International Journal of Innovation, Creativity and Change. www.ijicc.net
Volume 15, Issue 4, 2021

A Comparative Analysis of Unlevered and Levered Beta and its Impact on Firm Performance

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This paper examines a comparative analysis of unlevered beta and levered beta and its impact on firm performance. Panel data of 15 cement companies listed on PSX with duration ranges from 2008-2017 are used. For analysis of data descriptive statistics, correlation and Panel estimate generalised least square (Cross-section weights) are employed. A Firm performance indicator comprises of return on assets, return on equity and Tobin'q are used as dependent variables, whereas unlevered and levered beta as independent variables. In addition to that, control variables comprising of firm size, firm growth and firm age are also used. Finding from panel estimated generalised least square (Cross-section weights) states that beta levered and beta unlevered have a positive association with all three firm performance indicators i.e; Tobin's q, return on equity and return on assets. But the value of coefficient of beta levered and unlevered varies with each firm performance indicators. It is therefore proved that unlevered beta and levered beta have an impact over firm performance, thus management should adopt necessary carefulness while taking decisions regarding inclusion of debt in capital structure and its associated risk.

Key words: *Unlevered beta, Levered beta, asset beta, equity beta, firm performance, return on assets, return on equity, Tobin's q, Pakistan stock exchange, capital structure, systematic risk, unsystematic risk*

Introduction

Investors, while going for investment, are mainly worried about the associated risks and returns, as investments generally have an allied risk based upon the markets fluctuations. In the world of uncertainties risk cannot be avoided. Risk is the occurrence of an event against your expectations or it can be defined as in investment scenario; it is the variance between actual return and expected return. Furthermore, risk is the uncertainty about the future. The higher the deviation from expected return the higher will be the risk. Pakistan is a developing country which has environmental, political and economic uncertainty due to which investors are uncertain regarding investing here in a firm. Hence investors are not passionate about investing in high risk firms (Sharif et al., 2016).

Risks according to Lintner (1965), Sharpe (1963, 1964) and Brigham (2005) are of two types; systematic risk and unsystematic risk. Unsystematic risk (firm specific risk or diversifiable risk) is that type of risk which can be eliminated by the diversification technique; it may occur due to the impact of internal factors, such as shutdowns, gaining or losing of a contract and factors which are incomparable to a specific company. Systematic risk (un-diversifiable risk) is another type of risk which cannot be eliminated by the diversification technique; it may occur due to the impact of external factors on firms like, interest, inflation, tax reforms, recession, liquidity risk, credit risk, operational risk, economic stagnation and political events. It is generally denoted by Beta (β). Furthermore Brigham (2005) argues that systematic risk has two dimensions, which are business and financial risk. Business risk is that type of systematic risk which a common stockholder of company would face if the firm had no leverage issues. Whereas financial risk is additional risk associated with debt financing which is put on general stockholders.

The cost of equity capital remains an important tool of measurement intended for evaluation, capital expenditure estimation, governing purposes and performance. The capital asset pricing model is a regular and commonly tool used for assessment of cost of equity capital (Bowman & Bush, 2006). This model is still use by professionals and academicians for calculating cost of equity capital for corporations and also for a single projectile. The trouble arises where when professionals are using the capital asset pricing model for the estimation of beta of a particular division inside a company or a single projectile. Regardless of whether the department or project is a section of a traded company, the condition that the project or division doesn't have same systematic risk as a whole company, its Beta essentially is assessed independently from the firm as a whole (Lesseig & Payne, 2017).

Beta is categorized by Hamada (1972) in asset Beta (operating risk) and financial leverage (financial risk). Financial leverage manages the instability of earnings after tax and debt interest deductibility on tax increases which adds to investors (Persson & Dahlstrom,2010). The financial position of the corporate sector has effect on performance of real economy and the stability of the financial system through its influence to aggregate demand. Subsequently,

extreme debts would constrain the company's competence to access extra external capitals (Mulli, 2014). The financial performance of firms is linked with the associated risks. There is a famous maxim in finance which states that the higher the risk, the higher will be the return.

