RELATIONSHIP BETWEEN CAPITAL STRUCTURE AND FIRM VALUE: A STUDY ON PHARMACEUTICAL COMPANIES

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Abstract:

This study mainly deals with the effect of capital structure decisions on firm value. The study is made on twenty pharmaceutical companies selected from BSE-500 companies from 2016 to 2020 and the data is collected from the Moneycontrol. Price-earnings and price to book value ratio are the firm value ratio. The debt-equity ratio is used as the capital structure ratio. Panel data regression model is used for data analysis. The result showed that the debt-equity ratio has a negative impact on firm value in pharmaceutical companies.

Keywords: Capital structure, firm value, panel data, Hadri LM test, Variance covariance estimator (VCE).

Introduction:

Capital structure is the combination of debt and equity which refers to the permanent financing of the company. The capital structure includes all long term funds such as long term loans, preference shares and debentures including equity shares and reserves. Again the term capital structure is used to represent the relationship between debt and equity.

Capital structure is the essential function of the financial manager. It helps to maintain the return maximization, flexible strategy, reducing liquidity, increasing the firm value, reducing the financial risk, minimizes the cost of capital, the benefit of tax deduction and optimum utilization of fund.

Capital structure is the mixing of debt and equity that finance the organization's strategic plan. According to Myers (2001) there is no specific theory to choose the debt-equity mix, but few conditional useful theories are used for explaining the capital structure choices. Capital structure refers mainly to the permanent sources of the firm's financing. There are a number of factors that affect the capital structure. The capital structure takes into account and even justifies the effects of trade-off theory, pecking order theory and free cash flow theory. The traditionalist believes that capital structure affects the firm value but Modigliani and Miller (1958) argue that capital structure decision is irrelevant under the following assumptions of a perfect market and no taxes. Modigliani and Miller reverse their observation when they consider corporate taxes.

Significance of the study:

The debt-equity mix has a great impact on shareholder's earnings and risk that affect the firm value or market value of the company. So it is very crucial for the manager how to determine the portion of debt capital and equity capital that give the optimum value of the firm. This study has been utilized the panel data estimation models to provide a better relationship among the variables. This study especially helps the manager to take the financial decision of the company in the present scenario. This study has also tried to find out the relationship between capital structure and value of the firm in India's pharmaceutical industry

Objectives of the study:

On the basis of research gap, the objective of the study has been determined. The main objective of this empirical study is to examine the relationship between capital structure and value of the firm of Indian pharmaceutical companies. To achieve the main objectives the following sub-objectives are considered:

- To investigate the factors that affect the firm value
- To investigate the relationship between debt-equity ratio and the value of the firm

Hypothesis:

After the literatures review the researcher selects two objectives. Hence the hypothesis can be stated as follows.

1st Hypothesis:

H_{01}: The company level factors do not affect the value of the firm of Indian pharmaceutical companies

H_{11}: The company level factors do not affect the value of the firm of Indian pharmaceutical companies

2nd Hypothesis:

H_{02}: There is no significant relationship between value of the firm and its capital structure

H_{12}: There is a significant relationship between value of the firm and its capital structure

Literature Review:

Through the empirical study **Sinha, A (2017**) wanted to show the capital structure's effect on firm value. Sinha had applied the Hausman test to compare the better model of fixed effect and random effect. From the investigation, the author had opined that asset tangibility negatively effects on firm value. Sinha also said that debt-equity, size, and age negatively effect on the price to book value ratio.

To study the impact of capital structure on firm's value **Chowdhury and Chowdhury (2010)** had analyzed 77 companies from four different sectors through this article. Secondary data had been used. The study period was 1994 to 2003. They had been used 30 ratios and parameters. Chowdhury and Chowdhury also used fixed effect model, cross section regression model, time series analysis, correlation analysis and descriptive statistics. From the study they found that the price (share price) is positively correlated with EPS, DPS, current ratio, inventory turnover ratio, P/E ratio, dividend growth and net profit margin.

To show the relationship between Capital structure and firm value, **Maxwell and Kehinde (2012)** used regression method and OLS technique. F statistics measures the relationship between the dependent and independent variable. This article indicates that if long term debt increases then the firm value also increases and at the same time the results indicate that equity is inversely related to firm value.

In their article **Li and Chang (2011)** wanted to study the relationship between debt ratio and firm value. They selected 196 Taiwanese listed companies for the period of 1993 to 2005. They took Tobin Q for firm value as proxy. They used panel threshold regression model.

