

## **A Study of The Factors Influencing Use of Debt Across Three Industries – Auto & Auto Ancillary, Pharmaceutical and Information Technology Industries**

**Smeeta Bhatkal,**

Dean -Banking, Financial Services and Insurance (BFSI), Prin. L N Welingkar Institute of Management  
Development & Research, L Napoo Marg, Matunga, Mumbai 400019 email:  
[smeeta.bhatkal@welingkar.org](mailto:smeeta.bhatkal@welingkar.org)

**Dr Vaishali Patil,**

Senior Associate Dean -Research & Publications & Information Technology, Prin. L N Welingkar  
Institute of Management Development & Research, L Napoo Marg, Matunga, Mumbai 400019 email:  
[vaishali.patil@welingkar.org](mailto:vaishali.patil@welingkar.org)

### **Abstract**

The determinants of capital structure have been debated and researched over several years. What influences firms to borrow or use equity sources to fund their business operations and whether these factors differ across industries is the topic of this study. This paper analyses the influence that five independent variables have on the use of debt across three industries. The independent variables selected are asset tangibility, profitability, size, interest cover and growth in revenue and the dependent variable is debt to total assets. The three industries selected are automobile/auto ancillary, pharmaceutical and information technology sectors. These industries were selected as they are quite different in terms of characteristics with respect to fixed asset requirements and use of debt. The companies were selected from the Nifty 500 list of companies belonging to the automobile/auto ancillary, pharmaceutical and information technology sectors. and data for the years 2013 to 2021 has been considered. Mean values, Correlation and Multi Linear Regression analysis were studied. The result showed that the use of debt across the three industries selected differed and that asset tangibility was found to have a positive influence on the use of debt and profitability had a negative influence on the use of debt for the automobile/auto ancillary and pharmaceutical industries.

**Key Words:** Debt, Asset tangibility, Profitability, Capital structure

### **Introduction**

A robust and growing economy requires large investments. India being among the highest growth economies in the world requires large amounts of investment in order to support and sustain this high growth rate. Investment decisions are very critical strategic decisions as prudent investment decisions create value for equity shareholders of a firm. Creation and maintenance of shareholder value is the primary goal and responsibility of management. Equally important is how these investments are funded. Capital structure refers to how a firm funds its investments and operations.

Capital structure is made up of funding from shareholders like issue of equity shares, retention of profits earned, etc. and funding from debt sources where there is an obligation to pay interest and repay the principal amount. The pattern of funding i.e. the proportion of debt and equity differs based on various

factors. Management will try and strike a balance between the proportion of debt and equity – a balance is required as the risk return characteristics of these two sources of funding are very different. Debt has several advantages due to which it is often a preferred source of financing. On the one hand, the cost of debt is lower than the cost of equity funds and prevents dilution of equity shareholders. Debt also has the benefit of interest being a tax deductible expense hence it results in reduction of income tax paid by the firm unlike equity where returns are paid to shareholders out of after-tax profits. On the other hand, debt introduces risk in the form of higher financial leverage. The fixed cost of interest raises the break even point of a firm's operations. Hence, management has to "trade off" the advantages of lower cost against the increase in risk on account of higher fixed costs leading to higher risk. An optimal capital structure enables a firm to increase shareholder value by using an appropriate amount of lower cost source of funding i.e., debt. However, too much can result in destruction of shareholder value.

How firms decide on the amount of debt to borrow to fund their operations has been the subject of much debate and research. Capital structure theory was first researched by Nobel Laureates Franco Modigliani and Merton Miller in 1958. They stated that the value of a firm is based on its underlying assets and present value of future earnings and is independent of its capital structure given certain assumptions including perfectly efficient financial markets, no taxes and no financing costs. In 1963 they revised their theory to incorporate corporate taxes which made debt preferable on account of tax savings. They later also incorporated bankruptcy related costs which made debt a value destructor beyond certain levels.

The objective of this study is to study whether asset tangibility, profitability, size, interest cover and growth in revenue of a business influence the use of debt and whether there is a difference across industries. The industries selected are automobile/auto ancillary, pharmaceutical and information technology sectors. These sectors were selected as they are quite different in terms of characteristics with respect to fixed asset requirements and use of debt.

