Journal of Business Studies Quarterly

jbsq.org

Determinants of Leverage of Automobile Sector Firms Listed in Karachi Stock Exchange by Testing Packing Order Theory

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Abstract

Purpose: The purpose of the current research is to empirically investigate the Determinants of Leverage in automobile sector of Pakistan by testing "Packing Order Theory".

Design/Methodology/Approach: Panel data is used for analysis and ordinary least square method (OLS) for regression analysis which minimizes error in estimation results. The data was taken from Secondary source named as "Financial statement analysis of the firms (non-financial) listed in KSE Pakistan for 2005-2010". It is the annual publication of state bank and available at (www.sbp.org.pk). The dependent variable was Leverage (Long Term Debt to Total Assets) while the independent variable were Profitability, Size, Tangibility, Growth, Tax, risk and Non-Debt tax shield.

Key words: Leverage, Packing Order Theory, Automobile sector.

Introduction

The basic duty of financial manager is deal with the financing mix or capital structure in a way that it will increase firm's value and shareholder's wealth. The capital structure includes equity financing, long term debt financing and internal source of financing like retained earnings or surplus etc., so the financial manager has to decide a best mix among them. The first baseline theories presented by David Durand (1952) in the form of Net income approach states that increasing leverage in capital structure will increase the firm's value as well as market price of share. Later on, he also presented Net operating income approach but could not operationally justify his theories. Modigliani and Miller (1958) operationally justify the Net operating income approach by arbitrage process. They were of the view that both levered and unlevered firm are equal in value if arbitrage process is applied. Modigliani and Miller (1963) also stated the benefit of using debt financing in capital structure in the shape of Tax shield advantage. They were of the view that leverage provides tax shield in the form of interest that decreases taxable income which results in reducing the tax payable amount. A number of theories have been presented to solve the problem of deciding the best mix of financing for optimal capital structure. The researcher in the current study used "Packing Order Theory (POT)" on different factors affecting

leverage for the firms in automobile sector listed in KSE Pakistan. The Packing order theory (POT) was developed and suggested by Mayer's and Mujluf (1984) state that when a firm require funds to meet its long term financial requirement, they should preferably use internal funds like retained earnings, surplus or reserves etc., in case of financial deficiency they can use leverage in their capital structure and finally they can use equity financing as a final decision.

Objective of the current Research

The objective of the current research is to investigate empirically the impact of profitability, size, tangibility, growth, tax, risk and non-debt tax shield on leverage for the non-financial companies of automobile sector listed in Karachi Stock Exchange Pakistan and Testing Packing order theory on the observed relationship in order to analyze their consistency.

Research Questions

The researcher's aim in current study is to find the answer of the following two questions:

(i) What are the "Determinants that significantly affect the leverage in non-financial companies of automobile sector listed in Karachi Stock Exchange of Pakistan?

(ii) Does the observed relationship between leverage and its determinants also consistent with Packing order Theory (POT)?

Significance of the Current Research

The non-financial companies of automobile sector of Pakistan have a greater contribution of using long term debt in their capital structure. The current research will help to find that what factors significantly impact the long term leverage in this sector from profitability, size, tangibility, growth, tax, risk, and non-debt tax shield.

Research Limitations/Implication: The current research is applicable in automobile sector of Pakistan only and is not applicable in financial sector as their capital structure is entirely different from financial sector. The current study covers a small sample of non-financial sector so it also not applicable in textile and food sector because they are largest sectors in non-financial industry.

Literature Review

The study conducted by Shah and Khan (2007) stated that size and tangibility has a positive and significant relationship with **Leverage** while profitability and non-debt tax shield have significant and negative relationship with leverage. Sabir and Malik (2010) found that there are four factors that significantly affecting the leverage in oil and gas sector of Pakistan. They concluded that size, tangibility and liquidity have positive and significant relationship with leverage while profitability has significant and negative relationship with it. The research conducted by Ahmed et al (2010) on life insurance sector of Pakistan concluded that there are six factors that significantly affect the leverage in this sector. They found that size, tangibility, growth and risk have significant and positive relationship with leverage while profitability and liquidity have a negative and significant relationship with leverage.