Song (2009) wanted to study the firm value through the effect of market timing debt. The study period is 1983 to 1997. The author showed the changes of Firm Value by comparing the timers and non-timers in his article. The author concludes that debt timing spread do not affect the time value positively.

Gharaibeh and Sarea (2015) wanted to show the relationship between debt and firm value. They select 46 companies out of 239 for the period of 2008-2013. They had fitted two models to select two dependent variables viz. ROA and ROE as a proxy of firm value. Gharaibeh and Sarea showed that ROE and ROA are affected by the capital structure.

According to **Islam, Ahmad and Ghazalat (2019),** their main objective of their paper is to maximize the shareholders wealth. This research finds out the relationship between leverage and firm value of Malaysian companies. They categorically opined that STD/TA and LTD/TA have positive impact on firm value but TD/TA and TD/TE have negative effect on firm value.

Cheng, Liu, and Chien (2010) used descriptive statistics and panel threshold regression model to analysis the capital structure and firm value. Cheng, Liu and Chien finally conclude that firm value is affected by changing of debt ratio and debt structure maintained non-linear relationship with firm value.

Khaled Rahman and Nazneen (2017) selected DSE listed multinational companies and domestic companies of Bangladesh. They showed that debt has great impact on weighted average cost of capital. They also opined that firm value is also influenced by WACC

Baek, J-S (2011) mainly discussed the relationship between capital structure and firm value. The author used cross sectional regression model. Baek examined the capital structure when the economic situations are good as well as the bad economic conditions. The author finds out the effect of capital structure on firm value positively.

Research methodology:

This chapter discusses the research methodology of the empirical studies. The methodology gives the direction about the methods for conducting research. It is the procedures that are applied for the research where the data may be quantitative or qualitative. The researcher used a Quantitative methodology for this study. This chapter explains the research design, data sources, data collection methods, data analysis methods, model formulation and definition of variables and measurement procedure.

Sample and Data source:

To determine the objectives, the researcher selected Indian pharmaceutical companies. In this article, 20 companies are considered for empirical studies. Moneycontrol is the primary source of the data.

Study period:

The period of study is 5 years and for the period of 2016 to 2020. This study is mainly based on secondary data. The researcher selects balanced panel data.

Panel Data Regression Analysis:

Baltagi (2005) said that panel data is informative data and the variables are more variability but less collinearity and more efficiency. To analyse the data, the researcher used STATA 11.2 version software. In this study, the researcher utilized descriptive statistics, correlation matrix, unit root test for data stationarity, VIF test for multi-collinearity and regression analysis. After that, the researcher applied the fixed-effect model and random effect model. For selecting the appropriate model the researcher utilized the Hausman specification test.

To fulfill the objectives the researcher used price-earnings ratio (PER) and price to book value ratio (P/B) as the dependent variables that denote the firm value. Leverage ratios, tangibility, size, growth, liquidity, return on net worth and dividend per share are the independent variables. From the model, the researcher wants to find out the relationship between firm value and capital structure ratio. The researcher applied the debt-equity ratio (D/E) as capital structure ratio or leverage ratio. This model is specified on an empirical framework to investigate the impacts of capital structure on the firm value of pharmaceutical companies in India.

Variable selections depend on research objectives. To examine the relationship between capital structure and the value of the firm, the researcher selected some dependent and independent variables as well as some control variables.

Price to Earnings Ratio (PER):

This variable is mainly used as a proxy for firm value. It is measured by its current share price divided by earnings per share.

P/E Ratio=Market value per share/Earnings per share

Price to book value Ratio (PBR):

PBR is used to compare a firm's market capitalization to its book value. It is calculated by the company's stock price per share by its book value per share.

PBR=Market price per share/Book value per share

Debt-equity Ratio (DER):

The debt to equity ratio is also called the debt-equity ratio (DER) and gearing ratio. This ratio highlights the capital structure of the company. A higher debt ratio indicates the levered firm and a lower debt ratio indicates the less levered firm.

Debt–Equity Ratio= Total debt /Shareholder's equity

Tangibility (TANG):

Tangibility shows the firm's fixed asset position of that company. If the tangibility position is high then the firms easily get more debt. So tangibility has a positive impact on leverage ratios. A positive relationship is present between asset tangibility and leverage (Booth et al.; Kayo and Kimura, 2010). Here the researcher used fixed assets by the total asset as tangibility.

