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Article

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BANKING & FINANCE | RESEARCH ARTICLE

Asymmetric impact of economic value-added dynamics on market value of stocks in Pakistan stock exchange, a new evidence from panel co-integration, FMOLS and DOLS

Adil Pasha^{1*} and Muhammad Ramzan¹

Abstract: Shareholders' wealth maximization is the ultimate objective of firms. Economic value added (EVA) is a financial metric linked to shareholders' wealth maximization. Prior studies revealing the efficacy of value-based and accounting-based performance measures are inconclusive. Moreover, all prior research ignored long-run and short-run co-integration of traditional as well as value-based financial performance measures with share prices. This research found EVA has a negative weak but significant relation with stock return in long run by employing panel co-integration, panel FMOLS and panel DOLS for 70 nonfinancial Pakistan Stock Exchange listed firms from 13 industries for a study period of 2006–2015.

Subjects: Corporate Finance; Financial Accounting; Financial Management

Keywords: EVA; ROA; Stock Returns; FMOLS; DOLS

1. Introduction

Pursuit of abnormal profits is a dream of every investor. Shareholders of firms are keen about business profitability enhancement reflected by enhanced stock prices (Warrad & Box, 2015). Prior



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PUBLIC INTEREST STATEMENT

Pursuit of abnormal profits is a dream of every investor. Research gap identified is ignorance of firm-level heterogeneities and idiosyncrasies (financial leverage, firm size and operating liquidity) and moreover about the peculiarity of local financial markets characteristics like imperfect secondary markets, information asymmetry, less established capital markets, underutilized banking sector and cumbersome financial reporting practices in erstwhile literature linking financial performance with share prices. Shareholders of firms are keen about business profitability enhancement reflected by enhanced stock prices. Prior research on Pakistani capital market has found it to be inefficient, which means as an emerging market information takes time to be processed. Therefore, this research will enable various stakeholders like prospective investors, management of corporations, financial analysts and general public make informed investment decisions.

research on Pakistani capital market has found it to be inefficient, which means an emerging market information takes time to be processed (Haroon, 2012; Suleman, Hamid, Ali Shah, Akkash, & Shahid, 2010). Hence, there lies information asymmetry in the domestic capital market which an investor can exploit to realize excess returns in Pakistani capital markets by using financial performance information.

Therefore, a variety of surrogates have been employed so far to realize this dream. Most prominent proxies (predictors) of excess returns realization are financial performance measures bifurcated as conventional bookkeeping metrics besides value measures, respectively. Researchers have two schools of thoughts: one that advocates supremacy of economic value added (EVA) as an economic output evaluator toward explaining stock returns (Bao & Bao, 1998; Kumar & Sharma, 2011; Stern, Stewart, & Chew, 1995), while the other that prefers traditional accounting-based performance measures (Chen & Dodd, 1997; Kumar & Sharma, 2011).

Moreover, each firm possesses heterogeneity and idiosyncrasy; thus, firm-specific factors such as size, liquidity and leverage need to be inculcated for a robust financial performance analysis unfortunately ignored in prior research studies in this context. Therefore, this study incarcerates them. Further stock prices reflect all available information in efficient capital markets, so testing market efficiency is helpful in investment decisions.

2. Literature review

2.1. Economic value added (EVA) and traditional financial performance measures

Previous researches reflect little efficacy of EVA with reference to income-based output metric in elucidating stock returns. The major reason for this could be the idiosyncratic factors of a particular firm. Ismail (2006) studied a 2,252 firm-year data of UK and used pooled analysis for investigating the comparative and differential explanatory capacity of conventional and value-based metrics in elucidating share prices. The results showed that NOPAT and earnings after taxes are superior to EVA. Kumar and Sharma (2011) analyzed 873 nonfinancial Indian firms to examine preeminence of EVA as a business output gauge in comparison to conventional accounting-based performance measures by using panel OLS to examine differential and individual predictive capacity for market value added.