The impact of levered and unlevered beta on firm performance is an emerging question in research and its literature is found to be rare. Therefore, this paper tries to fill this gap in literature by examining first the comparative analysis of unlevered and levered beta and second it impacts on firm performance in the context of Pakistan.

Previously most examinations that measure this structure includes, Bowman and Bush (2006), Lesseig and Payne (2017), Mandelker and Rhee (1984), Sarmiento-Sabogal and Sadeghi (2014) and other numerous authors which employed Hamada (1972) formula (or through some variation) for the estimation of asset Betas of similar line firms and after that looked at the evaluated beta to the observed unlevered beta of a firm.

The problem statement of my study is that how Unlevered Beta and Levered Beta affect the performance of firm.

Many authors like, Abiodun (2014), Chinaemerem and Anthony (2012), Goyal (2013), Hasan et al. (2014), Twairesh (2014), and others studied the Impact of Capital structure on firm performance. In Pakistani context authors including, Amjed (2016), Kausar et al. (2014), Muhammad et al. (2014), Umar et al. (2012) and certain others investigate the impact of capital structure on firm performance. These studies are differing in their selection of explanatory variables as well in statistical model results.

The relationship of financial variables and systematic risk (Beta) in different industries or sectors required to be explored (Kamran & Malik, 2018; Iqbal & Ali Shah, 2012). Similarly, the determinants of capital structure of Pakistani companies like business risk also needs to be examined (Umar et al., 2012). In addition, Ahmad Fawad et al. (2011) recommend the use of periods that have a different corporate tax rate. Moreover liquidity, ratio of net income to net equity, growth in earnings, financial risk, risk of real estate, and change in corporate tax rate also needs to be examined.

This research will answer the following questions?

1. What is the impact of Unlevered Beta on Firm performance?
2. What is the impact of Levered Beta on Firm performance?

As far as the main objective of this research is concern, it is to investigate impact of unlevered and levered beta on firm performance.

The significance of this study is that, it is an addition to the existing corporate finance literature. Furthermore, it highlights the role of unlevered and levered beta which can possibly affect the performance of a firm that will help practitioners to manage it accordingly. Additionally, it will make the financial managers understand about changing their decisions to influence the risk. On the other hand, it is significant for investors to forecast the Unlevered and Levered Beta correctly, due to which they will be able to make efficient portfolios.

Literature Review

Merton Miller and Franco Modigliani presented the irrelevance theory of capital structure in 1958 and is an initial step forward about the effect of capital structure on company financial performance. Modigliani and Miller (1958) stated that "average cost of capital of any company is completely independent from its capital structure and is equal to the capitalization rate of a pure equity stream of its class." They proposed that in perfect markets, the value of a levered firm and without tax is precisely the same as unlevered companies. According to Modigliani and Miller firms market value is determined through its earning power and underlying assets risk, that its value is independent from the way it chooses to finance its investments or issue dividends. Furthermore, firms can be clustered into diverse business risk classes.

The impact of transaction cost, taxes and inflation are associated with funds expanding or the possibility of a business being bankrupt, are omitted in Modigliani and Miller (1958) proposition about completely competitive markets. But in the real world, earnings after interest payments are taxable, which is the utmost significant reason for firms to use debt financing. Therefore, they improved their first theory, that tax advantage is incorporated as a delimiter of capital structure. The most critical element regarding taxes is the acknowledgment that interest is a tax-free expense.

Miller and Modigliani (1963) expressed that a firm which pays tax obligations may benefit from interest since it is a tax-free expense that drives companies to pay less taxes. The use of borrowed money diminishes the cost of capital to the firms. Consequently, they brought up that companies can extend their values and performance by using more debt to take benefit from interest since it is a tax-free expense. Subsequently, employing further leverage is gainful for firms, because corporate tax will permit the leverage to diminish the cost of capital. Furthermore, they demonstrate that increasing function of leverage is firm value and firm performance, due to deductibility of tax from interest payments at the corporate level.

