

# An Empirical Study of the Relation Between Stock Market Returns And Risk In Information Technology Industry In India

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**Abstract-** The research paper focuses on the risk and return as the base of investment in stock market. It helps the investor in choosing the best stock option as per the requirement of investor. Any investment has major focus on return and return depends upon the amount of risk taken. Higher the risk, higher is the return. The data for the purpose of analysis has been collected from Secondary sources and the sources being NSE, IBEF.org and Money Control.com. The data have been collected for a period of 5 years from August 2012 to August 2017. The companies chosen for the analysis is Infosys, Wipro, Tech Mahindra, Oracle, and TCS. Growth, Return on Equity and systematic risk has been used as factors for analyzing the performance of IT industry. Capital Asset Pricing Model (CAPM) and Arbitrage Pricing Theory (APT) are used as the two major tools. The findings of the research concludes that CAPM provides higher returns as compare to returns derived from APT. IT sector has fallen in terms of its growth to 7.7% in 2017 as compare to 9.3% in 2016.

**Keywords-** Arbitrage Pricing Theory (APT), Capital Asset Pricing Model (CAPM), Risk, Return. Stock Market.

## I. INTRODUCTION

In the financial market, when an investor is willing to spend money in expectation of return they may have two situations in mind i.e. profit or loss. Investment in financial market is completely uncertain. Investment is related to Risk and return. With higher risk there is higher return. Risk is considered to be one of the major factors at the time of investment. Investor should have a complete mindset for all sort of expectations which may occur in the market.

Information Technology (IT) in India is one of the quickly developing divisions. Indian IT area has an incredible notoriety and brand an incentive in the worldwide markets. With the fast growing economy with numbers of changes, impact of these changes can be seen on every aspect be it investments or income. Today, investors show their interest in investing in financial market but the expectation of return is

completely a big question. Different measuring tools and techniques are being used from long period of times and some of which are still considered for analysis. CAPM and APT are two such tools which focus on the changing pattern of the past years data with relation to its changes at today's are been observed. Investment in every sector differs because of the changes in the economy. Changes in the economy play a major role on the working of each sector of the nation. So for investors it becomes very complicated to come to a conclusion on the sector that should be preferred for investment. This study gives a better view to investors to focus on the opportunities available to invest in IT sector.

## II. OBJECTIVES OF THE STUDY

- To understand the concept of risk and return of a security which can be analyzed using CAPM and APT as financial tool and further determining that whether arbitrage pricing model can be used as relevant tool to predict the security valuation of stocks.
- To analyze and compare the effect of risk and return on the performance of selected companies in IT sector.

## III. SOURCE OF DATA

The data have been collected from secondary sources. The sources include NSE, Money Control and Internet. For the research, IT industry have been chosen and Stocks of 5 different companies with different turnover have been taken for analysis.

## IV. TOOLS FOR ANALYSIS

Two tools for analysis has been used which includes the following:

### 1. Arbitrage Pricing Model

It is a common model that embraces that the estimated return of a financial asset can be displayed as a direct purpose of various factors or hypothetical market indices, where sensitivity to deviations in each aspect is represented by a factor-specific beta coefficient.

$R_i = E_i + b_{i1}I_1 + b_{i2}I_2 + \dots + b_{ik}I_k + e_i$  where  
 $R_i$  is the casual rate of return on the  $i$ th asset;  
 $E_i$  is the expected rate of return;  
 $b_{ik}$  means the sensitivity of the  $i$ th asset's returns of the  $k$  factor;  
 $I_k$  signifies the mean zero  $k$ th factor common to the returns of all assets;  
 $e_i$  is a nonsystematic risk constituent characteristic to the  $i$ th asset by means of mean zero and variance  $\sigma_{ei}^2$ .

**2. Capital Asset pricing model.**

CAPM shows the relationship between systematic risk and return for assets.

$$Expected\ Return = r_f + \underbrace{\beta(r_m - r_f)}_{\text{risk premium}}$$

Where

$R_f$  is the risk free rate,  $R_m$  is the market return and Beta is the systematic risk.

**V. LIMITATIONS OF THE STUDY**

- The study is solely based on secondary data collected from different sources.
- The study is limited to some selected companies of IT industry of Indian Stock Market.
- The risk cannot be measured accurately since market is always fluctuating and uncertain.
- The two factors used in APT model are of two different extremes which if changed will change the returns derived from APT and which will further change the overall analysis.
- The results determined may not act as the most accurate information for deciding the best option to be chosen for investment in practical scenario.

**VI. DATA ANALYSIS AND INTERPRETATION**

CAPM is a model which considers single factor to derive the value of return on the basis of past data whereas APT uses multiple factors which may include macro-economic factors or company specific factors. CAPM model uses the expected return from inputs whereas APT uses risk premium derived from multi factor economic model and expected return.