In a study, 59 companies out of KSE 100 index were empirically examined for a sample period 2006–2010 to reveal that EVA is a significant financial metric to explain stock returns and it is significant at a level less than 10% (Siddique & Sarwar, 2014). Altaf (2016) examined the claim of Stern Stewart & Company about the dominance of EVA® above orthodox bookkeeping-based performance metrics in predicting stock returns. This research study chose 325 Indian companies from manufacturing and services sector, and after employing univariate and multivariate regression analyses, empirical evidence substantiates operating profit's dominance over EVA in terms of relationship with share returns.

2.2. Firm size

Banz (1981) reported 0.4% excess market-adjusted returns for smaller US stocks. Another study on 556 US firms equity returns during 1963–1977 testified excess returns of 1.77% on small-size firms over their larger counterparts (Reinganum, 1981). Later on, the three-factor model presented by Fama and French (1995) incorporated the firm size effect as a formal component of asset pricing model cementing the claims of prior researchers. Since EVA does not take into consideration firm size differences (Hansen & Mowen, 1997). Investor recognition hypothesis posits higher returns for small stocks because of investors' ignorance and lack of information (Merton, 1987). An important but ignored factor of a business is the firm size (Li & Zhu, 2015).

2.3. Leverage

Leverage means magnification of returns by use of constant charge. Hence, the linkage of financial performance and leverage is undeniable. Modigliani and Miller (1958) flagged the direction for contemporary capital structure theory punch line of these propositions which include value of company and total cost of capital behavior under three cases ranging from irrelevance of debt-equity mix, 100% debt to ideal blend of debt and equity which maximizes corporate worth and curtails the required rate of return.

Trade-off theory suggests that firms' tax shield should be in equilibrium with the costs associated with insolvency (Kraus & Litzenberger, 1973). Signaling theory information asymmetry theory favors leverage contrary to the Modigliani and Miller assumption of symmetric information which is unrealistic; here the difference of information among the insiders and outsiders is recognized. Pecking order theory posits that firms choose unappropriated income and then obligation and offer ordinary shares as the last option (Myers & Majluf, 1984). Agency cost theory of free cash flow proposed by Jensen (1986) favors leverage. Once ample surplus cash is at the discretion of management, it gives rise to shirking and conflict of goal congruence and tempts management to prioritize self-interest and perks rather than shareholder wealth maximization. Remedy of this agency problem is debt financing, which shares the monitoring costs in the shape of debt indentures and debt covenants.

2.4. Liquidity

In this study, liquidity refers to operating liquidity which is the lifeblood of any organization. Liquidity is defined as nearness to cash. Operating liquidity is the core area of working capital and hence is also quoted as working capital management policy in finance literature. Operating liquidity major components include the amount of cash and equivalents, receivables and inventories reflected in financial statements. Influential theories like exchange by Kraus and Litzenberger (1973) and pecking order theory by Myers and Majluf (1984) have interesting connotations for researchers as trade-off theory advocates inverse association of liquidity and profitability, while pecking order theory purports direct relation of liquidity and returns.

2.5. Hypotheses of the study

H1: EVA influences share prices in the long run

H2: ROA influences share prices in the long run

H3: Firm size influences share prices is extended

H4: Liquidity influences share prices is extended

H5: Leverage influences share prices is extended

3. Methodology

Research sample is ought to be a reflection of population, i.e. Pakistan Stock Exchange (PSX) listed firms. Only non-financial firms were chosen from a total of 561 listed firms. Moreover, PSX consists of firms from 35 different sectors, both financial and non-financial, which accommodate all industries of the Pakistani economy. For this research, precise removal of listed firms was done to arrive at the research sample. As mentioned above, deletion initiated with exclusion of financial sector firms because of their different financial reporting and capital structure. Research population included 7 close-end mutual funds, 20 commercial banks, 28 investment companies, 10 leasing companies, 31 modarba companies and 23 miscellaneous, totaling 119 financial companies leaving 442 non-financial firms behind. Out of 442 non-financial firms, 39 had financial year that ended on 30 September, four firms had

