

***The Reward of  
the ₹ : Cost of  
Capital In India***

***(August, 2016)***



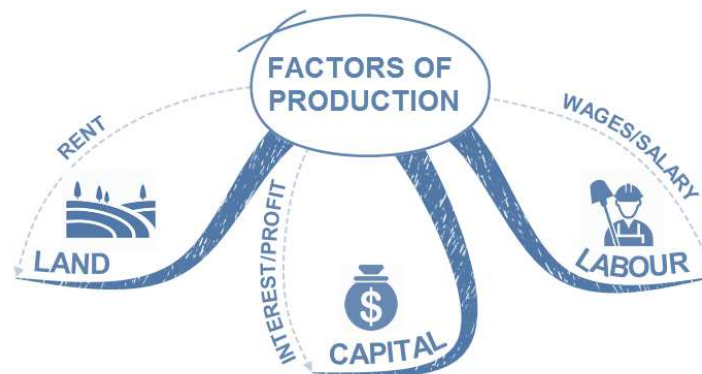
# Introduction

Economic growth, measured as GDP, is a function of the interaction between the three factors of production viz. **Land**, **Labour** and **Capital**.

- **Land** includes all natural resources and area where production activities can be conducted. **Land** needs to be compensated with **rent** for its use.
- **Labour** refers to the aggregate physical and mental effort used by human capital to produce goods and services. **Labour** needs to be compensated for its effort and time with **wages**.
- **Capital** is a means to employ land and labour to produce goods and services. **Capital** needs to be compensated with **interest** or **profits**; the residual left after compensating other factors of production.



Production of all goods or services entails some combination of these three factors to interact.



*Capital is different from money. While money is used to purchase goods and services for consumption, capital is more durable and is used to create wealth through returns generated from investment.*

Hence the need of understanding “**Cost of Capital**”.

A company's capital typically includes both Debt and Equity, one must therefore calculate both the Cost of Debt and the Cost of Equity to determine a company's Cost of Capital. More importantly, both cost of debt and equity must be forward looking, and reflect the expectations of risk and return in the future. **Hybrid Instruments** have characteristics of both debt and equity, therefore the risk and return of the instruments is also expected to remain between that of debt and equity capital. Example - preferred shares, convertible bonds.

There are essentially two ways in which cost of capital can be interpreted:

1. From the perspective of a **business**:
  - a. cost of raising new financing
  - b. opportunity cost of investing in new projects
2. From the perspective of **investors** :
  - a. the discount rate to value the business or
  - b. the minimum returns that an investor is willing to receive for investing in a company, based on the given risk characteristics of the business.



Hence, cost of capital can be understood as the minimum rate of return that providers of capital expect on the funds provided.

# Cost of Capital: Cost of Equity ( $K_E$ )

Cost of Equity ( $K_E$ ) can be computed theoretically by using **Capital Asset Pricing Model, Arbitrage Pricing Model and Build Up Model**

## 1. Capital Asset Pricing Model (CAPM)

The Cost of Equity is calculated by comparing the investment to other investments (comparable) with similar risk profiles. It is commonly computed using the **Capital Asset Pricing Model (CAPM)**. The CAPM estimates the expected return on a stock:

$$E(R) = R_f + \beta (R_M - R_f) + \alpha$$



- $R_f$  is the risk free rate corresponding to the investing period horizon
- $\beta$  is a measure of systematic risk, capturing the volatility of a stock in relation to the market
- $(R_M - R_f)$  is the equity risk premium (ERP) of the stock

CAPM states that investors would expect to be compensated for additional risk of investing in the market instead of a risk free asset. This additional compensation would be in the form of the market risk premium which would be further adjusted for inherent risk of the company in relation to the market. Company specific risk perception is quantified in the form of Beta which is then used to adjust the market risk premium.

*Here it is appropriate to note that one of the main assumptions of the CAPM is that the investor is only compensated for the “systematic risk”; since all other risks faced by the investee’s business are diversifiable through investment in securities that offset the inherent risks of a particular business.*

# $\alpha$ & $\beta$ – Alpha & Beta of the Equation

According to the CAPM theory, there are two types of risks — systematic and non-systematic.

**Alpha represents unsystematic risk.** The level of unsystematic risk of an individual security is dependent on its own unique characteristics. It is independent from market returns and cannot be diversified.

## Factors (alpha) responsible for adjustment in discount rate:

- Size of the company/project
- Stake under consideration
- Stage of Development/gestation period
- Company specific risk factors
- Comfort on Projections
- Distressed situation

**Beta represents systematic risk.** The level of systematic risk of an individual security depends on how correlated it is with the overall market. This risk can be diversified if one invests in a portfolio of securities.

$\beta$  which is arrived at by regressing the historical stock returns with the historical market returns numerically provides the extent to which the stock returns varies from the market returns hence capturing the systematic risk of a stock. Looking at it from the perspective of risk, it states how risky/volatile the stock return has been in relation to the aggregate market.

( $R_M - R_F$ ) - The equity risk premium (ERP) is the additional return that an investor holding a market portfolio (a portfolio of the index components of the same weights) will require for taking on additional systematic risk {since market portfolio is considered to be a well-diversified portfolio hence theoretically ( $R_M - R_F$ ) should only represent systematic risk that cannot be diversified.}

## 2. Arbitrage Pricing Theory (APT):

Arbitrage Pricing Theory is another model to estimate the  $K_E$ . It is similar to CAPM as it is a factor sensitivity model. However, unlike CAPM which postulates that  $K_E$  is dependent only on one factor, APT further divides the calculation of the  $K_E$  into multiple macroeconomic factors that reflect systematic risks (Eg.: interest rates, FX rates, etc.). APT does not provide any particular set of factors to be considered for the calculation of  $K_E$  and leaves the factor selection to the analyst.

$$E(R) = R_F + \beta_1 R_1 + \beta_2 R_2 + \dots + \beta_N R_N$$

- $R_F$  is the risk free rate corresponding to the investing period horizon
- $\beta_x$  are factor sensitivities of the parameters representing systematic risk. This is arrived at by regressing historical values of individual parameters over the returns on the stock.
- $R_x$  are the additional returns on account of exposures to each parameter.

## 3. Build Up Model:

The build up model calculates  $K_E$  by adding incremental premiums to the risk free rate to account for factors such as equity risk, industry risk, business risk and size of company. However, the premiums ascribed to the factors are left to the discretion of the analyst while also allowing flexibility to include additional factors.

$$E(R) = R_F + P_E + P_I + P_B + P_S$$

- $R_F$  is the risk free rate corresponding to the investing period horizon
- $P_E$  is the premium required for investment in a risky security
- $P_I$  is the premium associated with industry specific risks
- $P_B$  is the premium associated with business specific risks
- $P_S$  is the premium associated with company specific risks



# Cost of Capital: Cost of Debt ( $K_D$ )

When companies borrow funds from outside or take debt from financial institutions or other sources the interest paid on that amount is called cost of debt. Since in most cases debt interest is a tax deductible expense, the cost of debt is computed as an after-tax cost to make it comparable with the cost of equity.

$$K_D = \text{Interest} * (1 - \text{tax rate})$$

## Calculation of Cost of Debt ( $K_D$ )

If a company has market traded debt instrument, the  $K_D$  of the company is relatively easy to compute as it is the Yield To Maturity (YTM) of the traded bond. The YTM of a bond is the return that is generated if the bond is bought today at the market price and held to maturity is a reflection of what lenders would require the firm to pay them as compensation (interest) for funds borrowed as of **today**. It is the IRR of the bond which equates current price of bond to the present value of remaining cash flows.

Alternatively, when current market price of a company's debt is not available or is not reliable, a debt rating approach can be used, to calculate the  $K_D$ . The debt rating approach involves the identification of a bond with similar risk-return characteristics to the bond for which  $K_D$  is required and using its yield to maturity as an approximate measure of the  $K_D$  for the selected company.

**The factors to compute the interest** that lenders (majorly banks) charge to borrowers would be dependent on:

- **Marginal cost of funds:** costs that bank is incurring to get funds/deposits is calculated on a marginal basis.
- **Negative carry on account of CRR (Cash Reserve Ratio):** cost that bank has to incur while keeping reserves with RBI – RBI does not compensate with any interest for this CRR.
- **Operating costs:** is the operating expenses incurred by bank.
- **Tenor premium:** denotes that higher interest can be charged from long term loans.



# Cost of Capital: WACC ( $K_0$ )

In order to arrive at the aggregated cost of capital of the firm, the weighted average cost of individual sources of finance is determined with the weights being the proportion of each type of capital used.

