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AN EMPIRICAL ANALYSIS ON CAPITAL ASSET PRICING MODEL ON IMPACT INVESTING STOCKS AMONG INDIAN AUTOMOBILE INDUSTRY

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Abstract: *Impact investing is all about making an investment which brings a positive impact in the society/environment while also earning a reasonable profit. In recent times impact investing firms are on the rise as many investors are interested in bringing about a positive social/environmental impact through their investments. Choosing the right impact creating stock which yields good profit in the market is quiet challenging, as good yielding investment has its own risk factors. The Capital Asset Pricing Model (CAPM) in general is a simple financial model that enables an investor to analyze an investment's expected return. A novel and distinctive approach to a significant investment task is represented by CAPM. Financial planners can create accurate, practical estimations on the costs of equity capital by using the model in combination with other conventional methods and reasonable judgments. This paper empirically analyzes the CAPM of six well-known automobile industry stocks who are also actively involved in manufacturing electric vehicles; thus, creating a positive impact on the environment. The CAPM assesses expected returns based on systematic risk: Bajaj Auto Ltd leads in the CAPM index, suggesting strong expected returns. In contrast, companies like Tata motors and Mahindra & Mahindra show substantial negative expected returns, reflecting significant market risks. This indicates that in spite of considerable risks many companies are manufacturing electric vehicles, thus making the automobile sector a good market opportunity for investors.*

Keywords: *Capital Asset Pricing Model, Impact Investing, Risk, Return, Market trends, Automobile.*

I. INTRODUCTION

A sustainable investment technique known as impact investing aims to provide financial gains while simultaneously having a convincing positive influence on the community or the environment. A company can offer monetary benefits to investors while also accomplishing a positive impact in the world by making money through an inventive business model. Many investors want to use their riches to create positive change and match the investments they make with their principles. An investor can concentrate on sectors where their money may make a difference by using impact investing tactics. They can also assist an investor in locating cutting-edge businesses with the potential to develop by tackling the world's environmental and social issues.

Electronic vehicles are crucial for the environment since it offers environmentally preferable substitutes for fuels which are harmful to the environment. Numerous studies show that many people are preferring electric vehicles as they are both cost effective and are eco-friendly, particularly in developing nations like India where people are becoming more social and environmental conscious. The nation is working to strike a delicate balance between providing for its rapidly increasing energy demands and cutting pollution. India's dedication to expanding renewable energy, promoting sustainable growth, and promoting the use of electric vehicles is unwavering. The country is working to carve a more improved greener future for the future generations by mindfully considering its economic development with environmental consciousness.

II. LITERARY REVIEW

All of the world's stock markets saw significant volatility as a result of the 2008 subprime crisis. Therefore, it is anticipated that stock prices will deviate from their equilibrium level. This paper aims to empirically investigate the capital asset pricing model (CAPM) in the context of the 2008 Indian securities market crisis. The sub-prime crisis period is the subject of the study. As a result, an effort has been undertaken to analyse the CAPM while taking the recession into account. Additionally, the CAPM has been evaluated on a rolling sample of daily data for a year using a monthly updating strategy in order to demonstrate the model's robustness. According to this research, the CAPM is unable to effectively describe how stocks generate returns, Shweta Bajpai and A.K. Sharma (2017). One important paradigm in financial risk management is the capital asset pricing model (CAPM). In the presence of a risk-free investment, such short-term government bonds, it formalises mean-variance optimisation of a risky portfolio. The premium that investors seek for taking on extra risk is used by the CAPM to determine the price of financial assets, James Ming Chen (2021).

Sehgal and Subramanian (2012) used data for 493 companies listed on the BSE between January 1996 and December 2010 to investigate the profitability anomaly for the Indian stock market. Contrary to earlier studies for developed economies, an empirically supported negative relationship between profitability and returns has been shown. Additionally, the link is strong regardless of the profitability metric chosen. The results can be explained by the fact that more profitable companies typically pay out larger dividends, which makes them appear less risky to investors, which lowers returns. Their argument is supported by data showing a negative correlation between payouts and beta and a positive correlation between profitability and payouts.

III. DATA SAMPLE AND METHODOLOGY USED

The study makes use of secondary data for analysis. All required data were extracted from authentic official websites of India stocks listed in Bombay Stock Exchange are the samples for the study. Bajaj Auto Ltd, Eicher Motors, Hero Motors, Mahindra & Mahindra, Maruti Suzuki Ltd and Tata Motors are the companies chosen for the study, they focus more on green energy in the recent times especially with the increase in the use of Electric vehicles in the Indian market. The stock price data for calculation of CAPM was obtained for ten years, from 2014 to 2024.The collected data was analyzed with the CAPM formula to arrive at the results.

IV. OBJECTIVES OF THE STUDY

- The purpose is to evaluate the CAPM's applicability on selected companies.
- To determine whether the chosen companies' stocks have good return relative to its risk.
- To use beta as a risk measure to calculate the market risks associated with a stock.

V. CAPITAL ASSET PRICING MODEL (CAPM)

The capital asset pricing model or CAPM, is a sort of financial concept used in corporate finance to explain how the potential risks of an investment (for example, a stock) along with market as a whole relate to one another. This technique is frequently used by investment bankers to evaluate specific stocks or entire portfolios. The CAPM analyzes the connection between an investment's risk and the market's overall inherent risks. The main purpose of CAPM is to quantify systemic risk, which is the risk that neither a firm nor an individual can predict nor avoid. Risk from exchange rates, interest rates, and inflation are all examples of systemic risk.

