Systematic and Unsystematic Risk Analysis of (Asian, Berger and Nerolac Paints)

Assignment 3

Submitted in partial fulfillment of the requirements for the course of ECON F355 Business Analysis and Valuation

By

Group no. (2)

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Group Details

Group Number: 02

Industry: PAINTS

Company Names: Asian Paints, Berger, Kansai Nerolac

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INDEX FORMATION:

The Index was created by considering the companies related to Paint Sector as only around 6 Paint Sector companies are listed. The following companies are selected from the chemical, petroleum, and Paint sector as they fall under the chemical sector umbrella. The chemical sector was considered. TiO_2 is the required raw material produced by the chemical industry, and crude oil is also one of the major requirements for the paint industry and impacts paint prices.

Asian Paints	Berger	Kansai Nerolac
Shalimar Paints	Akzo Nobel	AlkylamineChemicals
Tata Chemical	ONGC	UPL
Coromandel	Deepak Nitrate	Pidilite
PI industries	Aarti Industries	Chambal Fertilizers

Basic Information about selected companies:

Asian Paints: Largest company in the paint industry which has the highest market cap. Asian paints has been dominating the market in India for nearly 60 years. The company is involved in the production, marketing, and distribution of paints, coatings, home décor goods, bathroom fixtures, and related services. Thus, Asian paints can be a good flagship benchmark for the paint sector and can reflect macroeconomic trends for the paint sector. Asian paints is also a key component for most Indices owing to its high market cap.

Berger: Berger paints is one of the oldest paint companies in the world, founded by Lewis Berger in 1760 and re-initiated in India in 1923. It is a part of the 3 biggest players in the Indian paint Industry and has repeatedly shown to be the fastest growing paint company in India. It has a technical license agreement with DuPont Performance and Nippon paints in the area of automotive coating.

Nerolac: It is the largest producer of industrial paint and third-largest producer of decorative paint in India, previously named Goodlass Nerolac Paints Ltd, The company is based in Mumbai. It is owed by the Japanese corporation Kansai Paint's division. As of 2015, it had a around 15% market share and is ranked third in the Indian paint industry. It functions in the industrial, automotive, and powder coating sectors.

Shalimar Paints: Established in 1902 by British merchants as the Shalimar Paint Color & Varnish Company. The company's three product areas are industrial, marine, and architectural paint. Additionally, it makes varnishes and resins. A large variety of paints and coatings are offered by Shalimar Paints, which is listed on both the BSE and the NSE.

Akzo Nobel: Akzo Nobel is a dutch multinational company and is the largest coatings company in the world. Akzo Nobel India owns a large number of companies like Dulux which sell paints and finishes in India. Akzo Nobel being a global company, is representative the global paints position.

Alkyl Amine Chemicals: Incorporated in 1979, Alkyl Amines Chemicals Limited (AACL) is a publicly traded firm. Aliphatic amines, amine derivatives, and specialty amines are all products of AACL, a leading global provider. The products created by Alkyl Amine ltd are used as raw materials in the paint industry and thus are closely correlated to the paint industry.

Tata Chemicals: It is Asia's largest saltworks and world's third largest Soda Ash producer, along with these chemicals they also manufacture chemicals like amine derivatives and oils which are used in the manufacture of paint.

ONGC: The Indian government established ONGC on August 14, 1956. It is the largest government-owned oil and gas explorer and producer in the nation and generates over 84% of India's natural gas production as well as around 70% of the country's crude oil (which is equivalent to about 57% of the total demand). Oils are used across all paint companies as raw materials for paint manufacturing and thus ONGC being one of the prominent PSUs manufacturing raw materials for paints can be indicative of both government policies and national oil prices.

UPL: It's one of the biggest Chemical companies in the world with a revenue of $6.2B in the year 2022. UPL focuses on providing chemical solutions to agricultural problems across India. UPL produces a variety of coatings , cleaners and crop protection products which use the same raw materials as the paint Industry ,which is why UPL India has a similar market movement.

Coromandel : Similar to UPL Coromandel is a chemical company focused on solving agricultural problems throughout India. It is a subsidiary of EID Parry, a fertilizer company based in India which owns 62% of the company.

Deepak Nitrate: It is one of the largest producers of Nitrate and nitrate derivatives and the fastest growing chemical intermediates company in India. Incorporated in 1970 and listed in 1971 it is now India's largest producer of Phenol and Acetone, generating about Rs 6500 Cr of Revenue in 2022.

