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Leverages Effect on Profitability: A Case of Cement Sector of Pakistan

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ABSTRACT

The aim of this study is to find out the effect of leverages on the profitability of the company. This research is conducted on the cement sector of Pakistan from 2009 to 2015. Degree of financial leverage (DFL) and degree of operating leverage (DOL) are representative of systematic risk and return on assets (ROA) and return on equity (ROE) as the measure of the profitability. Two models are built to find out the relation between systematic risks with profitability. OLS approach is used in the study. It is found that there is both negative and positive relationship exist within the two models ROA, DFL and DOL and ROE, DFL and DOL respectively.

Introduction

Every organization wants to get high profit with minimum risk and it is necessary for each organization to know how it can manage its risk for optimal profit. Organization adopted different ways to manage risk as managing leverages, portfolio, hedges, beta, variance analysis and value added methods. Lo (2011) analysed that leverages cover the issues of macro-economic conditions, credit, sectors information and liquidity properly as compare to other traditional ways as variance analysis and beta analysis. Leverages depend on the systematic risk and these effects the performance of the organization. Degree of operating leverage delivers the information to any organization that what level the quest of target operating profit will be full filled by bearing the operating fixed cost. So it is huge task for the management of the company to manage the operating fixed cost in such a balanced way against the profitability because by increasing the fixed cost it exerts the pressure on the sales of the company. Organization has to make more sales for covering high operating fixed cost if the degree of operating leverage increased. Sometime increasing in fixed cost cannot increase the sales of the organization, so this time the profitability of a company goes down. In long term it has been seen that if the degree of operating leverage is continuously increasing than it make a negative impact on profitability. On the other hand management of companies work for how they can increase in the profitability of the organization by keeping cost of capital low. For managing the cost of capital the management generally adopt the optimal combination between the debt investment and equity investment. Some prefers the debt investment on equity investment and some manger prefers the equity investment on debt. Investment through debt can give the relaxation in the taxation which causes the decrease in the cost of the capital but on the other hand the huge amount is paid in the form of interest to lenders. When a manager makes a choice for debt investment then fixed amount of interest cause increase in financial leverage. Financial leverage has both negative and positive impact on the profit of the organization. The effect of financial leverage on the profitability is based on the economic condition of the country in which organization based. If the economic condition of the country is going downward than the financial leverage has negative impact on the profitability because recession in economy decrease the level of the sale of the organization but organization has to pay interest in whatever situation which cause decrease in the profitability. On the other hand if the economic condition of the country is going upward than the loans help the organization for more sales to earn more profit, in this case of financial leverage has positive impact on the profitability of the organization.

Financial leverage and operating leverage effect to return on asset (ROA) and return on equity (ROE) which are the measures of profitability rather these leverages effect positively or negatively. Sample size of this study contains of 16 companies of Cement sector of Pakistan which are registered in Pakistan stock exchange. The data covers the time period of 2009 to 2015 which is collected from annual reports of the companies from their websites.

Literature review

Ahmad and Salman (2015) analysed the impact of financial leverage on profitability of the firm. Their research consisted on the eighteen firms of cement sector of the Pakistan and data consist on annual base from 2005 to 2010. Profitability is measured by net profit divided by total assets and financial leverage with the proportion of total debt to total asset. Result of research indicates by using OLS analysis is that financial leverage has the significant negative relationship with the profitability of the company. They said that the cement sector of the Pakistan is highly leveraged sector in the Pakistan economy. So, this high financial leverage is the cause of the large amount is paid in the form of finance cost which result low profit.

Gates and Gadzo (2013) conducted study on the 18 Ghana insurance companies from 2002 to 2011. Results of regression

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analysis show that the degree of financial leverage has the negative relationship with the profitability and the degree of operating leverage has the positive relationship with profitability. Researchers measured the profitability in the form of Return on equity (ROE). Negative relation between financial leverage and profitability is due to the preference of more debt structure on equity structure by Ghana insurance sector. The large debt structure of Ghana insurance companies created the large amount of interest. The large amount of interest caused the decrease in the profitability. So, when the financial leverage increase it triggered the increased in the amount of interest and profitability of the company decreased. On the other hand discovered that degree of operating leverage caused the increased in operating fixed cost which provides the tax shield to the companies and increased the profit of the company in actual due to this reason that came to conclusion that if degree of operating leverage increase it also increased the profitability of the company.