In addition to this, MM Hamada (1972) explores the association of estimated betas and financial leverage; he finds that financial leverage has significant positive influence on estimated betas. In addition to that he added to literature by uniting the CAPM with MM proposition on weighted average cost of capital (WACC) for deciding the effects of capital structuring on market risk and cost of equity. He decays the market Beta into asset Beta (operating risk) and financial leverage (financial risk) components. The use of the Hamada

method regarding expelling financial leverage is as yet the most well-known adjustment method used for deciding an asset beta. His procedure disintegrates systematic risk into financial risk and operating risk by separating the company's unlevered Beta (asset Beta). The operating risk element of systematic risk is captured by an unlevered or pure asset beta (β_u), whereas the financial risk section is a product of the Debt to Equity ratio hired by the firm and the pure equity beta. In addition to that Rubinstein (1973) adjusted the Hamada work by expelling financial leverage from firm's using equity Beta.

The work of Hamada (1972) has added a lot to finance literature in both an academic and as well empirical perspective. Academicians and practitioners commonly use a firm's asset beta as a control variable for computing operating risk in different sorts of investigations. Hence, as a result cost of equity capital for a firm, individual project or division is used when a "genuine" tool of beta cannot calculated (Lesseig & Payne, 2017). After that, a lot of studies have been done.

Similarly, Huffman (1989) studies the impact of operating and financial leverage on systematic risk and finds that there is a positive association of degree of financial leverage with systematic risk, whereas the degree of operating leverage is negatively connected with systematic risk. Whereas Hasani (2013) and Alaghi (2012) find no significant association among operating leverage, financial leverage, combined leverage and systematic risk. In addition, Mandelker's and Rhee's (1984) finding states that operating and financial leverage are positively associated with beta. Furthermore, their result also shows that firms with higher operating risk have a tendency toward lower levels of financial leverage; additionally firms with lower operating risk have a tendency toward higher levels of financial leverage, demonstrating that in companies both components affect a firm's total systematic risk. Additionally, Rahim et al. (2016) also concludes that high leverage brings a great level of systematic risk that leads to immense volatility in the stock prices. Similarly, Abid and Mseddi (2004) also find a positive relationship between operating risk and financial risk with firm value.

Melicher (1974) finds a significant positive association amongst the size, financial leverage, equity returns, and market activity of the common stock and estimated beta (known beta), but the dividend payout policy has a significant negative relationship with estimated beta (known beta). Similarly, Adhikari's (2015) finding also states that size, growth, return on assets are positively linked with systemic risk, whereas leverage, liquidity and dividend payment is negatively associated to the risk.

Nawaz Rashed et al.'s (2017) finding indicates that there is significant positive association amongst size, operating efficiency, and profitability with systematic risk, whereas liquidity and financial leverage have insignificant negative connection with beta. Similarly, Dedunu's (2017) result also indicates that profitability, leverage and liquidity have positive relationship with beta. In addition, Puspitaningtyas (2017) also finds that size of the firm has significant

influence on systematic risk, whereas financial leverage, liquidity and profitability have an insignificant effect on systematic risk. In addition, Boz Gokhan et al.'s (2015) finding also indicate that there is a significant positive relationship of firm size with systematic risk while ROA has an insignificant negative impact on systematic risk. The macroeconomic indicators GDP, DJ industrial average, and the dollar-euro exchange rates have significant negative influence on systematic risk.

Iqbal's and Shah's (2012) study conclude that liquidity, operating efficiency, dividend payout, firm size, market value of equity is negative, whereas ROA has a significant positive relationship with Beta, while growth is positive and leverage has an insignificant negative relationship with Beta.