Hijazi and Tariq (2006) in their study conducted on cement industry of Pakistan found that tangibility and growth have a significant and positive relationship with leverage while profitability and size have a significant and negative relationship with leverage. Hussain (2007) in his study for textile industry of Pakistan found that there are four factor that significantly affecting the leverage in this sector. He found that size, growth and collateral value of asset

positively affect leverage while profitability negatively affects the leverage in capital structure for the firms in textile industry of Pakistan.

Another research conducted by Ali, Akhtar and Sadaqat (2011) states that six factors significantly affect the leverage in non-financial sector of Pakistan. They found that size and non-debt tax shield (depreciation) affect positively to the leverage while profitability, tangibility and liquidity affect negatively to the leverage for the firms in non-financial sector of Pakistan. Liaqat (2011) in his study the determinants of leverage in textile sector of India found that size, tangibility and non-debt tax shield (depreciation) affect positively and significantly to the leverage while profitability and growth affect negatively and significantly to leverage. Shaheen and Malik (2012) in their research for the impact of capital intensity, size of firms profitability on textile sector of Pakistan found that profitability and size affect significantly and negatively to the debt financing decision in this sector while capital intensity affect positively and significantly for the firms in textile sector of Pakistan.

There was a Research gap over the past literature that none of the Pakistani researcher did make a single empirical analysis for the firms in automobile sector of Pakistan for the study of leverage and its determinants and now there is a position to identify the factors that may affect the leverage in this sector by analyzing the past literature and with the help of packing order theory and to see the consistency with the empirical finding of the research conducted on other industries of non-financial sector of Pakistan.

Data and Methodology

Data and Source

The type of data being used for this study is panel data which is arranged with the help of secondary source named **"Financial statement analysis of companies (non-financial**) listed in Karachi Stock exchange Pakistan for the period 2005-2010". It is an annual publication of State Bank of Pakistan. The automobile sector of Pakistan is consists of 22 non-financial companies and the data is used for all these companies with ordinary least square method used for regression analysis due to the fact that it minimizes errors in the model and linearly fit the regression line also. STATA 11 software is used for the analysis of data in this study.

Regression Model

Based on the findings of literature review in the preceding sections and paragraphs, the following constant coefficient regression model is established by pooling cross sections and time period of panel data. Constant coefficient model assumes that there is no cross sectional or time serious effect in the data because both of these dimensions are assumed to be constant in Pooled OLS. The source of the data was "Financial Statement analysis of Companies (non-financial) 2006-2010", a yearly publication by State Bank of Pakistan (www.sbp.org.pk).So the following model has been established:

$$LV = \beta_0 + \beta_1 (PR) + \beta_2 (SZ) + \beta_3 (TN) + \beta_4 (GR) + \beta_5 (TX) + \beta_6 (RK) + \beta_7 (ND) + \varepsilon$$

Where

β_0 = Constant's coefficient

β_1 - β_7 = regression coefficients for independents variables

LV = Leverage

PR = Profitability

SZ = Size

TN = Tangibility

G = Growth

TX= Tax

RK= Risk

ND= Non-debt tax shield

ε = Error Term

Variables' Explanation

Leverage

Researchers used long term debt to total assets as proxy for measuring long term leverage in the capital structure of non-financial companies of automobile sector of Pakistan and used leverage as dependent variable.
Leverage = Long term debts / Total Assets
Profitability

Profitability is defined as the earnings before interest and taxes to total assets. It shows how profitable a firm is in automobile sector of Pakistan. Profitability is calculated as:
Profitability = EBIT/Total Assets
Firm's Size

The size of the firm can be calculated either by log of sale or by log of assets. The researcher in this study measured the firm's size by log of total assets. So the firm's size is calculated as:
Size = Log of total assets
Tangibility

