

Risk Comparison and the Impact of Advertising on Stock Liquidity between Defensive and Cyclical Sectors

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Abstract

The study aims to compare risk characteristics of Defensive and Cyclical firms and examine the impact of advertisement expenditure on the particular stock liquidity. Risk is compared through four risk measures i.e. Volatility, downside deviation, market beta and maximum drawdown, using monthly return data of five defensive and five cyclical firm from April 2009 to March 2024. Group mean of defensive and cyclical firms is tested through student T test. Stock turnover is used as a proxy for liquidity and results shows significant impact of advertisement on stocks liquidity, positive for cyclical and negative for defensive sector.

Keywords: Cyclical sector, Defensive sector, Volatility, Advertisement, Turnover, Market efficiency.

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Introduction

Financial market characterised by different attributes like expected return, risk and liquidity, assessing these factors at industry, sector and firm level is very crucial for investors, portfolio managers and policy makers. Return is the most crucial factor and beyond that evaluating risk like volatility, downside deviation, market beta and liquidity which define the value at risk and how easily asset can be traded. Understanding how these factors vary across firms and sector is crucial for estimating market behaviour and efficiency.

In financial market firms are categorised into different sector based on the behaviour of their risk and return under different phases of business cycle. MSCI (Morgan Stanley Capital International uses GICS classification to further classify firms into Defensive and Cyclical sector (Applied Research MSCI, 2009). firms with stable demand irrespective of the business cycle have low risk and volatility are called Defensive companies, while Cyclical firms change their tone with the business cycle, their sales and demand depend upon the state of economy (Reilly & Brown, 2003).

Along with the risk differences, firms market value, visibility and information flow also impact market outcomes, Advertisement draw people attention and increase firms' visibility and investors awareness, which has a significant impact on trading volume and liquidity and return (Madsen & Niessner, 2019). Liquidity has its own fundamental importance in making information flow more fluently and bring market closer to efficiency (Chordia et al. 2008). Advertisement creates more trading volume and how more turnover help in incorporating information into stock prices.

In this study we use a variety of risk measures to compare the risk characteristics of defensive and cyclical firms. Second, it investigates how advertising affects the liquidity of a firm's stock using turnover data from the Indian equity market, thus integrating the study of risk, visibility and market efficiency.

Review of Literature

Returns do not follow the same pattern for all the firms in the different phases of business cycle; some firms remain stable during market scruple and some firm goes with the market flow. Stable firms are classified under Defensive sectors and later comes under Cyclical sector. Adian & Asinas (2018) in their paper title "Stock Market Betas for Cyclical and Defensive Sectors: A Practitioner's Perspective", concluded Cyclical firms have higher market beta, exposing them more with the market risk while defensive firm have lower market beta and leave an option of save investment for the investors. Risk of any asset can be measured in different ways; each has its own advantages and disadvantages. Stock return Volatility is a very standard measure of risk and has been used in the research for so long, very recent studies from Chen et al. (2020) and Moolkham (2024) also considered stocks return Volatility as a measure of Risk. Standard Deviation, Downside Deviation and Beta are used as the risk proxies by Vijaya et al. (2024). Maximum drawdown is the highest percentage of loss an investor can have, i.e. from highest point of share value to the subsequent lowest point is also a measure of risk (Ismail & Atiya, 2004). These risk measures give a comprehensive assessment of risk characteristics of Individual firms.

A firm fundamental is not directly visible, making small investors difficult to identify a prospective investment opportunity, firm's advertisement brings investor's attention, increase

firms' visibility and awareness. Fehle et al (2005) discovered in their study that small investors are most influenced by media publicity and there is an abnormal increase in the net buying activity of stocks. Madsen & Niessner (2019) concludes, advertisement attract investors and as an impact of same there is a significant increase in trading volume and turnover, enabling firms to have higher liquidity. Advertisement draws investor's attention and positively impact return for the current year but negatively impact future returns and greater effect is on small and value firms (Chemmunur & Yan, 2019). Mayer (2020) argues that advertisement attract investors and create a temporary price pressure away from fundamentals, helping institutional investors to arbitrage. These studies help us to understand how advertisement affects trading volume and turnover rather than impacting long term returns.