### **Literature Review**

Several studies have been conducted on capital structure determinants both in India and in other countries. The path breaking work of Modigliani and Miller (1958, 1963, 1977) supported by the works of Jensen M. (1986) and Myers, S. C., & Majluf, N. (1984) paved the way for more research into the topic of capital structure and how firms take decisions on how to raise capital. Several researchers have studied various aspects of capital structure and factors that influence capital structure decisions. The work more relevant to the current research being looked at in this paper are summarized below.

Kumar A and Gupta N (2022) did a multiregression analysis to identify which internal and external factors influence capital structure of a firm. Financials of 23 companies in the Nifty 50 Index over five years were analysed. The companies belonged to four industry sectors viz., power, automobile, consumer and metal and mining sector. Current ratio, quick ratio, size, asset tangibility, profitability and age were the independent variables. They found that current ratio (one measure of liquidity) was significant for the companies in the metal and mining sector. For the companies in the consumer goods sector liquidity, age and tangibility were significant factors while for the companies in the automobile sector quick asset ratio; one measure of liquidity, profitability, log of assets and age were significant. Liquidity (both current ratio

and quick ratio), log of assets, age, profitability and tangibility significantly affected the financing decision of the energy and power sector companies.

Jacob T and Ajina V S (2022) studied the relationship between capital structure (as measured by the debt:equity ratio) and financial performance (as measured by Return on Equity). A regression analysis was conducted on the top five pharmaceutical companies in India for five years (2016 to 2020). They found that financial performance has no link with capital structure for the pharmaceutical industry in India. This, they concluded, was consistent with Modigliani and Miller's theory of capital structure. The study, however, was for only five companies and hence findings may not be representative of the entire industry.

Ranjan and Sreeramulu (2021) investigated the determinants of capital structure and examined whether there was any change in the factors influencing capital structure between pre and post global financial crisis (GFC) periods. They studied 140 listed non-financial firms for the years 2002 to 2015. They found that the use of debt in the post GFC period was lower and in the pre GFC period while profitability increased in the post GFC period. They also found that profitability, size, growth opportunities, cashflow and tangibility were significant in influencing the use of debt but the impact of these factors varied in the pre and post financial crisis periods. Profitability and cashflow had a negative association with leverage. Growth opportunities in the pre GFC period had a negative association with leverage while size had a positive association in the pre GFC period but both were insignificant in the post GFC period. Tangibility had a negative association in both the periods.

Hemaprasanna S (2018) undertook a study to identify factors that determined the capital structure in the pharmaceutical industry. Ten companies were studied over a period of sixteen years from 1998-1999 to 2013-2014. Correlation and multiple regression analysis was performed. The study concluded that out of 16 variables considered two variables – solvency ratio and liquidity were significant in determining capital structure in the pharmaceutical industry in India.

Oztekin O (2015) explored the determinants of capital structure for firms in 37 countries. She found that firm size, tangibility, industry leverage, profits and inflation were significant factors affecting capital structure. Large firms with high level of tangible assets tend to have high leverage in developed economies while in the case of countries with weak institutional framework the same did not hold. More profitable firms tend to have lower debt on account of availability of internal accruals to fund investments. She also found that in high inflationary environments leverage was low. This could be due to uncertainties in the economy. She concluded that a firm's capital structure reflects the institutional environment in which it operates.

Khan T F and Ghayas A (2020) studied the financial parameters of Indian firms during the period 2009 to 2018. The study explored factors that influenced use of debt and whether the pecking order theory or the trade-off theory of capital structure was supported by the findings. It was concluded that profitability, liquidity, firm size, risk and tax rate affected the capital structure of the companies analysed.

Arce et al (2015) proposed that all firms do not follow the same corporate structure models propounded by capital structure theorists. They argued that there is heterogeneity in the way corporates make capital

structure decisions. They reasoned that corporate use of debt was influenced by a firm's initial capital structure as well as the capital structure of its competitors. Their analysis included data on capital structures of US companies between 1965 and 2003 which supported their assertion.

Popli and Jaiswal (2012) studied the determinants of corporate capital structure of Indian companies. They investigated the influence of the main capital structure theories on the capital structure choice of Indian firms. Multiple regression models on the selected industries were used for the period 2005-2011. They examined the influence of various independent variables on capital structure and concluded that debt-equity ratio is linearly dependent on asset structure, profitability, agency cost, size and non-debt tax.