financial year that ended on 30 November, one firm had financial year that ended on 31 March and 48 firms had financial year that ended on 31 December. Since the research delimits selection of only those companies having financial year that ended on 30 June choosing 6 to 10 highest market capitalization firms from 13 different non-financial sectors, we were left with 360 companies. However, most of these firms were either delisted or had missing data issues, therefore, the ultimate data set shrank to 70 companies. This research targets elaborate value addition effect, corporate size, debt and nearness to cash on stock returns of 10 sectors comprising 70 companies data of PSX during 2005–2006 to 2014–2015. For this study, data were acquired from published yearly reports of respective companies. Moreover, the data were analyzed using EViews 9 and STATA 14 which are specialized econometric software.

4. Theoretical framework

In this study, stock returns are taken as independent variable and EVA, ROA, firm size, liquidity and leverage are taken as independent variables to find if any long-run relationship exists among aforesaid variables.

4.1. Variable description

SR = annual stock return

EVA = economic value added

ROA = return on assets

Firm size = log of total assets

LIQ = liquidity means current assets/current liabilities

LEV = Leverage means debt/total assets

$EVA = (NOPAT - WACC) \times Invested\ Capital$.

where

$NOPAT = EBIT(1 - Tax\ rate)$

$WACC = W_e K_e + W_d K_d(1 - Tax\ rate)$

$Invested\ Capital = Total\ Assets - Non\ Interest\ bearing\ Current\ Liabilities$

$K_e = R_f + \beta(R_m - R_f) + \varepsilon$

$$\beta = \left(\frac{\sigma_{KSE100 \& Stock}}{\sigma_{KSE100}^2} \right)$$

4.2. Econometric model

Panel data analysis is employed for estimation. The data were collected from audited published financial statements of respective firms and FSA (financial statement analysis) reports of State Bank of Pakistan. The methodology of prior researches to investigate the long-run impact of EVA, ROA, firm size, liquidity and leverage on stock prices is used in previous literature (Bint-e-Ajaz & Ellahi, 2012; Pedroni, 2004; Tahir, Shehzadi, Ali, & Ullah, 2015; Wu, Hou, & Cheng, 2010). However, there are modifications in the current article such as inclusion of firm-specific variables on the

basis of which long-run relationship of EVA is empirically evaluated. Furthermore, previous studies were in developed countries while current research examines Pakistan as an emerging market.

$$y_{it} = \psi_i + \sum_{p=1}^v \gamma_{pi} R_{pit} + u_{it} \quad (1)$$

Here $i = 1, \dots, 70$ for each firm in the panel and $t = 2006, \dots, 2015$ showing the time period. Parameter ψ_i reflects firm-specific fixed effects, u_{it} indicates residuals revealing dispersion from mean in long-run association. Null hypothesis of panel unit root k_{it} investigated by using panel unit root tests is as below:

$$u_{it} = k_i u_i \{t - 1\} + L_{it} \quad (2)$$

Three variants of panel cointegration tests were used in this article, namely, Pedroni (2004) the next is Kao (1999) based on 2 step phenomenon of Engle-Granger taking care of homogeneity of panel data. Furthermore, this is a modified form of Augmented Dickey-Fuller (ADF) test in the panel data context. Last but not the least, test for panel cointegration is Fisher's that joins probability values of sole Johansen maximum likelihood cointegration test statistics (Wu et al., 2010). It is a non-parametric test that precludes homogeneity. Null hypothesis of the aforesaid three investigations is no cointegration. The above-mentioned tests have asymptotic distributions post-reasonable benchmarking. This research used bivariate cointegration Fisher's test for all independent variables with stock returns.

