagnostic and stability test

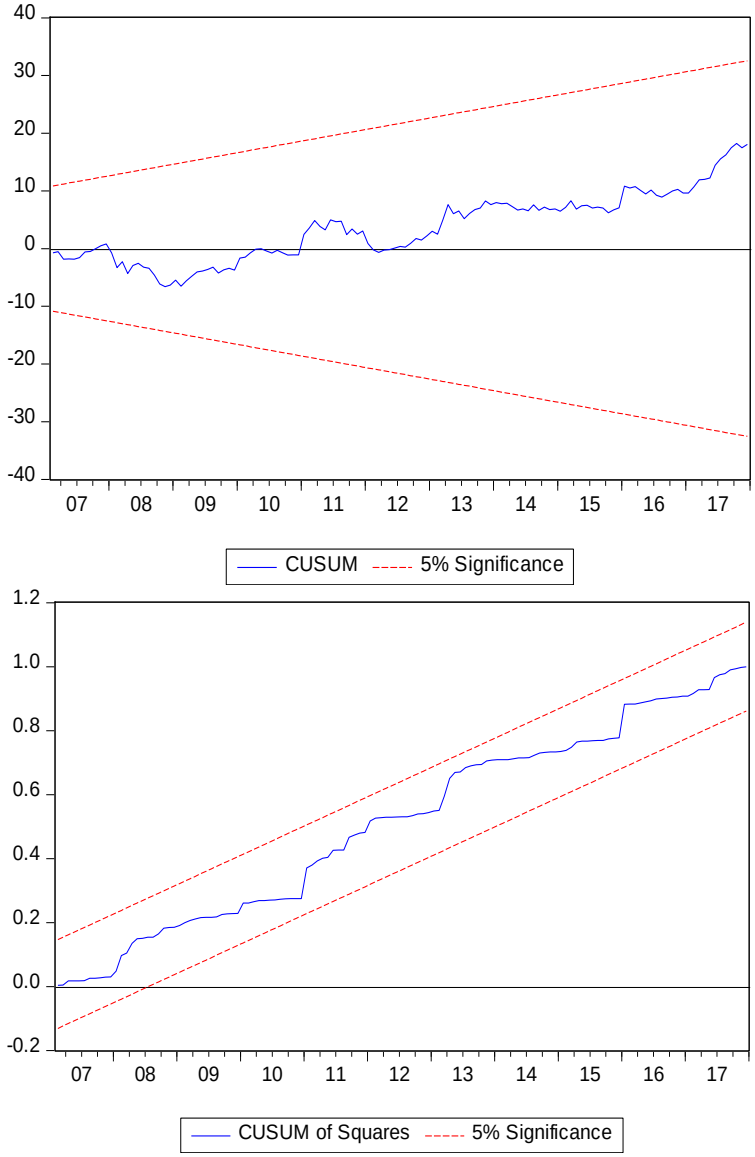
Based on results mentioned in below table 6, the study rejects the existence of serial autocorrelation and heteroscedasticity in the selected factors. Likewise, Ramsey reset test failed to reject the null hypothesis that model suffered from misspecification. Moreover, the results confirmed the stability of short-run and long-run coefficients over the study period. As evident from figure 1 that the plots of both the CUSUM and CUSUM square lie between the bonded lines at 5% significant level.

Table 6: Diagnostic test

Berusch-Godfrey Serial Correlation LM Test: Serial Autocorrelation			
F-statistics	2.1279	Probability	0.14
Obs*R-squared	442.5116	Prob.	0.16
Heteroscedasticity Test: White			
F-statistics	3.3456	Prob.	0.39
Obs*R-squared	256.5553	Prob.	0.21
Heteroscedasticity Test: ARCH			
F-statistics	29.2158	Prob.	0.49
Obs*R-squared	537.6892	Prob.	0.64
Ramsey RESET Test: Model Misspecification			

F-statistics	2.5402	Prob.	0.54
Log likelihood ratio	5.0828	Prob.	0.23

Figure 1: Stability test result



Robustness Check

Table 7 illustrate the results of VECM Granger Causality test. The findings confirmed about the unidirectional causality running from DER, NPM and PER to SR. Similarly, bi-directional causality is reported amongst PBR and SR. The results also reflect that there is no causal relationship amongst SR and EPS and ROE. Furthermore, the coefficient of error correction term (ECT_{t-1}) is significantly negative representing long-run causality running from SR to EPS, NPM, PBR, PER and ROE. It affirmed the findings of ARDL bound test which recorded long-run relationship among stock returns and selected micro-economic factors.