Pidilite: India's leading Adhesive manufacturer owns well known brands like Fevicol and Dr. Fixit. Pidilite was chosen as it plays in the same market as our

target companies who also produce adhesives and coatings along with paints. This is why Pidilite is closely associated with the paint industry and highly correlated.

PI Industries: Largest manufacturer of Profenofos, Ethion, and Phorate which are used by the Agricultural chemical companies like UPL and Coromandel as raw materials for their products. Thus companies like PI Industries determine the health of the Chemical Industry.

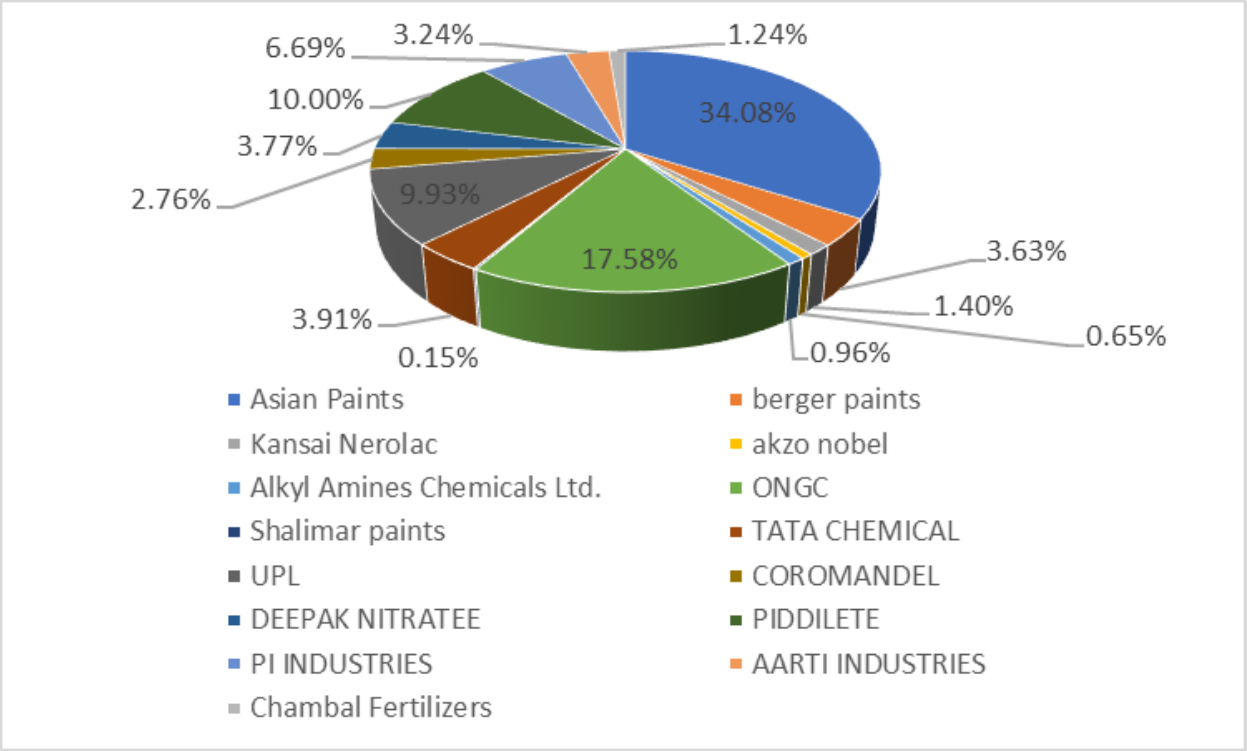
Aarti Industries: Basic chemicals, agrochemicals, specialty chemicals, and intermediates, all of which are widely utilized in the production of pharmaceuticals, agriproducts, polymers, additives, pigments, and dyes, are all part of Aarti Industries Limited's comprehensive chemical product line. This makes Aarti Industries a relevant choice.

Chambal: Another Agri-Sciences fertilizer and chemical company whose market movement is along the paint Industry as they both are prominent constituents of the chemical sector. Chambal fertilizer has shown constant growth in sales turnover through the years going from Rs 7500 Cr in 2018 to Rs 16000 Cr in 2022.