4.3. Testing for panel FMOLS and DOLS

Panel level cointegration is tested by using fully modified ordinary least-square method and dynamic ordinary least-square method among the variables of research. Long-run co-integration among EVA, ROA, firm size, liquidity, leverage and stock returns is investigated. Weakness of applying panel ordinary least-square method for cointegration tests for examining long-run relationship is biased estimator except the variables are rigorously independent. FMOLS takes care of autocorrelation problem by default, but it is non-parametric; although DOLS remains parametric test, nonetheless its weakness lies in the degree of freedom issue due to leads and lags (Maeso-Fernandez, Osbat, & Schnatz, 2006).

Functional form of FMOLS and DOLS is as below:

$$y_{it} = \gamma_i + j_{it} \varphi + u_{it} \quad i = 1, \dots, 70, t = 2006 - 2015 \quad (3)$$

Here φ is the symbol of slope ($m, 1$) dimension, shows matrix (1,1), reveals stationary disturbance terms and γ_i indicates individual-fixed effect shown as $j_{it}(m, 1)$ vector as integrated schemes of level one $I(1)$ for all i , where:

$$j_{it} = j_{it-1} + u_{it}$$

Aforesaid Equation 3 indicates cointegration regression that means y_{it} is co-integrated with j_{it} . An asymptotically normal behavior of FMOLS and DOLS estimators is reported. The equation of FMOLS rectifies the issue of serial correlation and endogeneity of OLS regression. Following is the mathematical form

$$\zeta_{FMOLS} = \left[\sum_{i=1}^N \sum_{t=1}^T (\mu_{it} - \bar{\mu}_i) \right]^{-1} \left[\sum_{i=1}^N \left\{ \sum_{t=1}^T (\mu_{it} - \bar{\mu}_i) y_{it} + T \Delta_u \right\} \right] \quad (4)$$

Here y_{it} is the transformed form of y_{it} to rectify endogeneity issue and Δ_u indicates a serial correlation term. Likewise, DOLS estimator by default takes care of autocorrelation and endogeneity issue in panel data regression as follows:

$$y_{it} = \gamma_i + \varphi l r_{it} + \sum_{h=d}^d f_{ih} \Delta r_{it+k} + v_{it} \quad t = 1, \dots, T \quad i = 1, \dots, N \quad (5)$$

Here v_{it} shows the deviations, φ indicates firm-related impact and f_{ih} shows values of lag or lead of first-difference independent variables. DOLS estimator is shown as follows:

$$\zeta_{DOLS} = \sum_{t=1}^N \{S_{it} S'_{it}\} \bar{1} \sum_{t=1}^{t-1} \{S_{it} Z_{it}\} \quad (6)$$

Here $S_{it} = \{l_{it} - \bar{l}_i \Delta l_{i,t-v}, \dots, \Delta l_{i,t+v}\}$ is $2\{v+1\} \times 1$ regressor's vector.

4.4. Empirical findings

Table 1 reveals the descriptive statistics of variables. Mean and standard deviation are important demonstrators of data structure. The average of stock returns is 9.59%, EVA is PKR −13,600,000 and ROA is 6.03%; however, there is an important thing to be noticed that the average traditional performance-based measures is positive and in line with each other for the selected sample firms during the period of study, but the sole objective activity method EVA is negative that is quite different from the other two accrual-based financial metrics, namely, earnings per share and earnings before interest and taxes.

As reported in Table 2 ROA has a positive association with stock returns at 10% level of significance. Firm size has a positive relation with EVA at 10% level of significance. Liquidity and ROA have a positive association with firm size at 10% confidence interval. Liquidity has a positive association with ROA at 10% level of significance. The weakness of pairwise correlation analysis is the inability to identify predictor, therefore, regression analysis is used (Baveld, 2012).

4.5. Test for panel data stationarity

Detection of unit root for variables of the study was tested by applying unit root test as shown in Table 3. There are many options for employing unit root such as Im-pesaran, ADF, Fisher, Levin Lin Chu and Breitung tests. The absence of stationarity causes spurious results, therefore, all the variables were tested one by one for the presence of unit root. Since all the variables were stationary at a level, the outcome of the econometric model will not be spurious (Gujarati & Porter, 2003).

