

Validity of Capital Asset Pricing Model & Stability of Systematic Risk (Beta) of FMCG - A Study on Indian Stock Market

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Abstract

Fast Moving Consumer Goods (FMCG) goods are all consumable items (other than groceries/pulses) that one needs to buy at regular intervals. These are items which are used daily, and so have a quick rate of consumption, and a high return. The FMCG sector in India is at present, the fourth largest sector with a total market size in excess of USD 13 billion as of 2012. This sector is expected to grow to a USD 33 billion industry by 2015. The CAPM model assumes that the variance of returns is an adequate measurement of risk. This would be implied by the assumption that returns are normally distributed, or indeed are distributed in any two-parameter way, but for general return distributions other risk measures (like coherent risk measures) will reflect the active and potential shareholders' preferences more adequately. To test the results statistical correlation analysis was done to show the significant relationship between CAPM return and actual return and risk associated with market beta and CAPM beta.

Keywords: CAPM, beta, FMCG companies, Risk and returns.

Introduction

The **Capital Asset Pricing Model (CAPM)** is used to determine a theoretically appropriate required rate of return of an asset, if that asset is to be added to an already well-diversified portfolio, given that asset's non-diversifiable risk.

Formula:

$$E(R_i) = R_f + \beta_i(E(R_m) - R_f)$$

where:

- $E(R_i)$ is the expected return on the capital asset
- R_f is the risk-free rate of interest such as interest arising from government bonds
- β_i is the sensitivity of the expected excess asset returns to the expected excess market returns, or

$$\beta_i = \frac{\text{Cov}(R_i, R_m)}{\text{Var}(R_m)}$$

- $E(R_m)$ is the expected return of the market
- $E(R_m) - R_f$ is sometimes known as the market premium (the difference between the expected market rate of return and the risk-free rate of return).
- $E(R_i) - R_f$ is also known as the risk premium

Restated, in terms of risk premium, we find that:

$$E(R_i) - R_f = \beta_i(E(R_m) - R_f)$$

Literature Reviews

This section covers review of literature from some of the important research papers, studies and articles as published by different authors. A large number of

studies on the growth and financial performance of CAPM model have been carried out during the past, in the developed and developing countries. Brief reviews of the following research works reveal the wealth of contributions towards the performance evaluation of Indian Stock Market.

Mika Vaihekoski Eero Pätäri (2007): This study examines the relationship between various types of risks and returns on the six-pronged cost-weighted portfolio from the year 1987 to 2004. In addition, we check whether the Finnish market has a large equity premium or not.

Kushankur Dey & Debasish Maitra, Doctoral Participant: Investing principle in the securities market gives pre-recovery of the relationship between risk and returns. In a review of the studies done for different markets of the world, researchers have used several methods to test the validity of CAPM. While some studies have endorsed and agreed with the validity of CAPM, some others have pointed out that Beta alone is not an appropriate indicator of property pricing and many other factors can explain the cross-section of returns

Mazen Diwani, Hossein Asgharian (2010): This paper is designed to check the legitimacy of the CAPM model in the emerging markets. The Indian market should be implemented in this case in which we will examine the applicability of this model and therefore I decided to study one of the largest Indian markets;

Objectives of the Study

1. To use the CAPM to establish benchmarks for measuring the performance of investment portfolios.
2. To infer from the CAPM the correct risk-adjusted

discount rate to use in discounted-cash flow Valuation models.

3. Validity of CAPM model for selected FMCG Company.
4. To identify the accuracy of beta on the basis of company return.

Methodology

Correlation: In the statistics, correlation and dependence is a broad class of statistical relations between two or more random variables or viewed data values. Familiar examples of dependent events include the relationship between the physical compositions of parents and their offspring and the relationship between a product's demand and its price. Correlations are important because they can indicate a predictive relationship that can be exploited in practice. For example, on the basis of connection between power demand and weather, an electric utility can produce less power on a light day. Correlation may suggest possible causes or mechanical relations; Although statistical dependency is not enough to demonstrate the presence of such relationships

$$r = \frac{\sum_i (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum_i (x_i - \bar{x})^2} \sqrt{\sum_i (y_i - \bar{y})^2}}$$

β (Beta)

Beta coefficient is calculated as co-representative of the return of a stock with market return divided by the return of market returns. A minor amendment helps in the creation of another important relationship which states that beta coefficient is equal to the coefficient of multiplication multiplied by the standard deviation of the stock returns divided by the standard deviation of