The following linear equation can be used to illustrate the relationship between the expected return and the risk. It was postulated by Mossin, William F. Sharpe and John Lintner.

Formula:

$$E_{Ri} = R_f + \beta_i (ER_m - R_f)$$

E_{Ri} = Expected Return on investment

The amount an investor should earn over the course of an investment is known as the expected rate of return on that asset or investment. The expected rate of return in the CAPM formula depends on other variables in the formula, such as the stock's beta and the market return rate.

R_f = Risk free rate

Theoretically, certain securities such as stocks or bonds are riskless. The risk-free rate of return is typically calculated using the yield on a government bill or bond. Using securities issued by the government serves as the standard for risk-free rates. These assets represent no risk to investors because there will be no payment defaults.

β_i = Beta of investment

An asset, stock or investment's beta simply measures how risky it is. The beta is a monetary measure of the stock's price volatility in relation to the market. Beta may also be considered as the stock's sensitivity to market fluctuations; a stock with a high beta will be quite volatile, whilst a stock with a low beta will not react to movements in the market as strongly. A stock's beta indicating one is just as erratic as the market, whereas a beta less than one indicates that the stock is stabler and less risky. Stocks with betas higher than one are nonetheless, more erratic than the market. It's not always beneficial or bad to have an elevated or decreased beta. Stocks with high betas, however, are riskier but could possibly produce bigger profits. Although they may provide lesser returns, lesser betas are less dangerous. Certain kinds of stock options frequently contain negative betas, which can have advantages and disadvantages.

ER_m = Expected Return of market

The average amount that investors can anticipate making from an investment in the stock market overall, based on previous data, is known as the market's rate of return.

$(ER_m - R_f)$ = Market risk premium

The risk premium also known as the market risk premium, in CAPM is the discrepancy between the returns on a particular stock or investment and the risk-free rate of return. In essence, this is the amount that the investor earns from taking a risk as opposed to investing in options with lower or no risk, like government bonds. A particular investment may carry a high-risk premium if it is particularly risky, which means the investor should receive a higher return on their risk.

VI. ANALYSIS AND INTERPRETATION

CAPM Index for the Automobile Companies

Name of the Company	Rf	Beta	Rm	CAPM Index
Bajaj Auto Ltd	7.50	0.35	0.04	4.89
Eicher Motors	7.50	2.46	0.04	-10.88
Hero Motors	7.50	0.44	0.04	4.25
Mahindra & Mahindra	7.50	2.30	0.04	-9.68
Maruti Suzuki Ltd	7.50	0.70	0.04	2.28
Tata Motors	7.50	2.69	0.04	-12.57
Average	7.50	1.49	0.04	-3.62

Bajaj Auto Ltd with a low Beta of 0.35, shows a positive CAPM index of 4.89, indicating that it offers a good return relative to its risk. Eicher Motors with high Beta of 2.46 suggests significant volatility, and its negative CAPM index of -10.88 indicates that it

underperforms compared to what would be expected based on its risk profile. Hero motors have a beta of 0.44, yielding a positive CAPM index of 4.25, suggesting favorable returns relative to its lower risk. Mahindra & Mahindra with beta of 2.30, this company also shows underperformance with a CAPM of -9.68, similar to Eicher motors. Maruti Suzuki Ltd has a beta of 0.70 and a CAPM index of 2.28, indicating moderate returns that align well with its risk. Tata Motors the highest beta at 2.69 results in a significant negative CAPM index of -12.57 indicates poor performance relative to its expectations based on its high risk.

VII. CONCLUSION

The average Beta across these companies is 1.49, which indicates that, on average, they are more volatile than the market (Beta > 1). The average CAPM index of -3.62 suggests that, collectively, these companies are underperforming against their expected returns. The analysis reveals that while some companies like Bajaj Auto and Hero Motors provide positive returns relative to their risks, others such as Eicher Motors and Tata Motors significantly underperform according to the CAPM model's expectations. This discrepancy highlights the importance for investors to consider both Beta and the CAPM index when evaluating potential investments in the automotive sector, as higher volatility does not always correlate with higher returns, which is crucial for making informed investment decisions in this industry.

Nonetheless, the findings of this thesis are consistent with research conducted after 1965, such as French 1980 or Fama and French 1992, which disapproved of the model. However, one should use caution when comparing the findings of these research because they permitted factors other than beta to affect stocks' predicted return. It is important to remember that this model is built on very strong assumptions and uses the most basic version of the CAPM. It was assumed, for example, that all investors had equal access to information and that there were no market defects (taxes, transaction costs). Maybe the findings would be better if some of the assumptions were changed or reenacted. Additionally, some CAPM variants place constraints on risk-free assets. For example, the Black versions of the CAPM assume that there are no risk-free assets on the market, or the CAPM where lending at a risk-free rate is feasible but borrowing is not. There may be empirical evidence to support these versions. It's also critical to keep in mind that the market and market portfolio were represented by the WIG index. Though theory posits that a market portfolio includes all tradeable assets, including not just stocks, bonds, options, and futures, but also property and human capital, it is important to keep in mind that such an index only includes common stocks. Future research might benefit from testing the Arbitrage Pricing Theory, a theory that was established after the CAPM and that permits factors other than beta to affect the rate of return on securities.

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