Table 1. Summary statistics

	N	Mean	Min	Max	St.dev	Kurtosis	t-value
Returns	700	9.59	−268.7	417.42	71.3	10.94	3.56
EVA	700	−1.36e+07	−2.84e+09	2.84e+09	2.40e+08	137.07	−1.49
Total assets	692	2.77e+07	−1.16e+07	6.15e+08	7.22e+07	25.29	10.08
Firm size	691	15.29	6	20.24	2.24	5.78	179.64
Leverage	661	−.86	−1,604.52	39.14	62.57	654.64	−.36
Liquidity	694	1.7	0	58.52	3.24	223.4	13.83
ROA	695	6.03	−90.16	122.86	12.64	19.66	12.58

Table 2. Pairwise correlations

Variables	Returns	EVA	Firm size	Leverage	Liquidity	ROA
Returns	1.00					
EVA	−0.00	1.00				
Firm size	0.05	0.21*	1.00			
Leverage	−0.01	−0.00	−0.07	1.00		
Liquidity	0.04	0.00	−0.13*	0.01	1.00	
ROA	0.11*	0.05	0.14*	0.06	0.15*	1.00

*Significant at the 0.01 level.

Table 3. Panel unit root analysis

Variables		LLC	Breitung	Im-Pesaran	ADF—Fisher	PP—Fisher
CFO	At levels	−23.76	1.30	−1.39	111.65	211.95
	Significance	0.00	0.90	0.08	0.00	0.00
	At first difference	−15.27	−0.21	−1.81	141.55	348.44
	Significance	0.00	0.42	0.04	0.00	0.00
EBIT	At levels	−8.02	3.46	1.03	129.48	231.90
	Significance	0.00	1.00	0.85	0.59	0.00
	At first difference	−15.76	1.57	−1.14	189.74	440.66
	Significance	0.00	0.94	0.13	0.00	0.00
EPS	At levels	−15.22	3.62	−0.83	174.22	319.81
	Significance	0.00	1.00	0.20	0.01	0.00
	At first difference	−19.09	−1.57	−1.56	202.35	538.08
	Significance	0.00	0.06	0.06	0.00	0.00
EVA	At levels	−6.81	0.60	−0.77	179.29	314.81
	Significance	0.00	0.73	0.22	0.01	0.00
	At first difference	−18.88	4.10	−1.40	227.12	515.31
	Significance	0.00	1.00	0.08	0.00	0.00
Firm size	At levels	−6.98	−3.33	1.04	98.79	150.63
	Significance	0.00	0.00	0.85	0.98	0.10
	At first difference	−14.27	−4.83	0.60	109.51	352.66
	Significance	0.00	0.00	0.73	0.90	0.00
Leverage	At levels	−9.42	3.28	−0.02	109.90	141.58
	Significance	0.00	1.00	0.49	0.54	0.03
	At first difference	−15.58	−0.77	−1.53	166.14	385.18
	Significance	0.00	0.22	0.06	0.00	0.00
Liquidity	At levels	−14.33	3.09	−0.39	165.37	212.80
	Significance	0.00	1.00	0.35	0.04	0.00
	At first difference	−19.83	−2.06	−1.92	225.86	505.47
	Significance	0.00	0.02	0.03	0.00	0.00
NI	At levels	−12.43	3.43	0.11	142.71	188.03
	Significance	0.00	1.00	0.54	0.06	0.00
	At first difference	−16.20	0.96	−0.79	165.73	427.49
	Significance	0.00	0.83	0.22	0.00	0.00
Returns	At levels	56.00	0.50	−2.63	239.24	590.93
	Significance	1.00	0.69	0.00	0.00	0.00
	At first difference	24.00	−6.35	−3.59	291.19	768.98
	Significance	1.00	0.00	0.00	0.00	0.00
ROA	At levels	−9.66	−0.87	−0.15	153.03	296.94
	Significance	0.00	0.19	0.44	0.12	0.00
	At first difference	−17.51	−2.16	−1.41	203.11	525.52
	Significance	0.00	0.02	0.08	0.00	0.00
ROE	At levels	−14.08	−1.59	−0.79	174.12	358.08
	Significance	0.00	0.06	0.22	0.02	0.00
	At first difference	−19.60	−2.23	−1.84	225.56	577.13
	Significance	0.00	0.01	0.03	0.00	0.00