Dabur

Table 1

Year	Rm	Return of stock (X)	CAPM b	Calculated b	Remark
2008	-0.2531	0.0714	0.0544	0.3695	Aggressive
2009	0.2494	0.0308	-0.3717	0.1020	Aggressive
2010	0.0727	-0.2145	17.5590	0.2011	Defensive
2011	-0.1029	-0.0870	0.9173	0.0083	Defensive
2012	0.1063	-0.1078	-12.1736	0.1188	Aggressive

In the year 2008, calculated (actual) beta was 0.3695 and calculated beta as per CAPM with reference to return given by the company was 0.0544. So with reference to the calculated value of beta on the basis of actual return and beta derived from the capital asset pricing model (CAPM) with the use of Risk free rate and market premium, it can be interpreted that instability of the systematic risk and CAPM beta. In the year 2009, calculated beta as per CAPM with reference to return given by the company was -0.3717 and the actual beta was 0.1020.

the share return. Beta coefficient is given by the following formulas:

$$\beta = \frac{\text{Covariance of Market Return with Stock Return}}{\text{Variance of Market Return}}$$

$$\beta = \frac{\text{Correlation Coefficient} \times \text{Standard Deviation of Stock Returns}}{\text{Standard Deviation of Market Returns}}$$

Expected Return: The expected return for an individual investment is simply the sum of the probabilities of the possible expected returns for the investment.

$$\text{Expected Return } E(R) = p_1R_1 + p_2R_2 + \dots + p_nR_n$$

Where: p_n = the probability the return actually will occur in state n

R_n = the expected return for state n

1. Database

No.	Name of Company	Market Capitalization (In Crores)
1	ITC Ltd.	2558404.00
2	Hindustan Unilever Ltd.	1237773.00
3	United Spirits Ltd.	379022.00
4	Dabur India Ltd.	299935.81
5	Godrej Consumer Products Ltd.	289559.81
6	Marico Ltd.	142516.91
7	Tata Global Beverages Ltd.	99252.97

(Data As on November, 2013)

2. Empirical Findings and Discussion: This paper has tried to examine the Validity of Capital Asset Pricing Model & Stability of Systematic Risk (Beta) with Reference to FMCG.

Godrej Consumer Products**Table 2**

Year	Rm	Return of stock (X)	CAPM b	Calculated b	Remark
2008	-0.2531	0.1079	-0.0520	0.2016	Aggressive
2009	0.2494	0.1461	0.3519	0.1127	Defensive
2010	0.0727	-0.2690	20.6988	-0.2355	Defensive
2011	-0.1029	-0.1411	1.1981	0.2460	Defensive
2012	0.1063	0.1063	1.0012	0.1534	Defensive

In the year 2008, calculated (actual) beta was 0.2016 and calculated beta as per CAPM with reference to return given by the company was -0.0520. So with reference to the calculated value of beta on the basis of actual return and beta derived from the capital asset pricing model (CAPM) with the use of Risk free rate and market premium, it can be interpreted that instability of the systematic risk and CAPM beta.

Hindustan Uniliver Limited**Table 3**

Year	Rm	Return of stock (X)	CAPM b	Calculated b	Remark
2008	-0.2531	0.1931	-0.3002	0.4238	Aggressive
2009	0.2494	-0.0681	-0.9923	0.1493	Aggressive
2010	0.0727	-0.1446	13.5255	0.3156	Defensive
2011	-0.1029	0.1490	-0.3057	0.1267	Aggressive
2012	0.1063	0.0497	-2.4847	0.1521	Aggressive

From the year 2008 to 2012 calculate i.e. actual beta was higher than the CAPM beta derived by using actual return given by company except 2010. In the year 2010 CAPM beta 13.5255 was higher than calculated beta 0.3156. In 2008 CAPM beta was -0.3002 and calculated beta was 0.4238. In the year 2009 calculated beta was 0.1493 and CAPM beta was -0.9923 and the return of company was also negative. In the year 2011 actual i.e. calculated beta was 0.1267 and CAPM beta was -0.3257. And in the year 2012 calculated beta was 0.1521 and CAPM beta was -2.4847.

Indian Tobacco Company (ITC)**Table 4**

Year	Rm	Return of stock (X)	CAPM b	Calculated b	Remark
2008	-0.2531	-0.0862	0.5136	0.4057	Defensive
2009	0.2494	-0.0105	-0.6312	0.4566	Aggressive
2010	0.0727	0.0682	1.2569	0.4547	Defensive
2011	-0.1029	0.0297	0.3126	0.2289	Defensive
2012	0.1063	0.1182	1.7322	0.1307	Defensive

From 2008 to 2012 CAPM beta with reference to return given by company was higher than the calculated i.e. actual beta except the year 2009. In the year 2009, CAPM beta i.e. -0.6312 is lower than the calculated beta i.e. 0.4566 and also the return of stock was negative. In the year 2008, CAPM beta was 0.5136 and calculated beta was 0.4057. In the year 2010, stock return was 6%, CAPM beta with reference to the return given by company was 1.2569 whereas calculated beta was 0.4547. In the year 2011, calculated i.e. actual beta was 0.2289 and CAPM beta was 0.3126.

