Dissertation Report on

Equity Valuation: A Case Study on Motherson Sumi Systems Limited

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CERTIFICATE

This is to certify that that the Project Report titled "Equity Valuation: A Case Study on Motherson Sumi Systems Limited" is an original and bonafide work carried out by Mr. V ishal Garg of MBA 201719 batch and was submitted to Delhi School of Management, De lhi Technological University, Bawana Road, Delhi110042 in partial fulfilment of the require ment for the award of the Degree of Masters of Business Administration.

Signature of Guide	Signature of HOD (DSM)
(Mr. Mohit Beniwal)	(Prof. Rajan Yadav)

Place: Delhi
Date:

DECLARATION

I Vishal Garg, student of MBA 201719 of Delhi School of Management, Delhi Technological University, hereby declare that Dissertation report on **“Equity Valuation: A Case Study on Motherson Sumi Systems Limited”** submitted in partial fulfilment of Degree of Masters of Business Administration is the original work conducted by me. The information and data given in the report is authentic to the best of my knowledge. This report is not being submitted to any other University for award of any Degree, Diploma and Fellowship.

(Vishal Garg)

Place: Delhi

Date:

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Vishal Garg

EXECUTIVE SUMMARY

The value of an asset is the future cash flow it can generate discounted at an opportunity rate that reflects the risks of the asset. Thus, the discounted cash flow (DCF) method is widely used to estimate the true value of an asset. On the stock market, the price of equt y or a stock determined by the market may differ from its true value to the extent that it is overvalued or undervalued. In that belief, the investment theory suggests to buy or hold a stock if it is undervalued and not to buy or sell it if it is overvalued.

The purpose of this study is to evaluate the fair value of stocks from Motherson Sumi Sy stems Limited by conducting fundamental analysis on the financial performance of the comp any period 2019to2022. The aim is to find out if Motherson Sumi Systems Limited is a g ood investment by comparing its fair value with the current stock price. The valuation was limited to applying only to public equity, employing only DCF method using FCFF model with historical data, and investment potential is determined solely on estimated value per s hare. Within the limitations, the author found the estimated value per share was Rs.7116, which was lower than the market price of Rs.8277 on March 31st, 2019 when the valuatio n was started.

Also **Relative valuation** also called **valuation** using multiples is the notion of comparing t he price of an asset to the market value of similar assets. From Relative valuation the aut hor found the estimated value per share was Rs175, which was higher than the market pri ce of Rs160 on March 31st, 2019 when the valuation was started.
Hence, the conclusion was that Relative valuation is giving the better and close results on comparing the estimated value with the actual value of year 2019. Also Motherson Sumi S ystems Limited was undervalued and investing in the company would be profitable. The stu dy aims to provide a reference in valuating Motherson Sumi Systems Limited stock price a nd a benchmark to compare with results from other researches to assist investors in making investment decisions. Furthermore, the research can be considered as a guide line of stock valuation for readers who take an interest in equity investment.

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ABBREVIATION

CAGR: compounded annual growth
rate CAPM: capital asset pricing m
odel CFO: cash flow from operatio
n
CoS: cost of sales
DCF: discounted cash fl
ow Dep: depreciation
EBIT: earnings before interest and tax
EBITDA: earnings before interest, tax, depreciation, and amorti
zation ECAs: Emission Control Areas
EMH: efficient market hypothe
sis FCFF: free cash flow to f
irm FCFE: free cash flow to
equity FCInv: fixed capital in
vestment Int: interest expense
NCC: non-cash charges
NI: net income
NRFR: nominal risk-
free rate NWC: net worki
ng capital RFR: risk-
free rate
RRFR: real risk-free rate
SG&A: selling, general and administra
tion WACC: weighted average cost of
capital

1 INTRODUCTION

Does the price of a listed stock genuinely reflect the intrinsic value of the issuance company? The efficient market hypothesis (EMH) created by Eugene Fama in 1970s stated that in the capital market in its strongest form of efficiency, stock prices follow a “random walk” that is independent of past performance and instantly reflect all available information. Hence, investors would not be able to achieve superior return than the average return of all market participants; they cannot beat the market (Fama, 1970). How- ever, there has been studies and evidence showing the market is not always efficient and from time to time, it does allow anomalies to occur.

Throughout the history, there were times that the market made errors resulted in financial crisis, popular of which is “the great depression” in 1929-39, “the Black Monday” in 1987, “the Internet Bubble” in 1990s, the financial crises of 2008, etc. Many studies and researches conducted in the attempt of seeking the explanation for those incidents from DeBondt, Werner F. M and Richard Thaler (1995), Eugene Fama (1998), Hersh Shefrin (2000), etc. suggested the theory of behavioral finance. The general idea of behavioral finance is that investors are not always rational and their actions depend on attitudes toward risk and beliefs about probabilities, which causes a deviation in market prices from the intrinsic values (Brealey, Myers, & Allen, 2011). Although the deviation only last for a short time and the market will eventually correct itself, it gives incentive to investors to exploit these temporary efficiencies to make profit.

Hence in a certain period, a stock can be undervalued if its market price is below its intrinsic or fair value; overvalued if market price is above its fair value; and true to value if the two values are approximately the same. To determine a fair value of a stock, an analyst must consider the financial performance and the management of the issuance company as well as take into account the factors exist in the industry in which the company operates. By comparing market price with fair value, one would decide or give advice whether to buy, sell or hold a stock. This research will provide a fundamental analysis of Motherson Sumi Systems Limited. The Company was chosen because of its well-focused business operation.

1.1 Research aim, questions and significance

The purpose of this study is to evaluate the fair value of stocks from Motherson Sumi Systems Limited by conducting fundamental analysis on the financial performance of the company period 2014-2018. The aim is to find out if Motherson Sumi Systems Limited is a good investment by comparing its fair value with the current stock price. Also both Discounted Cash Flow Method and Relative Valuation Method is used in order to match the projected valuation values of year 2019 and match that value with present value of 2019 in order to find the best valuation technique.

The research is significant since an intrinsic value of a company is one of the key factors in determining its potential as an investment. It can be served as a reference in valuating Motherson Sumi stocks and a benchmark to compare with results from other researches. An industry analysis of automobile industry was conducted in this paper to provide an overview and expected outlook of the industry. Together they help assisting the investors in making decision regarding investing in the industry, in general or the company, in specific. Furthermore, the research can be considered as a guide line of stock valuation, using both Relative valuation method and DCF method for readers who take an interest in equity investment.

The research question involved in this study is: Is Motherson Sumi Systems Limited undervalued, over-valued or true to value at the current stock price (March 31st 2019)?

The sub-research questions are subject to be answered through the study:

- How will the company perform in the next 3 years?
- How much is the cost of capital (WACC) of the company?
- What is the fair value of Motherson Sumi Systems Limited?

1.2 Limitations

First, this research will solely compare the estimated fair value of Motherson Sumi Systems Limited with its current market price to evaluate the investment potential. Hence, a good investment, particularly in this paper, is when fair value is higher than the current market price while the other way around indicates a bad investment. In reality, analysts must take into consideration other factors such as associated risks, stock liquidity, free float rate, etc. to provide a thorough and accurate equity analysis.

Second, the method for stock valuation in this research is restricted to Relative Valuation and Discounted Cash Flow (DCF) method, which is most common and widely used among analyst society. In fact, there are many methods developed to valuate a stock value and each has distinct advantages and disadvantages. Analysts often combine different methods to seek the optimal answer since stock valuation is an elusive process that involves a lot of assumptions and uncertainties. Moreover, the analysis conducted in this paper solely based on data retrieved from the annual reports of the company. Other information regarded the management quality and corporate governance is neglected.

Finally, Motherson Sumi Systems Limited is publicly traded, therefore, the method employed in this research should only be used to this type of company. Other types of equity in the capital market are not subjected to be investigated for this project.

1.3 Research Structure

The structure of this paper is divided into two main parts: the literature review and the empirical part. The literature review follows a general-to-specific pattern which starts with investing fundamentals and gradually comes to equity valuation. Readers will be familiarized with the concepts of risk and return, tools to measure them in terms of investment, and different appr oaches to valuate an asset. In addition, there will be an extensive overview of the Free cash flow to firm (FCFF) model, which is the key mechanism for the empirical part. The empirical part in this thesis mainly focuses in the valuation of Motherson Sumi Systems Limited using the FCFF model. In the beginning of this part, an analysis of the automobile industry is provided as a foundation of the valuation process beside the past performance of the company. Then, the company analysis will illustrate how the valuation process is conducted, begins with a brief overview of Motherson Sumi Systems Limited and shows the rational, interpretation as well as the estimated results towards the end followed by a short discussion explaining the reliability of the results. Lastly, the author summarizes what has been presented in the paper and suggests further research to improve the estimated results.

2 METHODOLOGY

The focus of this study is to estimate the fair value of Motherson Sumi Systems Limited. Therefore, financial data extracted from annual reports of the company will be the foundation for the analysis. Data is retrieved from annual reports of the five most recent financial years, which is from 2014 to 2018, from the company's website. In which, quantitative data regarding the financial performance of Motherson Sumi Systems Limited is extracted from the financial statements. The author will also take into consideration any qualitative data regarding the company's management, strategies and goals presented in the reports. In addition, market data from financial websites such as Money Control will be used for further analysis. These data consist of monthly prices of Motherson Sumi Systems Limited in the period of five years, and the monthly yield which are used to estimate the company's weighted cost of capital (WACC).

Other secondary data and related information is gathered from past researches and available reports to conduct industry analysis.

As mentioned before, the method for stock valuations in this paper are discounted cash flow (DCF) method and Relative valuation method. A literature review of these methods will be presented in the Literature Review section below. Specifically, the inputs for the DCF model are the company's forecasted free cash flow to firm (FCFF) and weighted average cost of capital (WACC). The inputs for Relative valuation is taken for the other companies working in the same sector.

Financial model

For the FCFF valuation, a financial model is built based on data from financial statements of the company. The models can be divided into three main parts: Input, Break-down, and Forecast. The input section is primarily a replication of the financial statements in the chosen period. The breakdown section picks the vital elements from the financial statements: Sales revenue, Working Capital, Depreciation schedule, and Interest-bearing Liabilities; and investigates even further to forecast their changes in the future. Forecast section represents the company’s financial statements in the coming periods, in this case, from 2019 to 2022. The first period is separated into three single years while the latter is presented as an average for the whole period. The reason for doing in such way is to be as precise as possible in forecasting, that is breaking down the forecasted period into individual financial years. The number of forecasted individual years is three but not higher, nevertheless, is because increasing the number of individual years at this point would not significantly improve the precision of the estimated results. The longer period of forecasting, the less accurate the results would be. Therefore, it is rational and more efficient to make forecasting specifically for every year for a short period, in this case four years, and then assume an estimated average for the rest. There is one row at the end of the balance sheet worksheet, which shows the difference between total assets and sum of total equity and total liabilities, to check if the model is correctly built. If the model is correctly built, the values of this row in every year should be zero to indicate that total assets and sum of equity and liabilities are balance, which is the essence of a balance sheet.

Microsoft Excel is used to build the financial model.

Capital asset pricing model (CAPM)

To estimate the company’s WACC, the capital asset pricing model (CAPM) is employed. A literature review for the model will be presented in the Literature Review section below.