MARKET INDEX FORMATION

Step 1: Calculate the weights of each of the companies

- Find out the free-floating shares of all the companies part of the index from the Bloomberg terminal by also taking promoter holding into consideration.
- Obtain the free-floating market capitalization by multiplying the free-floating shares with the share price.
- Calculate the total market free floating capitalization for the Index by taking a sum of free floating market capitalization for all the selected companies.
- Generate the weights for each of the companies by dividing respective free floating market cap by the total free floating market cap.



Step 2: Calculation of returns

- Retrieve the data for adjusted close price for each of the companies from Bloomberg.
- Generate the returns from the formula (Pt-Pt-1+Dividend Period)/Pt-1, where Pt and Pt-1 is the adjusted close price at time t and t-1 respectively.

Step 3 : Calculate the weighted price

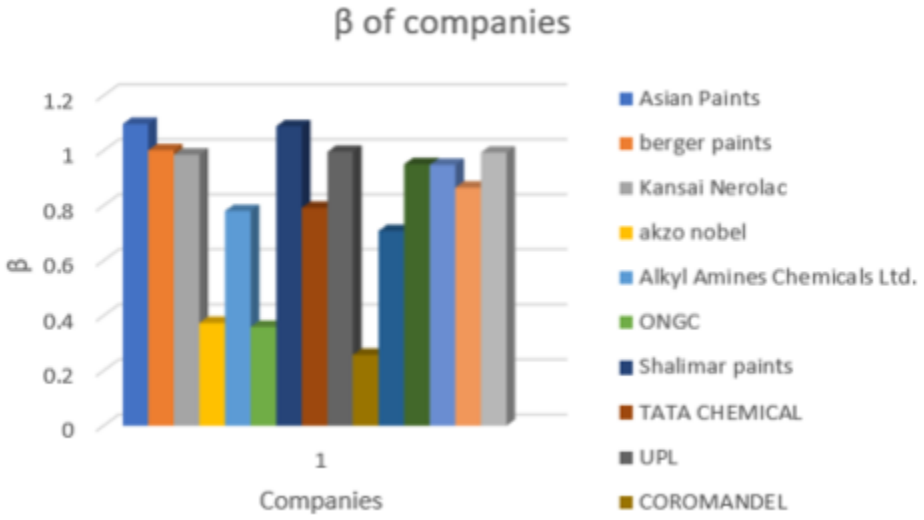
- Multiply the weights calculated before, of each company with its adjusted close price to get the weighted price of that firm.

Step 4 : Calculate the Index returns

- Find the market index price by taking a sum of all weighted prices on a certain date.
- Generate the Index returns by using the method used in step 2.

Step 5 : Beta Regression

- Use the Data analysis Regression tool in Excel, with Y range as the returns for the target company and X range as the index returns.
- Once the regression data is obtained we get the **Beta** for the firm from the X variable coefficient value.
- Jensen's alpha can be obtained from the intercept coefficient value.
- We also acquire R^2 from the regression that'll help us with risk analysis.j



These are the Beta calculated by regressing the stock return with the designed Index, here we can see that Asian paints have the highest Beta of around 1.1.

Implied ERP-

Implied Equity Risk Premium is the risk premium calculated by subtracting the risk-free asset that is a 10-year govt. Bond from the return of the market.
Risk free rate is 6.64%
The implied equity risk premium calculated is 8.704%-6.64%=2.06%.

Cost of Equity:

It is the Required rate of return for an equity investment, the rate of return demanded by investors for risking the ownership of equity in the firm. It can be calculated through 3 popular methods, CAPM model, dividend capitalization model and the implied ERP model. We will be using Implied ERP model.

Implied Equity Risk Premium Model :

Cost of Equity (Re) = Risk free rate(Rf) + beta obtained from market regression(β)*Equity risk premium(ERP)

Cost of Equity for Asian Paints = 6.64%+1.097(2.06%) = 8.89982%
Cost of Equity for Berger = 6.64%+ 1.001(2.06%) = 8.70206%
Cost of Equity for Kansai Nerolac=6.64%+0.985(2.06%) =8.66910%

Cost of Debt

It is the Effective Interest rate on account of which the amount of debt paid by a firm is determined. Cost of debt allows a firm to understand how it will finance its decisions through various fund sources which may include debt in the form of loans and bonds.
We have taken into consideration the current bond yields of the companies and then took a weighted average to get the final cost of after tax cost of debt.

The after tax cost of debt obtained is 6.05%.