Turnover shows how much liquidity a particular asset holds, liquidity have a foundational importance in market efficiency, during the time of high liquidity there is increased arbitrage that enhance market efficiency (Chordia et al. 2008). There are two ways liquidity positively impact market efficiency, new information is more intensively absorbed into prices during high liquidity and secondly liquidity by arbitrage market participants absorb order flow (Chung & Hrazdil, 2010). Similarly, Hodrea (2015) found significant and positive relation between market information efficiency and market liquidity. More liquidity implies more turnover and more incorporation of information into stock prices.

Despite the substantial literature on the characteristics of defensive/cyclical sectors and the large and growing literature on advertising and the financial markets, we know relatively little about their interaction. The existing literature examines either sector characteristics such as risk or advertising, and attention separately or briefly discusses how advertising and investor attention are related to risk and liquidity at the firm level. Further, there is a dearth of studies in the context of Indian equity markets. This study seeks to close the divide. We compare the risk measures of firms in defensive and cyclical sectors of the Indian equity market and analyse the effect of advertising expenditure on stock liquidity, measured in turnover terms in the Indian market.

Data and Methodology

Data

Monthly adjusted closing price data of 10 companies listed on NSE, five Defensive and five Cyclical firms has been collected for the period of 15 years. From April 2009 to March 2024. Monthly return has been calculated from adjusted closing price. NIFTY 50 return is used as a proxy of market return.

Annual data of Advertisement expenditure by firm, their Market capitalization and share turnover value also collected for the same period, i.e. April 2009 to March 2024. All the data is sourced from CMIE Prowess IQ database.

Methodology

Risk calculation

The research aims to compare the risk characteristics of Defensive and Cyclical sector and how risk vary within and outside the sector among the individual firms. "Volatility, downside deviation, market beta, and maximum drawdown" are the four risk measures used to have a better and clear comparison of risk bearing capacity of firms.

Risk Metric	Definition	Formula
Volatility	Measures the overall dispersion of firm's stock returns and represents the total risk.	$\sigma_i = \sqrt{\left(\frac{1}{(T-1)}\right) \sum_{t=1}^T (R_{i,t} - R_i)^2}$
Downside Deviation	Measures the volatility of negative returns only, capturing downside risk.	$DD_i = \sqrt{\left(\frac{1}{T}\right) \sum_{t=1}^T \min(0, R_{i,t} - R_f)^2}$
Market Beta	Measures sensitivity of a firm's returns to market movements.	$\beta_i = \frac{Cov(R_{i,t}, R_{m,t})}{Var(R_{m,t})}$
Maximum Drawdown	Largest peak-to-trough decline in cumulative returns.	$MDD_i = \max \left[\frac{(P_{peak} - P_{trough})}{P_{peak}} \right]$

These risk measures were calculated using the monthly return (derived from monthly log prices) for each firm, from April 2009 to March 2024.

Risk comparison

Welch two sample T-test is a test to check the difference between the mean of two independent group. In this research it is used to check whether the average of all the four risk measures differ significantly between Defensive and Cyclical sector.

T test equation:

$$t = \frac{(X_D - X_C)}{\sqrt{(s_D^2/n_D) + (s_C^2/n_C)}}$$

Ordinary Least Squares (OLS): it is a statistical method used to estimate the parameters of a linear regression model. In OLS, the goal is to find the line that minimizes the residuals between the observed data points and the predicted values on the line. This method calculates the coefficients for the independent variables in the linear equation, allowing you to describe the relationship between the dependent variable and the predictors. The OLS generally expressed in the form:

$$Y = \beta_0 + \beta_1 X_1 + \varepsilon$$

Where: Y is the dependent variable

X₁ is the independent variable.

β₀ is the intercept (constant term)

β₁ is the coefficients representing the impact of independent variable.