The **Weighted Average Cost of Capital (WACC –  $K_0$ )** is defined as the weighted average of the cost of various sources of finance, weights being the book value or market values of each source of finance:

$$K_0 = W_E K_E + W_D K_D$$

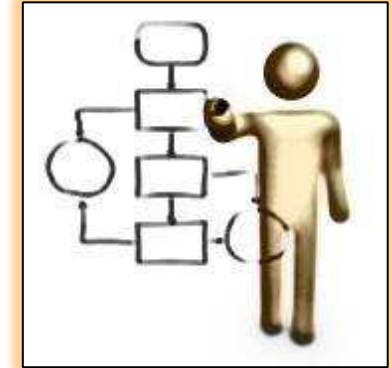
$K_0$  = Weighted Average Cost of Capital

$K_E$  = Cost of Equity

$K_D$  = Cost of Debt including Term Loans

$W_E$  = Proportion of total capital supplied by external equity

$W_D$  = Proportion of total capital supplied by debt



## Determinants of Cost of Capital

The **major determinants to the Cost of Capital** are:

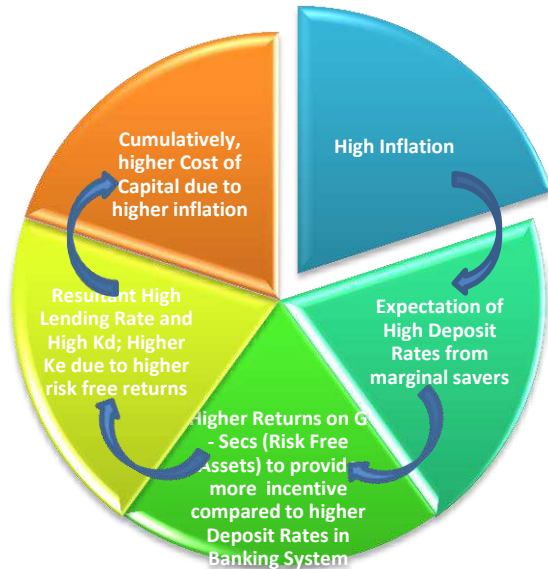
1. Inflation
2. Government Regulations
3. Liquidity
4. Risk Perception



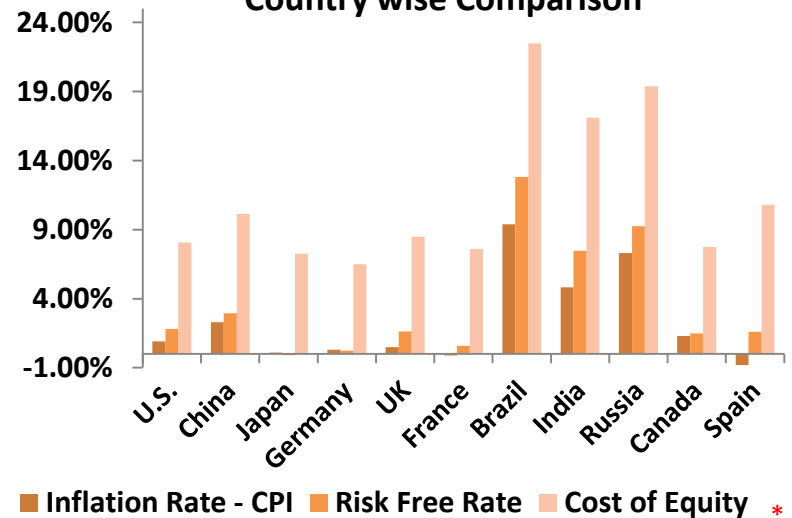


# Determinants of Cost of Capital – I. Inflation

## Inflation – Cause & Effects



## Country wise Comparison



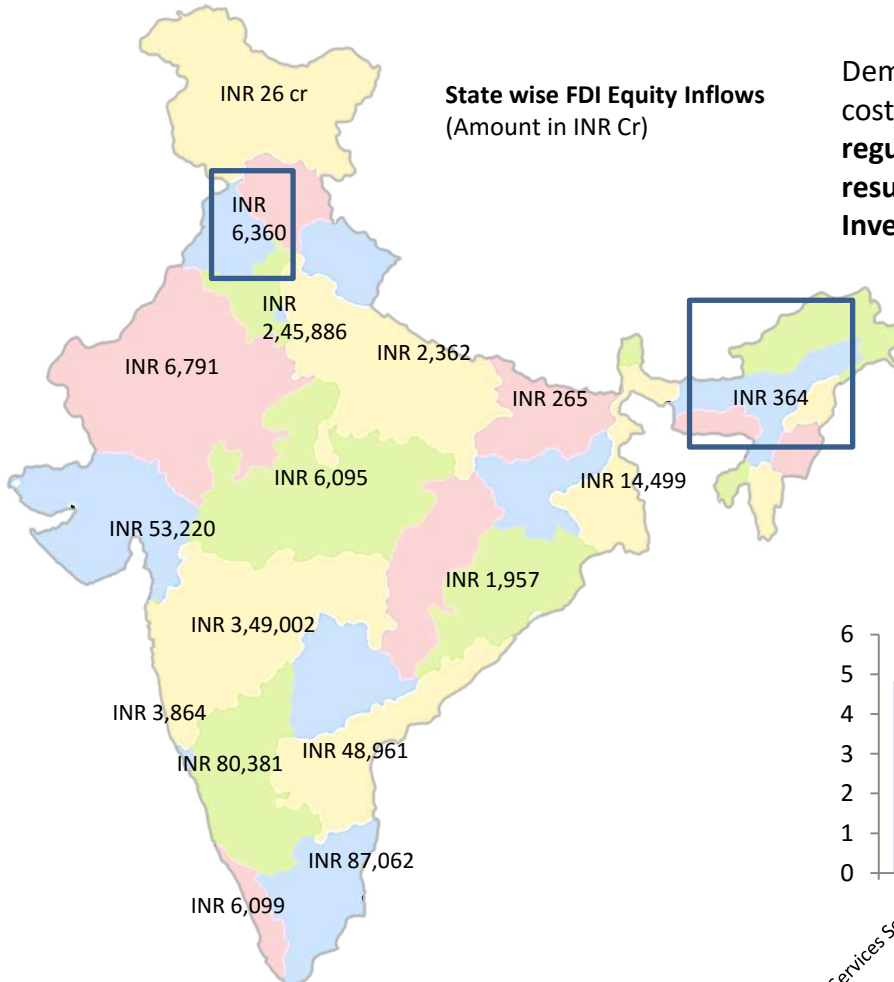
\* Cost of Equity is computed by CAPM. Beta for individual country is taken at 1 and no additional adjustments (alpha) has been taken in the calculation.

**High inflation can have damaging economic and social consequences and one of them is that it leads to higher cost of capital:**

*“High inflation may also lead to higher borrowing costs for businesses and people needing loans and mortgages as financial markets protect themselves against rising prices and increase the cost of borrowing on short and longer-term debt. There is also pressure on the government to increase the value of the state pension and unemployment benefits and other welfare payments as the cost of living climbs higher”.*

In our research report we have tried to map inflation rate of various countries along with their Risk Free Rate and cost of Equity. In developing nations we observe there is high inflation which is sustained with higher risk free rate and higher cost of equity when compared with developed nations.

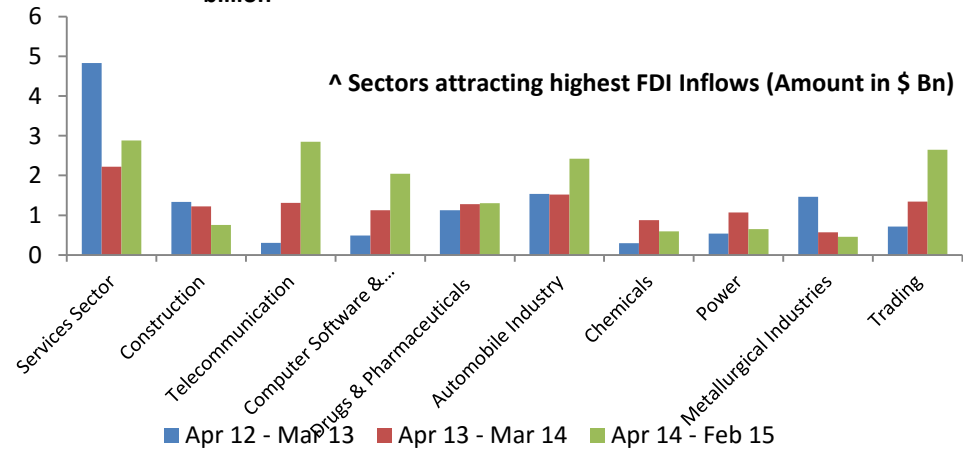
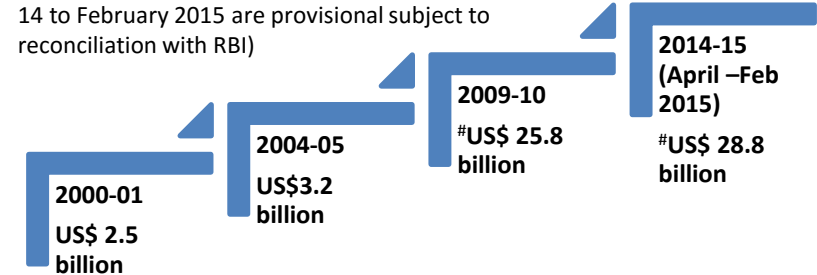
# Determinants of Cost of Capital – II. Government Rules



Demand & supply of money (capital) affects the cost of capital. The cost of capital and supply of capital are inversely related. **Government regulations are pivotal in deciding the Capital Flows (Supply) in India, resultantly deciding its cost; one such tool being Foreign Direct Investment (FDI). More liberal FDI policy, attracts foreign investment**

### DIPP'S – FINANCIAL YEAR-WISE FDI EQUITY INFLOWS

(# Figures for the year 2009-10 & from April 14 to February 2015 are provisional subject to reconciliation with RBI)



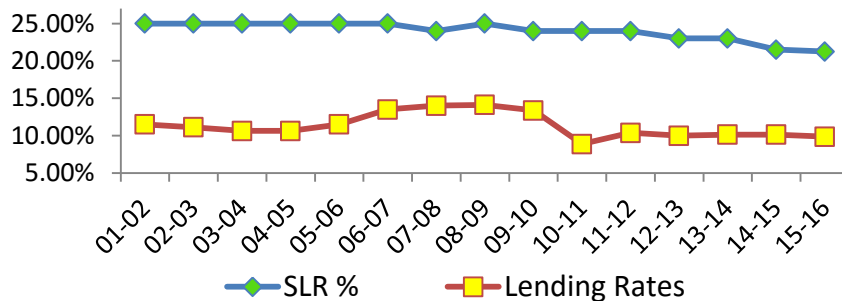
States having liberal Business and FDI policies have received highest cumulative FDI till date as can be see from above representative Map

Source: [http://dipp.nic.in/English/Publications/FDI\\_Statistics/2015/india\\_FDI\\_February2015.pdf](http://dipp.nic.in/English/Publications/FDI_Statistics/2015/india_FDI_February2015.pdf)