4.6. Pedroni residual cointegration test

Null hypothesis of panel unit root tests assumes non-stationary data. Here, the variables of study when tested at level were found to be non-stationary and we had to accept null hypothesis. When the first difference of variables is tested for unit root, the results were significant; thus, we can reject the null hypothesis to say that variables are stationary at order I(1). Hence, they are cointegrated of order 1. So we can run the cointegration test as in Tables 4–6 respectively. Here we employed Pedroni (2004) test (Table 4) and the results of panel PP-stats, panel ADF, group PP-stats and group ADF stats were significant; hence the cointegration exists among the variables.

4.7. Kao residual co-integration test

In Table 5, the results of Kao (1999) are shown which are significant at 1% level of significance to reveal the presence of cointegration among the variables of the study.

4.8. Johansen Fisher panel cointegration test

In order to examine vigor for cointegration of variables of research (Table 6), the Johansen Fisher panel cointegration test was employed which is a bivariate cointegration technique for examining the cointegration among the independent and dependent variables. The findings of results also reveal that all variables cointegrated at 1% level of significance and hence the results are robust.

4.9. FMOLS and DOLS

Table 7 shows the findings of FMOLS and DOLS tests, showing that ROA, firm size, liquidity and leverage are correlated with stock returns. However, EVA is found to be negatively associated with stock return. ROA has a highly significant and positive association with stock returns, firm size has a negative association but at 10% level of significance, liquidity has a negative association with stock returns at 5% level of significance and leverage is highly and negatively associated with stock returns at 1% level of significance. Weakness of the DOLS model is the degree of freedom issue because of leads and lags phenomenon peculiar to this method. But the DOLS model gives results with comparatively less rigorous restrictions and permits to see the direction and trend of the relationship of variables.

Table 4. Pedroni residual co-integration test. Returns EVA ROA firm size liquidity leverage

			Weighted	
Test statistics	Statistic	Prob.	Statistic	Prob.
Panel v-Statistic	−3.068460	0.9989	−5.825482	1.0000
Panel rho-Statistic	6.308673	1.0000	6.841873	1.0000
Panel PP-Statistic	−22.10428*	0.0000	−17.24575*	0.0000
Panel ADF-Statistic	−12.91523*	0.0000	−10.09622*	0.0000
	Statistic	Prob.		
Group rho-Statistic	10.21614	1.0000		
Group PP-Statistic	−27.91930*	0.0000		
Group ADF-Statistic	−12.20898*	0.0000		

*Significant at 1% level.

Table 5. Kao residual cointegration test. Returns EVA ROA firm size leverage liquidity

	t-Statistic	Prob.
ADF	−8.787960*	0.0000

*Significant at 1% level.

Table 6. Johansen fisher panel cointegration test

Variables	Hypothesized	Fisher Stat.* (from trace test)	Prob.	Fisher Stat.* (from max-eigen test)	Prob.	Remarks
EVA-SR	None	1800.0*	0.0000	918.8*	0.0000	Cointegration exists
	At most 1	215.3*	0.0000	215.3*	0.0000	
ROA-SR	None	1836.0*	0.0000	933.9*	0.0000	Cointegration exists
	At most 1	210.60*	0.0000	210.6*	0.0000	
Firm Size- SR	None	1381.0*	0.0000	840.0*	0.0000	Cointegration exists
	At most 1	208.2*	0.0000	208.2*	0.0000	
LIQ-SR	None	1842.0*	0.0000	1003.0*	0.0000	Cointegration exists
	At most 1	243.3*	0.0000	243.3*	0.0000	
LEV-SR	None	1678.0*	0.0000	806.0*	0.0000	Cointegration exists
	At most 1	179.5*	0.0001	179.5*	0.0001	

*Significant at 1% level.

