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Original Research Article

Stock evaluation using capital assets pricing model with reference to select food processing organisations in India

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ABSTRACT

The capital asset pricing model is used to calculate the expected return of stock of the firm. Researcher has evaluated the stock of the ten food processing companies based on its share prices either from National Stock Exchange or Bombay Stock Exchange for the period from 2017-2018 to 2021-22. The researcher has evaluated the cost of equity and its application in different stock market conditions with the application of CAPM. CAPM can be applied in risk controlling and to project the synergy effects in mergers and acquisition process.

1. Introduction

Investment risk remains a big issue in terms of financing, and this impact on expected returns. CAPM are used to measure the cost of capital in firms and evaluate the performance of portfolios. According to this model, there are two types of risk; systematic risk and unsystematic risk. Systematic risk is called differential risk and market risk. Systemic risk arises from the fluctuations in securities income caused by the business aspects of the macro economy (Changes in politics, Government policy, changes in the Nation's economy and International economy). The second risk, unsystematic risk, is called company risk and diversified risk. This affects the company's revenues in the scenarios such as the production of undesirable products, labour strikes, etc., in the micro-economy.[1–5]

1.1. Theoretical background of the study

The CAPM includes a coherent framework for investment problems. This model was introduced in 1962 by Jack L. Treynor. The model was further developed by William Sharp in 1964, John Linter in 1965 and Jan Mossin, in 1966. An important part of this type of portfolio management was independently developed in 1952 by Harry Markowitz in his earlier work, Diversification and Modernity. The CAPM model is a key asset value measurement model that provides a risk relationship between underlying returns and capital. Based on the overall Markowitz Model, Sharp (1964) and Linter (1965) invented a new paradigm, the CAPM, in which two models are considered best when describing the trade-off between risk and return. In that case the CAPM model consists of the key components of money pure time value, market risk premium, and beta for asset. Lastly, this model has been well received by many investors and researchers in the 1960s and 70s.

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1.2. Basic concepts and terms of CAPM

Here the formula of CAPM model is explained,

$ER_{i = R_f + \beta_i (ER_m - R_f)}$ Where:

ER*i* = Expected return if Investment Rf = Risk Free Rate Bi = Beta of Investment

(Erm – Rf) = Market risk premium

1. *Risk:* Risk is the difference between the expected return and the actual return
2. *Risk Free Rate:* The risk-free rate is the time value of money in the CAPM model.
3. *Beta:* - Beta is the measure of volatility of a stock. The risk of one stock is used to compare the risk of another stock with that of another.
4. *Expected Return:* = Risk Free Rate + (Beta * Market return premium
5. *Systemic Risk and Non-Systematic Risk:* - Systemic risk, also known as "unexplained risk", "volatility" or "market risk", affects the overall market, not just a stock or industry. Non-systematic risk also called "specific risk"; this risk is related to individual stocks.

1.3. Industry profile

The food processing sector is essential for the development of the economy, providing links between agriculture and industry. The word food processing is often regarded as a "value added process". Food processing industry is the largest in India and is ranked fifth in the world. It is a technique for preparing and preserving food, improving the quality and functionality of products in an effective way to enhance the shelf life. It covers a wide spectrum of food products, including agriculture, horticulture, animal husbandry and fisheries.[6–9]

1.4. Six major segments of the food processing sectors

1.Fruits and Vegetables 2. Meat 3. Poultry 4. Marine Products 5. Grain Processing 6. Consumer Packaged Foods

Compiled by author from http://mofpi.nic.in, Ministry of Food Processing Industries.

1.5. Government initiatives for food processing sector

Government Initiatives for Food Processing Sector are detailed as below:

1.Scheme for Foundation Advancement, 2. Scheme for Innovation Up gradation, Foundation and Modernization of Food Handling Enterprises, 3. Plan for HR Advancement, 4. Scheme for setting up of Value Confirmation/Food Testing Research facility/Research and development and special Exercises, 5. Scheme for Reinforcing of Establishments.