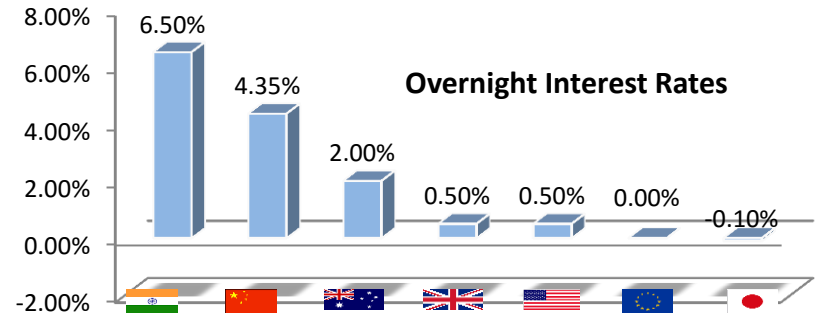
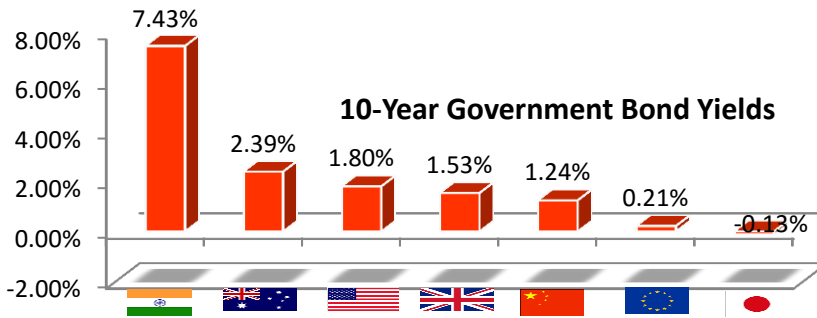
^ Services sector includes Financial, Banking, Insurance, Non-Financial / Business, Outsourcing, R&D, Courier, Tech. Testing and Analysis, Construction includes Development of Townships, Housing, Built-Up Infrastructure, **Chemicals Excludes Fertilizers**

# Determinants of Cost of Capital – III. Liquidity

**Statutory Liquidity Ratio (SLR):** is the amount, as determined by RBI, that the commercial banks require to maintain in the form of gold or government approved securities (like bonds and shares) before providing credit to the customers.



*Due to the lag in transmission of higher liquidity, there is no immediate impact on the lending rates of the banks. SLR is one of the major source for channelling the country's savings into government's deficit financing, crowding out private credit and increasing cost of private credit.*



Source: Central Bank Website

For further analysis, we have considered long-term government bonds as a credible proxy for the risk free rate. Above is a comparison of the prevailing yields on 10-Year Government Bonds of India, US, UK, China, Australia, Japan and Eurozone. The shortest term of borrowing between banks is denoted by the overnight lending rate. The second graph is a snapshot of the prevailing rates of overnight lending for the same set of countries. **The rates prevailing in India are significantly higher than any of the other countries compared at both the short- as well as the long-end of the yield curve. Hence, the base on which the cost of capital is built is quite high in India.**

Source: <https://www.rbi.org.in/Scripts/PublicationsView.aspx?id=16515>  
<http://dbie.rbi.org.in/OpenDocument/opendoc/openDocument.jsp>

## Determinants of Cost of Capital – IV. Risk Perception

Risk perception is a major determinant of cost of capital for not only a company but entire country. However, it cannot be quantitatively measured since the perception of risk and the expected additional return is subject to an investor's risk appetite. Broadly, given an increase in the risk perception of an industry/company, the cost of capital increases for the industry and subsequently the company. As with other cases, this increase in cost of capital is to compensate the investor for the additional risk undertaken.



It is worth noting that the changes in the cost of capital for companies within an industry perceived as risky is not linear, since it also depends on the strengths of the individual company itself. This implies that companies with stronger businesses within a risky industry will experience smaller incremental costs of borrowing in comparison to companies with weaker businesses. In essence, the cost of capital for companies has a direct relation to the perceived riskiness of the industry as well as the business.

# Sector-wise Analysis of Cost of Capital in India

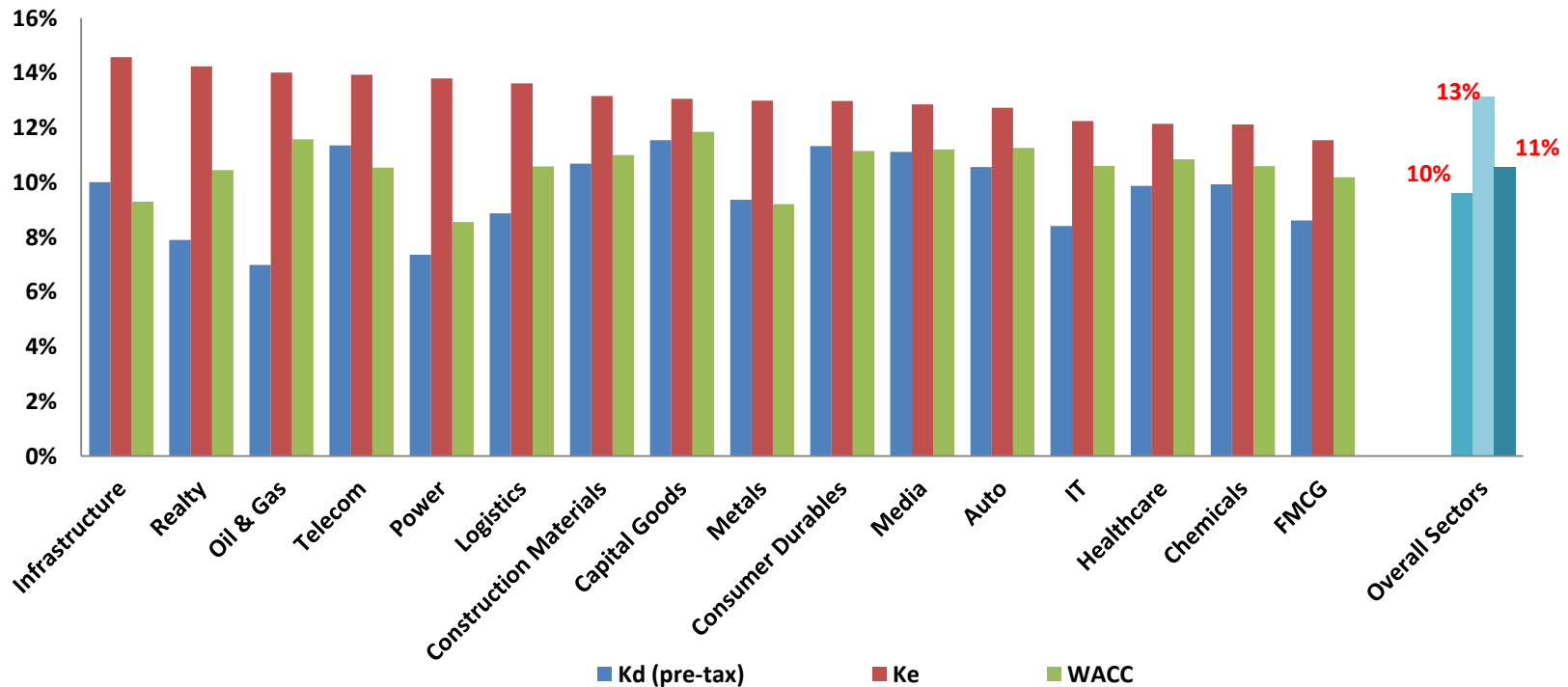
The sample size for our study of Cost of Capital has been deduced by analyzing all the Listed Companies on NSE. Of the 36 sectors, we have selected 16 sectors which represent ~75% of total Market Capitalization; excluding BFSI sector (constituting ~19% of Market Capitalization) from our study due to the different parameters of Debt and Equity being applicable to it (summing up to ~94% of the total Market Capitalization) . We have ignored the sectors which are < 1% of the total Market Capitalization. The selected sectors are as enlisted below:

Sr No	Sectors
1	IT
2	Auto
3	Oil & Gas
4	FMCG
5	Healthcare
6	Metals
7	Power
8	Telecom
9	Chemicals
10	Construction Materials
11	Capital Goods
12	Infrastructure
13	Logistics
14	Realty
15	Media
16	Consumer Durables