Relevant information from past researches will be gathered together to draw the consensus view. Based on the industry analysis as well as the data obtained from Motherson Sumi’s annual reports, the author will make assumptions and forecasts of the future performance of the company. In addition, there will be calculations using statistical and financial mathematics to estimate the fair value of the company. The value per share is then derived from the company's value and is put into comparison with the market value on March 31st, 2019, when the valuation is started. The result will be interpreted as one of three following scenarios:

(1) The company is undervalued if its fair value is higher than its market value
(2) The company is overvalued if its fair value is lower than its market value
(3) The company is fairly valued if its fair value equals to its market value

3 LITERATURE REVIEW

3.1 The investment setting

When current earnings exceed current spending desire, one can choose to eith er keep the excess as saving or receive the exact amount in the future or gi ve up his or her immediate possession in exchange for a larger sum after a certain period. Hence, in- vestment is defined by Reilly and Brown (2003) as the current commitment of dollars for a period to get future payments that will compensate the inv estor for the time value of the funds or the opportunity cost, the expected r ate of inflation and the uncertainty or risk of future payments. The compensa tion, which is often described as a return on the initial dollar amount investe d, is called the investor’s required rate of return. This is the minimum rate of return an investor accepts as a compensation for deferring consumption. (R eilly and Brown, 2012)

3.1.1 Risk & return

Return is an incentive for making investments. It can be measured as the tot al gain or loss to investors over a certain period and often presented as perc entage return on initial investment. Realized return is the return which has be en earned while expected return is one which investors anticipate to receive over a certain period of investment and it may or may not occur. Investors predict expected return based on the realized return in the past. In terms of equity investment, return consists of the dividends and capital gain or loss at the time of sale of stocks. Typically, required returns are higher for riskier in- vestments. (Omisore, Yusulf and Christopher.I., 2012)

In investment context, risk is the uncertainty of future returns. In other words , it represents the possibility that the actual return from an investment will d iffer from its expected return (Omisore, Yusulf and Christopher.I., 2012). Simi larly, risk regarding to a company is the possibility that the actual outcome of a financial decision may not be same as anticipated. Hence, the risk of an investment can be statistically measured by variance and standard deviation of returns. The larger the variance or the more variation in returns from an investment, the riskier the investment is.

3.1.2 Risk-free rate & risk premium

The required rate of return is made up from interest rates which are influenced by three variables mentioned above: the opportunity cost of the investment, the expected inflation rate, and the uncertainty of future payments. The real risk-free rate (RFRR) is the basic interest rate derived from the opportunity cost, the benefit or return of alternative investments that an investor gave up for a certain investment, assuming there is no inflation and uncertainty about future payments. If inflation is taken into account beside opportunity cost, the RFRR becomes the nominal risk-free rate (NFRR). The NFRR is derived from the RFRR as follow:

$$\textbf{NRFR} = [(1 + \textbf{RRFR}) \times (1 + \textbf{Expected Rate of Inflation})] - 1$$

A risk-free investment is one that investors are certain about the amount of future payments and when they will be made. In this case, investors only ask for a rate of turn equals to the risk-free rate. Since inflation almost always exists, the risk-free rate (RFR) is often expressed as the NRFR. This is also applied in this paper. Government treasury bonds are typically considered as risk-free. If there is uncertainty about the expected return, investors will demand a higher rate of return and the difference between the required rate of return and the risk-free rate is called risk premium (RP):
(Reilly and Brown, 2012)

$$\textbf{Required rate of return} = \textbf{RFR} + \textbf{RP}$$

Expected return

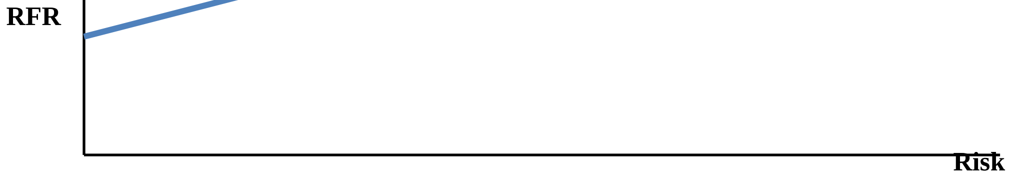


Figure 1. Risk & Return Relationship (Reilly and Brown 2012)

3.2 Market portfolio theory

Since the research in this paper will not directly employ the Markowitz's portfolio model but rather its applications, the author will not show the original model but instead point out the implied ideas behind it. Interested readers who would like to have a thorough understanding the theory as well as the models within it can find Markowitz's scientific work in the bibliography section below.

The market portfolio theory, first developed and introduced by Harry Markowitz (1952, 1959), provided a measure of portfolio risk and showed how to build an optimal portfolio. A portfolio, in terms of investment, is a combination of different financial assets and types of investments held by individual investors or managed by portfolio managers in financial institutes. As mentioned before, risk of an investment is considered as the variation of its returns. Hence, it can be measured by the variance and standard deviation of possible future returns from the expected returns (Reilly and Brown, 2012). The variance and standard deviation of an investment's returns in n periods of time are computed as follow:

$$\begin{aligned}
\sigma^2 &= \frac{\sum (X-\mu)^2}{N} \\
&= \frac{\sum (X^2 - 2\mu X + \mu^2)}{N} \\
&= \frac{\sum X^2}{N} - \frac{2\mu \sum X}{N} + \frac{N\mu^2}{N} \\
&= \frac{\sum X^2}{N} - 2\mu^2 + \mu^2 \\
&= \frac{\sum X^2}{N} - \mu^2
\end{aligned}$$

The variance (σ^2), is defined as the sum of the squared distances of each ter m in the distribution from the mean (μ), divided by the number of terms in the distribution (N).

However, risk of a portfolio which consists of multiple individual investments is not simply measured by taking average of each component‘s variance or standard deviation.

According to Markowitz’s portfolio theory, one should take into account the co-variance of individual investments when measuring a portfolio risk. Covariance measures the degree to which two variables move together relative to their individual means over time. Hence, a positive covariance means the two variables tend to move together while a negative covariance indicates they tend to move differently relative to their means during the same period (Reilly and Brown, 2012). For two individual investments x and y, the covariance of their returns in n period of times is computed as follow:

$$\mathrm{Cov}\,(X, Y) = \frac{\sum(X_i - \overline{X})(Y_j - \overline{Y})}{n}$$

When interpreting the covariance of returns of two investments, one can only see the co-movements of their variations in return. In order to examine how strong their relationship is, the covariance is standardized by the variability of the individual returns of each investment to yield the correlation coefficient:

The correlation coefficient only varies from -1 to +1. A value of -1 indicates a perfect negative correlation while a value of +1 indicates a perfect positive correlation between the returns of two investments. In a perfect correlation, one variable defers from its mean value by a comparable amount of that of the other variable, in either direction from the means. A value of zero means the returns have no linear relationship or uncorrelated statistically. (Reilly and Brown, 2012)

So, the variation of returns of an investment may have the same or opposite movements of that of another investment, or just fluctuates randomly. This means that putting two investments which have a perfectly negative covariance of returns in one portfolio will be less risky than just keeping either one, since the increase in one’s return will offset for the decrease in the other’s. The return of this portfolio is the sum of each investment’s average return weighted with their proportions in the portfolio.

By keeping a portfolio with multiple investments, one can reduce the bearing risk while achieving the same desired return. This act is called diversifying. The total risk of a portfolio can be reduced through diversifying but not eliminated. The portion that can be eliminated is call unsystematic risk or specific risk, which is peculiar to each company due to the distinctiveness in their operations and other factors which influence them. On the other hand, systematic risk or market risk is the portion that cannot be eliminated through diversifying. It is based on the fact that there are economy-wide factors that have impact on all businesses (Brealey, Myers, & Allen, 2011).

Figure 3 illustrated the relationship between the standard deviation of return or the risk of a portfolio and the number of stocks in the portfolio. According to figure 2, the unsystematic risk decreases as the number of stocks in a portfolio increases to the extent that only systematic risk remains, at which the portfolio becomes the market portfolio.

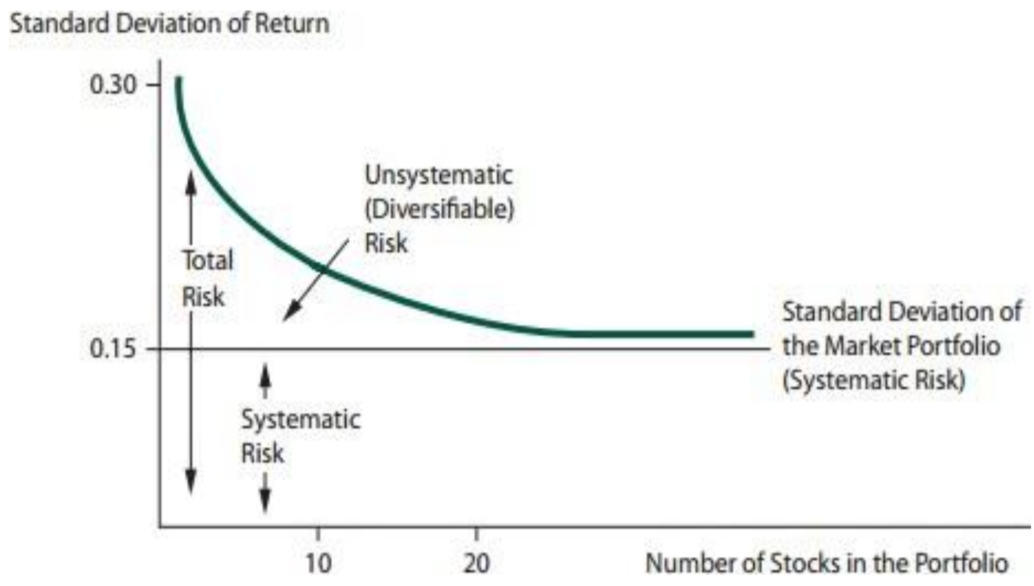


Figure 2. Number of stocks in a portfolio & the standard deviation of the portfolio return (Reilly & Brown, 2012)

3.3 The capital asset pricing model (CAPM)

Based on the market portfolio theory, investors should diversify their investm ents and aim for the market portfolio in which the total risk equals systema tic risk since the un-systematic risk is diversified away. Nevertheless, the theory did not explain how risk and return work for individual risky assets. The capital asset prici ng model (CAPM), developed by Sharpe (1964), Lintner (1965) and Mossin (1966), showed how to evaluate risk-return trade-off for both diversified portfolios and individual securities. The mathematical representation for the model goes as follows:

$$E(r_i) = r_f + \beta_i\left[E(r_m) - r_f\right]$$

$E(r_i) = Expected\ return\ of\ stock\ i$
$r_f = Risk\ free\ return\ rate$
$\beta_i = Beta\ of\ i$
$E(r_m) = Expected\ market\ return$

Note: “Risk Premium” = (Rm – Rrf)

(Reilly and Brown, 2012)

The CAPM redefines the relevant measure of risk from total volatility to only the systematic risk. Therefore, the new risk measure beta coefficient, denoted as β, calculates the systematic risk of a security compared to that of the market portfolio or the market (Reilly and Brown, 2012). The beta coefficient can be calculated by running a simple linear regression of a security’s returns and the market returns in a certain period or by using the following formula:

$$\beta_p = \frac{Cov(r_p, r_b)}{Var(r_b)}$$

The CAPM once again expresses the expected return as the sum of the RFR and the expected RP. Nevertheless, the model is simplified by employing the overall market risk premium $[E(R_M) - RFR]$ and adjusting it according to the riskiness of a security relative to the market, which is captured by the beta coefficient, rather than calculate the risk premium for every security (Reilly and Brown, 2012).

