Impact of Leverage on Stock Price Volatility Reference to Automobile sector

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1. Introduction

Risks are generally defined by the unfavorable blow on profitability of numerous diverse sources of uncertainty. While the types and degree of risks an organization may be exposed to depend upon a number of factors such as its size, complexity business activities, volume etc. The basic premise of leverage in investment portfolios is to borrow at a cost of capital lower than the return at which the capital can be reinvested. Corporations use financial leverage to create flexibility, maintain access to capital markets, and buy back equity, and ultimately create shareholder value.

The theoretical framework provides the foundation on which the whole research is based. In the theoretical framework, relationship between different variables is identified on which serve as a basis for the whole study. The theoretical framework is the pictorial representation of this relationship derived in the light of previous literature available; the study has considered Leverage as the independent variable and the Risk and Return as a dependent variable.
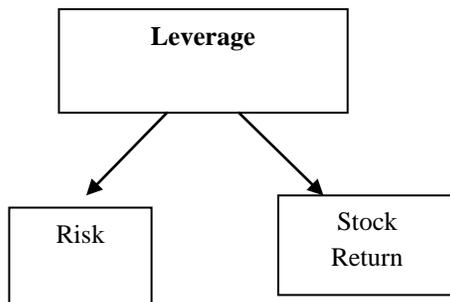
2. Objectives of the study:

a)   To determine the stock return in special reference of automobile sector.

b)   Study the effect of leverage on volatility of stock price in changing economy.

c)   To provide suggestions to improvise the leverage effect.

Based on above objectives hypothesis has developed:

H0- There is no significant impact of leverage on stock price volatility.

H1- There is significant impact of leverage on stock price volatility.

3. Review of Literature

Banumathy, Ramanarayanan(2011) "Modelling Stock Market Volatility: Evidence from India", studied the effects of good and bad news on volatility in the Indian stock markets using asymmetric ARCH models during the global financial crisis of 2008-09. The BSE500 stock index was used as a proxy to the Indian stock market to study the asymmetric volatility over 10 year's period. The BSE500 returns series found to react to the good and bad news asymmetrically. The presence of the leverage effect would imply that the negative innovation (news) has a greater impact on volatility than a positive innovation (news). Therefore, we conclude that, bad news in the Indian stock market increases volatility more than good news.

Abdullah, Parvez, Bari Tooheen(2015) "The impact of financial leverage and market size on stock returns on the Dhaka stock exchange: Evidence from selected stocks in the manufacturing sector" This paper examines the impact of financial leverage and market size of selected stocks on stock returns. Ordinary Least Square (OLS) regression models were used to examine the relationship between the dependent and independent variables. The study established a

significantly negative relationship between leverage and stock return when the overall industrial data is used. However at the individual firm level the relationship was not stable. **Wabwile, Chitiavi, Douglas (2014), "**Financial Leverage and Performance Variance A Mong Banks. Evidence of Tier 1 Commercial Banks Listed On Nairobi Security Exchange Kenya." This paper focus on compare performance amongst tier 1 commercial banks listed on NSE (that is banks with an asset base above 100 billion by the year 2011) in relation to their financial leverage. There is a negative correlation between debt asset ratio and ROAC and ROCEC (-.642) and (-.494) respectively though not significant.

4.   Research Methodology:

4.1 Period of the study: The Study is limited to only five selected companies from automobile industry. The study period is limited to 2004 t0 2014.

4.2 Data Collection Method and sample size: The secondary sources of data are taken from companies who have made it public announcements. The data relating to these variables have been collected from the annual reports of companies, and company's websites. In this study, the reference period is ten years from 2004 to 2014. The companies are;

a) Ashok Leyland
b) Tata Motors
c) Eichers Motors

4.3 Statistics Adopted for the study:

GARCH model: The generalized specification of the threshold GARCH for the conditional variance (Zakoian 1994) is given by:

$$\sigma_t^2 = \omega + \alpha 1 \varepsilon^2_{t-1} + \gamma d_{t-1} \varepsilon^2_{t-1} + \beta_1 \sigma^2_{t-1}$$

The γ is known as the asymmetry or leverage parameter. In this model, good news ($\varepsilon t -1 > 0$) and the bad news ($\varepsilon t1 < 0$) have differential effect on the conditional variance. Good news has an impact of α i, while bad news has impact on α i $+\gamma$i. Hence, if γ is significant and positive, negative shocks have a larger effect on σ 2 t than the positive shock.