WACC

WACC is an abbreviation of weighted average cost of capital, It includes common, preferred stocks, bonds, and other kinds of debt, it describes the typical after-tax cost of capital for a firm. The WACC is the average interest rate that a corporation intends to pay to finance its assets. It is the percentage by which a corporation's net worth is discounted to get its net present value.

WACC Formula and Calculation

$$\text{WACC} = \left(\frac{E}{V} \times Re\right) + \left(\frac{D}{V} \times Rd \times (1 - Tc)\right)$$

where:

$E = \text{Market value of the firm's equity}$

$D = \text{Market value of the firm's debt}$

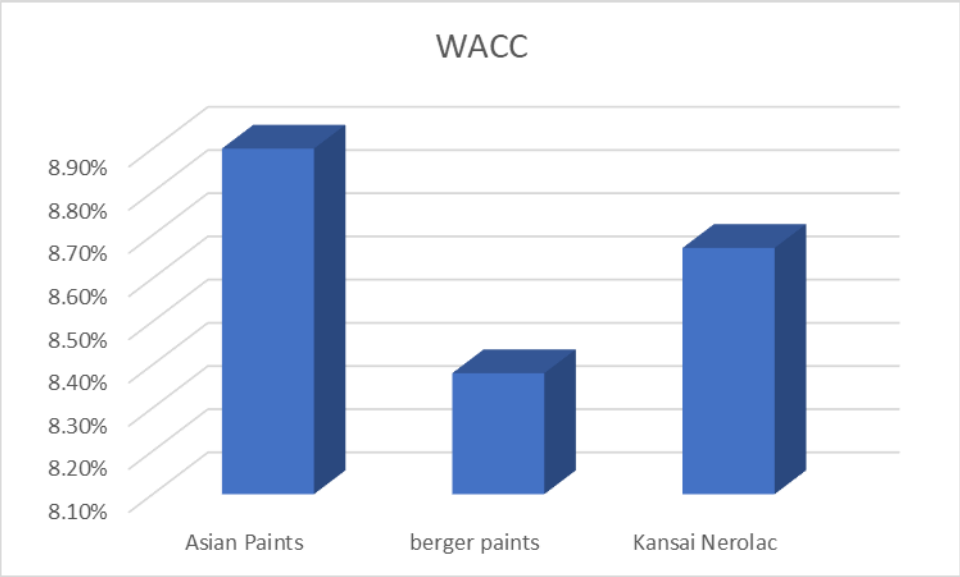
$V = E + D$

$Re = \text{Cost of equity}$

$Rd = \text{Cost of debt}$

$Tc = \text{Corporate tax rate}$

The WACC for the chosen companies obtained by calculations is:
Asian Paints: 8.89%
Berger:8.38%
Kansai Nerolac:8.64%



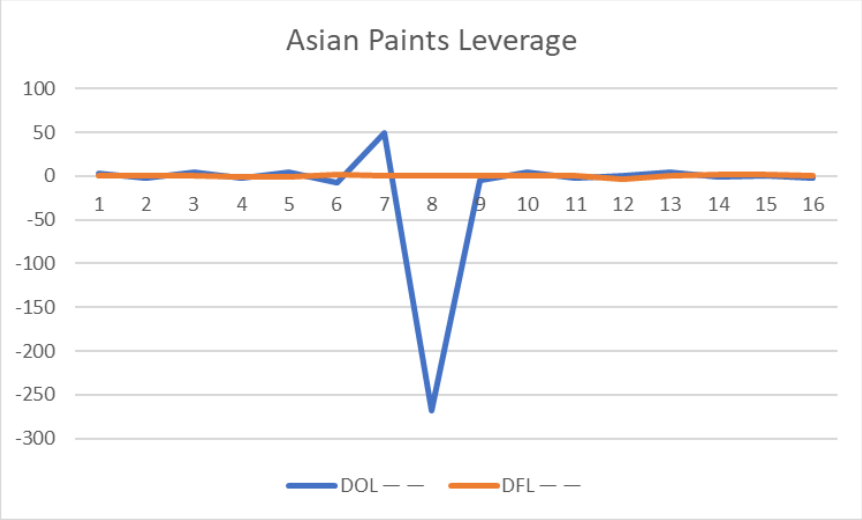
Leverage:

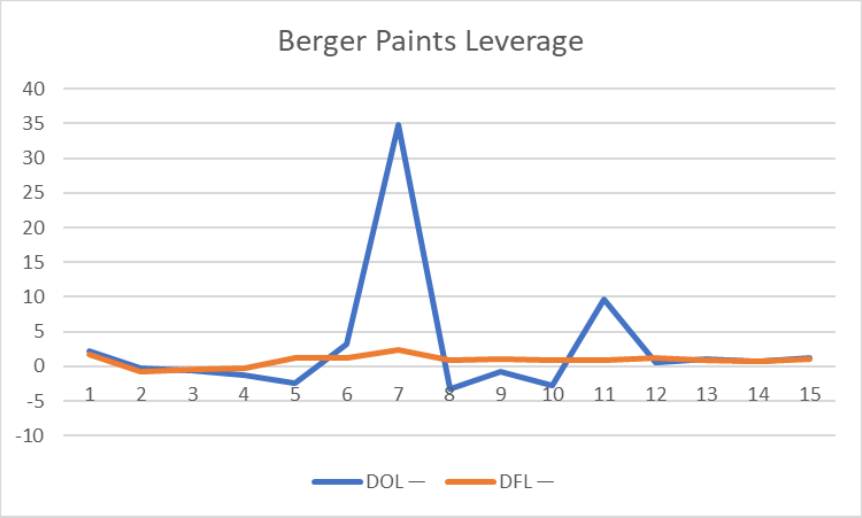
There exists 2 types of risk and 2 types of fixed cost; we can measure business risk through 2 types of leverage.
Change in one variable and its influence on other variables.
Operating fixed cost gives rise to Degree of operating leverage and financial fixed cost paves way for din risk which is represented by degree of financial risk.

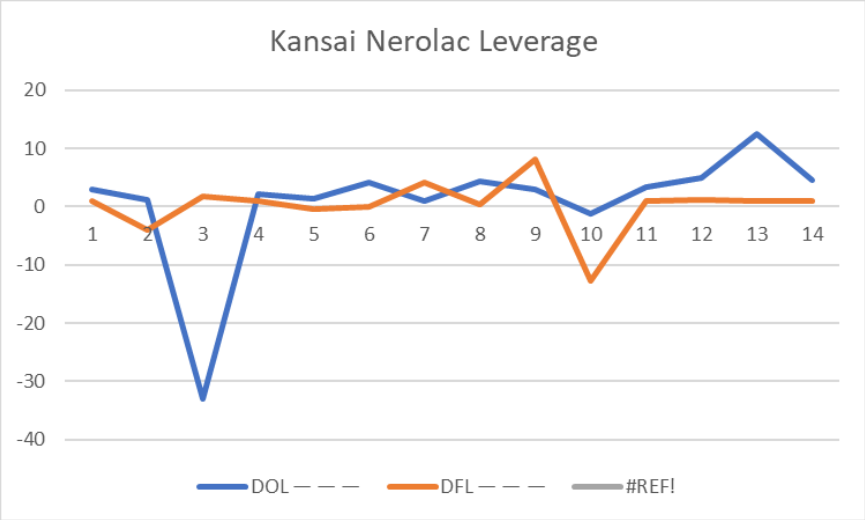
DOL: %change in EBIT and its influence on % change in sales.
This denotes degree of business risk; increases with increase in fixed cost
Degree of Leverage(DOL) = (% change in EBIT) / (% change in sales)

DFL: %change in EPS and its influence on % change in EBIT.
Operating fixed cost leads to operating risk and fixed financial cost contributes to financial risk.
EPS sensitive to high interest cost
Degree of financial leverage(DFL) = (% change EPS) / (% change in EBIT)

Degree of total leverage(DTL) = (DOL)*(DFL)







Risk Analysis :

As you can see from the following tables the systematic and unsystematic risk for the 3 target companies show completely opposite results.
The systematic risk is obtained from the value of adjusted R2. R2 is the proportion of risk(variance) of a firm that can be attributed to market risk. It gives an idea from where the risk is coming from and how much is coming from market/ company specific.

On the other hand, the unsystematic risk is obtained from subtracting the value of systematic risk from total risk. Thus, the unsystematic risk is 1- adjusted R2.

Difference between intercept and Rf(1-b) is Jensen's alpha. Jensen's alpha measures how well/bad the stock did after adjusting for risk and market performance.