1.6. Review of literature and industry forecasts report

1. *Navya Ninan (2018)* studied the valuation of the capital asset bills in the Indian stock market has been conducted, which looks at the risk that Indian insurance companies face from trading in the stock market several decades ago. This study proves that there is no relationship between future growth rate and cost of capital. Risk in capital accounting costs is not considered important in this chapter.
2. *Charumathi (2014)* in her paper compared valuation models for Indian bank shares to evaluate Bank Shares. This includes the Johnson model, P / B model, CAPM, GDDM model and the additional models used to determine the price of bank shares.
3. *Zafar (2014)* Studied on mutual fund performance of different AMCs in India: An empirical study using CAPM model. In the context of a dynamic global business, the performance of the industry that changes from day to day has been studied.
4. *Viviana (2006)* article outlined the time-scale segmentation of the international version of CAPM, which leads to market exchange rate risk. This method is applied through an analytic formula called the portfolio's time- scale value and marginal value (VAR).
5. *Kilselakova (2015)* has done a case study of a food processing company and used the CAPM model. CAPM-based approach is used to estimate the systematic risks for the measurement of cost of equity. The building - Off 1 model is adopted for business and financial risk assessment.
6. *Bhuva (2017)* studied on validity of capital asset pricing model and stability of systematic risk (Beta) of FMCG firm in Indian stock market. In this article, the CAPM model assumes that the variance of returns is an adequate measurement of risk.
7. *K,Sathyanarayana.et.al (2019)* from their study found t Expected Return, Expected Risk, Co-efficient of Variation (CV) and Beta of stock to analyse and present the performance of stocks of 35 companies across seven sectors. It supported the investors to identify the expected return and risk associated with the stock in relation to the stock market and support investors to make appropriate investment decision.
8. *Rangasamy et.al (2016),* in their research they ranked various the mutual funds schemes based on the average return and standard deviation.

1.7. Scope of the study

This study is based on data of the Food Processing organization over a six-year period from 2017-18 to 2021-22. It measures financial performance through stock evaluation in terms of Risk-Free Rate, Market Risk, Risk premium, Beta of the investment and Expected Return of

Investment.

1.8. Objectives of the Study

1. To understand the effectiveness of CAPM model in stock evaluation
2. To measure the security and systematic risk of security by using beta as a measure in select food processing organisations.
3. To determine the food processing organization stock valuation using through Capital Assets Pricing Model

1.9. Limitation of the study

This study relies only on information extracted from different online sources, websites and annual report of the firm.

1.10. Name of the selected indian food processing organizations and expected return rank report

Researcher has selected ten food processing firms for the study purpose as detailed below:

1.Hindustan Unilever Ltd, 2. Nestle Ltd, 3. L T Food Private Ltd, 4. Britannia Biscuit Company Limited, 5. Venky's India Limited, 6. Bajaj Agro India Limited,7. Jubliant Food Works Limited, 8. American Dry Fruits Limited, 9. Heritage Food Limited, 10. Khushi Ram Bihari Lal Ltd.

2. Data Anlysis and Interpretation

Analysis: The above table presents beta and expected return. Beta and Expected Returns are calculated by taking 5 years data from 2017-18 to 2021-22. The expected return on HUL technologies is -32.88 and the beta is -0.606. The HUL beta here is less than the market beta (β-1). So, it can be said as "the lower value of the stock and it is perceived as fair to buy more securities. [10–14]Table 1.

Analysis**:** The above table presents beta and expected return. Beta and Expected Returns are calculated by taking 5 years data from 2017-18 to 2021-22. The expected return on Nestle technologies is -80.862 and the beta is -1.326. The Nestle beta here is less than the market beta. So, it can be said as "the lower value of the stock" and it is perceived as fair to buy more securities.Table 2.

Analysis**:** The above table presents beta and expected return. Beta and Expected Returns are calculated by taking 5 years as month for 2017-18 to 2021-22. The expected return on LT food limited is 27.63 and the beta is 0.306. The LT food ltd beta here is less than the market beta. So, it can be said as "the upper value of the stock" and it is perceived as unfair to buy more securities.Table 3.

Analysis**:** The above table presents beta and expected return. Beta and Expected Returns are calculated by taking 5 years as month for 2017-18 to 2021-22. The expected return on Britannia Limited is 55.90 and the beta is 0.732. The Britannia beta here is less than the market beta. So, it can be said as "the upper value of the stock" and it is perceived as unfair to buy more securities.Table 4.