Tangibility of fixed assets is defined as gross fixed assets to total assets. This proxy shows that how much fixed tangible assets a firm has in automobile sector of Pakistan. High tangibility of fixed assets provides a firm with more ability of taking long term loan by providing these fixed tangible assets as collateral security for paying back loan safely. So the tangibility of fixed assets can be calculated as:
Tangibility = Gross Fixed Assets / Total Assets
Growth

There are two ways to measure growth either by change in total sales or by change in total assets. The researcher used change in total assets as proxy for measuring growth in automobile sector of Pakistan. It is calculated as:
Growth = Change in total assets / Total assets
Tax

Tax is defined as current year's tax provision to earnings before tax. The researcher used this variable due to the fact that long term debt (leverage) provide tax shield advantage in the form of interest which decreases taxable income and ultimately decreases the tax payment. It is calculated as:
Tax = Current year's Tax provision / Earnings before tax

Risk

There are lot measures available in the past research for measuring the risk factor like earnings volatility, Standard deviation and coefficient of variation. We used degree of financial leverage as measure of risk because it refers to financial risk attached with long term debt financing or long term leverage. It is defined as earnings before interest and taxes to earnings after interest and taxes. It is calculated as:

Risk = EBIT/ EAIT

Non-debt Tax shield

Non-debt tax shield or simply depreciation is another tax shield available for decreasing the taxable income of a firm. It is defined as earnings after interest and taxes plus depreciation to average tax rate to total assets. It is calculated as:

NDTS = EAIT + Depreciation / average tax rate / total assets

Hypotheses Development

The objective of the researcher in current study is to test packing order theory that provides positive as well as negative relationship between leverage and different factors, so the following hypotheses have been developed according to the above said theory:

H_1: *Profitability should have a negative impact on leverage.*

H_2: *Size should have a negative impact on leverage.*

H_3: *Tangibility should have a negative impact on leverage.*

H_4: *Growth should have positive impact on leverage.*

H_5: *Tax should have a positive impact on leverage.*

H_6: *Risk should have a negative impact on leverage.*

H_7: *Non-debt tax shield should have a negative impact on leverage.*

Regression Analyses and Discussion of Results

The table 4.1 shows the descriptive statistics for the firms in automobile sector of Pakistan for the year 2005-2010.

Table 4.1
Descriptive Statistics

Variables	Mean	Stdv	Min	Max
LEVERAGE	.089561	.136676	0	.761884
PROFIABLITY	.092903	.158367	-.396035	.477595
SIZE	14.7179	1.908067	9.58994	17.9222
TANGIBLITY	.611765	.465539	.046163	4.45964
GROWTH	.121436	.232609	-.675645	1.27727
TAX	.294398	.731768	-1.76560	5.85084
RISK	1.03146	.682821	-3.67157	4.88610
NDTS	.224844	.388383	-1.26582	1.27612

The table 4.1 indicates that firms in automobile sector uses leverage on average at 9% approximately which means that these firms either use internal source of financing heavily or equity financing for meeting their long term investment decision and leverage or long term debt financing plays a very little contribution in long term financing decision in this sector. The table 4.1 also indicates a pretty high value for size and risk on average.

Table 4.2

Correlation Matrix

	LV	PR	SZ	TN	GR	TX	RK	ND
LV	**1.000**							
PR	-0.470	**1.000**						
SZ	-0.401	0.407	**1.000**					
TN	0.342	-0.289	-0.349	**1.000**				
GR	-0.204	0.195	-0.128	0.178	**1.000**			
TX	-0.038	0.066	0.129	0.045	-0.132	**1.000**		
RK	0.075	0.166	-0.107	-0.025	0.064	-0.100	**1.000**	
ND	-0.479	0.894	0.406	-0.225	0.196	0.048	0.074	**1.000**

Table 4.2 indicates correlation matrix of the variables used in the current study. It indicates that Profitability is negatively correlated with leverage with coefficient value as -0.470. It accepts the consistency with packing order theory. Size also shows a negative correlation with coefficient value as -0.401 and accepts the packing order theory while the tangibility shows a positive correlation with leverage showing 0.342 values of coefficient and rejects packing order theory. Growth, tax and non-debt tax shield also shows negative correlation while risk shows positive correlation with leverage in the firms of automobile sector of Pakistan.