Nimalathasan & Pratheepkanth (2012) studied the systematic risk management and its effect on the profitability. Researchers used the conveniences sampling technique to choose the sample size of 10 financial institutions of Sri Lanka. Indicators of systematic risk as the degree of financial leverage and degree of operating leverage and the profitability is measured in the form of return on equity and net profit. Regression and correlation tests were apply by the researchers on this model. Through their findings they find out that Sri Lanka has not efficient market for the investment so there is weak positive relationship among degrees of financial leverage and degree of operating leverage with the net profit and moderate positive relation with return of equity. This weak relationship occurred because a large number of amounts were paid by the financial institution of Sri Lanka in the form of interest. They explain in their research the un-systematic risk is controlled by making portfolio and by hedging the investment but it cannot be completed wipe out.

Yoon & Jang (2005) conducted research to explore the effect of financial leverage on the profitability of restaurants. This research was conducted on the 62 restaurants on the United States of the America from 1998 to 2003. The researcher came to conclusion that highly financial leveraged restaurants have the positive relationship with the profitability. The profitability is measured in the form of return on equity and financial leverage was measured by dividing long term debt with total assets. Researchers explore this positive relation was due to large numbers of cash flows occurred and restaurants used the amount of debt for the growth of their respective restaurants.

Abid & Meseddi (2004) analyzed the effect of the financial leverage and operating leverage on the company value. They found out the relation with the help of panel data methodology on United States of America firms, they revealed the positive relationship of both financial and operating leverage with the firm value. They said that increased in debt provide the relaxation against tax and provide the less cost of capital and increased in operating cost increase the numbers of sales which cause increase in the value of the firm.

Selling and Stickney (1989) examined the effect of operating leverage and product life cycle on the return on assets. Return on assets shows variability when the operating leverage varies. Through their examination those industries who have high operating leverage means high fixed cost have greater variability and lower asset turnover. On the other hand those industries that have lower operating leverage means low fixed cost have low variability and high assets turnover.

Baker (1973) made the model of two equations to studied effect of financial leverage or intensity of debt on the profitability of industry. One equation consists on industry profitability with usual market structure and with the leverage. Second equation contains the risk variables to explain the leverage. This model applied on time span of ten years. He firstly applied the two stages least squares on the model and got the result as earlier theories who described the financial leverage has the negative impact on the profitability means that if the financial leverage increased then the profitability of the firms goes down. He also applied the ordinary least square method and found the same result.

Data source and methodology

This study contains variables of systematic risk as degree of operating leverages and degree of financial leverage and variables of profitability as return on assets and return on equity. Data of this study consist on sixteen (16) companies of Cement sector of Pakistan and with the seven years of time span from 2009 to 2015. All the data gather from the financial reports of the Cement companies of Pakistan which are registered in Pakistan stock exchange

In time series data mostly time trend is involved which cause the non-stationery issue. Results obtain by applying regression on non-stationery data can be false (Newbold and Granger, 1974) [9]. So, OLS applies on stationery data it provides the reliability of the data. There are different methods used to measure stationery of the data like Ng and Perron, Phillips-Perron (PP) and Augmented Dickey-Fuller. In this study unit root test is conducted by Phillips-Perron (PP).

Ordinary least square (OLS) has been applied when the variables of the study become stationery at level. This method helps to estimate the results among the variables in which time trend involve. OLS is one the common method used in econometrics, finance and economics to find out the relations among variables which have time trend. This ordinary least square method helps to analyse the data even the data consist on small numbers of observations. The basic purpose of OLS to finds the relation among independent variables and dependent variables. It also shows that the relation among variables is positive or negative.

In table 1 formulas of variables are shown related to this study.