## Methodology adopted for analysis:

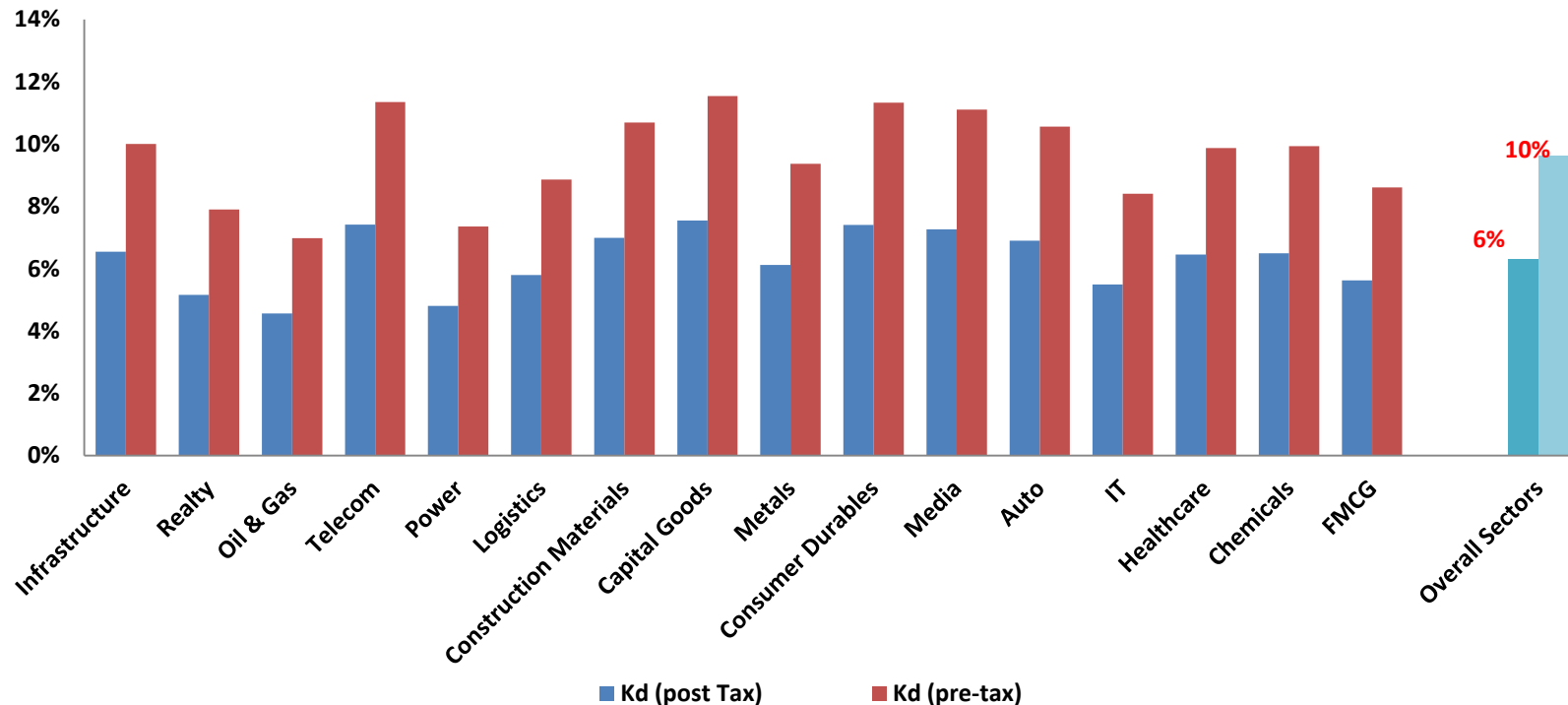
- The Listed companies are filtered as per sectors enlisted on the adjoining table. The respective data related to Debt, Interest Costs and Market Capitalisation has been sourced from various Databases
- Kd used for analysis is pre tax Kd deduced by dividing Finance Cost and Outstanding Debt
- Ke is calculated using CAPM - Beta has been regressed over a period of three years i.e. 01<sup>st</sup> April 2012 – 31<sup>st</sup> March 2015. No additional Alpha has been considered.
- WACC is calculated using respective Debt and Market Cap for these companies as on 31<sup>st</sup> March 2015
- The Doughnuts of every sector shows the Total Number of Companies that has been analysed for various Kd, Ke and WACC intervals. E.g. Auto sector Kd pie says <7% - 33 implies 33 companies have Kd less than 7%, 14% -41 implies 41 companies have Kd in the range of 7-14% so on and so forth for all the Doughnuts for Kd, Ke and WACC. The total sample entries are plotted on a normal distribution Bell Curve to show the median Kd, Ke and WACC of the respective sectors
- The smoothed Kd, Ke and WACC are presented to give an analysis of CoC prevalent in India in subsequent slide

# Weighted Average Cost of Capital



- Median WACC for all listed companies is approximately 11%. Oil & Gas and Capital Goods have the highest WACC and Telecom, Power and Metals & Mining sectors have the lowest WACC. Median Ke and Kd for all sectors analyzed is 13% and 10% respectively.
- Restrictions in various sectors for Foreign Direct investments (FDI) and restrictions on debt investments by Foreign Institutional Investors (FIIs) causes sectoral differences in the availability of capital and the cost of raising such capital.
- Weighted average cost of capital (WACC) is also affected by capital structure choices peculiar to each sector e.g. Asset-heavy sectors like Infrastructure and Realty tend to have more debt in their books.
- Sectors with highest Ke are Infrastructure and Realty (15% and 14% respectively) while Chemicals and FMCG have the lowest Ke (12% each).

# Weighted Average Cost of Capital

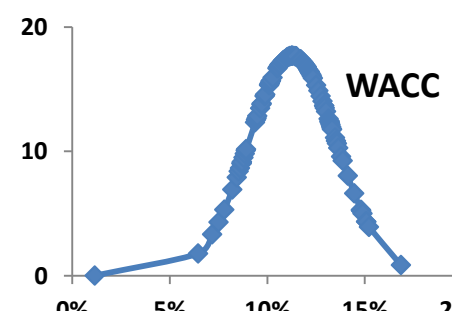
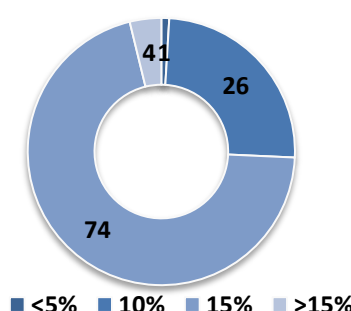
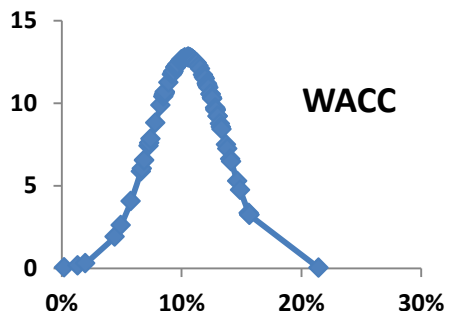
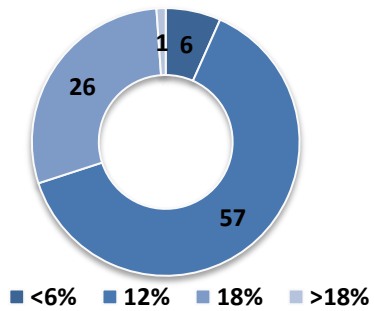
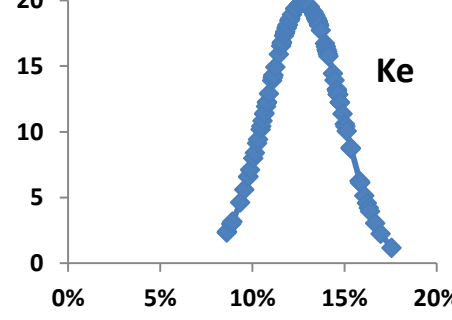
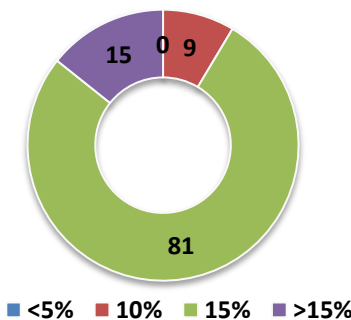
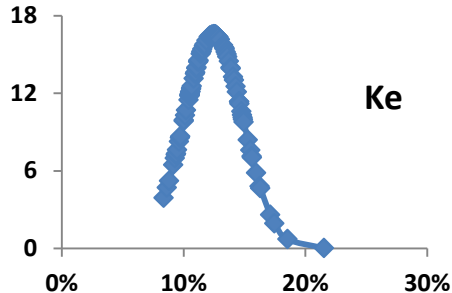
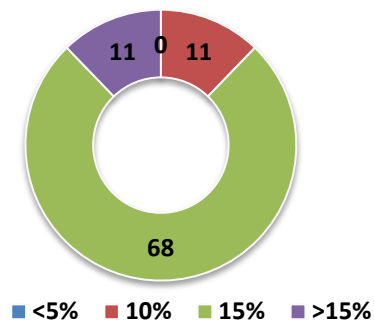
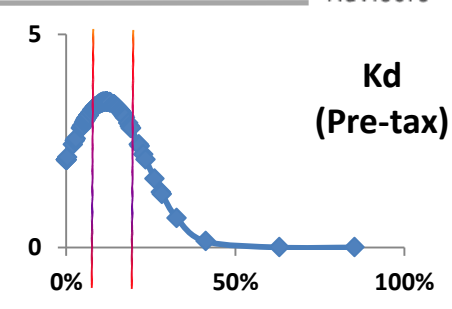
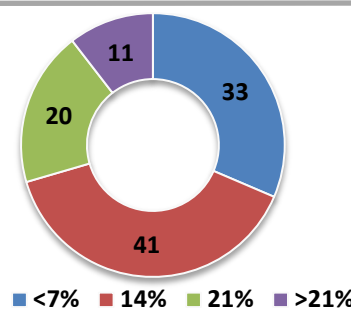
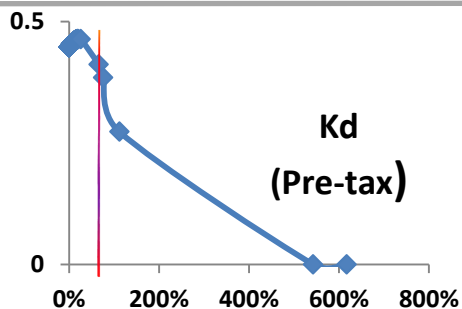
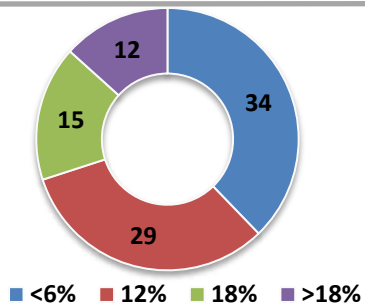


- Sectors with highest kd is Capital Goods 12% while Oil & Gas and Power have the lowest kd (7% each).
- The above chart indicates the Cost of Debt for the Sectors on a pre tax and post tax basis. The WACC as deduced in erstwhile slide is on the basis of post tax Cost of Debt.