Handoo and Sharma (2012) undertook a study to identify factors which are important in capital structure decisions for public sector and private sector companies in India. They studied 61 public sector and 809 private sector companies over a ten year period from 2001 to 2010. They found that public sector companies considered size, age, debt servicing capacity and interest rates as important factors in making capital structure decisions. The factors important for private sector companies were profitability, growth, asset tangibility, size, cost of debt, tax rate and debt servicing capacity.

### **Determinants of Capital Structure:**

Capital structure theory and research have considered various factors as being significant in their influence on the use of debt. This paper has considered the following five parameters as independent variables for examining their influence on capital structure.

1. **Asset tangibility:** Asset tangibility has been measured by the proportion of Net Fixed Assets to Total Assets (NFA/TA). This gives us an indication as to how capital intensive the firm is. Whether capital intensity affects debt is sought to be ascertained.
2. **Profitability:** Profitability has been measured by Earnings before Interest and Tax to Total Assets (EBIT/TA) as this is a measure of the operating efficiency of the firm before the effect of capital structure costs like interest. Do firms with high profitability borrow less on account of having higher profits to plough back onto the business to fund investment is sought to be established.
3. **Size:** Size has been measured by the value in rupees crores of Total Assets (TA). Do larger firms borrow more is the question at hand.
4. **Interest Cover:** Interest Cover by Earnings before Interest and Tax to Interest (EBIT/Interest). Does the ability of a firm to cover its interest payments influence its use of debt?
5. **Growth in revenue:** Growth in revenue is growth over the previous year. This measures the growth in operations which would require increase in investment and therefore funding.

### **Capital Structure measurement**

Capital structure is the mix of different means of financing the fund requirement of a firm. Debt or borrowing is an important source of finance. It is non-dilutive to equity shareholders, is lower cost than equity and also has the advantage of tax deductibility of interest payments. It, however, increases

financial risk for the firm. How much debt is used by firms to fund their assets is being considered as the dependent variable i.e., debt to total assets (Debt/TA) as it quantifies the amount of borrowing used to fund all assets held by a firm.

### **Industry selection:**

Three industries have been selected for the study viz., automobile/auto ancillary, pharmaceutical and information technology sectors. The three industry sectors have very different requirements of fixed assets or capital intensity, have differing profitability characteristics and growth trends. It would therefore be meaningful to evaluate the differences in capital structure and influences thereon.

### **Objectives**

The objective of this research is to study the use of debt by companies in the Nifty 500 from 3 industries viz., automobile/auto ancillary, pharmaceutical and information technology sectors as under:

1. To study the use of debt across the 3 industries selected viz. automobile/auto ancillary, pharmaceutical and information technology sectors and whether there is any difference in the use of debt across the 3 industries selected.
2. To explore the association between five independent variables of a firm (asset tangibility, profitability, size, interest cover and growth in revenue) and its use of debt to fund assets (debt to total assets (Debt/TA)). Asset tangibility has been measured by the proportion of Net Fixed Assets to Total Assets (NFA/TA), profitability by Earnings before Interest and Tax to Total Assets (EBIT/TA), size by the value in rupees crores of Total Assets (TA), interest cover by Earnings before Interest and Tax to Interest (EBIT/Interest) and growth in revenue as growth over the previous year.

### **Hypotheses:**

The following are the proposed hypotheses:

H01: No difference in the influence of the five independent variables of a firm (asset tangibility, profitability, size, interest cover and growth in revenue) on the use of debt to fund for the Auto & Auto Ancillary and Information Technology Industries.

H02: No difference in the influence of the five independent variables of a firm (asset tangibility, profitability, size, interest cover and growth in revenue) on the use of debt to fund for the Pharmaceutical and Information Technology Industries.

H03: No difference in the influence of the five independent variables of a firm (asset tangibility, profitability, size, interest cover and growth in revenue) on the use of debt to fund for the Auto & Auto Ancillary and Pharmaceutical Industries.

## Scope

The scope of the research extends to companies in the Nifty 500 list and belonging to the automobile/auto ancillary, pharmaceutical and information technology sectors. These companies are listed on the National Stock Exchange and data for the years 2013 to 2021 has been considered. **Methodology:**

The study is a causal one to investigate whether the degree of fixed assets employed by a firm has a bearing on the use of debt to fund its assets.