Table 7. FMOLS and DOLS

Dependent variable SR	FMOLS results		DOLS results	
	Coefficient	p-value	Coefficient	p-value
EVA	−0.005244	0.0039	−4.38E-05	0.0020
ROA	36.47757	0.0001	61.39211	0.0000
FIRM_SIZE	−39.96229	0.0985	−3.728691	0.0904
LIQUIDITY	−17.64979	0.0252	65.83518	0.0335
LEVERAGE	−27.84104	0.0029	−109.3994	0.0020

5. Discussion

This study finds the long-run relationship of EVA with stock returns to deduce if any opportunity of realizing excess return exists in the Pakistani capital market by using EVA, a value-based performance measure, to take investment decisions. We can run FMOLS and DOLS model when our all variables are stationarity at the same order as well as cointegrated. Since the variables were stationary of the same order as revealed in Table 3 using LLC, Beritung, IM-Pesaran, ADF-Fisher and PP-Fisher panel unit root, this study employed cointegration subsequently to find the long-run association among variables and FMOLS and DOLS models are applied. For panel cointegration, there are three options: Pedroni, Kao and Fisher tests. Moreover, in Pedroni tests, lag selection was employed using Schwarz criteria using intercept as we have 11 probabilities; among these, a majority of probability values are significant which implies incidence of cointegration and then for double-check Kao individual intercept was used since here also a significant result reveals cointegration existence. Likewise, the third test, Fisher test, also reinforced the existence of cointegration.

Findings of FMOLS and DOLS shown in Table 7 reveal negative long-run relationship of EVA and stock returns at 5% level of significance; the reason for this could be attributed to the fact that in Pakistan, public limited companies follow International Financial Reporting Standards and Companies Act 2017, both of which do not require mandatory disclosure of EVA in annual audited financial reports nor investors have awareness of this value-based financial performance measure these are in conformance to preceding research (Altaf, 2016; Ismail, 2006; Mosavai, 2015; Palliam, 2006; Samadiyan, Pooryeganeh, Ebrahimi, & Ghanbari, 2013).

Firm size reflects negative long-run association with stock returns at 10% level of significance. These results are in line with the investor recognition hypothesis which posits higher returns for small stocks because of investors' ignorance and lack of information (Merton, 1987). Hence, a Pakistani investor feels more comfortable while investing in small corporations (small firm size) as these firms are less tracked by analysts causing more information asymmetry, too big to monitor, agency costs, conflict of interest this finding goes with few of previous researchers (Bos, Faems, & Noseleit, 2017; Li & Zhu, 2015; Paulson & Townsend, 2004).

Leverage reflects highly significant and negative relationship towards share price in the long run due to investor preference for internally generated funds/retained earnings over borrowed money. Less reliance on borrowed money reduces debt servicing burden in the short run as well as wards off financial distress costs in the long run. These findings are in line with pecking order theory of corporate finance where business prioritize own resources before knocking at doors of external financiers; these findings are in line with prior studies (Abor, 2005; Acheampong, Agalega, & Shibu, 2014; Giroud, Mueller, Stomper, & Westerkamp, 2012; Henry, 2015; Javed, Rao, Akram, & Nazir, 2015; Lee & Dalbor, 2013; Mwangi, Anyango, & Amenya, 2012).