Var formula:

$$VarE_t = \frac{\alpha_0}{1-(\alpha_1 + \beta)}$$

$\alpha 0$ = intercept
$\alpha 1$ = ARCH term
β = GARCH

5.   Analysis and Finding

GARCH = C(2) + C(3)*RESID(-1)^2 + C(4)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Ashok Leyland	1.000353	0.000123	8107.393	0.0000
Variance Equation				
C	3.79E-06	3.98E-07	9.521359	0.0000
RESID(-1)^2	0.296776	0.019878	14.92998	0.0000
GARCH(-1)	0.701607	0.017176	40.84895	0.0000

In the above table, RESID (-1) ^2 represents ARCH and GARCH is represented by GARCH (-1). The p value (probability) of the ARCH 1 is found to be 0.0000, whereas and GARCH is also 0.00000which is less than 0.05 meaning that ARCH and GARCH effects are noteworthy. The

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table also suggests that the coefficients α1 (0.296776), and β1 (0.701607) are statistically significant and are within parametric restriction for all the period under the study, thus implying a greater impact of shocks (or news) on volatility.

Thus, the null hypothesis of no Leverage effect is rejected and concludes that there is presence of Leverage effects. Accept the alternative that there is Leverage effect in volatility of stock Return**.**

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Eicher Motors	1.000353	0.000123	8107.393	0.0000
Variance Equation				
C	3.79E-06	1.76E-07	10.10600	0.0000
RESID(-1)^2	0.201391	0.012547	16.05063	0.0000
GARCH(-1)	0.774456	0.010711	72.30242	0.0000

The p value (probability) of the ARCH 1 is found to be 0.0000, whereas and GARCH is also 0.00000which is less than 0.05 meaning that ARCH and GARCH effects are noteworthy. the coefficients α1 (0.201391), and β1 (0.774456) are statistically significant and are w a greater impact of shocks (or news) on volatility. The coefficients of the variance equation are significant. The asymmetric factor β is significant and is positive suggestive of the presence of leverage effect. The σ+β=0.975847 which is near to the 1 i.e. the

sum of ARCH & GARCH terms shows high persistence in volatility. The result derived is 0.825. Level of volatility prevailing in the stock market has been found to be: 0.825.so it shown like there is volatility in stock return, thus the null hypothesis of no Leverage effect is rejected and concludes that there is presence of Leverage effects. Accept the alternative that there is Leverage effect is rejected and concludes that there is presence of Leverage effects.

Variable	Coefficient	Std. Error	z-Statistic	Prob.
Tata Motors	1.000353	0.000123	8107.393	0.0000
Variance Equation				
C	3.78E-07	1.15E-07	3.282458	0.0010
RESID(-1)^2	0.356063	0.019835	17.95084	0.0000
GARCH(-1)	0.763822	0.015220	50.18474	0.0000

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Leverage as shown from the results in Table 5.7 is significant and positive which proves the presence of leverage effect. The significance of this coefficient indicates that negative shocks (bad news) have a larger effect on the conditional variance (volatility) than positive shocks (good news) of the same magnitude. The p value (probability) of the ARCH 1 is found to be 0.0000, whereas and GARCH is also 0.00000which is less than 0.05 meaning that ARCH and GARCH effects are noteworthy.

The table also suggests that the coefficients α1 (0.356063), and β1 (0.763822) are statistically significant and are w a greater impact of shocks (or news) on volatility. The result derived is 2.660115 Level of volatility prevailing in the stock market has been found to be: 2.660115.so it shown like there is volatility in stock return. The null hypothesis of no Leverage effect is rejected and concludes that there is presence of Leverage effects. Accept the alternative that there is Leverage effect is rejected and concludes that there is presence of Leverage effects.

6.   Conclusion and Suggestion
The paper investigated the volatility of stock market returns in Bombay stock exchange using GARCH models in selected companies in automobile sector. Volatility and leverage effects were examined for the BSE returns series from april 1st 2004 to march 31st 2014. The results from GARCH (1, 1) model show that volatility of stock returns is persistent in automobile sector. The result of GARCH model shows the existence of leverage effects in Automobile stock returns. The parameter estimates of the GARCH (1, 1) models (and) indicates a high degree of persistent in the conditional volatility of stock returns on the Bombay Stock Exchange which means an explosive volatility. The analysis of leverage effect in the stock return in automobile sector shows higher. Therefore, the investors are advised to predict volatility in the cash market by observing volatility in the index futures since volatility in the stock market is a measure of market risk. The leverage effect is

positive which indicates the earnings of the firm are higher. The leverage is an important factor which is having impact on Market Price of shares the of the firm and the wealth of the shareholders can be maximized when the firm is able to employ more debt.

The significant negative linkage between share price volatility and Leverage provides empirical supporting evidence for the duration effect, the pricing arbitrage effect and the information effect.

7.   Scope for further study
This paper analyse the GARCH specifications and explain the explosive volatility process but there is more opportunity available for further study with TGARCH model and Researcher can also include more variable with some more number of Companies.

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