Table 1. Description of variables

Sr No	Variables	Formulas to measure variables
1	Degree of financial leverage	%Changes in EPS / %Change in EBIT
2	Degree of operating leverage	%Change in EBIT/ %Change in sales
3	Return on asset	Net profit / Average total assets
4	Return on equity	Net profit / Shareholder equity

Models

In this study two models are used to find out the effect of systematic risk on the profitability on the cement sector of Pakistan. In Model 1 the degree of operating leverage and degree of financial leverage as the measure of systematic risk are selected as independent variables and return on asset as the measure of profitability is selected as dependent variable. On the other hand in Model 2 the degree of operating leverage and degree of financial leverage as the measure of systematic risk are selected as independent and return on equity as the measure of profitability is selected as dependent variable.

The functional representation of Model 1 of this study is given below:

$$ROA = \beta_0 + \beta_1 DFL + \beta_2 DOL + \varepsilon$$

ROA= Return on assets
DFL=Degree of financial leverage
DOL= Degree of operating leverage
$\beta_0 =$ Y-Intercept
$\varepsilon =$ Error term

The functional representation of Model 2 of this study is given below:

$$ROE = \alpha_0 + \alpha_1 DFL + \alpha_2 DOL + \mu$$

ROA= Return on assets
DFL= Degree of financial leverage
DOL= Degree of operating leverage
$\alpha_0 =$ Y-Intercept
$\mu =$ Error term

Empirical results

OLS is applied on Model 1 as Table 2 in which return on assets (ROA) is selected as dependent variable and degree of operating leverage (DOL) and degree of financial leverage (DFL) are selected as independent variables.

Table 2. OLS on Model 1

Dependent variables: ROA			
Variable	**Coefficient**	**t-statistics**	**p-value**
DOL	-0.011880	-3.653941	0.0217
DFL	-0.003827	-0.846066	0.4452
Constant	-	-	-
R^2= 0.777880			
Adjusted R^2= 0.666820			
F-statistics= 7.004146			
Probability (F-statistics)= 0.049337			

Model 1 results demonstrate that value of adjusted R-square is 67% which indicates that changes in our independent variables cause the 67 percentage change in dependent variable of our study which shows a good relation. Results of Model 1 shows that there is a negative relationship between the return on assets (ROA) as dependent variable and Degree of operating (DOL) as independent variable which means that if the financial leverage increase it cause the decrease in return on assets. This relation was also found by Ahmad & Salman (2015), Shell (1994). On the other hand Degree of operating leverage (DOL) has also a negative relationship with return of assets (ROA) which also indicate the increase in DOL causes the decrease in ROA as found by Barker (1973), Selling and Stickney (1989).

In Model 2 the return on assets (ROA) as dependent variable and degree of operating leverage (DOL) and degree of financial leverage (DFL) as independent variables.

Table 3. OLS on model 2

Dependent variables: ROE			
Variable	**Coefficient**	**t-statistics**	**p-value**
DOL	-0.045256	-6.807644	0.0024
DFL	0.009143	0.988519	0.3789
Constant	-	-	-
R^2 = 0.922265			
Adjusted R^2 = 0.883397			
F-statistics = 23.72830			
Probability (F-statistics) = 0.006043			

In Model 2 **(**table 3**)** ordinary least square (OLS) is applied. This result of OLS method shows the value of adjusted R-square is 88% which indicates when we change the independent variables which cause the change in depended variable very strongly with 88%.

Results of model 2 indicates that degree of financial leverage (DFL) has positive relationship with return on equity (ROE) which presents that increase in financial leverage cause the increase in return on equity or if degree of financial leverage decrease the return on equity also decreased .The relation is also found by Nimalathasan & Pratheepkanth (2012), Abid & Meseddi (2004). On the other hand degree of operating leverage has negative relationship with return on equity which means increase in DOL cause the decrease in the return on equity. This relation is also pointed out by Barker (1973), Selling &Stickney (1989).

Unit Root Test

In this study unit root test of Phillips-Perron (PP) is used to measure the stationery of the data.