Table 7: VECM Granger Causality test results

Dependent variable	**Independent factors**							
	$\Delta ln\ SR_{t-1}$	$\Delta ln\ DER_{t-1}$	$\Delta ln\ EPS_{t-1}$	$\Delta ln\ NPM_{t-1}$	$\Delta ln\ PBR_{t-1}$	$\Delta ln\ PER_{t-1}$	$\Delta ln\ ROE_{t-1}$	ECT_{t-1} [t-stat]
	Chi-sq. (probability)							
ΔlnSR	----	5.283	1.181	10.715	33.256	42.416	0.869	-0.713**
		(0.05)	(0.55)	(0.04)	(0.00)	(0.00)	(0.64)	[-8.49]
ΔlnDER	1.839		0.054	3.747	2.056	1.225	1.273	0.012
	(0.39)	----	(0.97)	(0.15)	(0.35)	(0.54)	(0.52)	[1.68]
ΔlnEPS	6.396	0.260	-----	4.608	3.176	0.648	1.466	-0.020***
	(0.24)	(0.87)		(0.09)	(0.20)	(0.72)	(0.48)	[-1.83]
ΔlnNPM	0.799	0.837	4.992	------	1.870	0.942	0.008	-0.035**
	(0.24)	(0.65)	(0.08)		(0.39)	(0.62)	(0.99)	[-2.26]
ΔlnPBR	13.458	2.714	5.848	18.079	------	5.294	0.320	0.017**
	(0.00)	(0.25)	(0.05)	(0.00)		(0.07)	(0.85)	[1.15]
ΔlnPER	0.541	0.076	7.039	6.339	20.796	------	1.750	3.500**
	(0.46)	(0.96)	(0.02)	(0.04)	(0.00)		(0.41)	[0.01]
ΔlnROE	0.208	0.444	9.459	0.372	4.629	3.695	------	-0.034**
	(0.90)	(0.80)	(0.00)	(0.83)	(0.09)	(0.15)		[-0.23]

Note: This table reports direction of causality amongst six micro-economic factors and stock returns. ** and *** represent significance at 5% and 10% level. The optimal lag length is 2 as determined through AIC criteria. Figures in parenthesis and square brackets report p-value and t-statistics.

Conclusion

The current study investigated the co-integration and direction of causality amongst micro-economic factors and stock returns for the Pakistani listed firms over the period from 2006 to 2017. The study applied Phillips and Perron test and Augmented Dickey-Fuller test to identify the unit roots among the selected factors. ARDL bound testing is applied to check the co-integration and VECM Granger causality test is used to gauge the course of causality amongst selected micro-econmic factors. The study reported statistically positive short-run and long-run relation amongst NPM, EPS, PER and ROE with the SR and negative relation amongst DER and SR over the study period. Furthermore, the result of VECM Granger causality test confirmed the presence of unidirectional causality from NPM, DER and PER to SR. It means that excess debt financing can cause financial distress for a company and thus the stock returns will be decrease. Similarly, stocks with high PER are over-valued and hence

expected to reduce earnings yield. Moreover, bi-directional causality is reported amongst PBR and SR. It means that Pakistani investors can use PBR to envisage the future share price. However, the results demonstrate no causal relation amongst SR and EPS and ROE. Overall it can be concluded from the findings that the investors can predict the stock returns based on the firm level factors in the emerging market like Pakistan.

References

Ali, M. B. (2011). Impact of micro and macroeconomic variables on emerging stock market return: A case on Dhaka stock exchange (DSE). *Interdisciplinary Journal of research in business*, *1*(5), 8-16

Akinlesi, O. A. (2011). Share Price Determination and Corporate Firm Characteristics. Covenant University.