*\*Interest component is excluding Interest Cost that has been capitalized*

# Information Technology

# Automobiles



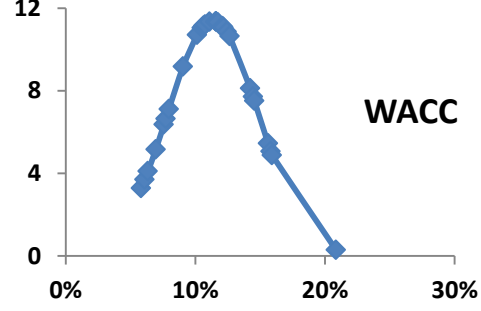
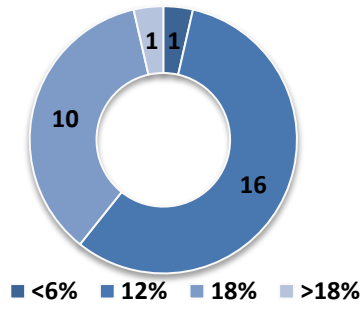
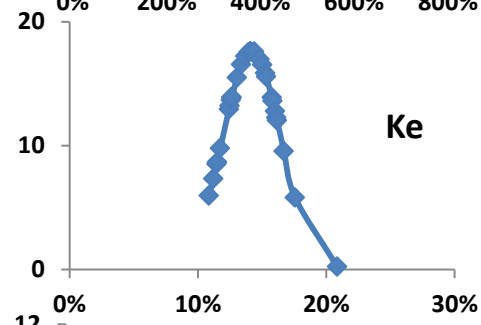
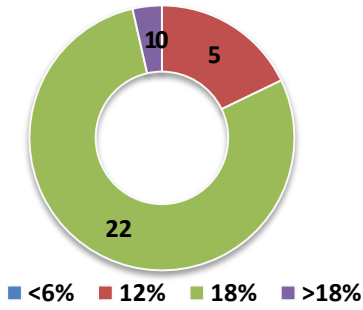
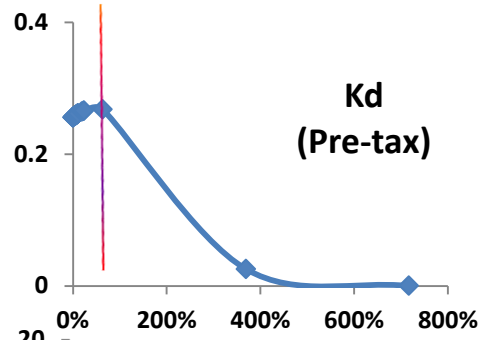
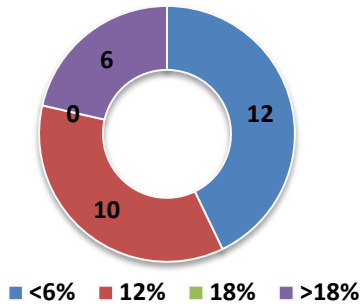
Median Kd (post tax), Ke and WACC of the sector is at 5%, 12% and 11% respectively; with maximum number of companies falling under the normal distribution. *Total Number of Companies = 90*

Median Kd (post tax), Ke and WACC of the sector is at 7%, 13% and 11% respectively; with maximum number of companies falling under the normal distribution; *Total Number of Companies = 105*

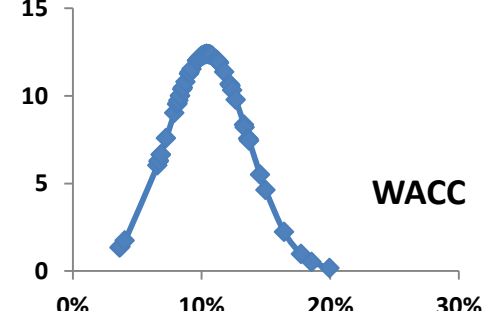
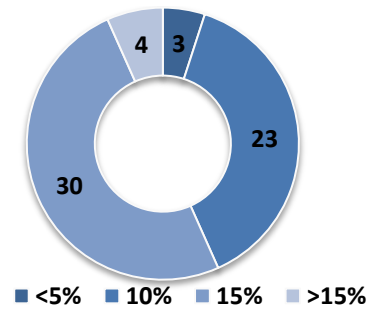
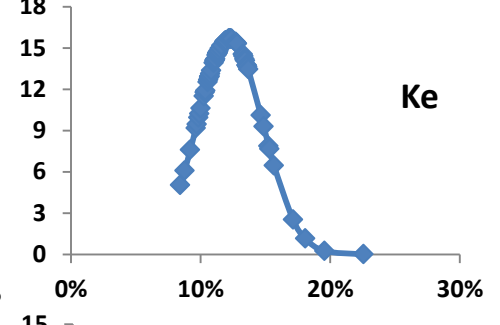
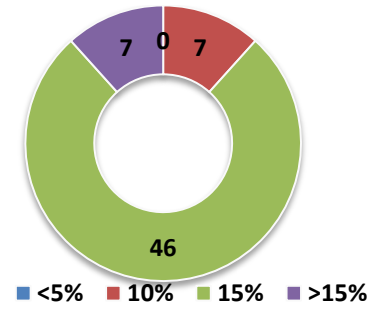
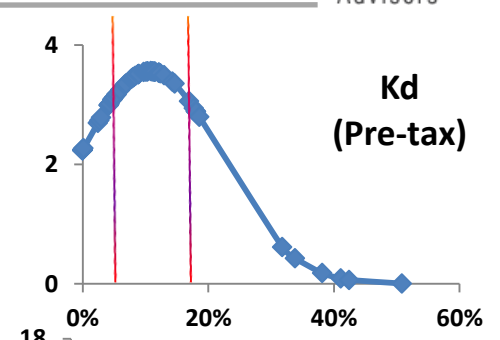
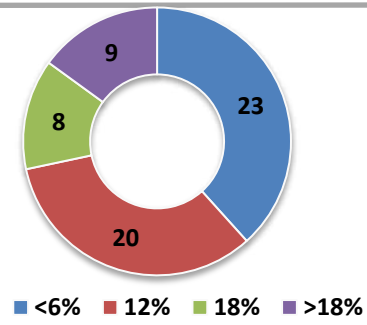


# Oil & Gas

# FMCG



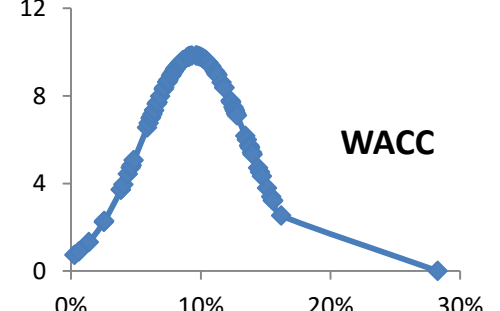
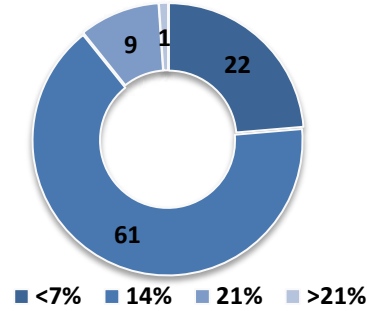
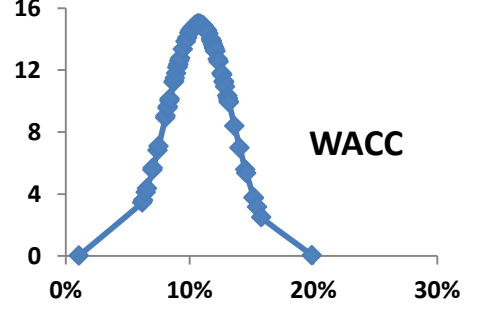
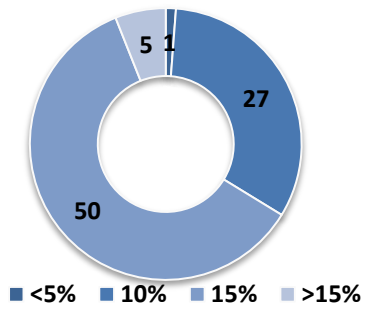
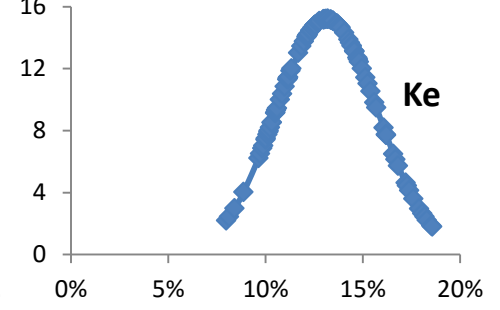
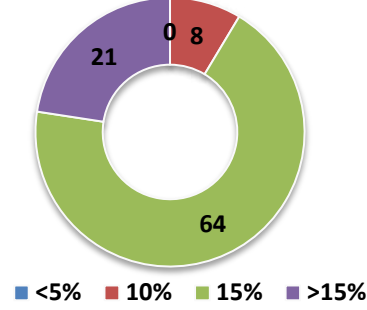
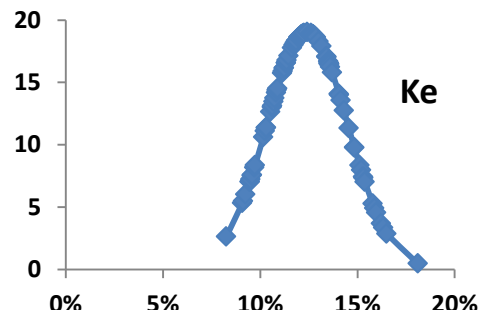
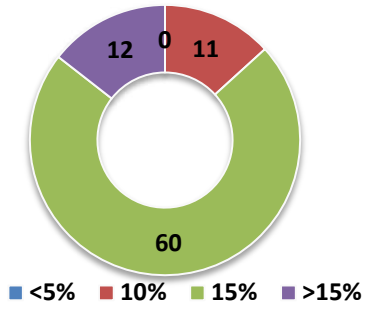
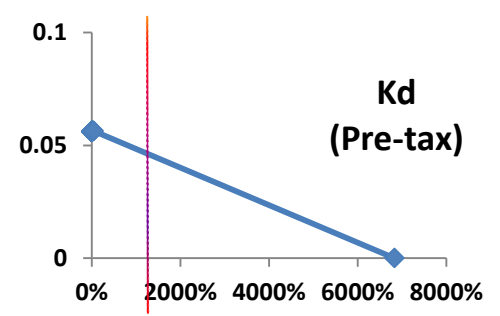
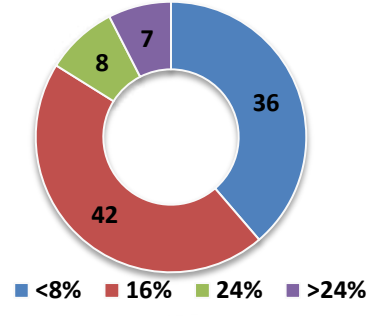
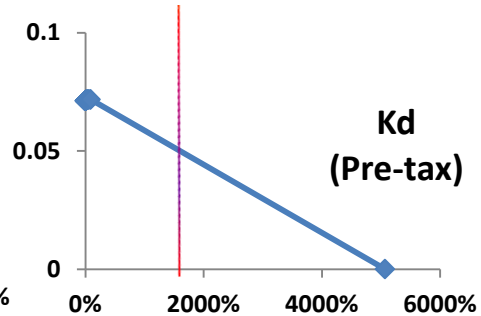
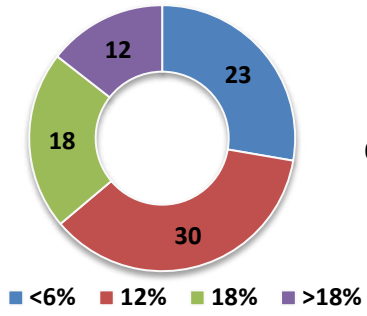
Median Kd, Ke and WACC of the sector is at 5%, 14% and 12% respectively; with maximum number of companies falling under the normal distribution; Total Number of Companies = 28