Kamran's and Malik's (2018) finding sayss that liquidity, operating efficiency, dividend payout, growth, and chin model are significantly negative, whereas leverage is insignificantly associated with systematic risk, whereas profitability and Tobin q is insignificantly positively linked with Systematic risk. In addition to this, numerous other studies have found a negative association between systematic risk and the use of debt (Chung, 1989). In addition, Lee and Jang (2007) find that return on assets, growth, and safety are significantly negatively linked with systematic risk, whereas leverage and size of the firm are positively associated with systematic risk, while operating efficiency has an insignificant impact on systematic risk.

Mardini (2013) finds a significant positive influence of bank size and relative volume of loans on systematic risk, whereas profitability and liquidity have a statistically significant negative influence on systematic risk, while leverage has no significant impact on systematic risk. Additionally, Tanrıöven and Aksoy (2011) finds that sales growth, leverage, ratio of short-term debt in total debt, asset size and ratio of long-term debt to total debt have a positive impact on the Beta. Conversely, size, tangible assets ratio to permanent capital, price earnings ratio and total debt to shareholders' equity have a negative effect on systematic risk. Hsu's and Jang's (2008) finding states that size of the restaurant firm has a significantly negative impact on risk. Liquidity and leverage have an insignificant positive impact on risk while profitability has insignificant negative effect on risk.

Al-saedi and Hadi (2016) investigate the relationship of financial variables with systematic risk and they find that return on equity and debt ratio have a negative impact on systematic risk, but assets turnover has a positive association with systematic risk. Similarly, Karakus' (2017) result states that current term equity to total debt ratio has a positive influence on beta, while current term cash ratio has a negative impact on beta. Previous term debt to total assets has a negative impact on beta, whereas previous equity to total debt and cash ratio positively affects beta. Asset turnover and the size of the firm has a positive effect on beta, while net profit margin and dividend payout ratio have a negative effect on Beta. The influence of the previous term and the current term Beta, GDP per capita, and consumer price index were also investigated by the author. Furthermore, previous and current term beta, CPI and GDP per capita have a

negative influence on current term beta. All variables were statistically significant. Whereas the impact of GDP per capita and previous term CPI are not significant.

Mulli Syokau (2014) finds that total assets turnover, current ratio and net profit margin have a statistically insignificant positive impact on systematic risk, while leverage has a significant positive influence on the systematic risk. Similarly, Logue and Merville (1972) conclude that leverage, profitability, log of total assets and size have a significant impact on risk, whereas liquidity and growth have an insignificant effect on risk.

Biase's and Apolito's (2012) result states that firm size and intangibles ratio have a significant positive influence on equity beta under all the models. Liquidity except under pooled Ordinary Least Square model and loan loss ratio except under one-way fixed effect model and earnings per share under all the models have a significant negative relationship with equity beta. Leverage under Pooled Ordinary Least Square model and two-way random effect model has a significant positive impact on equity beta. The loan to assets ratio except under Pooled Ordinary Least Square model, has a significant positive impact on equity beta. Similarly, Al-Qaisi's (2011) finding states that size has significant influence on systematic risk under all models. Operating leverage has also a significant impact on systematic risk under the generalised least square model, while it is insignificant under the ordinary least square, fixed effect and random effect model. The financial leverage result is also mixed.

Ang et al. (1985) finds a significant negative relationship amongst size and risk, whereas financial leverage has a positive impact on risk. Liquidity has a somewhat positive effect on risks; in addition, operating leverage also does not have a strong relationship with risk.

Ahmad Fawad et al. (2011) concludes that the corporate tax rate has an insignificant negative effect, while Market value of equity and return on assets has an insignificant positive influence on systematic risk; whereas leverage has a significant positive impact on systematic risk.

Rowe's and Kim's (2010) result shows that firm size has a significant positive relation with beta before and also during recession. Assets turnover has a significant positive correlation with Beta before recession but was found to be insignificant negative during the recession. Leverage has an insignificant negative relation with Beta before recession while significant positive relation during recession. While liquidity has a positive insignificant relation with beta before and during recession, whereas Growth rate and Return on Assets has insignificant negative relation with beta before and during recession.

Based upon the above conflicts literature the following hypotheses are formulated.