Analysis**:** The above table presents beta and expected return. Beta and Expected Returns are calculated by taking 5 years data from 2017-18 to 2021-22. The expected return on Venky's Ltd is 18.412 and the beta is 0.167. The beta here is less than the market beta. So, it can be said as "the upper value of the stock" and it is perceived as unfair to buy more securities.Table 5.

Analysis: The above table presents beta and expected return. Beta and Expected Returns are calculated by taking 5 years data from 2017-18 to 2021-22. The expected return on Bajaj Agro limited is 23.654 and the beta is 0.246. The Bajaj Agro ltd beta here is less than the market beta. So, it can be said as "the upper value of the stock". Bajaj Agro Stock is priced high and it is perceived as unfair to buy more securities.Table 6.

Analysis: The above table presents beta and expected return. Beta and Expected Returns are calculated by taking 5 years data from 2017-18 to 2021-22. The expected return on Jubilant Food works ltd is 32.28 and the beta is 0.376. The Bajaj Agro ltd beta here is less than the market beta. So, it can be said as "the upper value of the stock". Jubilant stock is priced high and it is perceived as unfair to buy more securities.Table 7.

Analysis: The above table presents beta and expected return. Beta and Expected Returns are calculated by taking 5 years data from 2017-18 to 2021-22. The expected return on ADF Food ltd is 27.56 and the beta is 0.305. The ADF Food ltd beta here is less than the market beta. So, it can be said as "the upper value of the stock". ADF ltd. stock is priced high and perceived it is perceived as unfair to buy more securities.Table 8.

Analysis: The above table presents beta and expected return. Beta and Expected Returns are calculated by taking 5 years data from 2017-18 to 2021-22. The expected return on Heritage Food ltd is 42.169 and the beta is 0.525. The Heritage Food ltd beta here is less than the market beta. So, it can be said as "the upper value of the stock". Heritage ltd. stock is priced high at and it is perceived as unfair to buy more securities.Table 9.

Analysis**:** The above table presents beta and expected return. Beta and Expected Returns are calculated by taking 5 years data from 2017-18 to 2021-22. The expected return on KRBL Food ltd is 51.26 and the beta is 0.662. The KRBL Food ltd beta here is less than the market beta. So, it can be said as "the upper value of the stock". KRBL ltd. stock is priced high and perceived it is perceived as unfair to buy more securities.Table 10.

Table 1: Details of expected return of hindustan unilever Ltd from 2017-18 to 2021-22

Year	Index Closing Price	Index Return	HUL ltd Closing Price	Return
2017-18	120956.60	0.105	13321.48	0.416
2018-19	131530.50	0.150	18859.75	0.283
2019-20	136939.05	-0.264	22199.20	0.330
2020-21	144898.35	0.564	25119.48	0.100
2021-22	200056.20	0.181	27650.65	-0.131

Beta (β) = $\frac{Coveriance}{Variance}$ Beta (β) = Beta (b)= -0.606
= + b * (ER_m -), ER_i=7.33+ (-0.606) (74-7.33)
ER_i=7.33+ (-0.606) (66.36), ER_i=7.33- 40.214, ER_i=-32.88

Table 2: Details of expected return of Nestle Ltd from 2017-18 to 2021-22

Year	Index Closing Price	Index Return	Nestle ltd Closing Price	Return
2017-18	120956.60	0.105	79945.430	0.225
2018-19	131530.50	0.150	116558.087	0.343
2019-20	136939.05	-0.264	155771.970	0.440
2020-21	144898.35	0.564	198238.810	0.088
2021-22	200056.20	0.181	215680.552	0.038

Beta (β)= $\frac{Coveriance}{Variance}$ Beta (β) = Beta (β)= -1.329
= + b * (ER_i - R_f), ER_i= 7.33+ (-1.329) (74-7.33)
ER_i= 7.33+ (-1.329) (66.36), ER_i= 7.33- 88.192, ER_i= -80.862

Table 3: Details of expected return of LT food Ltd from 2017-18 to 2021-22

Year	Index Closing Price	Index Return	LT Food ltd Closing Price	Return
2017-18	120956.60	0.105	842.289	0.314
2018-19	131530.50	0.150	575.193	-0.634
2019-20	136939.05	-0.264	282.307	-0.508
2020-21	144898.35	0.564	561.644	1.287
2021-22	200056.20	0.181	843.697	0.397