3.4 Equity valuation

3.4.1 Theory of Valuation

A valuation of an investment is the process of estimating its value which represents the present value of its expected returns during the invested period. An equity or stock valuation specifically refers to the process of estimating the intrinsic value of common stocks. A commonly accepted theoretical principle in valuating any financial asset is the discounted cash flow methodology (Reilly and Brown, 2012). A value of an asset equals to all the future cash flows discounted at an opportunity rate which reflects the risk of the investment

(Pratt, 1998). The valuation process is a fundamental approach to support making investment decision. By comparing the estimated value of an investment to its market value or market price, one can determine to invest or not. The interpretation of estimated intrinsic value of an investment for making investment decision is summarized as follow:

- If Estimated Intrinsic Value > Market Price, Buy or Hold it if you Own It.
- If Estimated Intrinsic Value < Market Price, Don't Buy or Sell it if you Own It.

(Reilly and Brown, 2012)

3.4.2 Valuation approach

Since a value of asset is fundamentally the expected future cash flows discounted back to the present, valuation process involves uncertainties about the future and therefore, the estimated value will always be subjective and imprecise. Equity valuation models help specifying what to be forecasted and turning it to an intrinsic value estimate. There are three major valuation techniques which are generally applicable and widely used:

1. DCF valuation
2. Relative valuation

(Froidevaux, 2004)

Asset based valuation is closely associated with value investing developed by Benjamin Graham. The idea is that the fair values of a company's current tangible assets should be the foundation in estimating the intrinsic value of that company.

The fair value of an asset is estimated by its reproduction cost which is the cost a competitor would have to incur to enter the business. The reproduction cost reflects the earning power of an asset which might increase or decrease over time, therefore it can be significantly different than the book value or the acquisition cost (Froidevaux, 2004). This approach might be difficult when valuating companies which have a substantial number of intangible assets, for instance Research & Development, which is hard to quantify into monetary value.

In relative valuation, a value of an asset is estimated based on how similar assets are priced in the market. The principle underlying is that similar assets should sell for similar prices. The values of assets or companies first need to be standardized, by converting them into multiples of their earnings, book values, replacement values, or revenues that they generate. Then, comparable companies which have similar cash flows, growth potentials, risk levels, etc. are selected and their multiples are compared with one another to determine their relative adequacy. The four main methods using different multiples that are commonly used to valuate common stocks:

1. Relative to earnings: P/E ratio, PEG ratio
2. Relative to revenues generated: P/S ratio
3. Relative to cash generated: P/EBIT, P/EBITDA, P/CFO, EV/EBITDA ratios
4. Relative to book value: P/B ratio

(Froidevaux, 2004)

The DCF method is primary based on the fundamental principle mentioned above, that a value of an asset is the present value of its expected future cash flow.

The model can be extended to valuate a company considering it as a portfolio of assets. The method then can be approached in two ways: via value of equity or via value of firm. Value of equity represents only the stake of the company that belongs to the common shareholders.

In this approach, free cash flow to equity (FCFE), which is the residual amount after all operating expenses, tax obligations, and interest and principal payments, is discounted at the cost of equity which is the rate of return require d by equity investors (Damodaran, 2004). On the other hand, free cash flow to firm (FCFF) is discounted at the company’s weighted average cost of capital (WACC) to get value to firm in the second approach. This approach is different from the former in which it takes into account the leverage used by the company in financing its business, by replacing FCFE by FCFF – the exact same amount but prior to debt payments – and using WACC – the cost of all financing components, weighted by their market value proportion – as the discount rate instead of cost of equity (Damodaran, 2004). The two approaches are summarized in the table below:

3.4.3 Optimal valuation technique

The three valuation techniques above are the most commonly used by analysts. Each has its own advantages and disadvantages compared to others. Because valuation is an elusive process that involves a lot of uncertainties and the results are often subjective, thus differ from one another, there is no such optimal valuation technique. Analysts often use a combination of valuation methods to better estimate the intrinsic values of assets or companies. In this research, however, the method employed is the DCF method and Relative Valuation method. It reflects the commonly-accepted principle of asset valuation: the value of an asset is the total amount of expected cash flows it can generate, discounted at a rate which reflects the risks of the asset. More specifically, the author chose the approach via valuating the value to firm where FCFF and WACC are the inputs for model. The reason is that this approach, in practice, is more straightforward as FCFF is unaffected by changes in financial leverage (Damodaran, 2004).

3.5 Free cash flow to firm (FCFF) model

3.5.1 Calculating free cash flow to firm (FCFF)

As mentioned before, FCFF is the amount of cash a company generates by running its business after all expenses, tax obligations, and investments are deducted. There are different ways to estimate FCFF, originated by different starting points. An analyst can calculate FCFF by starting with the following items from the financial statements: net income (NC), earnings before interest and tax (EBIT), earnings before interest, tax, depreciation and amortization (EBITDA), or cash flow from operations (CFO)

FCFF = cash flow from operations + interest expense x (1 - tax rate) - capital expenditures (CAPEX)

The net income appears at the bottom line of an income statement is not necessarily cash since companies can sell their products or services on credits where cash transactions do not occur yet. Therefore, one must make some adjustments to get the FCFF, fundamentally that is adding the actual cash transactions which do not appear in the income statement and deducting noncash charges when calculated net income. Some common noncash charges include depreciation & amortization – a method to spread the cost of an asset throughout its useful life, restructuring charges, and deferred taxes, which show the difference between reporting income and expenses for accounting and tax purposes. Fixed capital investment is the difference between the capital expenditures, which refer to the investment in long-term assets, and the divestment in such assets. Net working capital(NWC) is a measure of company’s short-term financial health, which is the ability to meet short-term obligations. Therefore, it is calculated as the difference between current assets excluding cash and cash equivalents and current liabilities. NWC is a noncash item involved in the calculation of net income in the income statement, therefore should be taken into the formula. An increase in NWC during the financi al year should be added back to NI where- as a decrease in NWC should be deducted. The final adjustment is the interes t expense which is the interest payment companies must pay to their debt hold ers for cash financing. Since FCFF is prior to debt payments, interest expense should be added back into the formula.

It should be noted that only the after- tax interest cost is adjusted since interest expense affects the amount of taxable income which in turn**,** affects the tax obligations.

Calculating FCFF from EBIT

FCFF = earnings before interest and taxes (EBIT) x (1 - tax rate) + depreciation Long term investments - investments in working capital.

Starting from EBIT does not require to adjust for interest expense since it is before interest and taxes. Nevertheless, depreciation is added back becaus e it was subtracted in calculating EBIT.

Calculating FCFF from EBITDA

FCFF = earnings before interest, tax, depreciation and amortization (**EBITD A**) x (1 - tax rate) + depreciation x tax rate - long-term investments - investments in working capital.

EBITDA is the earnings before interest, taxes, depreciation, and amortization . There- fore, the depreciation tax shield calculated by multiplying depreciation and tax rate is added back. It represents the cash amount increased from taxe s saved by having depreciation.

Calculating FCFF from CFO

FCFF = cash flow from operations + interest expense x (1 - tax rate) - capital expenditures (CAPEX)

CFO is the cash flow from operations which appears in the cash flow statem ent. Since it is derived from net income and already adjusted for noncash ch arges and working capital, only after-tax interest expense and fixed capital investment should be taken into the formula.

If a company uses preferred shares to raise fund beside debt and common equity, further adjustment is necessary to estimate the FCFF. Preferred shares represent ownership in a corporation that is similar to common equity but do not carry voting rights. Therefore, preferred shareholders have priority over common shareholders in which dividends of preferred shares must be paid out before dividends of common shares (Investopedia).

In calculating FCFF, preferred shares are treated like debt, which dividends are added back to the FCFF, except that the amount is not tax-deductible (Cross-Reference to CFA Institute Assigned Reading #42 - Free Cash Flow Valuation, n.d.).

To forecast FCFF in the future, analysts can choose to either forecast the growth of FCFF as a whole, based on historical data or forecast the components of FCFF. The latter method is more realistic, more flexible and thus, more complicated because it is assumed that each component has a different growth rate (Cross-Reference to CFA Institute Assigned Reading #42 - Free Cash Flow Valuation, n.d.). By analyzing and fore-casting each component of FCFF, analysts would make more reasonable assumptions as well as have more flexibility adjusting one or more components to see the effect on the value of FCFF.

3.5.2 WACC as the discount rate

WACC is the cost of capital that a company uses to finance for operating its business. Since the goal is to estimate the total value of the company, it is reasonable to use WACC as the discount rate. Cost of capital is derived by summing the cost of debt and equity weighted by their relative proportions in the company’s financing structure.

Both the weights of equity and debt financing is estimated based on market value. Since the WACC may change over time as the company's capital structure changes, analysts should use target structure weights instead of actual weights. The cost of equity, which is the rate of return required by common shareholders, can be calculated using the CAPM. It will then equal to the RFR plus the RP, which is the net of market return and the RFR, adjusted to the correlation between the company's return and the market return by multiplying with the beta coefficient. On the other hand, the cost of debt represents the required rate of return by debt holders. According to the above formula, it is tax-deductible since the interest payment reduces the amount of tax obligation.

3.5.3 Single-stage vs multi-stage model

The FCFF model can be used as a single-stage or a multi-stage model to better illustrate the different stages of a business and the industry in which it is operating. One of the most common models of an industry's life cycle was presented by Michael Porter in 1980. According to Porter (1980), an industry's cycle has four stages: introduction, growth, maturity, and decline. In introduction stage, a company must spend huge amount of capital for establishing its business and often results in negative profit. Any profits generated would be reinvested into the company to consolidate for growth. The growth stage is similar to the introduction stage in which the company spends significant amount of capital to differentiate its products or services from competitors and to standardize its operation to obtain economies of scale. Demand in this stage is growing and leads to substantial increase in sales and earnings as well as intense competition among existing players and new entrants. Maturity stage experiences a slowing growth rate compared to the growth stage. Competition is among those big and dominant companies who rem ain in the industry and there is apparent barrier for new entrants. Companies may have excess cash to pay dividends to shareholders, nevertheless continue to invest to further expand and increase sale volumes. As companies enter decline stage, sales decrease in an accelerating rate. As a result, more companies are forced to exit or be consumed by larger companies through merger & acquisition.

Multi-stage models capture the idea that a company may have different future growth patterns. Generally, multi-stage models break the future growth pattern of a company into smaller short-term periods before assuming it has constant growth rate. A two-stage model assumes that a company has two growth stages: a high-grow stage in a short amount of time follow by a stable-grow stage in long-term. A three-stage model assumes that a company has two periods of certain growth rates before entering its stable growth period. The stable-growth period is called the **terminal value** of a company which is calculated using similar formula as in the single-stage model.

4 COMPANY ANALYSIS

4.1 Overview

Motherson Sumi Systems Limited (MSSL) is the flagship company of the Sumi Motherson group. The Delhi-based Sehgal family initially promoted it as Motherson Auto Private Limited in 1986 as a single product (wire harnesses) company, supplying mainly to Japanese customers, namely Maruti Suzuki, Hero Honda, DCM Toyota etc. In 1986, Sumitomo Wiring Systems (SWS), Japan, which was till then the technical collaborator, picked up equity stake in MSSL along with Nissho Iwai Corporation, Japan. Thereafter the company changed its strategy and tied up with other tier-1 suppliers to cater to the needs of other OEM in India. MSSL became a public limited company in 1992.

Mother son Sumi Systems Limited (MSSL) is the flagship company of the Samvardhana Mother son Group (SMG) and is a listed entity. From a small wiring harness maker in India, the company has evolved into a full system solutions provider and caters to a diverse range of customers in the automotive and other industries across Asia, Europe, the Americas, Australia and Africa. MSSL overs a wide array of products and is well recognised among leading manufacturers of automotive wiring harnesses, passenger car mirrors, plastic components and modules such as cockpits, bumpers and door trims. The company has also been expanding its presence in a broad range of other polymer, elastomer and metal-based parts and systems.