Median Kd, Ke and WACC of the sector is at 6%, 12% and 10% respectively; with maximum number of companies falling under the normal distribution; Total Number of Companies = 60

# Healthcare

# Metals & Mining

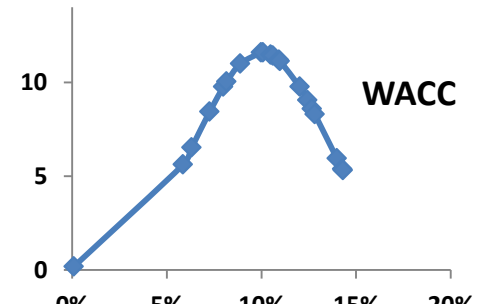
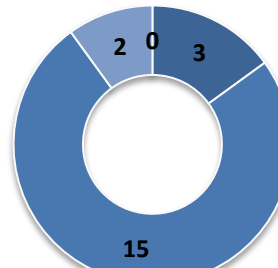
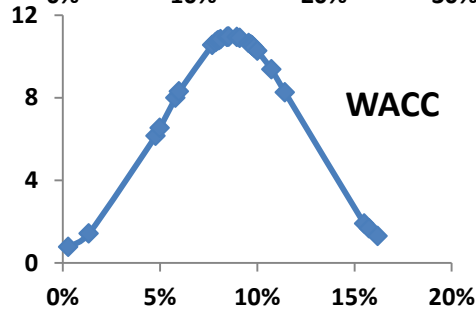
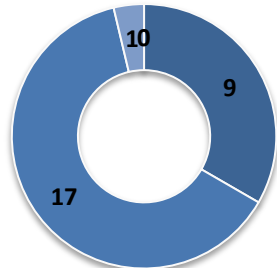
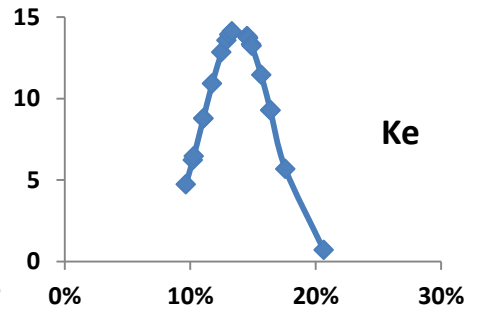
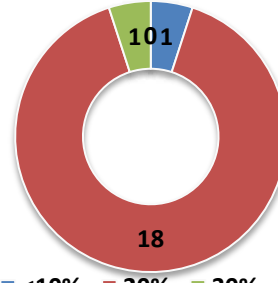
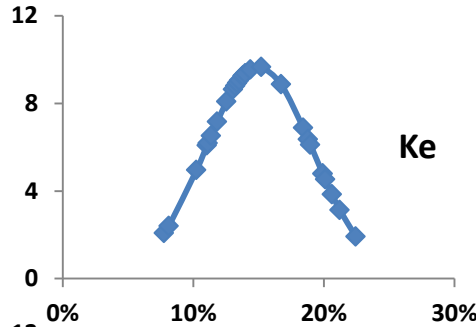
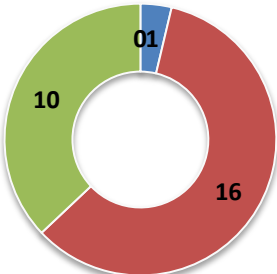
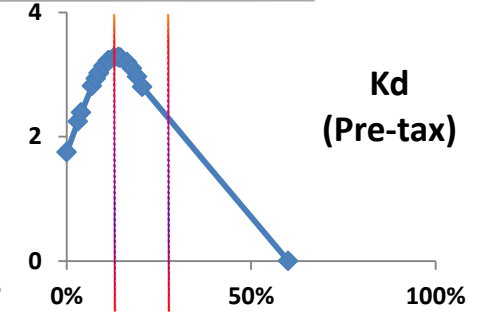
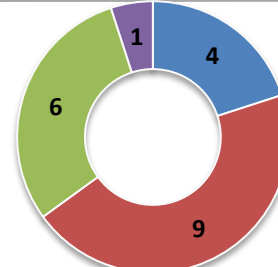
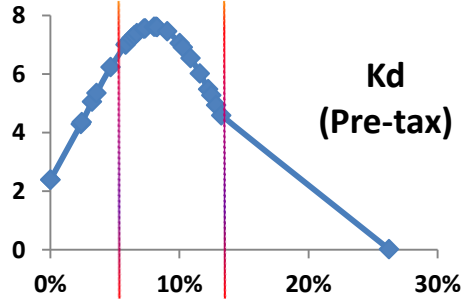
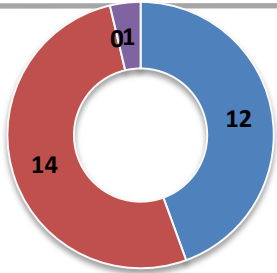


Median Kd, Ke and WACC of the sector is at 6%, 12% and 11% respectively; with maximum number of companies falling under the normal distribution; Total Number of Companies = 83

Median Kd, Ke and WACC of the sector is at 6%, 13% and 9% respectively; with maximum number of companies falling under the normal distribution; Number of Companies = 93

# Power

# Telecom

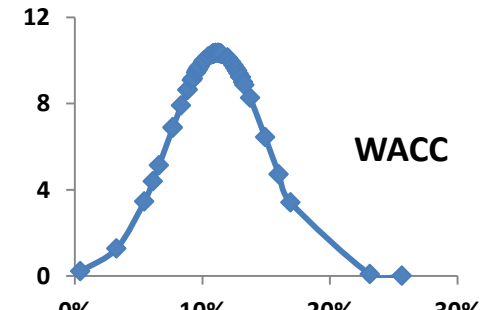
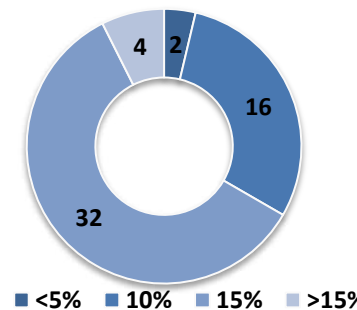
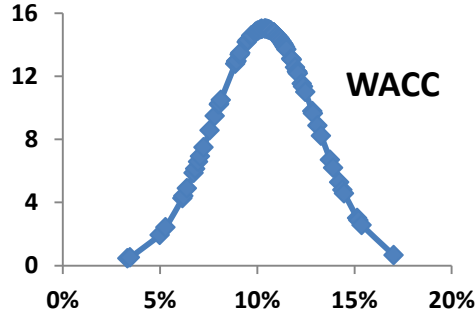
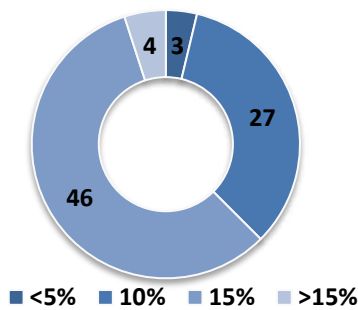
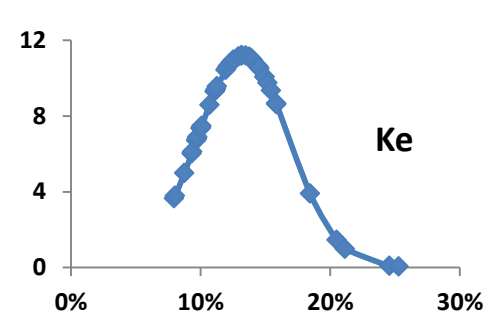
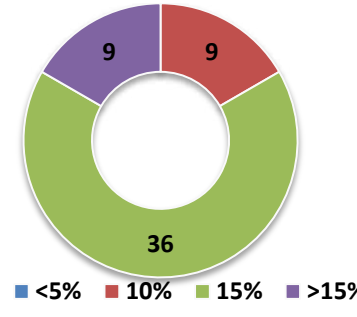
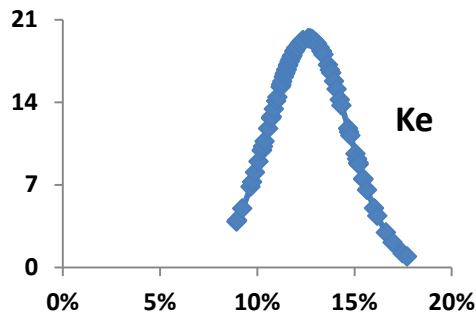
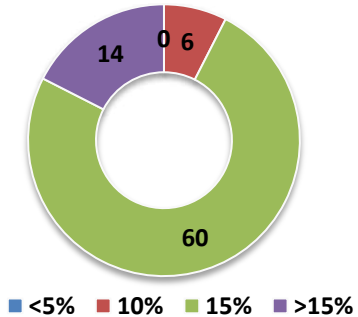
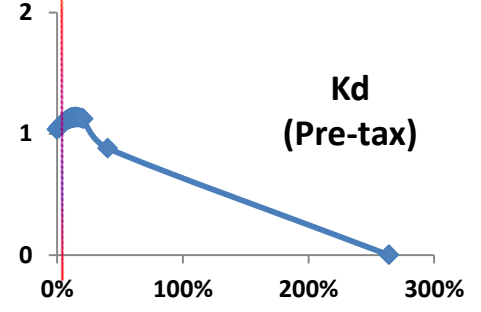
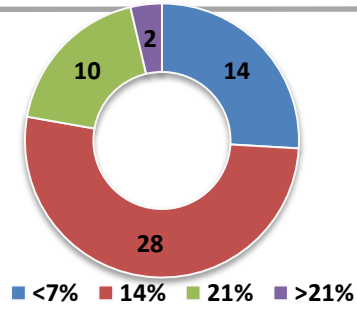
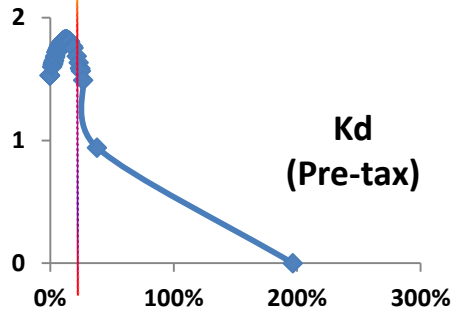
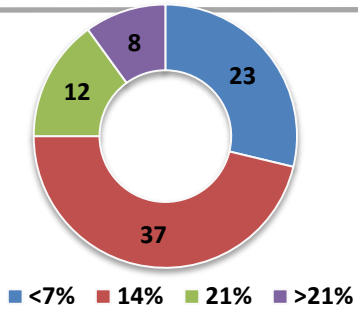