H1. There is positive association between unlevered beta and firm performance.
H2. There is positive association between levered beta and firm performance.

Research Methodology and Analysis

This research examines the impact of unlevered beta and levered beta and its impact on firm performance in the context of Pakistan. Secondary data is used and obtained from different sources like annual reports of listed firms, state bank of Pakistan and from the Federal board of Revenue websites. The duration of study ranges from 2008 to 2017. Panel data is used in this study as it contained data of 15 firms of the same industry and data to be analysed in the same given duration.

This study uses firm performance as a dependent variable and is assessed by accounting and market-based performance measures, these are: Tobins q return on equity and return on assets. Whereas the independent variable of this study comprised of unlevered beta and levered beta. Control variables are also used in this study which is comprised of firm size, firm growth and firm Age.

Levered Beta (known beta) of listed firms is measured through the following simple formula.

$$\beta = \frac{Cov(r_i, r_m)}{\sigma^2_m} \qquad (1)$$

$Cov(r_i,r_m)$ = covariance of 'i' asset return with market return
σ^2_m = variance of market return

It permits us to compare the unlevered beta estimate to the beta of a firm measured by using the above formula. For unlevered beta Hamada (1972) and adjusted formula by Rubinstein (1973) is use.

$$\beta_U = \beta_L / [1 + (1 - T)(D/E)] \qquad (2)$$

β_U = Unlevered Beta (asset Beta);
β_L = Levered firm's equity Beta;
T = Corporate income tax rate;
D = Book value of Total debt,
E = Book value of Shareholder's Equity.

The reason for using book values is that the market value of a firm's debt is desirable but is normally harder to find and less likely to be used by a practitioner (Sweeney et al., 1997). Additionally, in Pakistan the market value of corporate debt is rare (Amjed 2016). According to Bowman (1980) and Mulford (1985) the book value of the debt is a good substitute for market value of the debt at firm level.

Numerous other researchers used book values instead of market values (Mahmood & Aziz, 2017; Saifadin, 2015; Boz et al., 2015; Sabogal & Sadeghi, 2014; Mardini, 2013; Biase & Apolito, 2012; Pouraghajan et al., 2012; Ozdagli, 2012; Cohen et al., 2009; Brealey & Myers, 2003; Faff et al., 2002; Amit & Livnat, 1988; Breen et al., 1973; Ang et al., 1985).
For examining the relationship of levered beta and unlevered beta with firm performance the following models are utilize.

$$\mathbf{FP = a + b1\beta_L + b2CV + \varepsilon} \qquad \mathbf{(3)}$$

$$\mathbf{FP = a + b1\beta_U + b2CV + \varepsilon} \qquad \mathbf{(4)}$$

"a" is constant term, "FP" is the firm performance and is proxy by Tobin' q, ROA, ROE. β_L is levered Beta and β_{Ui} is Beta unlevered and is already defined above at equation 1 & 2. CV is control variables and is proxy by firm age, growth, size. "b1"and "b2" is coefficient, "ε" is the error term.

Descriptive Statistics

Table 1: Descriptive Statistics of all Variables

	Mean	Std. Dev.	Maximum	Minimum	Skewness	Kurtosis
ROA	0.05	0.10	0.24	-0.18	-0.20	2.60
ROE	0.10	0.17	0.45	-0.34	-0.61	2.97
TOBINSQ	0.29	0.39	1.23	-0.74	0.51	2.83
BLEV	1.08	0.50	2.30	-0.16	-0.31	2.82
BUNLE	0.72	0.44	1.85	-0.44	0.05	2.97
FIRMAGE	37.64	12.69	65.00	16.00	0.68	2.15
GROWTH	8.66	1.08	10.85	6.05	-0.55	2.83
SIZE	9.41	0.99	12.47	6.96	0.21	2.66

Table 1 results display the descriptive statistics of firm performance indicators with independent and control variables. The result displays that return on assets, return on equity, tobins Q have mean values of 0.05, 0.10, 0.29. This indicates that on average cement companies of Pakistan have a positive return on assets, return on equity and Tobins Q. Average return on assets of 5% means that each rupee invested in assets makes 0.05 rupee in earnings. Similarly, Average ROE is 10%, which directs that each rupee invested in equity creates 0.10 rupees in earnings.