Table 4.3

Regression Results of constant coefficient Model (OLS)

Dependent variable - Leverage

Variables	Coefficients	Std. err	t-statistics	P-values
Profitability	-.07461	.14644	-0.51	0.611
Size	-.01458	.00608	-2.40	**0.018
Tangibility	.06971	.02352	2.96	*0.004
Growth	-.12912	.04549	-2.84	*0.005
Tax	-.00462	.01377	-0.34	0.738
Risk	.02046	.01504	1.36	0.176
Non-debt tax shield	-.08063	.05764	-1.40	0.164

Constant	.28245	.09613	2.94	0.004
Num of Obs	**132**			
Prob > F	**0.0000**			
R^2	**37%**			
Adj-R^2	**33%**			
*significant @ 1% level, **significant @ 5% level, ***significant @ 10% level				

Estimated OLS Model

LV = .28245 - .07461(PR) - .01458(SZ) + .06971(TN) - .12912(GR) - .00462(TX) + .02046(RK)

- .08063(ND)

Discussion on findings

The regression analysis shown in table 4.3 indicates number of observation as 132 relating to the firms in automobile sector listed in KSE Pakistan. The overall statistical fitness of the regression model is indicated by Prob > F = 0.000 which means that the model is fit. The R^2 indicates that 37% variation in leverage is explained by profitability, size, tangibility, growth, tax, risk and non-debt tax shield (depreciation) while the remaining 63% is explained by unobserved factors. The adjusted-R^2 is slightly below the R^2 and is indicated as 33%.

Profitability

The table 4.3 shows a negative relationship between profitability and leverage with the coefficient value as -.07461 insignificant with P-value as 0.611. It shows that a one unit increase in profitability will reduce the leverage by .07461. The negative relationship between profitability and leverage accepts the first hypothesis and also consistent with packing order theory which states that there is a negative relationship between profitability and leverage. This finding is also consistent with the same findings by the following researchers; Shah and Khan (2007), Sabir and Malik (2012), Ahmed et al (2010), Hijazi and Tariq (2006) and Ijaz (2011). This negative relationship between profitability and leverage indicates that more profitable firms in automobile sector of Pakistan uses less amount of leverage and prefer to use internal source of financing like retained earnings, surplus etc.

Size

The table 4.3 also shows another negative relationship between firm's size and leverage with coefficient value as -.01458 significant at 5% with P-value as 0.018. It shows that a one unit increase in firm's size will reduce the leverage by 01458. This negative relationship between both variables accepts the 2nd hypothesis and also consistent with packing order theory. It is also consistent with the similar finding of the following researchers; Kakani and Reddy (1998), Shaheen and Malik (2010), Hijazi and Tariq (2006) and Afza and Hussain (2011). It means that the firms with large size use less leverage in their capital structure.

Tangibility

Table 4.3 indicates a positive relationship between firm's tangibility of fixed assets and leverage with coefficient value as .06971 significant at 1% level with P-value as 0.004. This

indicates that a one unit increase in tangibility of fixed assets increases the level of leverage. This negative relationship between both variables rejects the 3rd hypothesis and also not consistent with packing order theory. It is consistent with the same findings by the following researchers; Shah and Khan (2007), Sabir and Malik (2012), Ahmed et al (2010) and Hijazi and Tariq (2006). It indicates that firms with more tangibility of fixed assets uses more leverage because fixed assets are used for providing collateral for paying back the long term loan safely.

Growth

A negative relationship is observed between growth and leverage as indicated in table 4.3 with the coefficient value as -.12912 significant at 1% level with P-value as 0.005. It rejects the 4th hypothesis as well as not consistent with packing order theory. This shows that a one unit increase in growth will result in a decrease in leverage by .12912. This relationship between both variable is consistent with the following researcher's findings; Shan and Khan (2007), Teker, Teseven and Tukel (2009) and Ali (2010). The reason of this relationship might be that growing firms in automobile sector of Pakistan uses less amount of leverage and prefer internal source of financing.