ε is the error term

Results and Discussion

Table 1: Firm Level Risk Measure Variables

Company Name	Category	volatility	Downside Deviation	Beta	Max Drawdown
Bajaj Auto Ltd	Cyclical	0.085	0.056	1.147	-0.393
Hero Motocorp Ltd	Cyclical	0.082	0.052	0.869	-0.600
ICICI Bank Ltd	Cyclical	0.092	0.065	1.506	-0.473
JSW Steel Ltd	Cyclical	0.110	0.070	1.443	-0.631
State Bank of India	Cyclical	0.101	0.064	1.438	-0.553
Cipla Ltd	Defensive	0.070	0.038	0.360	-0.435
Dabur India Ltd	Defensive	0.057	0.031	0.423	-0.225
Dr Reddy's Laboratories Ltd	Defensive	0.075	0.048	0.322	-0.549
Hindustan Unilever Ltd	Defensive	0.062	0.032	0.315	-0.259
ITC Ltd	Defensive	0.060	0.035	0.546	-0.489

Source: Authors' own calculation

The firm level risk analysis reported in table1 brings out the considerable variation in the risk profile of cyclical and defensive firms. In terms of total risk, measured by volatility JSW steel Ltd exhibits the highest volatility among cyclical firms, while Hero MotoCorp Ltd demonstrate the lowest. Dr Reddy's Laboratories Ltd exhibits the highest volatility among the defensive firms. Dabur India Ltd marks the lowest volatility, reflecting risk averse conditions of defensive sector. In the case of downside risk variable, JSW Steel Ltd emerge as the most downside risk prone firm in the cyclical category. Dr Reddy's laboratories depicts a similar pattern of the highest downside risk firm in the defensive category as well. Based on Beta estimates which measures the sensitivity of a firm's returns to market movements, it is observed that ICICI Bank Ltd has the highest market sensitivity and the Hero MotoCorp Ltd has the lowest beta value among the cyclical firms. ITC Ltd and Hindustan Uniliver Ltd exhibits the highest and the lowest beta values respectively among the defensive sector firms. The analysis of **maximum drawdown reveals that JSW Steel Ltd and Bajaj Auto Ltd has the highest and the lowest position respectively in the cyclical sector. In contrast Dr Reddy's Laboratories Ltd depicted the highest score among the defensive firms.**

Table 2: Group Averages of Cyclical and Defensive Firms

Category	Mean volatility	Mean Downside Deviation	Mean Beta	Mean Max Drawdown
Cyclical	0.094	0.061	1.280	-0.530
Defensive	0.065	0.037	0.393	-0.392

Source: Authors' own calculation

The inter group analysis between cyclical and defensive firms exhibits notable differences in the mean volatility scores. Cyclical firms exhibit a **higher mean volatility** (0.094) compared to defensive firms (0.065). A similar pattern is observed for **downside deviation**, where cyclical firms record a higher mean value (0.061) than defensive firms (0.037). In terms of **systematic risk**, measured by beta, cyclical firms have a remarkable higher mean beta (1.280), as compared to that of defensive firms (0.393). The analysis of **maximum drawdown** provides additional support for these results. Cyclical firms experience a deeper average maximum drawdown (-0.530) compared to defensive firms.

Table 3: Mean Difference Tests of Volatility between Defensive and Cyclical Firms

RISK MEASURE	FIRM TYPE	MEAN	T-STATS	P-VALUE
Volatility	Defensive	0.06	4.81	0.002
	Cyclical	0.09		

Source: Authors' own calculation

A Welch's t-test was employed to examine whether there is a statistically significant difference in stock return volatility between defensive and cyclic firms. Since the calculated P - Value is less than the level of significance at 5%, it is evident that there is a statistically difference in the volatility index of defensive and cyclical firms.

Table 4: Mean Difference Tests of Downside Deviation between Defensive and Cyclical Firms

RISK MEASURE	FIRM TYPE	MEAN	T-STATS	P-VALUE
Downside Deviation	Defensive	0.03	5.38	0.000
	Cyclical	0.06		

Source: Authors' owns calculation

The mean downside deviation for defensive firms is 0.03, and 0.06 for cyclical firms. The t-statistics of 5.38 with a p value of 0.000 represent that there is statistically significant difference in the downside deviation measures of the two sectors.

Table 5: Mean Difference Tests of Beta between Defensive and cyclical Firms

RISK MEASURE	FIRM TYPE	MEAN	T-STATS	P-VALUE
Beta	Defensive	1.28	6.95	0.000
	Cyclical	0.39		

Source: Authors' own calculation

Welch's t test results for Beta measure corroborates a similar finding of having statistically significant difference for systematic risk measure between cyclical and defensive firms.