PARTNERSHIPS

Over the years Samvardhana Mother son Group has forged long term partnerships and collaborations with global technology leaders, facilitating access to cutting-edge technology. Today, the Group has 24 joint venture partners. These partners are industry and technology leaders in their respective markets, and their technological capabilities and global reach give significant advantages and benefits to the Group across its businesses., and their technological capabilities and global reach give significant benefits to the Group across its businesses.

The Group's association with its business partners has only enhanced its focus on inno vation and continuous efficiency improvements. SMG has consistently leveraged the combination of its partners' technologies with its own existing know-how and manufacturing capabilities to provide high quality automotive component s to its customers.

BUSINESS AREAS

SMG is a global solutions provider offering end-to-end design and manufacturing solutions to its customers, including product concept a nd product design, engineering, prototyping and tool manufacturing product, manufa cturing, assembly and the production of integrated modules.The Group's business portfolio covers multiple areas of the automotive value chain as well as several non-automotive industries. The product range includes:

- **WIRING HARNESS**

The wiring harness business of the Group is done by Mother son Sumi Systems Ltd., the flagship company of SMG. MSSL was established as a joint venture partnership with Sumitomo Wiring Systems, Japan for wiring harnesses manufacturing. Today, it manufactures Wiring Harnesses, High tension cords, battery cables and high-level assemblies.

The Group provides complete solutions including design from basic vehicle sche matic, development, prototyping, validation and manufacturing of wiring harnesses fo r passenger cars, commercial vehicles, two & three wheelers, multi utility vehicles, farm & material handling equipment and off-road vehicles. MSSL also manufactures specialized wiring harnesses for white goo ds, office automation equipment, medical diagnostic equipment and other electrical and electronic equipment.

The complete vertical integration for manufacturing critical wiring harness components like wires, connectors, terminals, grommets, junction boxes, relay boxes, protectors etc., enables MSSL to provide quality products with reduced time to market. The capability of designing and manufacturing of jigs, fixtures, applicators, circuit checking & assembly boards, supported by state-of-the-art facilities for wiring harness & component testing, makes the company a full system solutions provider.

In order to provide services to the global customer base of the Group, facilities have been established in close proximity to the customers MSSL serves. The facilities are spread across India, Mexico, Sri Lanka, UAE, Thailand, USA, UK, Japan, Italy, Germany, Ireland and Korea.

- **Mirrors**

The MSSL mirror business vertical, working under the name of Samvardhana Motherson Reflectec (SMR) is one of the largest manufacturers of mirrors for passenger cars in the world. The vertical develops and manufactures rear view mirror system and intelligent camera technologies for the automotive industry. The product range includes exterior and interior mirrors, mirrors with integrated lighting and turn signals, warning detection systems, telescopic trailer tow mirrors, as well as other rear view vision technologies including cameras and sensors that help make driving more comfortable and safer. At the request of customers, a unanimous decision by the top management of MSSL to acquire Visicorp in 2009 led to the inception of SMR. The familiarity with Visiocorp's operation and customers owing to its joint venture with MSSL in India since 1996, led to a successful integration into the Motherson Group. SMR equipped with its expertise in moulding technologies, decorative surface finishes, light weighting, lighting technologies aided by strong vertical integration in various mirror components, provides end to end solutions to its customers.

- **Polymers and modules**

The Polymers and Modules vertical is the largest business line of MSSL. Its encompasses high level polymer modules as well as process and tooling operations for interior, exterior and under bonnet components for various vehicle segments in countries around the globe. The vertical's product line includes a full range, fro m smaller components and assemblies to fully completed cockpits, door trim modu les, centre consoles as well as full body panels, pillar trims, bumper covers and mod ules, frontend carriers and modules. The in-house capabilities also include development and production of polymer compounds. The vertical in its present evolved after 2011. When customers saw that MSSL succes sfully took over SMR in 2009, we were asked to consider Peguform as well. With the successful acquisition and integration of Peguform, which was then named Sa mvardhana Motherson Peguform (SMP), the success of MSSLs' polymers vertical gathered pace

Vision, mission and values.

MSSL is expected to reach U.S. $ 5 billion worth in less than 5 years. Cont inuous focus on cost and operating efficiency remains the hallmark of the co mpany. Adding to all this is the fact that radicalization in India is throwing up fresh opportunities, as is the boom in road infrastructure and the completion of t he Golden Quadrilateral and the North-South-East-West corridor. Therefore, the future is optimistic with promises of a virtuous cycle of growth. MSSL has three automotive manufacturing facilities and one unit for the production of tubes and flaps in four locations based in West and South Indi a. MSSL endeavor has been to have the widest spread of sales and regional offices, along with stock points at locations which allow for maximum customer research and efficient supply of chain management.

MSSL dealers or business partners are also chosen with great care. MRF's products are sold through a combination of outlets ranging from exclusive dealerships to mu lti-brand and branded retail outlets. The continuous upgradation of dealer knowledge is in MSSL's interest and therefore their training is undertaken by the company. With a dedicated field production, technical and commercial force, we feel that we are best positioned to meet the customer specific needs.

Government Policies

Government Initiatives

The Government of India's Automotive Mission Plan (AMP) 2006–2016 has come a long way in ensuring growth for the sector. Indian Automobile industry is expected to achieve a turnover of $300 billion by the year 2026 and will grow at a rate of CAGR 15 per cent from its current revenue of $74 billion.

Government has come out with Automotive Mission Plan (AMP) 2016-26 which will help the automotive industry to grow and will benefit Indian economy in the following ways:-

- Contribution of auto industry in the country's GDP will rise to over 12 per cent
- Around 65 million incremental number of direct and indirect jobs will be created
- End of life Policy will be implemented for old vehicles

COMPLIANCE WITH GOVERNMENTAL LAWS, RULES AND REGULATIONS

Officers must comply with all applicable governmental laws, rules and regulations. Officers must acquire appropriate knowledge of the legal requirements relating to their duties sufficient to enable them to recognize potential dangers, and to know when to seek advice from the finance department. Violations of applicable governmental laws, rules and regulations may subject Officers to individual criminal or civil liability, as well as to disciplinary action by the Company. Such individual violations may also subject the Company to civil or criminal liability or the loss of business.

Achievements

Following are the achievements of the government in the past four years:

- The FAME – India Scheme formulated by Department of Heavy Industry led to a continuous increase in registered OEMs and vehicle models. Also, the scheme enhanced the sales of electric vehicles and about 261,507 electric/hybrid vehicles were supported under the scheme up to December 6, 2018.
- Under National Automotive Testing and R&D Infrastructure Project (NATRiP) various facilities including passive safety labs comprising of crash core facility and crash instrumentations including dummies were established at ICAT-Manesar & ARAI-Pune
- To give a fresh thrust to e-mobility in public transport, Department of Heavy Industry announced the launch of public & shared mobility based on electric powertrain.

The Group's association with its business partners has only enhanced its focus on innovation and continuous efficiency improvements. SMG has consistently leveraged the combination of its partners' technologies with its own existing know-how and manufacturing capabilities to provide high quality automotive components to its customers.

Subsidiaries shareholding

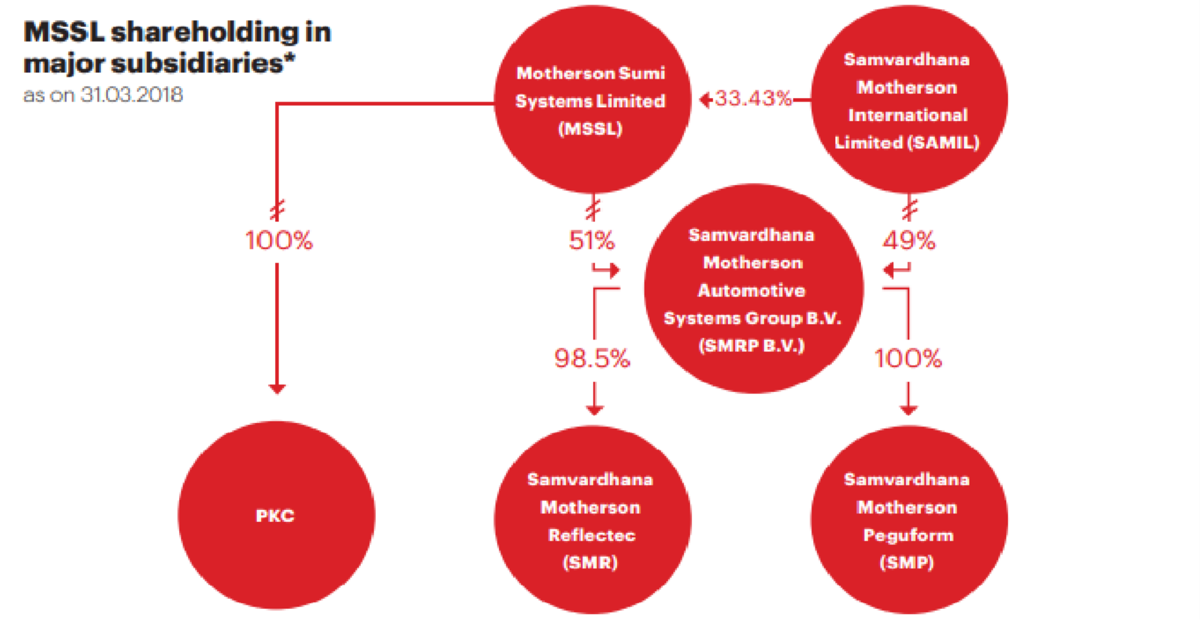
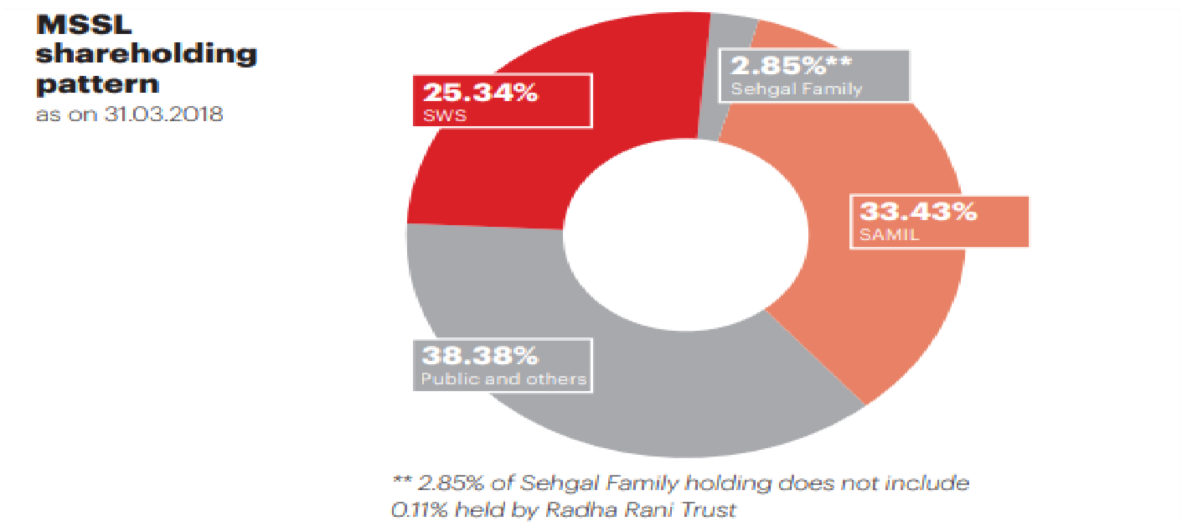


Figure 5. Motherson Sumi core business (by revenues) and operating routes (by passengers) 2016

The company is a pioneer in integrated wiring harnesses has over 50 per cent share of the Indian automotive market. It enjoys a privileged status as the main suppl ier to a large number of automotive and auto components industries in India. It offers its customers the complete range of services from design concept to prototy ping, mass production and logistics.