Company	Beta	CAPM
Infosys	0.601093	0.1289 or 12.89%
Tech Mahindra	0.529293	0.120793 or 12.07%
Wipro	0.462761	0.11329 or 11.39%
TCS	0.40076	0.106297 or 10.62%
Oracle	0.336221	0.099019 or 9.90%

Source: Author's research

**Interpretation**

The table above shows the relation of risk and return which has been derived from the formula of CAPM. The companies have been fixed in descending order in terms of returns. Infosys stocks shows a risk of 0.6010 with a return of 12.89% which specifies the fact that higher the risk and higher the return. Tech Mahindra showed a risk of 0.5292 against which a return of 12.07% was achieved. Wipro shows a risk of 0.4627 and return of 11.39% which as compare to other companies is really good. TCS has risk of 0.4007 with a return of 10.62% which is moderately lower as per the level of risk. Oracle shows a risk of 0.3362 and fetches a return of 9.90% which seems to not really good as per the amount of risk. In all, CAPM as a model involves systematic risk which cannot be avoided and that part of risk is always involved in the investment in securities. Therefore, though Infosys shows the highest return but comparatively TCS is a better investment option as compare to others.

Company	Growth rate (in %)
Year 5 (2016-17)	0.077 or 7.7%
Year 4 (2015-16)	0.093 or 9.3%
Year 3 (2014-15)	0.095 or 9.5%
Year 2 (2013-14)	0.081 or 8.1%
Year 1 (2012-13)	0.08 or 8%

Source: Author's research

**Interpretation**

The table indicates the growth contribution of IT industry towards GDP in the last five years. In the year 2016-17, growth rate of IT with respect to GDP has fallen on 7.7% which in the year 2015-16 was 9.3%. The growth rate in the year 2016-17 is the lowest in the last five years. The reasons emerging out for such fall includes the increasing competition which India is facing within the nation and from foreign nations as well. Due to increasing competition, also a fall in the growth rate of IT sector could be realized.

Company	APT (Expected return)
Infosys	0.1820 or 18.20%
TCS	0.1022 or 10.22%
Wipro	0.0946 or 9.46%
Tech Mahindra	0.0924 or 9.24%
Oracle	0.0878 or 8.78%

Source: Author's research

### Interpretation

The table above shows return derived from Arbitrage Pricing Model. Arbitrage pricing model is a model which comprises of multiple factor which affects the return when it is determined. Infosys fetches the highest return followed by TCS of 10.22%, Wipro of 9.46%, Tech Mahindra of 9.24%, Oracle of 8.78%. The change in performance and returns of the companies is an impact of the multiple factors involved in the model. This model comprises of various macro-economic factors which has resulted in fluctuations of return.

Company	CAPM	APT
Infosys	12.89%	18.20%
Tech Mahindra	12.07%	9.24%
Wipro	11.39%	9.46%
TCS	10.62%	10.22%
Oracle	9.90%	8.78%

Source: Author's research

### Interpretation

From the comparative analysis it can be seen that there is variation between the returns of companies derived from CAPM and APT. CAPM provides better returns as compare to APT but impact of CAPM is less effective because it consider only one factor whereas on the other hand APT gives less return but considers more factors which proves to be an impactful result because in order to come up with and more accurate outcomes some major factors should be considered and this logic is justified only by using APT.

## VII. FINDINGS

From the research, it could be analyzed that IT sector growth contribution towards GDP has fallen from 8% in 2012 to 7.7%. The impact of such fall is because of fall in the performance of IT companies. Amongst the five companies chosen Infosys, TCS, Wipro and Tech Mahindra shows a fall on Return on Equity (ROE) whereas Oracle has increased its ROE as compared to previous years. Infosys shows the highest return according to both CAPM and APT model followed by Wipro, tech Mahindra and TCS but the investment in these securities seems to be little risky with good returns and shows that the company needs to be prepared for dynamic changes in

environment because a gap between returns could be analyzed because of lack of preparation towards uncertain situations.

## VIII. CONCLUSION

Indian Stock Market is a diversified market with different sectors but the investment in every specific sector should be encouraged equally. Amongst a population of one billion, investors in India accounts for more than 75% which is very good for a developing nation but amongst that 75% only 8-9% population invests in stock market which makes India fall below the line against other developed nations. Investment options/alternatives needs to be improved in India. New tools should be identified for in depth analysis of the factors which leads to the fluctuation of returns on the stock performance. Due to fall in ROE of four companies out of five, it shows a major fall in growth percentage also of IT sector towards GDP has fallen from 8% in 2012 to 7.7%. It can be concluded from the findings that CAPM provides with better returns as compared to APT.

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