Median Kd, Ke and WACC of the sector is at 5%, 14% and 9% respectively; with maximum number of companies falling under the normal distribution; Total Number of Companies = 27

Median Kd, Ke and WACC of the sector is at 7%, 14% and 11% respectively; with maximum number of companies falling under the normal distribution; Total Number of Companies = 20

# Chemicals

# Construction Materials

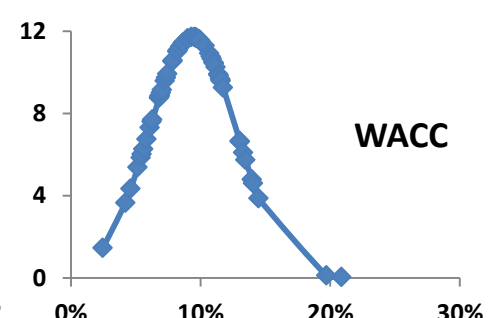
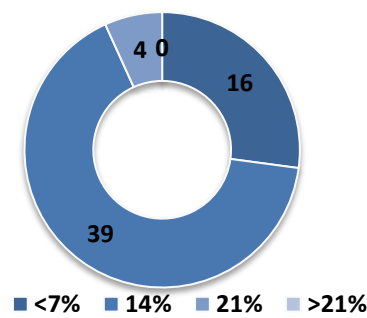
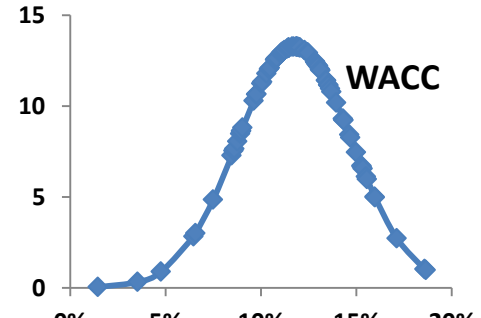
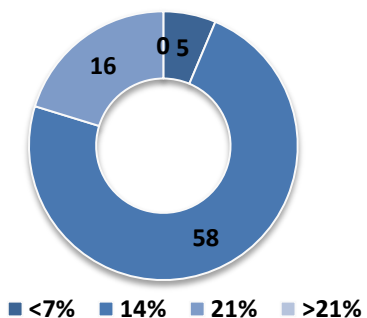
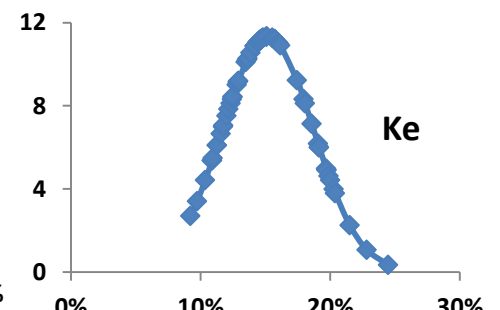
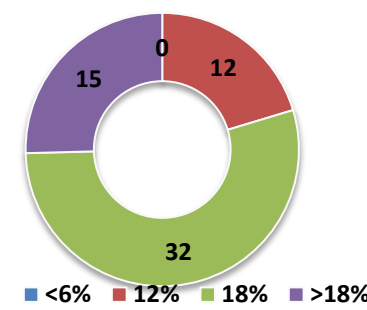
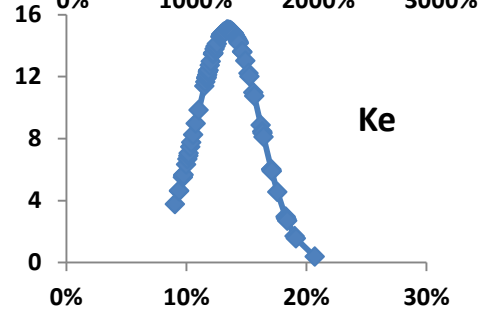
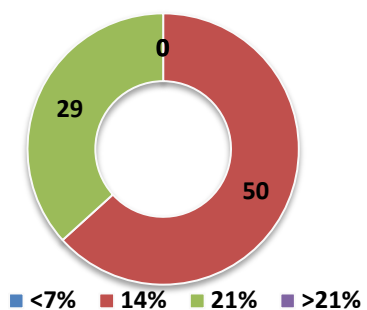
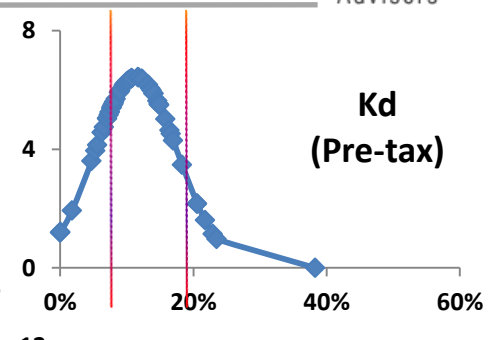
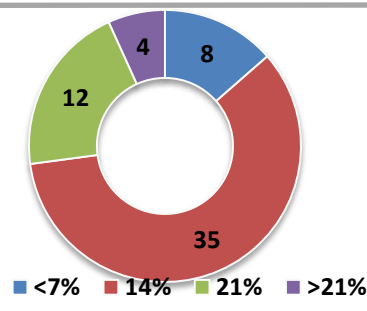
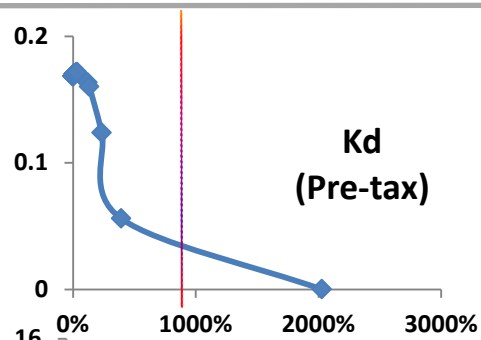
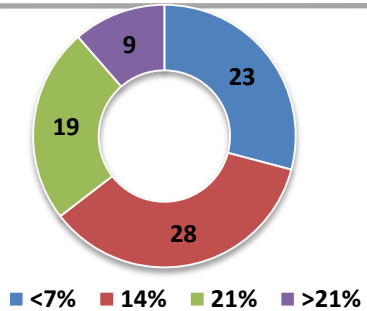


Median Kd, Ke and WACC of the sector is at 6%, 12% and 11% respectively; with maximum number of companies falling under the normal distribution; Total Number of Companies = 80

Median Kd, Ke and WACC of the sector is at 7%, 11% and 13% respectively; with maximum number of companies falling under the normal distribution; Total Number of Companies = 54