After acquiring R square, Standard error, Slope of regression (Beta) and intercept from regression.
This data will serve as an input alongside risk-free rate to calculate Jensen’s alpha and annualized excess return for the target firms. Then we dive into the true value of Beta for a given confidence level, as beta is an estimate which is subject to

standard error. This will shed some light on the investment risk for each of the target firms compared to the market risk.

ASIAN PAINTS:

R Square = 0.87956
Standard Error = 0.02545
Slope of regression = Beta = 1.096
Intercept = -0.0012 (0.12%)
Risk free rate considered = 6.64%
Monthly Risk Free rate = 6.64%/12 = 0.5533
Rf(1-Beta) = 0.5533*(1-1.0967) = -0.053%
I.e. Intercepts would exactly be -0.053% if stock performed as exactly predicted.
But actual was -0.12%

Intercept (0.12%) Vs Risk Free Rate*(1- Beta) (-0.053%)
Jensen's Alpha = 0.12 - (-0.053) = 0.173%

Jensen's Alpha is close to the intercept
Therefore, Asian Paints did 0.173% better than expected per month in the given time frame.
Annualized Asian Paints Excess return = (1.00173)^12 - 1 = 2.09%

During regression, Asian Paints did 2.09% more than expected after adjusting risk and market performance.

True Beta after regression with 67% confidence would be between 1.071 to 1.122 (plus or minus 1 standard error)
True Beta after regression with 95% confidence would be between 1.045 to 1.147 (plus or minus 2 standard error)
Thus, Beta is an estimate not fact (as Beta is subject to standard error)

87.9% risk is coming from the market and 12.1% risk is coming from Asian Paints specific reasons. I.e., if you put the entire money in stock, you should not expect a return of 12.1% capital invested in stock.

Berger Paints:

R Square = 0.641716
Standard Error = 0.0469
Slope of regression = Beta = 1.001
Intercept = -0.00322 (0.32%)
Risk free rate considered = 6.64%
Monthly Risk Free rate = 6.64%/12 = 0.5533
Rf(1-Beta) = 0.5533*(1-1.001) = -0.055%
I.e. Intercepts would exactly be -0.055% if stock performed as exactly predicted.
But actual was -0.32%

Intercept (0.32%) Vs Risk Free Rate*(1- Beta) (-0.055%)
Jensen's Alpha = 0.32 - (-0.055) = -0.375%

Jensen's Alpha is close to the intercept
Therefore, Asian Paints did 0.375% better than expected per month in the given time frame.
Annualized Asian Paints Excess return = (1.00375)^12 - 1 = 4.59%

During regression, Asian Paints did 4.59% more than expected after adjusting risk and market performance.

True Beta after regression with 67% confidence would be between 0.954 to 1.0479 (plus or minus 1 standard error)
True Beta after regression with 95% confidence would be between 0.9072 to 1.0948 (plus or minus 2 standard error)
Thus, Beta is an estimate not fact (as Beta is subject to standard error)

64.1% risk is coming from the market and 35.9% risk is coming from Berger Paints specific reasons. I.e., if you put the entire money in stock, you should not expect a return of 35.9% capital invested in stock.

Kansai Nerolac:

R Square = 0.4033
Standard Error = 0.075136
Slope of regression = Beta = 0.985
Intercept = -0.02055 (2.05%)
Risk free rate considered = 6.64%
Monthly Risk Free rate = 6.64%/12 = 0.5533
Rf(1-Beta) = 0.5533*(1-0.985) = 0.00829%
I.e. Intercepts would exactly be 0.00829% if stock performed as exactly predicted.
But actual was -2.05%

Intercept (2.05%) Vs Risk Free Rate*(1- Beta) (0.00829%)
Jensen's Alpha = 2.05 - (0.00829) = 2.041%

Jensen's Alpha is close to the intercept
Therefore, Asian Paints did 2.041% better than expected per month in the given