MSSL shareholder structure



Standalone financial performance

			.... In Rs. Million.....................						
	Actual values					Projected Values			
	2014	2015	2016	2017	2018	2019	2020	2021	2022
Sales	45821	50057	53739	62487	74488	84907.73	97806.9	114567.05	133983.5
Sales growth		9.24%	7.36%	16.28%	19.21%	13.99%	15.19%	17.14%	16.95%
COGS	25142	27981	28535	33845	40987	46369.09	53362.8	62200.286	73061.306
cost of goods sold As % of sales	54.87%	55.90%	53.10%	54.16%	55.02%	54.61%	54.56%	54.29%	54.53%
Staff cost	4976	6028	6869	8560	10619	10806.87	12814.1	15252.581	17979.853
staff cost As % of sales	10.86%	12.04%	12.78%	13.70%	14.26%	12.73%	13.10%	13.31%	13.42%
Other expenses	6105	6830	7189	8313	9636	11307.25	13023.8	15180.229	17718.75
other espenses as %of sales	13.32%	13.64%	13.38%	13.30%	12.94%	13.32%	13.32%	13.25%	13.22%
EBITDA	9598	9218	11146	11769	13246	16424.51	18606.2	21933.95	25223.595
EBITDA margin	20.95%	18.42%	20.74%	18.83%	17.78%	19.34%	19.02%	19.15%	18.83%
Depreciation	1530	2071	2008	1977	2183	2021.06	2431.74	2775.93	3195.82
Interest	417	303	474	124	433	899.96	919.28	927.54	764.59
PBT	7651	6844	8664	9668	10630	13503.5	15255.2	18230.479	21263.188
Tax	2233	2089	2336	3455	3316	4500.72	5084.55	6076.22	7087.02
Tax rate						33.33%	33.33%	33.33%	33.33%
PAT	5418	4755	6328	6213	7314	9002.781	10170.6	12154.26	14176.168
Net Profit margin	11.82%	9.50%	11.78%	9.94%	9.82%	10.60%	10.40%	10.61%	10.58%
Dividend	-1175	-2202	-5928	-5953	-4210	-5672.67	-7249.10	-9269.81	-10318.24
Dividend payout ratio	-21.69%	-46.31%	-93.68%	-95.82%	-57.56%	-63.01%	-71.27%	-76.27%	-72.79%

Industry Overview

Introduction

The Indian auto-

components industry has experienced healthy growth over the last few years. The auto-

component industry of India has expanded by 18.3 per cent to reach at a level of US$ 51.2 billion in FY 2017- 18.The auto-

components industry accounts for 2.3 per cent of India's Gross Domestic Product (GDP) and employs as many as 1.5 million people directly and indirectly eac h. A stable government framework, increased purchasing power, large domestic ma rket, and an ever-

increasing development in infrastructure have made India a favourable destination f or investment.

Market Size

The Indian auto-components industry can be broadly classified into the organised and unorganised sectors. The organised sector caters to the Original Equipment Manufacturers (OEMs) and consists of high-value precision instruments while the unorganised sector comprises low-valued products and caters mostly to the aftermarket category.

The total value of India's automotive exports stood at US$ 13.5 billion in 2017-18 as compared US$ 10.9 billion in the year 2016-17. This has been driven by strong growth in the domestic market and increasing globalization (including exports) of several Indian suppliers. Growth is further expected to accelerate to 8-10 per cent in FY19 due to pick up in global scenario. According to the Automotive Component Manufacturers Association of India (ACMA), the Indian auto-components industry is expected to register a turnover of US$ 100 billion by 2020 backed by strong exports ranging between US$ 80- US$ 100 billion by 2026.

Segment	Share in total	CAGR
Two wheelers	74.1%	9.6%
Passenger vehicles	16.3%	19.5%
Three wheelers	4.6%	12.6%
Commercial vehicles	5.0%	21.8%

Investments

The Foreign Direct Investment (FDI) inflows into the Indian automotive* industry during the period April 2000 – June 2018 were recorded at US$ 19.29 billion, as per data by the Department of Industrial Policy and Promotion (DIPP).

Some of the recent investments made/planned in the Indian auto components sector are as follows:

- Schaeffler India, the Indian arm of Germany's automotive and industrial parts mak

er, is planning to
invest Rs 300 crore (US$ 46.66 million) per annum over FY18-19.

- As of December 2018, German automotive major Continental has planned investments of Rs 180 crore (US$ 25.65 million) for setting up a premium surface materials facility in Pune. The facility will have an initial capacity of five million square metres and is expected to start production in 2020.
- In October 2018, IMI Precision Engineering inaugurated its second largest manufacturing facility in the Asia Pacific region. The company is planning to expand its product and technical offerings over the course of the next few years.

5.2 Forecasting

In the section, the author will present the assumptions and rational behind them for forecasting Motherson Sumi financial results from 2019 forward. Readers can find the whole spreadsheet model showing the historical input data from 2014 to 2018, forecasted results from 2019 forward, and the valuation process. Of which, results for period from 2019 to 2022 is presented separately for every single year, which shows the difference in growth rates each year while from 2020 forward, financial results are assumed to grow at a constant rate. For better demonstration of the forecasting process, this section will be divided into 3 parts relative to three main components of the financial statements: Income statement, Balance sheet, and Cash flow statement. Each part provides the constituent items need to be forecasted. The row check at the bottom of the balance sheet worksheet shows zero value for every year, which indicates the model was correctly built.

5.2.1 Income statement

The most important item that need to be forecasted in the income statement is apparently the revenue. Revenue of Motherson Sumi Systems comes from its core operating business which is the Wiring Harness, other operating incomes may come from other automobile products. Other comprehensive income which consists of items affect the net income but do not appear in the income statement also needs to be estimated.

The company is a pioneer in integrated wiring harnesses has over 50 percent share of the Indian automotive market. It enjoys a privileged status as the main supplier to a large number of automotive and auto components industries in India. It offers its customers the complete range of services from design concept to prototyping, mass production and logistics.

First group company "Motherson" was established in 1975. However, Motherson Sumi Systems did not come into existence till 1986 when Joint Venture wi th Sumitomo Wiring Systems (of Japan) was formulated. Following are the ke y timelines.

Year	Events
1975	Motherson founded
1977	First Cable factory started
1983	Technical agreement with Sumitomo Wiring Systems, Japan for Wiring Harness
1986	JV with Sumitomo Wiring Systems, Japan
1992	Cutting Tool Manufacturing
1999	First Overseas office established (Austria)
2002	Established wiring harness manufacturing at Sharjah and design centre at Ireland
2004	European Headquarters established in Germany
2005	Established fabrication units in Germany
2006	Established fabrication units in UK
2007	Established fabrication units in Australia
2009	Takeover of Visiocorp
2011	Takeover of Peguform
2014	Takeover of Stoneridge Wiring Division

2014	New Plant Start in Noida of Injection Moulding (MAE_ NOIDA)

5.2.2 Balance sheet

Current assets, non-current or fixed assets, current liabilities, non-
current liabilities, and equity are items need to be forecasted in the balance s
heet. Current assets and current liabilities were estimated in the working capit
al worksheet based on day's outstanding ratios, except for trade receivables si
nce there is no information about credit sales provided in the annual reports.
Thus, trade receivables were estimated simply by a margin on sales revenue

For trade payables and inventory, the author forecasted based on the days out
standing ratios which measure the average number of days Motherson Sumi k
eeps its inventory before selling it and the average number of days to pay in
voices to its suppliers. The ratios were calculated by dividing the average am
ount of inventory/trade payables by the daily CoS (CoS divided by 365 days)
. The ratios were assumed to remain unchanged from that of 2016. Other typ
es of payables were estimated by taking average of results from the last thre
e years.

Table 6. Assumptions for working capital forecasted period 2019-2021

	2019E	2020E	2021E
TradeTReceivables/SalesTRevenue	Same as 2018	Same as 2019	Same as 2020
DaysTinventoryToutstanding	Same as 2018	Same as 2019	Same as 2020
DaysTtradeTpayablesToutstanding	Same as 2018	Same as 2019	Same as 20120
AccruedTexpensesTandTprepaidTincome	Average of last 5 years	Average of last 5 years	Average of last 5 years
OtherTpayables	Average of last 5 years	Average of last 5 years	Average of last5 years

To forecast the value of fixed assets in the balance sheet, the author made a depreciation/amortization schedule. According to information provided in the a nnual reports of Motherson Sumi, the fixed assets are depreciated/amortized us ing straight-line method, in which the cost or value of the assets is deducted by a const ant amount throughout their estimated useful life. The constant amount equals the cost or value of the asset divided by its estimated number of years it c an be used to generate profit. The exceptions, how-ever, are the value of building and structures which is depreciated by a fixe d percentage of remaining expenditures and value of land which is not deprec iated over time.

Table 7. Depreciation methods for non-current assets

	Depreciation method	Estimated useful life (years)	Assumed remaining years
Intangible assets	Straight-line	5-10 years	5
Land	Not depreciated	Value = 0.6 (2017 forward)	
Building and structures	% of remaining expenditure	4-7% (building) 20-25% (structures)	8%
Vessels	Straight-line	20-25 years	13
Machinery & Equipment	Straight-line	5-15 years	4
Renovation costs	Straight-line	10	10

For those assets, which are depreciated using straight-line method, the depreciation/amortization is divided into two components: depreciation/amortization from current ending balance and depreciation/amortization from the amount of FCInv. Depreciation/amortization from current ending balance is constant for each year and equals the ending balance of the asset for the year divided by the its remaining years of useful life, which was estimated based on its ending balance and estimated years of useful life provided in the annual reports. Depreciation/amortization was calculated using the same approach whereas the current ending balance was replaced by the amount of FCInv and the amount depreciated/amortized in the first year was assumed to be halved. Table shows the depreciation schedule of vessels. On the other hand, depreciation of building and structures was calculated based on a fixed percentage of the ending balance. The amount for machinery and equipment was estimated as an average of values from 2014-2018 in 2019. The author thought this account would be replenished at a certain level similar reasoning was applied for the increase of renovation costs. Meanwhile, the FCInv amount for intangible assets in 2019 was estimated by taking average of that from 2014 to 2018. The value in 2019 was exceptionally high which might be due to a significant investment for developing the online sales system, and thus, was excluded from the calculation. The FCInv for other assets were estimated simply by taking average amounts of the last five years.

Table 8. Depreciation schedule for vessels period 2014-2019

	2014	2015	2016	2017	2018	2019
Net Tangible asset (PP&M)	14330	14612	14086	13824	14644	14815
Dep.	1530	2071	2008	1977	2183	2021.06
Gross Tangible asset	15860	16683	16094	15801	16827	16836
Ratio	0.10	0.12	0.12	0.13	0.13	0.13

Most of the non-current interest-bearing liabilities of Motherson Sumi come from the loan it while the current amount is a portion of the principal it must pay back every year. The info rmation regarding the pay back schedule can be found in the annual reports, therefore the author only needs to estimate the interest rate of the non-current interest-bearing liabilities by dividing the amount of interest expense in a certain year with the average amount of the liabilities in that same year (average of beginning and ending balance). Interest rates were then estimated as an average of that of the last five years and interest expenses for coming years were calculated by multiplying the rates with the average amount of non-current liabilities. In addition, the author also expected that Motherson Sumi would not take any additional loan until 2022. Deferred tax liabilities, which mostly result from the difference between depreciation calculation by the company and by taxation authorities, were assumed to remain unchanged.