Liquidity (LQ):

Liquidity is the ability to pay the company's current obligation. The current ratio used as a proxy of liquidity. It is measured by the current asset by current liabilities. Antoniou (2008) observed the relationship between leverage and liquidity. Different empirical studies showed the mixed result of liquidity on firm value.

Size (SZ):

Size is an important determinant of capital structure. Ranjan and Zingales (1995) observed that large firms tend to be more diversified. Size is measured by the logarithm value of sales. There is a significant negative relationship present between size and long term leverage (Chen, 2004).

Profitability:

Return on net worth (RONW) is used to measure profitability. The profitability firm prefers to maintain the capital structure. Myers (1984) said that a direct relationship is present between debt and profitability.

Dividend per Share (DPS):

DPS is the sum of declared dividends issued by the company for the equity shareholders. It is calculated by the total dividend paid out divided by the number of ordinary shares.

DPS=Sum of dividends/ No. of equity shares

The researcher applied descriptive statistics, correlation matrix, unit root test for data stationarity, collinearity test, Granger causality test and the regression analysis. After that, the researcher applied the fixed-effect model and random effect model. For selecting the appropriate model the researcher utilized the Hausman specification test.

So the researcher fit a model takes the following form-

FV=

FV=Firm value, LEV=Leverage ratios, TANG= Tangibility of fixed asset, Size= Logarithm value of sales, Prof= Profitability, GR= Growth, LQ=Liquidity and e=Error term

Data Analysis:

 In this model, the researcher analyzes the relationship between capital structure and firm value to fulfil the objective.

Data: The variables source has been as stated earlier. The dependent variables are the price-earnings ratio (PER) and price to book value ratio (PBR). The independent variables are Debt-equity ratio (DER). The control variables are size (Ln Sales), return on net worth (RONW), Dividend per share (DPS), tangibility (TANG), liquidity (LQ) and growth (GROW). To achieve the objective first descriptive statistics is to be demonstrated to understand the nature of the data.

Table-9: Descriptive statistics

	Mean	SD	Minimum	Maximum
PER	26.42	16.95	-57.57	78.88
PBR	4.54	2.68	0	15.04
DER	0.50	2.39	0	24
SZ	8.04	1.23	5.68	10.4
GR	145.89	797.09	-21.54	7004.88
DPS	6.45	7.10	0	35
TANG	0.37	0.12	0.10	0.64
LQ	2.56	1.44	0.91	6.97
RONW	17.87	11.20	-2.37	94.95

Source: Computed by the author

The mean values of two dependent variables are 26.42 and 4.54 respectively. The result of Standard deviation showed that the lowest variable is PBR and the highest variable is PER. The lowest standard deviations express the standard position of the companies and the highest standard deviation showed the volatility position of the companies. The mean value of independent variable (DER) is 0.50. The standard deviation of independent variable is 2.39.

Table-10: Correlation matrix

	PER	PBR	DER	SZ	GR	DPS	TANG	LQ	RONW
PER	1.00								
PBR	0.55*	1.00							
DER	-0.06	-0.06	1.00						
SZ	0.07	-0.08	-0.09	1.00					
GR	0.09	0.26*	-0.03	-0.04	1.00				
DPS	0.05	0.17	-0.07	0.32*	0.04	1.00			
TANG	0.04	-0.08	-0.07	0.15	-0.20	0.10	1.00		
LQ	-0.04	0.26*	-0.12	-0.44*	0.07	-0.03	-0.38*	1.00	
RONW	-0.15	0.28*	0.01	-0.07	0.07	0.16	-0.10	0.19	1.00

Source: Computed by the author

[Note- *, ** and *** denotes the 1%, 5% and 10% significance level]

The degree of correlation shows the direction of the variables which may be positive, negative and zero. The correlation matrix shows that there is no significant relationship present among these variables.

Unit root Test:

The author has used Hadri LM test. The unit root test used to check the panel data variables and also test these variables are unit root or not i.e. stationary or non-stationary. From the result, it is clear that the p-value is less than 5%. So the null hypothesis rejected that means an alternative hypothesis accepted. So the data is stationary at level.

Heteroskedasticity Test:

The researcher also used Breusch Pagan test for Heteroskedasticity.