time frame.
Annualized Asian Paints Excess return = (1.02041)^12 - 1 = 27.43%

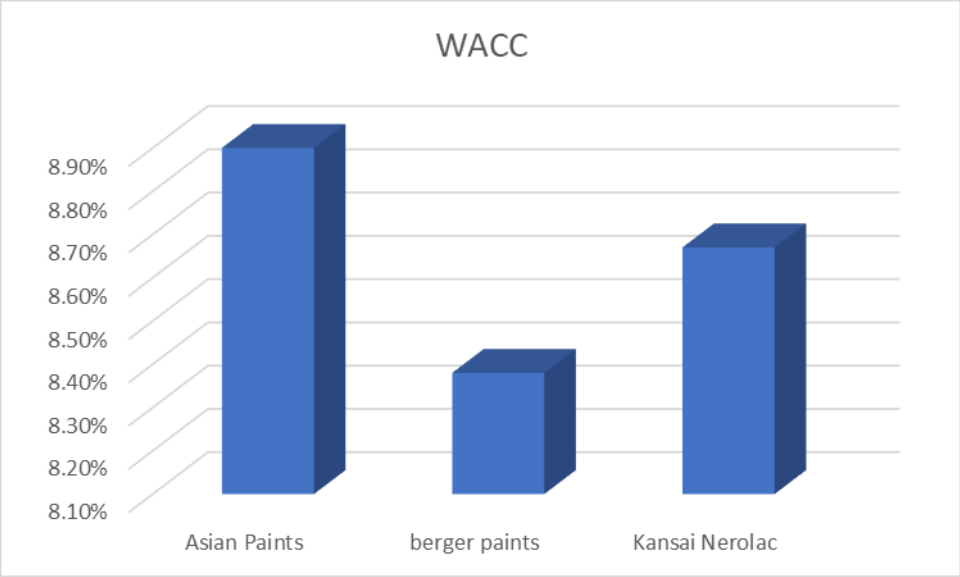
During regression, Asian Paints did 27.43% more than expected after adjusting risk and market performance.

True Beta after regression with 67% confidence would be between 1.071 to 1.122 (plus or minus 1 standard error)
True Beta after regression with 95% confidence would be between 1.045 to 1.147 (plus or minus 2 standard error)
Thus, Beta is an estimate not fact (as Beta is subject to standard error)

40.3% risk is coming from the market and 59.7% risk is coming from Kansai Nerolac specific reasons. I.e., if you put the entire money in stock, you should not expect a return of 59.7% capital invested in stock.

CONCLUSION

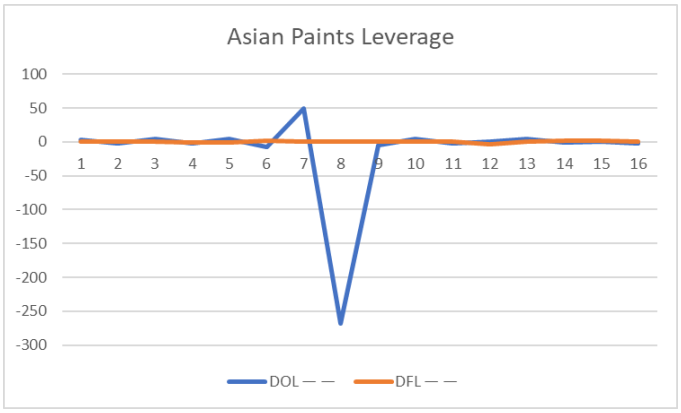
	Asian Paints	Berger	Kansai Nerolac
WACC	8.90%	8.38%	8.64%
Cost of Equity	8.89%	8.70%	8.67%