Finally, the author assumed Motherson Sumi would not issue bonds or common shares as financing instruments and therefore, the amount of share capital and minority remain unchanged as well.

Table 9. Assumptions for interest-bearing liabilities and other items in balance sheet forecasted period 2019-2021

	2019E	2020E	2021E
Income tax assets	0 (realized in income statement)	0	0
Advance payments	Same as 2018	Same as 2019	Same as 2021
Receivables	Same as 2018	Same as 2019	Same as 2021
Income tax liabilities	Same as 2018	Same as 2019	Same as 2021
Non-current interest-bearing liabilities	Not increase	Not increase	Not increase
Interest rate	Average of last 5 years	Average of last 5 years	Average of last 5 years

Deferred tax liabilities	Same as 2018	Same as 2019	Same as 2021
Share capital	Same as 2018	Same as 2019	Same as 2021
Minority	Same as 2018	Same as 2019	Same as 2021

5.2.3 Cash flow statement

There are not many items need to be forecasted in the cash flow statement since most of the constituent items can be linked from the other two stateme nts. For the sake of simplicity, the author assumed there would be no divest ment in non-current assets and investment available for sale from 2019 to 2022. Looking back at the historical data from 2014 to 2018, there were little divestment of non-current assets and therefore, the assumption should not cause significant error to the forecasted results. Since there would no divestment in non-current assets, there should not be any capital gains from non-current assets.

Table 10. Assumptions for cash flow statement forecasted period 2019-2021

	2019E	2020E	2021E
Capital gains from non-current assets	No capital gains		
Divestment of vessels	No divestment		
Divestment of other tangible and intangible assets	No divestment		
Divestment of investment available for sale	No divestment		
Dividend paid	Annual re-port 20	Same as in 2019	Same as in 2019

5.3 Valuation

For the valuation process, the forecasted FCFF, the WACC, and the estimated growth rate are required. As mentioned before, the WACC for Motherson Sumi, which serves as a discount rate of future cash flow, will be estimated as the sum of cost of debt and cost of equity of the company, multiplied by their weights at market value. Since Motherson Sumi does not issue any debt instrument, the average debt was estimated as the average amount of non-current interest-bearing liabilities from 2014 to 2022. The cost of debt is then the interest rate of the liabilities. On the other hand, cost of equity was estimated using the CAPM. The inputs for the model include the RFR, the beta coefficient of Motherson Sumi relative to the market, and the RP, which is the required rate of return of the market minus the RFR.

The market value weight of equity was estimated by dividing the market value of equity of Motherson Sumi, share price on March 31st, 2019 timed number of outstanding shares, with the sum of which and the market value of the company's debt.

The weight of debt would equal to 1 subtracted by the weight of equity and finally the WACC was calculated.

Key Revenue drivers

Profits and other revenue margins of Motherson Sumi depends upon various parameters such as

- Ebit (earnings before interest and tax) margins at the European subsidiary
- Samvardhana Motherson Peguform (SMP) dropped because Motherson Sumi's policy t

o charge "start-
up" costs of its new units at Hungary and Alabama that are yet to go on strea m, which weighed on profitability.

- It's most recent acquisition PKC, the margin was an unexpectedly wafer-thin 3.1%. According to brokerage firm Emkay Global Financial Services Ltd, this w as due to challenges that PKC faced on material availability that led to higher freig ht and labor expenses, and dragged margins down.
- Raw material costs are on the rise too. At a consolidated level, they jumped by 3 9% in absolute terms and by 100 basis points as a percentage to sales. Employee co sts rose by 50 basis points.
- High growth rates in auto sales have bolstered the drop in overall profitability to some extent.
- Overseas entities account for 83% of consolidated revenue and nearly three-fourth of the profits, focus on margins is important to sustain rich valuations.
- Net debt too has risen over a year, reflecting in the 35% year-on-year increase in interest costs during the March quarter.

Key Growth drivers

- **Robust order book** The company reported the highest ever order book of 17. 2 billion euro at Samvardhana Motherson Automotive System Group (SMRPBV) in FY18, which provides strong revenue visibility going forward.
- **Huge expansion on track** At present, the company has six plants at different stages of completion globally. The management said start-up cost would be lower as SMP's Kecskemet plant in Hungry has turned operatio nal. They also mentioned that the Tuscaloosa plant in the US has also begun operati ons. These plants are expected to add 1 billion euro in revenue on a full ramp-up in FY19.
- **Strong volume growth** the management said topline growth for the India oper ations was due to strong growth in domestic passenger vehicles. Growth was also fuelled by an increase in content per vehicle.With regulatory challenges in Indian automobile industry easing, MSSL was able to register strong growth, indicating s trong position of the company in the Indian market. With teething problems relate d to Goods & Service Tax behind, it is in a vantage position to gain from increas

ed vehicle demand. New upcoming BS VI emission norm would lead to complex wi ring harness requirement that would benefit the company as the value is expected to go up.

Key risks

- **Regulation**

The first risk is regulation. Big swings in regulation could create pressure for automot ive makers to rethink their supply base and manufacturing locations on quite a s hort notice.

- **Consumer demand**

The second major risk factor is around the demand for cars, forecasting the types of vehicles and the specific demand in individual geographies. I think India is pro ving to be a very interesting laboratory in this sense, as a growing middle class is starting to buy cars and the industry is looking for ways to satisfy that demand.

Factors impacting

- **Raw Material Price** Automotive industry enjoyed falling commodity prices for m ost part of the year which helped the industry pass on the benefits to the customers . The fall in steel prices particularly was favorable to the industry.
- **Interest Rates**

With inflation under control, RBI has had enough headroom to play around with the rates and it has done so at all possible occasions.

- **Additional Cess Surprise** The hopes of auto industry for a positive budget 2016 were somewhat quashed because of the various additional cess which were intro duced on the auto industry. In the Union Budget 2016, the government introdu ced infra cess at 1 percent on small petrol vehicles, 2.5 percent on small diesel vehicles, and 4 percent on bigger vehicles.

Table 11. Capital structure of Motherson Sumi

EQUITY

Owner's equity (common)	1062	1710	1305.00	1458.00
Reserve & surplus	56474	59776	67684.87	73782.98
TOTAL EQUITY	**57536.00**	**61486.00**	**68989.87**	**75240.98**

Forecasted FCFF from 2019-2022 can be calculated using one of the approaches discussed in the literature review section. In this paper, the author chose to derive FCFF from CFO since it was already calculated in the cash flow statement. Therefore, a modest growth rate should be reasonable for Motherson Sumi. All the future cash flows were then discounted back to present using the WACC to get the firm value of Motherson Sumi. Then, the equity value was derived by subtracting the firm value with all the liabilities at the end of 2016 in the balance sheet. The value per share found by dividing the equity value by the number of outstanding shares. The estimated value per share is higher than the market price on March 31st, 2019 which indicates that Motherson Sumi was undervalued.

DCF Valuation

		2014	2015	2016	2017	2018	2019	2020	2021	2022
REVENUE		45821	50057	53739	62487	74488	84907.72992	97806.8675	114567.0458	133983.5034
REVENUE GROWTH RATE			0.0924467	0.073556146	0.162786803	0.192055948	0.139884678	0.151919473	0.171359933	0.169476812
EBITDA		9598	9218	11146	11769	13246	16424.51237	18606.19115	21933.95032	25223.59484
DEPRECIATION		1530	2071	2008	1977	2183	2021	2432	2776	3196
EBIT		8068	7147	9138	9792	11063	14403	16174	19158	22028
TAXES		2233	2089	2336	3455	3316	4500.715343	5084.550145	6076.218503	7087.020649
EBIT(1-t)		5835	5058	6802	6337	7747	9903	11090	13082	14941
+ Depreciation		1530	2071	2008	1977	2183	2021	2432	2776	3196
- Capital Expenditures		1455	3621	1609	2492	3040	3646.358787	4419.222191	4554.30023	5589.057901
FCFF		5910	3508	7201	5822	6890	8277	9102	11303	12548
Cost of Capital Calculations										
Tax Rate		0.3333	0.3333	0.3333	0.3333	0.3333	0.3333	0.3333	0.3333	0.3333
Debt Ratio		0.4819654	0.4819654	0.481965398	0.481965398	0.481965398	0.277999902	0.290845278	0.30959622	0.331523649
Beta		1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43
Cost of Equity		20.05%	20.05%	20.05%	20.05%	20.05%	20.05%	20.05%	20.05%	20.05%
Cost of Debt		0.0674976	0.0733656	0.140195209	0.010708117	0.03921036	0.066195375	0.065934936	0.064448799	0.049299517
After-tax cost of debt		0.0450006	0.0489129	0.093468146	0.007139102	0.026141547	0.044132457	0.043958822	0.042968014	0.032867988
Cost of Capital		0.1363871	0.1363871	0.136387071	0.136387071	0.136387071	0.163163327	0.161362386	0.158379063	0.150373464

Table 12. Motherson Sumi valuation

Relative Valuation

COMPANY	LAST PRICE	MARKET CAP. (RS. CR.)	SALES TURNOVER	NET PROFIT	TOTAL ASSETS		P/E RATIO
MARUTI SUZUKI	6,933.20	209,438.10	81,994.40	7,721.80	43,479.90		27.122964
BAJAJ AUTO	2,862.90	82,843.74	25,563.26	4,068.10	19,384.78		20.364234
M & M	649.35	80,727.19	49,444.99	4,356.01	34,578.48		18.53237
HERO MOTOCORP	2,673.65	53,406.16	32,871.82	3,697.36	11,883.82		14.444404
TATA MOTORS	180.1	52,001.17	59,624.69	-1034.85	40,146.67		-50.249959
ASHOK LEYLAND	86.55	25,406.75	26,926.67	1,562.59	8,627.34		16.259383
MRF	57,124.60	24,220.83	15,227.07	1,092.28	11,518.50		22.174561
EXIDE INDS.	218.75	18,593.75	9,459.80	668.35	5,442.74		-27.820379
BALKRISHNA INDS	894.3	17,286.82	4,464.46	739.25	4,952.43		23.384268
APOLLO TYRES	219.95	12,583.34	10,554.59	622.39	10,207.13		20.217773
AMARA RAJA BATT.	728.4	12,441.07	6,232.98	471.32	3,092.86		26.396228
ESCORTS	674.3	8,265.57	5,015.97	344.72	2,636.98		23.977634
AVERAGE							11.233623
NUMBER OF SHARES(IN CR)							701.7
MOTHERSON SUMI	**160.5**	**50,684.30**	**7,667.30**	**879.1**	**7,402.60**		57.654761
EPS							15.544166
TARGET PRICE							**174.61731**

5 DISCUSSION

The estimated value of Motherson Sumi's share indicated that it was undervalued at the market price of Rs160.5. In other words, according to the valuation conducted above, the author expected that Motherson Sumi's share worth approximately Rs174.61 and that in the near future, probably in one year, its price would increase to its fair value. Therefore, if considering only the fundamental valuation, it is suggested that investing in the company, at market share price of Rs174.61, will be profitable.