# Capital Goods

# Infrastructure

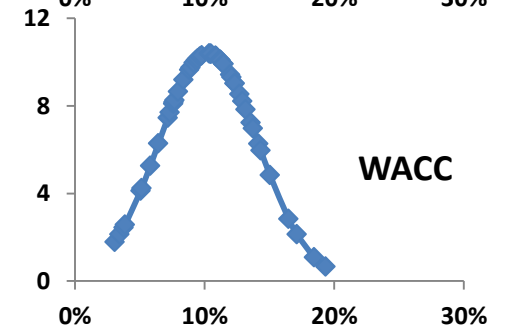
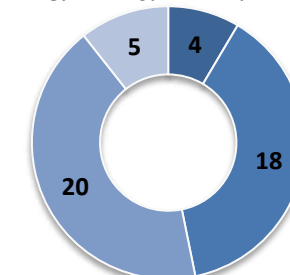
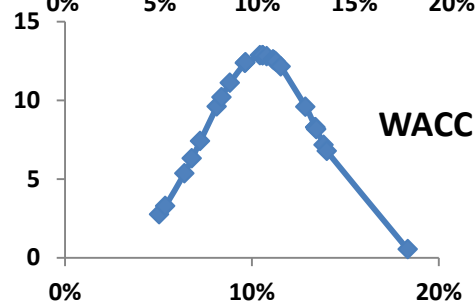
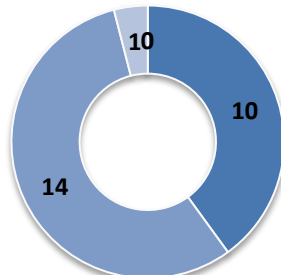
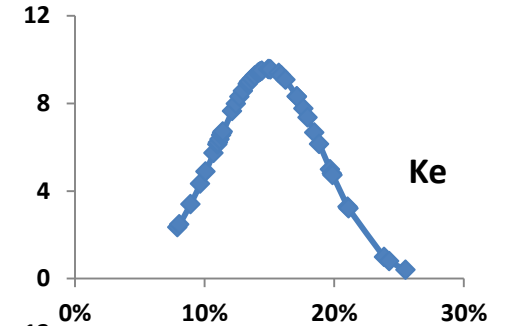
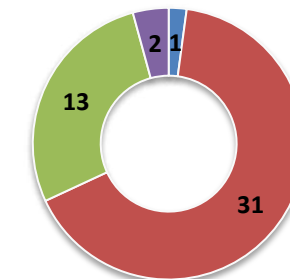
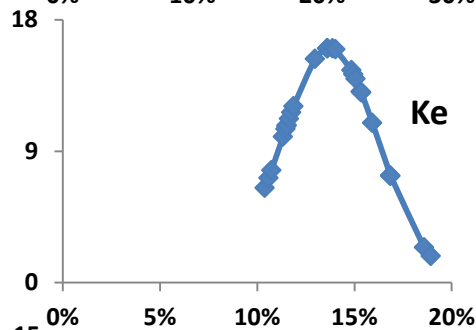
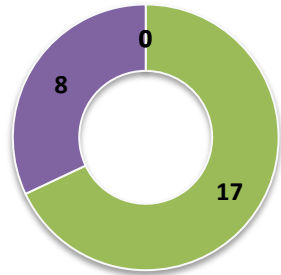
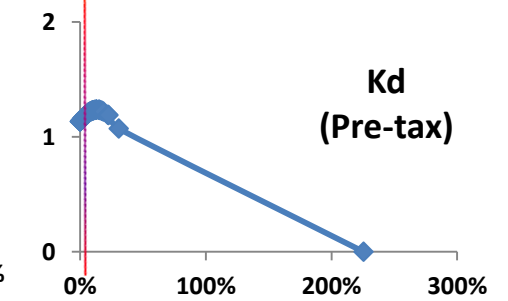
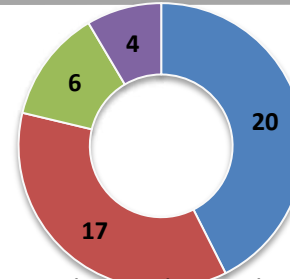
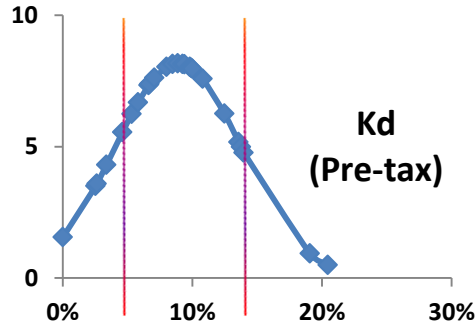
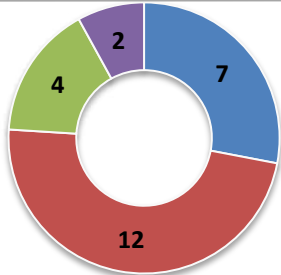


Median Kd, Ke and WACC of the sector is at 8%, 13% and 11% respectively; with maximum number of companies falling under the normal distribution; Total Number of Companies = 54

Median Kd, Ke and WACC of the sector is at 7%, 15% and 9% respectively; with maximum number of companies falling under the normal distribution; Total Number of Companies = 59

# Logistics

# Realty

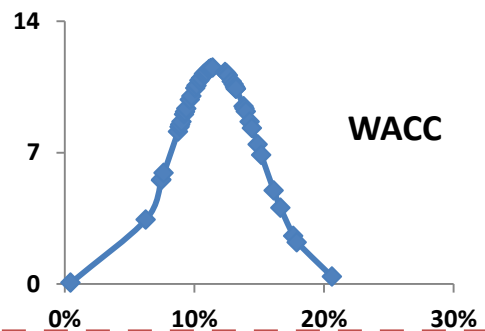
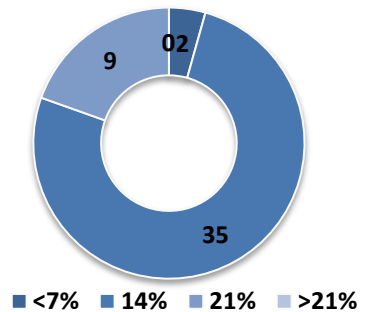
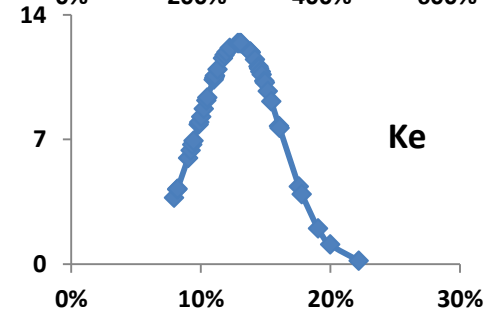
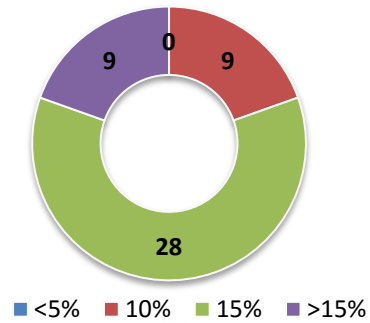
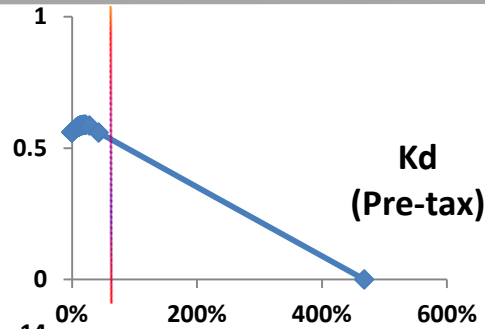
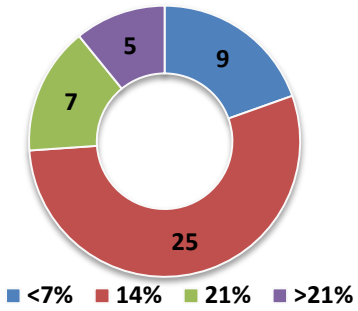


Median Kd, Ke and WACC of the sector is at 6%, 14% and 11% respectively; with maximum number of companies falling under the normal distribution; Total Number of Companies = 25

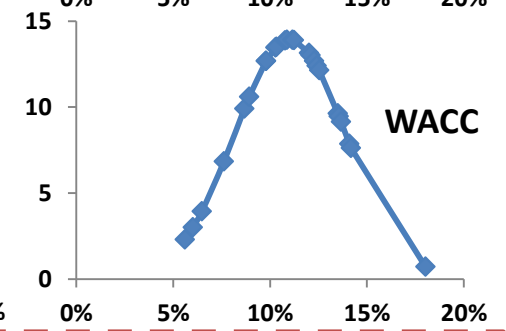
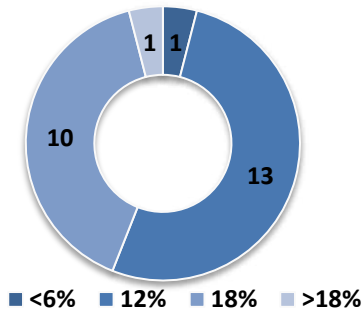
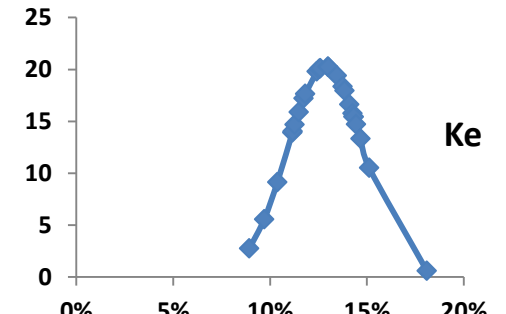
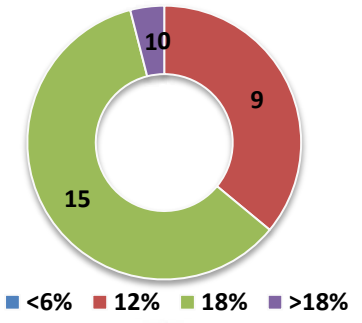
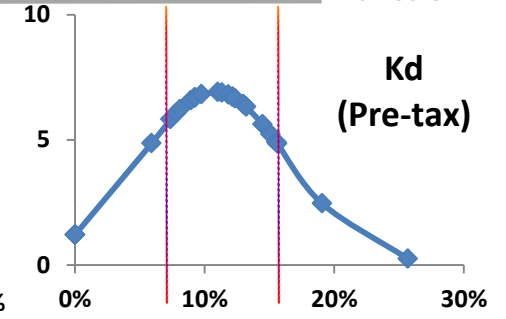
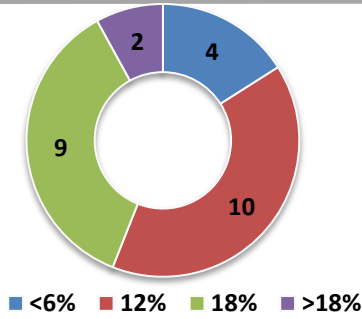
Median Kd, Ke and WACC of the sector is at 5%, 14% and 10% respectively; with maximum number of companies falling under the normal distribution; Total Number of Companies = 47

# Media & Entertainment

# Consumer Durables



Median Kd, Ke and WACC of the sector is at 7%, 13% and 11% respectively; with maximum number of companies falling under the normal distribution; Total Number of Companies = 46



Median Kd, Ke and WACC of the sector is at 7%, 13% and 11% respectively; with maximum number of companies falling under the normal distribution; Total Number of Companies = 25

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