Tax

The table 4.3 indicates a negative relationship between tax and leverage with coefficient value as -.00462 insignificant with P-value as 0.738. This shows that a one unit increase in tax may result a decrease in leverage by .00462. It rejects the 5th null hypothesis and also not consistent with packing order theory. This negative relationship is consistent with the same finding of the Afza and Hussain (2011). It indicates that firms in automobile sector of Pakistan do not avail tax shield advantage for using leverage. This may be due to the fact that large number of firms in this sector prefer to invest in long term asset by internal source of financing like retained earnings.

Risk

Table 4.3 shows a positive relationship between risk and leverage with coefficient value as .02046 insignificant with P-value as 0.176. This indicates that a one unit increase in risk will also increase leverage by .02046. This positive relationship between both variables accepts the 6th hypothesis and also consistent with packing order theory. The above relationship is consistent with the similar findings by the following researchers; Ahmed et al (2010) and Bashir (2012). This shows that increase level of leverage also increases risk level which is negatively perceived by investors and they demands risk premium to compensate this risk.

Non-debt Tax shield

The table 4.3 shows a negative relationship between non-debt tax shield (depreciation) and leverage with coefficient value as -.08063 insignificant with P-value as 0.164. This shows that one unit increase in non-debt tax shield can cause reduction in the level of leverage by .08063. This accepts the 7th hypothesis and also consistent with packing order theory which explains the same negative relationship between both of these variables. This finding is also consistent with the following researchers; Shah and Khan (2007), Afza and Hussain (2011), Teker, Teseven and Tukel (2009) and Kakani and Reddy (1998). This relationship indicates that firms in automobile sector with 2nd tax shield in the form of depreciation prefer to use internal source of financing.

Table 4.4

Expected and Observed Signs

Variables	Exp signs (POT)	Obs Signs	Significant	Hypothesis Accept/Reject
Profitability	(-)	(-)	n/s	Accepted
Size	(-)	(-)	5%	Accepted
Tangibility	(-)	(+)	1%	Rejected
Growth	(+)	(-)	1%	Rejected
Tax	(+)	(-)	n/s	Rejected
Risk	(-)	(+)	n/s	Rejected
Non-debt tax shield	(-)	(-)	n/s	Accepted

Findings & Conclusion: 3 factors (size, tangibility and growth) are statically significant out of the 7 above. The findings are also consistent with the packing order theory as well as with the similar findings of previous researchers. The researcher concluded that the automobile sector should follow packing order theory and should preferably use internal funds for financing needs while for making leverage decision these should consider size, tangibility and growth because these are the important factors that determine the leverage in automobile sector of Pakistan and having significant impact on leverage in this sector.

Conclusion and Recommendations

We conclude that the non-financial firms in automobile sector of Pakistan use packing order theory for their long term financing decision. Out of 7 variables only 3 are significant (Size, tangibility and growth). It means that the firms in automobile sector should keep in mind these factors because these factors determine the leverage decision in this sector. The remaining three factors (profitability, tax, risk and NDTS) are insignificant and do not play any role in the determination of leverage in non-financial firms of automobile sector of Pakistan.

The suggestion for the firms in automobile sector of Pakistan is that they should preferably use internal source of financing to meet their long term investment decision and should use leverage by considering the size, tangibility and growth factor of these firms. These factors play an important role in the determination of leverage for the firms in automobile sector of Pakistan.

Limitations and Suggestions for Future Research

The current research is limited to the firms of automobile industry of non-financial sector of Pakistan and not applicable either to other industries or financial sector and also not applicable to other countries' financial and non-financial sector. The reason for its not applicability is that the researcher took a very small sample of non-financial sector while there are large number of

firms in textile and food sector of non-financial industry. The study is not applicable to financial sector as their capital structure is entirely different from non-financial sector.

It is suggested that future research should include the other sectors of non-financial industry as well as the financial sector. The researcher also suggests that the future researcher should determine the other factors that may impact the leverage in capital structure.

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