Beta (β) $\frac{Coveriance}{Variance}$ = Beta (β) = Beta (β)= 0.306
= + b * (E -), ER_i= 7.33+ 0.306 (74-7.33)
ER_i= 7.33+ 0.306 (66.36), ER_i= 7.33+ 20.30, ER_i= 27.63

Table 4: Details of expected return of britannia industries Ltd from 2017-18 to 2021-22

Year	Index Closing Price	Index Return	Britannia ltd Closing Price	Return
2017-18	120956.60	0.105	23492.361	0.408
2018-19	131530.50	0.150	33488.963	0.259
2019-20	136939.05	-0.264	32086.914	-0.105
2020-21	144898.35	0.564	40090.463	0.362
2021-22	200056.20	0.181	41455.510	-0.078

Beta (β)= $\frac{Coveriance}{Variance}$ Beta (β) = Beta (β)= 0.732
= + b * (E -), ER_i= 7.33+ 0.732 (74-7.33)
ER_i= 7.33+ 0.732 (66.36), ER_i= 7.33+ 48.57, ER_i= 55.90

Table 5: Details of expected return of venky's India Ltd from 2017-18 to 2021-22

Year	Index Closing Price	Index Return	Venky's Closing Price	Return
2017-18	120956.60	0.105	28201.05	1.566
2018-19	131530.50	0.150	29971.61	-0.385
2019-20	136939.05	-0.264	18660.89	-0.792
2020-21	144898.35	0.564	16496.20	0.755
2021-22	200056.20	0.181	30777.66	0.580

Beta (β)= $\frac{Coveriance}{Variance}$ Beta (β) = Beta (β)= 0.167
= + b * (E -), ER_i= 7.33+ 0.167 (74-7.33)
ER_i= 7.33+ 0.167 (66.36), ER_i= 7.33+ 11.082, ER_i= 18.412

Table 6: Details of expected return bajaj agro India Ltd from 2017-18 to 2021-22

Year	Index Closing Price	Index Return	Bajaj Agro Closing Price	Return
2017-18	120956.60	0.105	171.950	-0.305
2018-19	131530.50	0.150	97.350	-0.039
2019-20	136939.05	-0.264	76.400	-0.831
2020-21	144898.35	0.564	69.350	1.505
2021-22	200056.20	0.181	173.700	1.276

Beta (β)= $\frac{Coveriance}{Variance}$ Beta (β) = Beta (β)= 0.246
= ER_{ii}+ b * (E R_m-R$_f$), ER_{ii}= 7.33+ 0.246 (74-7.33)
ER_{ii}= 7.33+ 0.246 (66.36), ER_{ii}= 7.33+ 16.324, ER_{ii}= 23.654

Table 7: Details of expected return jubilant food works Ltd from 2017-28 to 2021-22

Year	Index Closing Price	Index Return	Jubilant Closing Price	Return
2017-18	120956.60	0.105	1832.643	0.856
2018-19	131530.50	0.150	3093.827	0.285
2019-20	136939.05	-0.264	3490.159	0.080
2020-21	144898.35	0.564	5403.173	0.752
2021-22	200056.20	0.181	8128.757	-0.049

Beta (β)= $\frac{Coveriance}{Variance}$ Beta (β) = Beta (β)= 0.376
= + b * (ER_m -E$_f$), ER_{ii}= 7.33+ 0.376 (74-7.33)
ER_{ii}= 7.33+ 0.376 (66.36), ER_{ii}= 7.33+ 24.95, ER_{ii}= 32.28

Table 8: Details of expected return american dry fruits Ltd from 2017-18 to 2021-22

Year	Index Closing Price	Index Return	ADF Closing Price	Return
2017-18	120956.60	0.105	2972.856	0.306
2018-19	131530.50	0.150	2863.215	0.278
2019-20	136939.05	-0.264	3163.843	-0.217
2020-21	144898.35	0.564	5699.377	1.861
2021-22	200056.20	0.181	10201.515	-0.097