Table 6: Mean Difference Tests of Maximum Drawdown between Defensive and cyclical Firms

RISK MEASURE	FIRM TYPE	MEAN	T-STATS	P-VALUE
Maximum Drawdown	Defensive	-0.39	-1.79	-0.115
	Cyclical	-0.53		

Source: Authors' own calculation

T statistics and the associated p value reported in table 4, contradicts the previous results. The null hypothesis of no statistically significant difference between the maximum drawdown measure of cyclical and defensive firm is accepted. This implies there is no significant difference in the largest peak to trough decline in cumulative returns between the two sectors.

The study further conducted the ordinary least square regression, utilizing stock return as the dependent variable, and the advertisement expenditure as the independent variable. Market capitalization is used as the control variable in the model. While checking the robustness of the results, autocorrelation emerged as the prominent issue in calculating the perfect model fit. Newest regression was then used for calculating the accurate empirical results.

Table 7 reveals the results of the newest regression for defensive sector firms.

Table 7: Regression of Defensive Firms

Variables	Coefficients	T-Statistics	P-Value
Advertisement Expenditure	-0.277	-2.55	0.0124
Market Capitalization	0.963	-3.28	0.001

Source: Authors' own calculation

Defensive sector includes firms from Fast moving consumer goods, pharmaceutical and firms dealing with goods of essential commodities. From the results of table 7, it is observed that there is a negative relationship between Advertisement expenditure and stock turnover of the firms. It is often seen that consumers purchase essential goods regardless of the fact that the conditions in the economy are stable or unstable. Whenever firms in this sector increase advertising expenditure, it gives a perception to the people that firms are losing their market share and falling behind their competitors. Investors then start believing that the financial health of the company is deteriorating and hence it needs to advertise aggressively. This leads to a loss of trading interest among them. As a result, the liquidity and turnover of the firms decline. Present study results reveal that the advertisement expenditure in the defensive sector reduces the turnover by 0.27 units. These results align with the signalling theory (Ross, 1977) and investor conservatism bias (Edwards, 1968).

Table 8 reveals the results for the newest regression results for the cyclical firms.

Table 8: Regression of Cyclical Firms

Variables	Coefficients	T-Statistics	P-Value
Advertisement Expenditure	0.118	2.10	0.0483
Market Capitalization	0.748	6.88	0.000

Source: Authors' own calculation

In the case of cyclical firms, the perception of investors towards Advertisement expenditure incurred by the firms is totally opposite to that of the defensive sector firms. Advertising is often seen as the growth signal for the firm. It is believed that the firms have the relevant capacity and potential for future market expansion. Investors believe that firms are going to expand and therefore respond by trading more actively. They react with more positive expectations about the future performance of the firms. In the same context, it is observed that firms in the cyclical sector have a positive relationship with the stock market turnover.

Many other theories such as attention-based valuation given by Grullon, Kanata's and Weston (2004) suggest that advertising improves firm visibility and reduces investor's attention.

Hence, one can argue that advertising expenditure has in the past, shown to impact investors perception and firms positioning in the market, further affecting their trading activities (Barber and odean, 2008; Grullon etal; 2004, Lou, 2014).

Conclusion

This study provides a comparative analysis of different risk measures between cyclical and defensive firms. Data for the study was extracted from the Prowess IQ Database of CMIE. The study employed a Welch's t test to establish a significant difference between the measures of volatility, downside deviation and systematic risk (beta) among the firms in the two sectors. Calculating the mean average of these risk measures further revealed that cyclical firms are more exposed to risk than the defensive firms. Application of Newest regression analysis, in the later stages of study further highlights the association of advertisement expenditure incurred by the firms with their stock turnover. For calculating the empirical results of this model advertisement expenditure is taken as the independent variable, market capitalization as control variable and stock turnover as the dependent variable. Regression results reveal that there is a negative relationship between Advertisement expenditure and stock turnover in the case of cyclical firms. This emphasizes the negative perception of investors towards aggressive Advertisement expenditure, believing that the firms are lagging behind with their competitors. However, on the contrary, firms in the cyclical sector depicted positive relation between the two variables. This reinforces the fact that investors of cyclical firms see higher advertising expenditure as the signal for market expansion and growth of the sector.

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