Market performance measure Tobin's Q shows high percentage as compare to ROA and ROE. Average Tobin's Q is 0.29. Average value of Tobin's Q shows that listed cement companies of Pakistan have a market value less than their book values because the market price of book

values of the assets for these companies is smaller than 1, which indicate that firm's stock is undervalued.

Average levered beta or known beta is 1.08, which shows that the beta of cement companies is little bit higher than the market beta which is always considered equal to 1. Put imply, cement companies are more risk than the market.

The average unlevered beta of cement firms is 0.72, which indicates that unlevered beta cement firms are less than the market beta and also from their own levered beta. Put simply, it directs that the unlevered beta of cement companies is less risk than market risk. Furthermore, it shows that when there is debt financing the risk is higher; the result is consistent with pervious findings.

The average age of cement companies is 37.64, which indicate that the companies listed in the Pakistan stock exchange are comparatively old. The value of listed firm age ranges from 16 to 65. The average growth of cement companies is 8.66. This states that cement companies have more opportunities of growth and are efficiently consuming their resources. Firms having high growth convey positive signals about future performance to the market. The average size of the selected cement companies is 9.41.

Correlation

Table 2: Spearman's Rho Correlations Matrix

	ROA	ROE	TOBINSQ	BLEV	BUNLEV	FIRMAGE	GROWTH	SIZE
ROA	1.00							
ROE	0.77**	1.00						
TOBINSQ	0.21*	0.32**	1.00					
BLEV	0.15	0.08	0.13	1.00				
BUNLEV	0.32**	0.29**	0.12	0.66**	1.00			
FIRMAGE	0.28**	0.03	0.03	-0.08	0.02	1.00		
GROWTH	0.60**	0.36**	0.11	0.14	0.15	0.81**	1.00	
SIZE	0.17*	0.15	0.15	-0.02	0.14	0.09	0.23**	1.00

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

Table 2 results show the correlation results; it indicates that the dependent variable return on assets has a positive association with all independent variables which comprises of beta levered, beta unlevered, firm age, growth and size by 0.15, 0.32, 0.28, 0.60 and 0.17 correspondingly. This indicates that whenever there is change (decrease or increase) in beta levered, unlevered beta, size, growth and firm age, the return on assets will also change with the same direction. Furthermore, it also indicates that when there is inclusion or exclusion of debt in beta, it will significantly positively affect ROA. There is also a positive correlation of

the dependent variable return on equity with beta levered, unlevered, firm age, growth and size by 0.08, 0.29, 0.03, 0.36 and 0.15 respectively, which means that dependent, independent and control variables move in same direction. Dependent variable Tobin's Q has also a positive relationship with independent and control variables, beta levered, beta unlevered, growth and firm age and size of firms which are 0.13, 0.12, .03, 0.11, and 0.15 respectively.

Regression

For investigating the relationship between levered, unlevered beta and firm performance, two main distinct regression models are used, which are then divided into six sub-models . This study uses fixed effects Panel EGLS (Cross-section weights) for analysis.

Table 3: Panel Estimated Generalised Least Square (Cross-section weights) of Tobins Q with independent and control variables

$TobinsQ = a+b1\beta_L+b2CV+\varepsilon$				$TobinsQ = a+b1\beta_U+b2CV+\varepsilon$			
Variable	**Coefficient**	**T-value**	**Prob.**	**Variable**	**Coefficient**	**T-value**	**Prob.**
C	0.27	0.76	0.45	C	0.46	1.29	0.20
BLEV	0.10	2.12	0.04	BUNLEV	0.02	0.33	0.74
FA	0.21	2.72	0.01	FA	0.16	2.04	0.04
GROWTH	0.16	4.14	0.00	GROWTH	0.16	4.02	0.00
SIZE	-0.24	-5.83	0.00	SIZE	-0.23	-5.44	0.00
Adjusted- R^2	24.48%			21.29%			
P-value	0.00			0.00			