Chai2	Prob.
17.80	0.000

[Source: Computed by the author]

The result shows that researcher data is not homoscedasticity.

Multicollinearity Test:

If the variance inflation factor (VIF) is greater than ten then the problem contains multicollinearity. The researcher found that the data is free from multicollinearity.

Variable	VIF	1/VIF
LQ	1.57	0.64
SZ	1.45	0.69
TANG	1.26	0.79
DPS	1.19	0.84
RONW	1.08	0.93
DER	1.06	0.94
GR	1.05	0.95

[Source: Computed by the author]

Results of Panel Data Regression Analysis:

The researcher has first used price earnings ratio (PER) as dependent variable. The researcher used a random effect and a fixed-effect model. After the checking, the Hausman specification test the researcher selects the fixed-effect model.

Table- Model Summery PER as dependent variable

PER	Fixed Effect		Random Effect	
Variable	Coefficient	SD	Coefficient	SD
DER	-0.53	0.63	-0.36	0.64
SZ	-3.08	7.29	-0.34	2.55
GR	-0.00	0.00	0.00	0.00
DPS	-1.09**	0.48	-0.32	0.35
TANG	65.60**	31.75	22.28	21.37
LQ	-3.40***	1.96	-1.92	1.70
RONW	0.17	0.15	-0.03	0.14
R Square	0.20		0.15	
F/Wald chi2	2.64*		5.83	

[Source: Computed by the author]

[Note- *, ** and *** denotes the 1%, 5% and 10% significance level]

The models showed that the fixed effect model is appropriate after checking the Hausman Test. The value of R-square is 0.20. From the result it is seen that there is no significant relationship is present between debt equity ratio and price earnings ratio. Dividend per share and liquidity has negative impact on price earnings ratio. Tangibility has positive impact on price earnings ratio.

Then the researcher has used price to book value ratio (PBR) as dependent variable. The researcher used a random effect and a fixed-effect model. After the checking, the Hausman specification test the researcher selects the random-effect model.

Table-: Model Summery PBR as dependent variable

PBR	Fixed Effect		Random Effect	
Variable	Coefficient	SD	Coefficient	SD
DER	-0.05	0.09	-0.02	0.09
SZ	-2.70*	-0.99	-0.43	0.38
GR	0.00	0.00	0.00	0.00
DPS	0.05	0.07	0.04	0.05
TANG	-1.22	4.34	0.27	3.08
LQ	-0.31	0.27	0.02	0.24
RONW	0.03	8.51	0.04*	0.02
R Square	0.16		0.08	
F/ Wald chi2	1.98**		10.32	

Source: Computed by the author

[Note- *, ** and *** denotes the 1%, 5% and 10% significance level]

The second model showed the R-Square value which is 08% and F value is not significant. So the model is not fitted.

From the above two models the researcher has selected first model where the dependent variable is price earnings ratio and the independent variable is debt equity ratio. The researcher data has not free from heteroskedasticity. So the researcher has used robust model to get more efficient result.

Table-Fixed Effect (Robust) PER as dependent variable

Variable	Coefficient	SD	Prob.
DER	-0.53**	0.22	0.025
SZ	-3.09	6.73	0.652
GR	-0.00	0.00	0.207
DPS	-1.09*	0.35	0.006
TANG	65.59	68.56	0.351
LQ	-3.40**	1.62	0.050
RONW	0.16	0.29	0.570
		R Square	0.20
		F	11.15*

Source: Computed by the author

[Note- *, ** and *** denotes the 1%, 5% and 10% significance level]

The researcher empirical study has showed that DER has a negative impact on the firm value.

Dividend and liquidity has negative impact on price earnings ratio. Other control variables are not significant.

Conclusion:

The result is very much interesting and given some additional knowledge in this field of research. From the above models, the researcher concludes that debt-equity has an inverse effect on firm value. The dividend per share has a negative impact on the price-earnings ratio. Liquidity has also a negative impact on the price-earnings ratio. None of the other independent or control variables have a significant effect on this firm value measure. Thus, this study has given the controversial findings of previous researchers' results which will give further opportunity for exploration with new lines of thought.

Scope of Further Research:

The study has opened the further research to take the following measures

- There are so many firm value ratios; the researcher only takes two ratios viz. PER and PBR.
- The researcher does not consider corporate governance, CSR and political stability.
- The researcher only takes DER as capital structure ratio other may be considered.
- This study only takes BSE-500 companies.

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