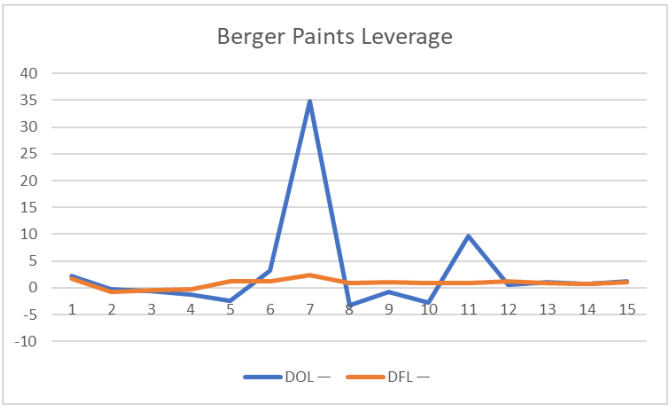


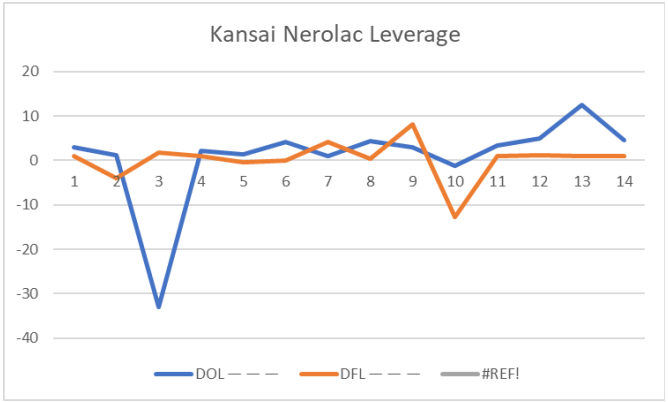
As we can see from the table above, the WACC and cost of equity for our target companies are quite similar, this is because these companies are very closely correlated. All of these firms have similar financing, operating and investing decisions, sell the same products, adopt business strategies which are alike and evidently belong to the same industry.

Unsystematic risk is the risk which is influenced by the activities of the individual company whereas systematic risk is the risk which is controlled by the market and industry to which the company belongs. Unsystematic risk and systematic risk are inversely proportional to each other and their sum is 1.
Kansai Nerolac has the greatest unsystematic risk of the three, this may be because of the recent business decisions, such as signing a new brand ambassador and setting up of a new manufacturing plant in Andhra Pradesh that Nerolac has taken.

To gauge risk for a firm , we measure business risk through 2 types of leverage namely degree of operating leverage(DOL) and degree of financial leverage(DOFL).







We see that Jensen's alpha is close to the intercept. Jensen's alpha measures how well/bad the stock did after adjusting for risk and market performance.
R square for Asian Paints is very high (87.9% risk is coming from the market and 12.1% risk is coming from Asian Paints specific reasons). Asian Paints being the industry leader has high risk coming from the market as it can act as a proxy for the paint sector and thus the chemical sector. It being a strong representative of the sector is thus impacted by sector trends and macroeconomic factors. The risk owing to Asian paints specific reasons is low, as the company's fundamentals are strong and cemented.

Measure of systematic Risk of the firms	Column1
Asian Paints	0.877483
Berger	0.635539
Kansai Nerolac	0.39305

Measure of Unsystematic Risk of the firms	Column3
Asian Paints	0.122517
Berger	0.364461
Kansai Nerolac	0.60905

Values of R square are slightly lower for Berger paint also denoting a certain level of risk from the market (not as high as Asian).
In the case of Kansai Nerolac, the risk coming from company specific reasons overpowers market risk.
Excess return is the return after adjusting the market performance and risk.
Annualized excess return for ASIAN Paints is 2.09% and those for Berger and Nerolac are 4.59% and 27.43% respectively to compensate for their higher risk.

Thus, return should not be expected on 12.1% of capital invested in stock. The number is 4.59% and 27.43% implying there's high risk for capital invested on stock for Kansai Nerolac.

SUMMARY

- Market selection : We chose a set of companies which were related to the target companies and belonged to similar industries such as agricultural and chemical industry as there are only 5 companies that belong to the paint industry and are listed on the national stock exchange.
- Market Index formation : After choosing firms for our custom market we found out the weights of each of the companies through their free floating shares and share price retrieved from bloomberg terminal.
  We then calculated the weighted price of each firm and obtained the total market adjusted close price by taking a sum of it.
  The adjusted close price of each firm and the total adjusted close firm of the market was then used to calculate the returns.
  Beta for each firm was calculated from the regression of individual and market returns.
- Cost of Equity : Cost of equity was calculated through the risk free rate, the beta obtained before and the implied ERP.
- Cost of Debt : We have taken into consideration the current bond yields of the companies and then we took a weighted average to get the final cost of after tax cost of debt.
- WACC: The values of cost of equity and cost of debt, with the help of debt and equity ratios (obtained from bloomberg) were then utilized to generate the WACC.
- Degree of Total leverage(DTL) : To gauge risk for a firm, we measure business risk through 2 leverages. Degree of financial leverage(DFL) and degree of operating leverage(DOL) were calculated from the data of % change in EBIT, % change in sales and % change in EPS.
  The degree of total leverage was then obtained from the multiplication of DFL and DOL.
- Risk Analysis :We got the inputs for risk analysis from regression and thus the corresponding inputs for analysis are R square, Standard error, Slope of regression (Beta), intercept and risk-free rate.This data was used to calculate Jensen's alpha and annualized excess return for the target firms. Then we dive into the true value of Beta for a given confidence level, as beta is an

estimate which is subject to standard error. This helped us comment on the investment risk for each of the target firms compared to the market risk.