Table 3 on the left side shows the relationship of Tobins Q with beta levered, firm size, firm growth, and firm age. The model is statistically significant at P-value 0.00, with Adjusted R^2 of 24.48%. The adjusted R^2 indicates that the 24.48% variation in Tobins Q is caused by beta levered, firm size, firm age, and growth. Regression coefficients of beta levered, firm age, and growth are 0.10, 0.21, 0.16, and -0.24 correspondingly, which means that beta levered, firm size, and firm age have a positive relationship, whereas growth has a negative association with Tobins Q. It shows that if beta is levered, firm size and firm age increases one unit, and it will cause 0.10, 0.21, 0.16 change respectively in Tobins Q, whereas growth causes -0.24 changes in Tobins Q.

The relationship of Tobins Q with unlevered beta and control variables is shown in right side of the table. This model is also statistically significant at P-value 0.0, with Adjusted R^2 of 21.29%, which means that a 21.29% variation in Tobins Q is due to unlevered beta, firm size, firm growth, and firm age. Coefficients of unlevered beta, firm age, and growth are 0.02, 0.16, 0.16, and -0.23 respectively, which shows that beta unlevered, firm size, and firm age have a positive relationship with Tonins q, whereas growth is a negative association with Tobins Q. It

means that one unit increase in beta unlevered, firm size, and firm age will change 0.02, 0.16 in Tobins q, and 0.16 correspondingly, while growth causes -0.23 changes in Tobins Q.

Table 4: Panel Estimated Generalised Least Square (Cross-section weights) of ROA with independent and control variables

ROA = a+b1β_L+b2CV+ε				ROA = a+b1 β_U +b2CV+ε			
Variable	Coefficient	T-value	Prob.	Variable	Coefficient	T-value	Prob.
C	-1.15	-6.62	0.00	C	-0.99	-5.98	0.00
BLEV	0.03	2.95	0.00	BUNLEV	0.05	4.13	0.00
FA	0.27	4.45	0.00	FA	0.23	3.99	0.00
GROWTH	0.02	2.18	0.03	GROWTH	0.02	2.09	0.04
SIZE	0.00	0.21	0.83	SIZE	0.00	0.12	0.90
Adjusted- R^2	72.29%			74.0%			
P-value	0.00			0.00			

Model 4 on the left side illustrates the relationship of return on assets with levered beta, firm size, firm growth, and firm age. The model is statistically significant at P-value 0.0, with adjusted R^2 of 72.49%, which means that a 72.49% variation in return on assets is due to levered beta, firm size, firm growth, and firm age. Coefficients of levered beta, firm age, growth and size are 0.03, 0.27, 0.02, and 0.00 correspondingly, which indicates that beta levered, firm size, firm age and growth have a positive relationship with return on assets, which means that one unit increase in beta levered, firm size, firm age and growth will cause change of 0.03, 0.26, 0.02, and 0.00 in return on assets.

The relationship of return on assets with unlevered beta, firm size, firm growth, and firm age is on the right side of the table. This model is also statistically significant at P-value 0.0, with adjusted R^2 of 74%, which means that 74% variation in return on assets is due to unlevered beta, firm size, firm growth, and firm age. Coefficients of unlevered beta, firm size, age, and growth are 0.50, 0.23, 0.02, and 0.00 respectively, which indicates that beta unlevered, firm size, firm age and growth have positive relationship with return on assets. It means that one unit increase in beta levered, firm size, firm age and growth will change 0.50, 0.23, 0.01, and 0.00 in return on assets.