Findings of liquidity reveal mixed connotations whereby a positive association of liquidity with share price is significant at 5% level as per DOLS; nevertheless, a negative association according to

FMOLS reveals the dynamic behavior of local investors among which few are risk avert thus having aptitude towards conservative working capital management policy, while others are inclined to aggressive policy. These results are in line with the notion of pecking order theory implicitly while maintaining decent liquidity levels to ward off external borrowing on one end as well as reducing debt servicing burden of organizations; likewise, these findings are in line with the established research (Abuzayed, 2012; Mansoori, 2012; Padachi, 2006).

ROA is also highly significant at 1% level of significant and shows direct relation with returns, implying investors regard this financial metric as a true depicter of firm performance based on its earnings power; this result is also in line with the seminal work of Modigliani and Miller (1958) first proposition, which states that the shareholders' wealth maximization is the function of the earning power of its assets. Therefore, we can deduce that for Pakistani capital market, traditional accounting-based financial measures show superior long-run relation with share prices; thus investors and other stakeholders should prefer these financial metrics for investment decision-making purposes. Revealing sample firms managed to realize positive returns on assets; thus sample firms are earning accounting profits which is interestingly contrary to the aforesaid negative economic profits which according to classical microeconomic firms theory happens if only explicit costs are covered by revenues, i.e. implicit financing costs are ignored which is the chief claim of EVA proponents.

6. Conclusion

As we have examined the long-run relationship by employing panel cointegration test, FMOLS and DOLS of EVA and traditional financial accounting-based metrics whereby the statistical results refuted the assertion of EVA exponents regarding its dominance over conventional performance measures using sample of 70 non-financial PSX listed firms data during the study period of 2006–2015. Keeping in view cointegration test results, EVA has a negative and significant relation with stock return because in Pakistan Public limited company's follow International Financial Reporting Standards and Companies Act 2017 both of which do not require mandatory disclosure of EVA in annual audited financial reports nor investors have awareness of this value-based financial performance measure. Hence EVA cannot be used to beat the market to arrive at excess/abnormal stock returns. Moreover, ROA came out to be the most powerful predictor of stock returns along with firm size, liquidity and financial leverage. The results about extraneous variables like company scope are adverse and important and reveal that if the size of total assets of a firm increases it becomes difficult to manage its affairs due to decentralization, agency problems, conflict of interest between owners and managers and the notion of too big to monitor; therefore, investors consider it as a weak point while investing in stocks of such firms.

Furthermore, leverage reflects an inverse and significant relation with stock returns which is in line with pecking order theory perspective, and due to tight economic climate, the cost of borrowing has risen as well as the bankruptcy and financial distress costs alleviate the problem also in line with the seminal work of Hamada (Hamada, 1972) as leverage enhances the systematic risk and required rate of return by the common stockholder. Likewise, liquidity showed an inverse relation with stock prices, implying that Pakistani investors are risk avert and so feel more comfortable with conservative working capital management policy. Keeping in view the aforesaid results, we may deduce that EVA is an inferior financial performance measure and its robustness is empirically tested so it cannot serve well for management and outside stakeholders to watch their relevant benefit, i.e. from management point of view its profitability and from other stakeholders like creditors its financial soundness and ability to honor obligations as they become due. But the traditional accounting-based financial performance measures and control variable used in this study all were found to have a significant long-run relationship with stock prices for the selected sample Pakistani non-financial listed firms or in other words robust for decisions relevant to shareholders' wealth maximization. However, future implication of the research is to conduct a qualitative research on these

parameters by including some qualitative variables such as market perception, corporate social responsibility and corporate governance, etc.

6.1. Future research implications

Since this study examined PSX listed 70 non-financial firms only from 13 different sectors for 10 years so future research can be extended by increasing the sample size and study period for more robust findings. Other financial sectors' firms can be added in future studies. Moreover, qualitative variables like corporate governance, customer satisfaction, sustainability and corporate social responsibility may also be included. Furthermore, this study had a delimitation of using few performance as well as firm-level characteristic variables, therefore, other variables and econometric models can also be used for future research.

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