Anwaar, M. (2016). Impact of a firm's performance on stock returns (the evidence from listed companies of FTSE-100 index London, UK). *Global Journal of Management and Business Research*

Brown, R. L., Durbin, J., & Evans, J. M. (1975). Techniques for testing the constancy of regression relationships over time. *Journal of the Royal Statistical Society: Series B (Methodological)*, *37*(2), 149-163

Dimmua, R. R. (2015). *The Influence of Microeconomic Variables on Stock Prices of Companies Listed on Ghana Stock Exchange* (Doctoral dissertation, University of Ghana)

Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica: Journal of the Econometric Society*, 251-276

Faisal, F., Tursoy, T., Gunsel Resatoglu, N., & Berk, N. (2018). Electricity consumption, economic growth, urbanization and trade nexus: empirical evidence from Iceland. *Economic research-Ekonomska istraživanja*, *31*(1), 664-680

Fama, E. F., & French, K. R. (1992). The cross-section of expected stock returns. *The Journal of Finance*, *47*(2), 427-465

Gregory, A. W., & Hansen, B. E. (1996). Residual-based tests for cointegration in models with regime shifts. *Journal of Econometrics*, *70*(1), 99-126

Hunjra, A. I., Chani, M. I., Sehrish Javed, S., Sana Naeem, S. and Ijaz, M. S. (2014). Impact of Micro Economic Variables on Firms Performance. *International Journal of Economics and Empirical Research*, 2(2), pp. 65-73.

Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration—with applications to the demand for money. *Oxford Bulletin of Economics and statistics*, *52*(2), 169-210.51

Khan, M. B., Gul, S., Rehman, S. U., Razzaq, N., & Kamran, A. (2012). Financial ratios and stock return predictability (Evidence from Pakistan). *Research Journal of Finance and Accounting*, *3*(10), 1-6.

Kheradyar, S., Ibrahim, I., & Nor, F. M. (2011). Stock return predictability with financial ratios. *International Journal of Trade, Economics and Finance*, *2*(5), 391.

Liem, P. F., & Basana, S. R. (2012). Price to earnings Ratio and Stock Return Analysis (Evidence from Liquidity 45 Stocks Listed in Indonesia Stock Exchange). *Jurnal Manajemen dan Kewirausahaan*, *14*(1), 7-12

Ligocká, M., & Stavárek, D. (2018). What macroeconomic variables drive the stock returns of Austrian financial institutions? *Scientific papers of the University of Pardubice. Series D, Faculty of Economics and Administration. 42/2018*.

Maysami, R. C., & Koh, T. S. (2000). A vector error correction model of the Singapore stock market. *International Review of Economics & Finance*, *9*(1), 79-96

Nurhakim, A., Yunita, I., & Iradianty, A. (2016). The Effect of Profitability and Inflation on Stock Return at Pharmaceutical Industries at BEI in the Period of 2011-2014‖. *Asia Pacific Journal of Advanced Business and Social Studies*, *2*, 206-208

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, *16*(3), 289-326

Phillips, P. C., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, *75*(2), 335-346

Piri, M., Rezaei, E., & Asadollahi, S. Y. (2017). A Review of the Impact Factors on the Financial Performance of Commercial Banks in Iran. *International Journal of Economic Perspectives*, *11*(1).

Rahaman, M. M., & Akhter, S. (2015). Bank-specific factors influencing profitability of Islamic banks in Bangladesh. *Journal of Business and Technology (Dhaka)*, *10*(1), 21-36.

Reddy, K., & Fu, M. (2014). Does shariah compliant stocks perform better than the conventional stocks? A comparative study of stocks listed on the Australian Stock Exchange. *Asian Journal of Finance & Accounting*, *6*(2), 155-170

Sarwar, M. S. (2013). Effect of Dividend Policy on Share Holders Wealth: A Study of Sugar Industry in Pakistan. *Global Journal of Management and Business Research*.

Ulzanah, A. A., & Murtaqi, I. (2015). The Impact of Earnings per Share, Debt to Equity Ratio, and Current Ratio towards the Profitability of Companies Listed in LQ45 from 2009 to 2013. *Journal of Business and Management*, *4*(1), 18-27

Utama, S., & Santosa, A. Y. B. (1998). Kaitan antara ratio price/book value dan imbal hasil saham pada bursa efek Jakarta. *The Indonesian Journal of Accounting Research*, *1*(1)

Wijesundera, A. A. V. I., Weerasinghe, D. A. S., Krishna, T. P. C. R., Gunawardena, M. M. D., & Peiris, H. R. I. (2015). Predictability of stock returns using financial ratios: Empirical evidence from Colombo Stock Exchange.

Wijaya, JA (2015). The effect of financial ratios toward stock returns among Indonesian manufacturing companies. *iBuss Management*, *3* (2).