Table 4. Unit root test of variables

Variables	T-Statistics	Critical Values	Decision
DOL	-5.315126 (0.0340)	1% level = -7.006336 5% level = -4.773194 10% level = -3.877714	Stationery at level
DFL	-2.129077 (0.0416)	1% level = -3.007406 5% level = -2.021193 10% level = -1.597291	Stationery at level
ROA	-4.635250 (0.0579)	1% level = -7.006336 5% level = -4.773194 10% level =-3.877714	Stationery at level
ROE	-7.728067 (0.0069)	1% level = -7.006336 5% level = -4.773194 10% level = -3.877714	Stationery at level

In this table 4 unit root test of Phillips-Perron is conduct on the Degree of financial leverage (DFL), Degree of operating leverage (DOL), Return on assets (ROA) and Return on equity (ROE) which becomes stationery at level. All the null hypothesis of having units root rejected.

Model Fitness Tests

To check the model fitness different diagnostics tests are implement on both models of our study.

Table 5. Model 1 diagnostics test

Heteroskedasticity Test (Breusch-Pagan-Godfrey)	F-statistics = 0.176789	Probability value= 0.8442
Serial correlation (Breusch-Godfrey Serial Correlation LM Test)	F-statistics = 0.167449	Probability value= 0.7099
Model Specification test (Ramsey RESET Test)	F-statistic= 4.404387	Probability value= 0.1267

The results of diagnostics tests of Model 1 show (Table 5) there are no problems of heteroskedasticity and serial correlation in this model.

Table 6. Model 2 diagnostics tests

Heteroskedasticity Test (Breusch-Pagan-Godfrey)	F-statistics = 0.722525	Probability value= 0.5397
Serial correlation (Breusch-Godfrey Serial Correlation LM Test)	F-statistics = 0.167449	Probability value = 0.7099
Model Specification test (Ramsey RESET Test)	F-statistics = 0.038254	Probability value= 0.8574

The model specification test (Ramsey RESET Test) also indicates that our Model 1 is sound defensible. On Model 2 the different diagnostics tests are conduct to find the model goodness. The results (Table 6) indicate there are no issue of heteroskedasticity and serial correlation in model 2. Ramsey RESET test for model specification also show the Model 2 is well justified.

Conclusion

This research is conducted on the Cement sector of Pakistan from 2009 to 2015 to investigate the effect of leverages on profitability. Two models are built to find the effect of leverages on profitability. The results of Model 1 indicate that both operating leverage and financial leverage have negative relation with return on asset which is a measure of profitability. Negative relation of degree of financial leverage (DFL) with return on assets due to increase in financial leverage cause the increase in finance cost which exerts pressure to organization to sell their products more enough to maintain the level of net profit. This negative relation was also identified by Ahmad & Salman (2015).On the other hand degree of operating leverage shows negative relation with return on assets because increase in operating leverage causes the increase in operating fixed cost. To balance the fixed cost more sales are required for organization. This shows companies of cement sectors of Pakistan are not utilizing their assets efficiently to bear the cost of finance and other operating fixed costs to convert the amount of loan into more constructive way. The negative relation between operating leverage and profitability also identified by Barker (1973), Selling and Stickney (1989). In the same ways Model 2 analysed it show that degree of financial leverage has positive relation with return on equity. This positive relation may occur due to finance cost provide shield from tax which cause the decrease in cost of capital. This result is also identified by Yoon & Jang (2005).The degree of operating leverage also has negative relation with return on equity because cement sector of Pakistan is highly operating leveraged sector means a large number of fixed operating costs are required to run its operation, so degree of operating leverage has negative relation with profitability.

This study shows leverages have very sensitive relationship with profitability. Cement a sector of Pakistan is highly leveraged sectors. So, the management of cement sector should look after financial and operating leverages to manage the risk related to profitability. Companies of cement sector of Pakistan should adopt measures to reduce the operating cost because sales are not increases with proportion of the operating cost. Companies should also manage the finance cost for getting optimal benefits from the loans.

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