Nevertheless, the results from the valuation might or might not be precise. As mentioned before, the valuation process involves anticipating about the future with many uncertainties that there is no guarantee that the future results would be as expected or might not even close to that. And as it was illustrated in the process, a lot of assumptions were made and most of them were subjective to the author's opinion It implies that the estimated results might differ from one analyst to another, hence one should, if possible, put them in comparison to have a consensus view. Furthermore, the valuation process conducted above is a primary research which lacks insight information from the company's management and employs valuation methods such as Relative valuation method and DCF method. In fact, analysts would combine different methods such as relative valuation using multiples of peered companies in the same industry or applying technical analysis on stock price movements on top of the DCF valuation as well as getting access to different pools of information to minimize the subjective biases. It is suggested that investors and interested readers should consider other factors as well as employ additional valuation techniques to have a more precise result.

One factor that investors and interested readers should take into account when making investment decision is the liquidity of an asset. Liquidity of an asse t, or specifically in this paper a public equity or listed stock, refers to “the ability to trade a substantial amount of a financial asset at close to current market price” (Kemp, 2014). Liquidity can be measured by the average daily trading volume of the stock. Thus, liquid stocks usually have high average t rading volume while low average trading volume indicates low liquidity. Liqui dity can have a considerable impact trading strategy and can even be used a s a predictive tool for future price. First, it is apparent that liquid stocks sho uld be easy to trade on the market, which is preferred by traders who aims to exploit the short-term mispricing period of certain stocks to gain profit. On the contrary, liquidity is less important to investors who aim to buy a stock and keep it in a long period. Second, because illiquid stocks cannot be traded as easily as their liquid counterparts, investors tend to demand higher return for keeping them, which has a large impact on stock valuation. A study by Chen, Ibbotson and Hu (2010) showed that investing in illiquid stocks with a low volume-to-earnings ratio pays more than going after most popular stocks and that liquidity as an investment style would continue to outperform in the future. In addition, Bali, Peng, Shen and Tang (2013) showed that stocks which are less liquid or received less investor attention underreact to liquidity shocks, which refer to significant change in stock liquidity triggered by public information releases. Based on the study, analysts at Standard & Poor developed an investing strategy using changes in liquidity as a signal to predict future stock prices.

After all, fundamental value has always been a solid foundation in asset valuation with DCF method being a powerful and reliable tool implied by the widely use among analysts. The valuation done in this thesis has given a demonstration on how to conduct such process and showed the author’s analysis and expectation on Motherson Sumi share price, though the input was limited to historical data and public-released information. Therefore, it is suggested to consider additional factors as well as other valuation methods to improve the precision of the estimated results. Another thing to keep in mind is that the estimated fair value of an asset will differ from time to time. Thus, one must update his or her valuation on a regular basis: yearly, quarterly, or monthly in accordance with information releases. Financial models similar to the one in this paper are deliberately built so that one can easily make adjustments by changing one or more assumptions to reflect the impacts of new information on fair value of assets.

6 SUMMARY AND CONCLUSION

People choose to invest their money in hope of getting a higher amount in return. Nevertheless, they must accept the risk that the return may differ from their expectations. Thus, the risk of an investment can be measured by the variance of expected future returns of that investment. The higher the risk of an investment is, the higher the return will be. Based on this theoretical principle, the value of an asset is the future cash flow it can generate discounted at an opportunity rate that reflects the risks of the asset. Thus, the DCF method is widely used to estimate the true value of an asset. On the stock market, the price of equity or a stock determined by the market may differ from its true value to the extent that it is overvalued or undervalued. In that belief, the investment theory suggests to buy or hold a stock if it is undervalued and not to buy or sell it if it is overvalued.

In an attempt of illustrating how the equity valuation process is conducted, Motherson Sumi, which operates in the automobile industry, was valuated and determined its investment potential. The valuation was limited to applying only to public equity, employing both Relative and DCF method (using FCFF model) with historical data obtained from Motherson Sumi annual reports from 2014 to 2018, and investment potential is determined solely on estimated value per share. Within the limitations, the author found the estimated value per share using Relative Valuation was approx. Rs175, which was higher than the market price of Rs160 on March 31st, 2019 when the valuation was started. Hence, the conclusion was that Motherson Sumi was undervalued and investing in the company would be profitable.

The estimated result, however, was bound by the stated limitations and the author's subjective judgments therefore might differ from other similar valuations. After all, equity valuation is an elusive process of anticipating the future outcomes and accepting the risk of uncertainties. Hence, readers are suggested to consider other relevant factors and other valuation techniques to improve precision. Furthermore, investors who are interested in investing in Motherson Su mi should consider the result of this paper as comparable tool in estimating t he company's value and the period of which this valuation is conducted as a n asset value varies across time.

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APPENDICES

Appendix 1.

Profit & Loss Statement

	.... In Rs. Million....................								
	Actual values					Projected Values			
	2014	2015	2016	2017	2018	2019	2020	2021	2022
Sales	45821	50057	53739	62487	74488	84907.73	97806.9	114567.05	133983.5
Sales growth		9.24%	7.36%	16.28%	19.21%	13.99%	15.19%	17.14%	16.95%
COGS	25142	27981	28535	33845	40987	46369.09	53362.8	62200.286	73061.306
cost of goods sold As % of sales	54.87%	55.90%	53.10%	54.16%	55.02%	54.61%	54.56%	54.29%	54.53%
Staff cost	4976	6028	6869	8560	10619	10806.87	12814.1	15252.581	17979.853
staff cost As % of sales	10.86%	12.04%	12.78%	13.70%	14.26%	12.73%	13.10%	13.31%	13.42%
Other expenses	6105	6830	7189	8313	9636	11307.25	13023.8	15180.229	17718.75
other espenses as %of sales	13.32%	13.64%	13.38%	13.30%	12.94%	13.32%	13.32%	13.25%	13.22%
EBITDA	9598	9218	11146	11769	13246	16424.51	18606.2	21933.95	25223.595
EBITDA margin	20.95%	18.42%	20.74%	18.83%	17.78%	19.34%	19.02%	19.15%	18.83%
Depreciation	1530	2071	2008	1977	2183	2021.06	2431.74	2775.93	3195.82
Interest	417	303	474	124	433	899.96	919.28	927.54	764.59
PBT	7651	6844	8664	9668	10630	13503.5	15255.2	18230.479	21263.188
Tax	2233	2089	2336	3455	3316	4500.72	5084.55	6076.22	7087.02
Tax rate						33.33%	33.33%	33.33%	33.33%
PAT	5418	4755	6328	6213	7314	9002.781	10170.6	12154.26	14176.168
Net Profit margin	11.82%	9.50%	11.78%	9.94%	9.82%	10.60%	10.40%	10.61%	10.58%
Dividend	-1175	-2202	-5928	-5953	-4210	-5672.67	-7249.10	-9269.81	-10318.24
Dividend payout ratio	-21.69%	-46.31%	-93.68%	-95.82%	-57.56%	-63.01%	-71.27%	-76.27%	-72.79%

Appendix 2

Balance Sheet

	ACTUAL VALUES			.... In Rs. Cr.		PROJECTED VALUES			
	31-03-2014	31-03-2015	31-03-2016	31-03-2017	31-03-2018	31-03-2019	31-03-2020	31-03-2021	31-03-2022
ASSETS									
Current Asset									
Cash and cash equivilant	191	1441	142	1854	1016	26575.61	25668.66	24612.48	23792.47
Short-term investment	0	6	6	8	9	8.59	11.29	13.16	15.44
Accounts receivable	5754	4577	5921	8115	9250	9117.59	10597.95	12708.64	14813.40
Total inventory	5628	6084	6982	6917	9242	9745.49	11227.21	12798.06	15040.49
Short term loan	1785	77	165	95	129	617.37	300.25	368.11	427.17
Other current assets	119	1919	1472	2034	1519	2092.53	2713.82	3016.24	3509.77
Total current asset	**13477.00**	**14104.00**	**14688.00**	**19023.00**	**21165.00**	**48157.19**	**50519.19**	**53516.69**	**57598.75**
Property & Equipment									
Buildings	14330	12350	14086	13824	14644	14815	17060	19452	22390
Less Accumulated depreciation expense	0	0	0	0	0	2021.06	4452.80	7228.73	10424.54
Total property & equipment	**14330**	**12350**	**14086**	**13824**	**14644**	**12794**	**12607**	**12223**	**11966**
Non-current Asset	29	412	404	667	462	584.83	759.75	882.84	1035.57
Goodwill	14	6	3	9	4	4	4	4	4
Long-term investments	5821	7309	7458	44980	46533	33211.82	41891.77	53405.69	67884.64
Long-term loan	2454	124	45	38	48	802.59	317.61	383.86	490.59
Total other asset	**8318.00**	**8125.00**	**8196.00**	**46048.00**	**47442.00**	**34603.24**	**42973.13**	**54676.39**	**69414.80**
TOTAL ASSETS	**36125.00**	**36841.00**	**36970.00**	**78895.00**	**83069.00**	**95554.37**	**106099.52**	**120416.34**	**138979.55**
LIABILITIES									
Current Liabilities (short-term borrowings)	1957	2078	3595	174	16	0.00	0.00	0.00	0.00
Accounts payable	4364	4269	5359	7641	8922	8312.52	9899.84	11800.82	13818.87
Short term provision	3487	19	17	20	25	1057.08	341.78	448.19	583.77
Other current liabilities	3155	1626	1732	1534	1802	2917.93	2886.63	3335.68	3849.36
Total current liabilities	**12963**	**7992**	**10703**	**9369**	**10765**	**12287.54**	**13128.25**	**15584.69**	**18251.99**
Long term provision	146	274	286	354	395	431.07	522.57	610.11	713.57
Other Liabilities (long-term borrowings)	4221	3166	1939	11543	11027	13595.45	13942.16	14391.92	15509.01
Other liabilities (non-current liabilities)	143	135	191	194	181	250.05	285.62	337.99	385.25
Deferred income tax	-62	-259	-179	-101	-785	0	0	0	0
Total other liabilities	**4448**	**3316**	**2237**	**11990**	**10818**	**14276.56881**	**17730.30**	**21695.7557**	**27823.01653**
TOTAL LIABILITIES	**17411.00**	**11308.00**	**12940.00**	**21359.00**	**21583.00**	**26564.10**	**30858.55**	**37280.45**	**46075.01**
EQUITY									
Owner's equity (common)	540	2232	981	1062	1710	1305.00	1458.00	1303.20	1367.64
Reserve & surplus	18174	23301	23049	56474	59776	67684.87	73782.98	81832.70	91536.90
TOTAL EQUITY	**18714.00**	**25533.00**	**24030.00**	**57536.00**	**61486.00**	**68989.87**	**75240.98**	**83135.90**	**92904.54**
TOTAL LIABILITIES AND EQUITY	**36125.00**	**36841.00**	**36970.00**	**78895.00**	**83069.00**	**95553.98**	**106099.53**	**120416.35**	**138979.55**
check	0.00	0.00	0.00	0.00	0.00	-0.39	0.00	0.00	0.00