Table 5: Panel Estimated Generalised Least Square (Cross-section weights) of ROE with independent and control variables

ROE = a+b1β_L+b2CV+ε				ROE = a+b1 β_U +b2CV+ε			
Variable	Coefficient	T-value	Prob.	Variable	Coefficient	T-value	Prob.
C	-2.03	-5.91	0	C	-1.92	-5.83	0
BLEV	0.07	3.06	0	BUNLEV	0.04	2.19	0.03
FA	0.48	3.63	0	FA	0.47	3.66	0
GROWTH	0.06	3.46	0	GROWTH	0.06	3.70	0
SIZE	-0.02	-0.70	0.48	SIZE	-0.02	-0.91	0.37
Adjusted- R^2	66.03%			72.13%			
P-value	0.00			0.00			

Table 5 on the left side shows the relationship of return on equity with levered beta, firm size, firm growth, and firm age. The model is statistically significant at P-value 0.0, with adjusted R^2 of 66.03% which means that a 66.03% variation in return on equity is due to levered beta, firm size, firm growth, and firm age. Coefficients of levered beta, firm size, age, and growth are 0.07, 0.48, 0.06 and -0.02 respectively, which means that beta levered, firm size, and firm age have positive, whereas growth has negative relationship with return on equity. It means that one unit increase in beta levered, firm size, firm age and growth will cause a change of 0.07, 0.48, 0.06, and -0.02 in return on equity.

The relationship of return on equity with unlevered beta, firm size, growth, and firm age is shown in the right side of the table. This model is also statistically significant at P-value 0.0, with adjusted R^2 of 72.13%, which means that a 72.13% variation in return on equity is due to unlevered beta, firm size, firm growth, and firm age. Coefficients of levered beta, firm age, and growth are 0.04, 0.47, 0.06, and -0.02 respectively, which means that beta unlevered, firm size, and firm age have a positive effect, while growth relationship has a negative relationship with return on equity. It means that one unit increase in beta unlevered, firm size, firm age and growth will cause a change of 0.04, 0.47, 0.06, and -0.02 in return on equity.

Conclusion

This paper examines the comparative Analysis of Unlevered Beta and Levered Beta and its impact on Firm performance. Tobin's Q, Return on Assets and Return on Equity is used as firm performance indicators. Levered Beta (Known beta) of listed firms is proxied through the commonly used formula, whereas unlevered beta is proxied by the Hamada (1972) and Rubinstein (1973) formula. Panel data is used in this study and panel estimated generalised least square (cross-section weights) for each six model is utilised. Secondary data is used and collected from the Pakistan Stock Exchange, the state bank of Pakistan and from Federal board of Revenue web sites. The study sample comprised of 15 companies from the cement sector and the duration of the study is ten years i.e. 2008-2017.

The result of the correlation matrix of listed firm shows that Return on Assets and Return on Equity has a positive association with all independent variables i.e. beta levered, beta unlevered, firm age, growth and size, which indicates that whenever there is a change in beta levered, unlevered, size, growth and firm age the return on assets and thereturn on equity will also change with same direction. Furthermore, it also indicates that when there is inclusion or exclusion of debt in beta, it will positively affect ROA. Tobin's Q also has a positive relationship with independent variables Beta Levered, Beta Unlevered, Growth and Firm Age, whereas it has a negative relationship with Firm Size.

Panel EGLS (Cross-section weights) is used for data analysis. EGLS specify fixed effects model and the result shows that Beta Levered, Beta Unlevered, Firm Size, and Firm Age have a positive relationship, whereas Growth has a negative association with Tobins Q and Return on Equity. Beta levered, Beta Unlevered, Firm Size, Firm Age and Growth have a positive relationship with Return on Assets.

Recommendation and direction for future Research

After results, discussions and findings it is recommended for future research that further studies can be done on examining the unlevered and levered beta impact on firm performance of other industries. Furthermore, this can be done on all listed firms on the Pakistan stock exchange. Future studies can be done in other countries. The most important recommendation is that this study can be done for unlisted firms working in Pakistan. Other risk factors which can have an impact on firm performance also need to be examined. It is recommended that a finance manager should keep a deep look on the financials of the company. Investors also need to be aware about the unlevered and levered beta impact on firm performance before investing in any business.

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