Results of Hypothesis:

H0: There is no significant relationship between actual return and CAPM return of Tata Global Beverages Limited

H1: There is significant relationship between actual return and CAPM return of Tata Global Beverages Limited

Table 5: Showing correlation test between CAPM return and actual return

Company	Calculated Value	tabulated value	result of Hypothesis
Dabur	-0.4548	0.811	accept null Hypothesis
Godrej	0.03895	0.811	accept null Hypothesis
HUL	-0.71108	0.811	accept null Hypothesis
ITC	-0.4888	0.811	accept null Hypothesis
Marico	0.72416	0.811	accept null Hypothesis
Tata Global beverages	0.2709	0.811	accept null Hypothesis
United spirits	0.57009	0.811	accept null Hypothesis

The above table shows the result of hypothesis on actual return and return calculated through CAPM on the selected sample companies of FMCG sector. It shows there no relationship between the actual return and CAPM return that is actual return is different than the return of Asset pricing Model.

H0: There is no significant relationship between actual beta and calculated beta of Tata Global Beverages Ltd.

H1: There is significant relationship between actual beta and calculated beta of Tata Global Beverages Ltd.

Table 6: Showing correlation test between Actual beta and Calculated beta

Company	Calculated Value	tabulated value	result of Hypothesis
Dabur	0.194	0.811	accept null Hypothesis
Godrej	-0.9591	0.811	accept null Hypothesis
HUL	0.4003	0.811	accept null Hypothesis
ITC	-0.5176	0.811	accept null Hypothesis
Marico	0.6207	0.811	accept null Hypothesis
Tata Global beverages	-0.2268	0.811	accept null Hypothesis
United spirits	0.6643	0.811	accept null Hypothesis

The above table shows the result of hypothesis on actual beta of stock and calculated beta of the selected sample companies of FMCG sector. It shows there no relationship between actual beta of stock and calculated beta that is actual volatility of stock different than the calculated (desired) volatility of selected FMCG stocks.

Findings & Conclusion

- From the year 2008 to 2013, the stock of Dabur India Limited is overpriced in all the years except the year 2008. That shows that the expectations of the stock holder are higher as compared to the return given by company.
- In 2008, 2009 and 2012 systematic risk i.e. beta of Dabur India Limited is Aggressive and in the year 2010 and 2011 beta is defensive. The correlation between CAPM return and actual return for the 5 years is -0.4548 whereas the correlation between calculated beta and actual beta for the 5 years is 0.1940.
- The stock of Godrej Consumer Products is overpriced in the year of 2010 and 2011. Except these years the stock is underpriced. Beta i.e. systematic risk associated with the stock is Aggressive in the year 2008. Except this year the stock beta is defensive.
- Correlation between CAPM return and Actual return is 0.0389 and the correlation of actual beta

and CAPM beta is -0.1951 From the year 2009, 2010 and 2012, the stock of HUL is overpriced. That shows that the expectations of the stock holder are higher as compared to the return given by company. The systematic risk i.e. Beta is aggressive in all the years except 2010.

- Correlation between CAPM return and Actual return is 0.71108 and the correlation of actual beta and CAPM beta is 0.4003 From all the years except 2012, the stock of ITC is overpriced. That shows that the expectations of the stock holder are higher as compared to the return given by company. The systematic risk i.e. Beta is aggressive in all the years except 2009.
- Correlation between CAPM return and Actual return is -0.4888 and the correlation of actual beta and CAPM beta is 0.5176.
- The stock of Merico Ltd. Is overpriced in all the years. That shows that the expectations of the stock holder are higher as compared to the return given by company. The systematic risk i.e. Beta is defensive in the years 2008, 2010 and 2011 and aggressive in the years 2009 and 2012. This shows that in consecutive years risk is not stable, it's fluctuating.
- Correlation between CAPM return and Actual return is 0.72416 and the correlation of actual beta and CAPM beta is 0.6207.

- The systematic risk i.e. Beta is defensive in all the years except 2009. This shows that market risk in CAPM beta is higher than actual beta. Correlation between CAPM return and Actual return is 0.57009 and the correlation of actual beta and CAPM beta is 0.6643.

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