Appendix 3

Cash Flow Statement

	PROJECTED VALUES			
Operating activities	31-03-2019	31-03-2020	31-03-2021	31-03-2022
net income	9002.78	10170.63	12154.26	14176.17
Depriciation	2021.06	2431.74	2775.93	3195.82
interest	899.96	919.28	927.54	764.59
change in long term loan	-754.59	484.98	-66.25	-106.73
change in non current assets	-122.83	-174.92	-123.08	-152.74
change in inventory	-503.49	-1481.72	-1570.85	-2242.43
change in recievables	132.41	-1480.35	-2110.69	-2104.76
change in short term loans and adv	-488.37	317.12	-67.85	-59.06
change in other current assets	-573.53	-621.29	-302.41	-493.53
change in other long term liab	69.05	35.57	52.37	47.27
change in trade payables	-609.48	1587.32	1900.98	2018.04
change in other current liab	1115.93	-31.31	449.05	513.68
change in short term prov	1032.08	-715.30	106.41	135.58
Total operating activities	**11220.98**	**11441.73**	**14125.40**	**15691.89**
Investing activities				
capex	-3646.36	-4419.22	-4554.30	-5589.06
change in non current inv	13321.18	-8679.95	-11513.92	-14478.95
change in current inv	0.41	-2.70	-1.87	-2.28
change in intangibl	0	0	0	0
Total investing activities	**9675.23**	**-13101.87**	**-16070.09**	**-20070.29**
Financing activities				
borrowings	2568.45	346.71	449.76	1117.09
reserves consumed	1093.91	1325.77	1366.29	1676.72
finance cost	-899.96	-919.28	-927.54	764.59
Total financing activities	**2762.40**	**753.20**	**888.51**	**3558.39**
Cumulative cash flow	23658.61	-906.95	-1056.18	-820.01
Beginning cash balance	2917	26575.61	25668.66	24612.48
Ending cash balance	**26575.61**	**25668.66**	**24612.48**	**23792.47**

Appendix 4

DCF Valuation

		2014	2015	2016	2017	2018	2019	2020	2021	2022
REVENUE		45821	50057	53739	62487	74488	84907.72992	97806.8675	114567.0458	133983.5034
REVENUE GROWTH RATE			0.0924467	0.073556146	0.162786803	0.192055948	0.139884678	0.151919473	0.171359933	0.169476812
EBITDA		9598	9218	11146	11769	13246	16424.51237	18606.19115	21933.95032	25223.59484
DEPRECIATION		1530	2071	2008	1977	2183	2021	2432	2776	3196
EBIT		8068	7147	9138	9792	11063	14403	16174	19158	22028
TAXES		2233	2089	2336	3455	3316	4500.715343	5084.550145	6076.218503	7087.020649
EBIT(1-t)		5835	5058	6802	6337	7747	9903	11090	13082	14941
+ Depreciation		1530	2071	2008	1977	2183	2021	2432	2776	3196
- Capital Expenditures		1455	3621	1609	2492	3040	3646.358787	4419.222191	4554.30023	5589.057901
FCFF		5910	3508	7201	5822	6890	8277	9102	11303	12548
Cost of Capital Calculations										
Tax Rate		0.3333	0.3333	0.3333	0.3333	0.3333	0.3333	0.3333	0.3333	0.3333
Debt Ratio		0.4819654	0.4819654	0.481965398	0.481965398	0.481965398	0.277999902	0.290845278	0.30959622	0.331523649
Beta		1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43
Cost of Equity		20.05%	20.05%	20.05%	20.05%	20.05%	20.05%	20.05%	20.05%	20.05%
Cost of Debt		0.0674976	0.0733656	0.140195209	0.010708117	0.03921036	0.066195375	0.065934936	0.064448799	0.049299517
After-tax cost of debt		0.0450006	0.0489129	0.093468146	0.007139102	0.026141547	0.044132457	0.043958822	0.042968014	0.032867988
Cost of Capital		0.1363871	0.1363871	0.136387071	0.136387071	0.136387071	0.163163327	0.161362386	0.158379063	0.150373464

Appendix 5
Relative Valuation

COMPANY	LAST PRICE	MARKET CAP. (RS. CR.)	SALES TURNOVER	NET PROFIT	TOTAL ASSETS		P/E RATIO
MARUTI SUZUKI	6,933.20	209,438.10	81,994.40	7,721.80	43,479.90		27.122964
BAJAJ AUTO	2,862.90	82,843.74	25,563.26	4,068.10	19,384.78		20.364234
M & M	649.35	80,727.19	49,444.99	4,356.01	34,578.48		18.53237
HERO MOTOCORP	2,673.65	53,406.16	32,871.82	3,697.36	11,883.82		14.444404
TATA MOTORS	180.1	52,001.17	59,624.69	-1034.85	40,146.67		-50.249959
ASHOK LEYLAND	86.55	25,406.75	26,926.67	1,562.59	8,627.34		16.259383
MRF	57,124.60	24,220.83	15,227.07	1,092.28	11,518.50		22.174561
EXIDE INDS.	218.75	18,593.75	9,459.80	668.35	5,442.74		-27.820379
BALKRISHNA INDS	894.3	17,286.82	4,464.46	739.25	4,952.43		23.384268
APOLLO TYRES	219.95	12,583.34	10,554.59	622.39	10,207.13		20.217773
AMARA RAJA BATT.	728.4	12,441.07	6,232.98	471.32	3,092.86		26.396228
ESCORTS	674.3	8,265.57	5,015.97	344.72	2,636.98		23.977634
AVERAGE							11.233623
NUMBER OF SHARES(IN CR)							701.7
MOTHERSON SUMI	160.5	**50,684.30**	**7,667.30**	**879.1**	**7,402.60**		57.654761
EPS							15.544166
TARGET PRICE							**174.61731**

Appendix 6
Revenue Sources

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Sales									
Wiring Harness									
Customers within india	27661.00	29655.00	30471.00	37135.00	45686.00	51951.51	59921.22	70999.41	83525.42
Growth (%)		7.21%	2.75%	21.87%	23.03%	13.714%	15.341%	18.488%	17.642%
Customers outside india	5974.00	6388.00	6633.00	6512.00	6603.00	6773.66	6875.15	6937.99	7048.90
Growth (%)		6.93%	3.84%	-1.82%	1.40%	2.58%	1.50%	0.91%	1.60%
Total	**33635.00**	**36043.00**	**37104.00**	**43647.00**	**52289.00**	**58725.17**	**66796.37**	**77937.40**	**90574.33**
Growth (%)		**7.16%**	**2.94%**	**17.63%**	**19.80%**				
Modules and Polymer Components									
Customers within india	9846.00	11849.00	12992.00	15716.00	18640.00	21881.57	25525.34	30222.93	35591.39
Growth (%)		20.34%	9.65%	20.97%	18.61%	17.39%	16.65%	18.40%	17.76%
Customers outside india	862.00	833.00	996.00	1292.00	1200.00	1316.41	1487.10	1655.38	1766.55
Growth (%)		-3.36%	19.57%	29.72%	-7.12%	9.70%	12.97%	11.32%	6.72%
Total	**10708.00**	**12682.00**	**13988.00**	**17008.00**	**19840.00**	**23197.98**	**27012.43**	**31878.31**	**37357.94**
Growth (%)		**18.43%**	**10.30%**	**21.59%**	**16.65%**				
Rubber machined & other products									
Customers within india	193.00	203.00	212.00	224.00	353.00	417.30	506.92	637.37	833.39
Growth (%)		5.18%	4.43%	5.66%	57.59%	18.22%	21.47%	25.74%	30.75%
Customers outside india	202.00	271.00	352.00	539.00	602.00	753.98	921.92	1103.87	1321.73
Growth (%)		34.16%	29.89%		11.69%	25.25%	22.27%	19.74%	19.74%
Total	**395.00**	**474.00**	**564.00**	**763.00**	**955.00**	**1171.28**	**1428.84**	**1741.24**	**2155.12**
Growth (%)		**20.00%**	**18.99%**	**35.28%**	**25.16%**				
TOTAL	44738.00	49199.00	51656.00	61418.00	73084.00	83094.43	95237.64	111556.96	130087.39
Other operational income	1083	858	2083	1069	1404	1771.34	2442.66	2727.97	3458.26
YOY growth in other operational income		-20.78%	142.77%	-48.68%	31.34%	26.16%	37.90%	11.68%	26.77%
Total Sales	45821.00	50057.00	53739.00	62487.00	74488.00	84865.77	97680.31	114284.93	133545.65

Appendix 7

Expenditure:-

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Sales	45821	50057	53739	62487	74488	84907.73	97806.87	114567	133983.5
COGS	25142	27981	28535	33845	40987	46369.09	53362.82	62200.29	73061.31
cost of goods sold As % of sales	54.87%	55.90%	53.10%	54.16%	55.02%	54.61%	54.56%	54.29%	54.53%
Staff cost	4976	6028	6869	8560	10619	10806.87	12814.08	15252.58	17979.85
staff cost As % of sales	10.86%	12.04%	12.78%	13.70%	14.26%	12.73%	13.10%	13.31%	13.42%
Other expenses	6105	6830	7189	8313	9636	11307.25	13023.78	15180.23	17718.75
other espenses as %of sales	13.32%	13.64%	13.38%	13.30%	12.94%	13.32%	13.32%	13.25%	13.22%
	2014	2015	2016	2017	2018	2019	2020	2021	2022
Net Tangible asset (PP&M)	14330	14612	14086	13824	14644	14815	17060	19452	22390
Dep.	1530	2071	2008	1977	2183	2021.06	2431.74	2775.93	3195.82
Gross Tangible asset	15860	16683	16094	15801	16827	16836	17471	19797	22809
Ratio	0.10	0.12	0.12	0.13	0.13	0.13	0.13	0.13	0.13
Short term borrowings	1957	947	1410	37	16	0.00	0.00	0.00	0.00
Long term borrowings	4221	3183	1971	11543	11027	0.00	0.00	0.00	0.00
Total Debt	6178	4130	3381	11580	11043	13595.45	13942.16	14391.92	15509.01
Finance cost	417	303	474	124	433	899.956	919.2752	927.5418	764.5866
Interest rate	0.067498	0.073366	0.140195	0.010708	0.03921	0.066195	0.065935	0.064449	0.0493
Current tax	2295	2348	2515	3556	4016	4500.715	5084.55	6076.219	7087.021
Deffered tax	-62	-259	-179	-101	-700	0	0	0	0
TOTAL TAX	2233	2089	2336	3455	3316	4500.715	5084.55	6076.219	7087.021
Sales	45821	50057	53739	62487	74488	84907.73	97806.87	114567	133983.5
Capex as % of sales	3.2%	7.2%	3.0%	4.0%	4.1%	4.3%	4.5%	4.0%	4.2%
CAPEX	**1455**	**3621**	**1609**	**2492**	**3040**	**3646.36**	**4419.22**	**4554.30**	**5589.06**
debt requirement for capex						2552.45	3093.46	3188.01	3912.34

reserves required for capex						1093.91	1325.77	1366.29	1676.72
repayment using reserve							2746.75	2738.25	2795.25

Repayment schedules(INR Mn.)				
Term loans as on 2018	**2019**	**2020**	**2021**	**2022**
5203	1300.75	1300.75	1300.75	1300.75
5750	1437.5	1437.5	1437.5	1437.5
17	8.5	8.5	0	0
57	0	0	0	57
11027	2746.75	2746.75	2738.25	2795.25

Appendix 8:-
Cash conversion Cycle

	fy14-15	fy15-16	fy16-17	fy17-18	fy18-19	fy19-20	fy20-21	fy21-22
avg Inventoy	5856	6533	6949.5	8079.5	9745.49	11227.21	12798.06	15040.49
avg recievables	5165.5	5249	7018	8682.5	9117.595	10597.95	12708.64	14813.4
avg payables	4316.5	4814	6500	8281.5	8312.52	9899.84	11800.82	13818.87
DSO	37.67	35.65	40.99	42.55	39.21	39.60	40.59	40.49
DIO	76.39	83.57	74.95	71.95	76.71	76.79	75.10	75.14
DPO	56.31	61.58	70.10	73.75	65.43	67.71	69.25	69.04
cash conversion cycle	57.75	57.64	45.84	40.75	50.49	48.68	46.44	46.59

DSO=avg recievables*365/total sales

DIO=avg inventory*365/COGS

DPO= avg payables*365/COGS

cash conversion cycle=DSO+DIO-DPO