Beta (β) = $\frac{Coveriance}{Variance}$ Beta (β) = Beta (β)= 0.305
= + b * (ER_m -R$_f$), $EERR_i$=7.33+ 0.305 (74-7.33)
$EERR_i$=7.33+ 0.305 (66.36), $EERR_i$=7.33+ 20.24, $EERR_i$=27.56

Table 9: Details of expected return of heritage food Ltd from 2017-18 to 2021-22

Year	Index Closing Price	Index Return	Heritage food Closing Price	Return
2017-18	120956.60	0.105	7862.242	0.322
2018-19	131530.50	0.150	6513.623	-0.188
2019-20	136939.05	-0.264	4172.181	-0.721
2020-21	144898.35	0.564	3436.446	0.438
2021-22	200056.20	0.181	4843.582	0.223

Beta (β) = $\frac{Coveriance}{Variance}$ Beta (β) = Beta (β)= 0.525
= ER_t+ b * (ER_m -E$_f$), ER_i= 7.33+ 0.525 (74-7.33)
ER_i= 7.33+ 0.525 (66.36), ER_i= 7.33+ 34.839, ER_i= 42.169

Table 10: Details of expected return KRBL food Ltd from 2017-18 to 2021-22

Year	Index Closing Price	Index Return	KRBL Closing Price	Return
2017-18	120956.60	0.105	5765.188	0.163
2018-19	131530.50	0.150	4117.161	-0.094
2019-20	136939.05	-0.264	2896.176	-0.614
2020-21	144898.35	0.564	2752.766	0.454
2021-22	200056.20	0.181	2810.939	0.232

Beta (β) = $\frac{Coveriance}{Variance}$ Beta (β) = Beta (β)= 0.662
= + b * (ER_m - E_f), ER_{ii}=7.33+ 0.662 (74-7.33)
ER_{ii}=7.33+ 0.662 (66.36), ER_{ii}=7.33+ 43.93, ER_{ii}=51.26

Table 11: Expected return rank report

SL. No	Organization Name	Beta (β) Value	Expected Return	Rank
1	Hindustan Unilever Ltd.	-0.606	-32.88	9^{th} Rank
2	Nestle Ltd	-1.329	-80.862	10^{th} Rank
3	LT Food Private Ltd	0.306	27.63	5^{th} Rank
4	Britannia Industries Ltd	0.732	55.90	1^{st} Rank
5	Venky'S India Ltd	0.167	18.412	8^{th} Rank
6	Bajaj Agro India Ltd	0.246	23.654	7^{th} Rank
7	Jubliant Food Works Ltd	0.376	32.28	4^{th} Rank
8	ADF Ltd (American Dry Fruits Ltd)	0.305	27.56	6^{th} Rank
9	Heritage Food Ltd.	0.525	42.169	3^{rd} Rank
10	Khushi Ram Bihari Lal Ltd	0.662	51.26	2^{nd} Rank

Source: Data used from National Stock Exchange of India ltd, based on the index return and investment return.

3. Results and Discussions

The returns of the firms shown in the above table are calculated based on index closing returns, then the price of beta is calculated based on the stock market index closing price and the organization index closing return price. Similarly, the expected return is found through the formula of CAPM model and their rank is determined. In this table Britannia firm earns expected return of 55.90 and beta price is 0.732, which means it is less than the market beta as it is considered as over-valued stock and it is perceived unfair to buy more security, Similarly, rest of the companies KRBL is in the second rank with revenue of 51.26 and Heritage is in the third rank, Jubilant Food is in the fourth rank, L&T Food is in the fifth rank, ADF is in the 6th rank, Bajaj Agro is in the 7th rank and Venky's is in the 8th rank considered by the above value of the stock It can be said that buying a security is not fair. But from the above table HUL and Nestle firms have negative expected return and beta is also negative so it can be said that these two firms' securities are reasonable to buy.

4. Conclusion

CAPM known as the "Capital Asset Pricing Model" has dominated modern finance. Based on numerous studies, as well as articles, companies with high market ratios tend to earn higher returns in the long run even after they are associated with beta. This has sparked fierce debate among some economic economists that certain risks should have greater rewards.

5. Source of Funding

None.

6. Conflict of Interest

None.

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