The data collected is secondary in nature. The relationship between asset tangibility, profitability, size, interest cover and growth in revenue and the use of debt has been studied. The secondary data was extracted from the Capitaline database which is considered reliable for corporate financial data. The data has been taken on an annual basis. The period considered is the financial years 2013 to 2021.

Descriptive statistics have been presented and mean values of the variables considered have been examined.

Correlation and Multiple Linear Regression (MLR) analysis has been used where the relationship between five independent variables of a firm (asset tangibility, profitability, size, interest cover and growth in revenue) and its use of debt to fund assets (debt to total assets) has been examined. MLR was selected as it would improve the accuracy of the regression model by using several independent variables.

## Analysis:

### Descriptive Statistics

Auto/Auto Ancillary	Mean
Debt/TA	0.15
NFA/TA	0.33
EBIT/TA	0.14
Size (Rs. Cr.)	11432
EBIT/Interest (times)	256
Growth in Revenue	0.08

Explanation: As may be observed the mean values for the Automobile/Auto Ancillary companies were as follows: Debt/Total Assets was 0.15 while asset tangibility (NFA/TA) stood at 0.33. EBIT/TA was 14% and growth in revenue was 8% while Interest Cover was 256 times. The average size of the companies was Rs. 11,432 crores.

Pharma	Mean
Debt/TA	0.13
NFA/TA	0.27

<b>EBIT/TA</b>	0.14
<b>Size (Rs. Cr.)</b>	5228
<b>EBIT/Interest (times)</b>	333
<b>Growth in Revenue</b>	0.15

Explanation: As may be observed the mean values for the Pharmaceutical companies were as follows: Debt/Total Assets was 0.13 while asset tangibility (NFA/TA) stood at 0.27. EBIT/TA was 14% and growth in revenue was 15% while Interest Cover was 333 times. The average size of the companies was Rs. 5,228 crores.

<b>IT Industry</b>	<b>Mean</b>
<b>Debt/TA</b>	0.036
<b>NFA/TA</b>	0.14
<b>EBIT/TA</b>	0.19
<b>Size (Rs. Cr.)</b>	11282
<b>EBIT/Interest (times)</b>	460
<b>Growth in Revenue</b>	0.30

Explanation: As may be observed the mean values for the Information Technology companies were as follows: Debt/Total Assets was 0.036 while asset tangibility (NFA/TA) stood at 0.14. EBIT/TA was 19% and growth in revenue was 30% while Interest Cover was 460 times. The average size of the companies was Rs. 11,282 crores.

### **Correlation**

Correlation analysis is given below:

#### **Auto/Auto ancillary Industry**

<b>Correlation to Debt/TA</b>	<b>Auto/Auto ancillary Industry</b>
NFA/TA	0.55
EBIT/TA	-0.48
EBIT/Interest	-0.26
TA	-0.13

Growth in Revenue	-0.08
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It is observed that there is a positive correlation of asset tangibility and a negative correlation of profitability and Interest cover to use of debt. Size and growth in revenue are not significant.

### Pharmaceutical Industry

Correlation to Debt/TA	Pharmaceutical Industry
NFA/TA	0.47
EBIT/TA	-0.29
EBIT/Interest	-0.16
TA	0.01
Growth in Revenue	0.16

It is observed that there is a positive correlation of asset tangibility and a negative correlation of profitability and Interest cover to use of debt. Size and growth in revenue are not significant. **Information Technology**

### Industry

Correlation to Debt/TA	Information Technology Industry
NFA/TA	0.003
EBIT/TA	-0.22
EBIT/Interest	-0.19
TA	-0.11
Growth in Revenue	0.05

It is observed that none of the variables have a correlation with use of debt.

### Multiple Linear Regression Auto/Auto

#### ancillary Industry:

Regression equation:

$$Y = 0.10 + 0.46(NFA/TA) - 0.73 (EBIT/TA) - 8.51E-07 (Size) + 1.0E-05 (Interest cover) + 0.05 (Growth in revenue)$$



It is observed that for every 0.46 unit increase in NFA/TA there is a 1 unit increase in Debt to Total Assets and for every 0.73 decrease in EBIT/TA there is a 1 unit increase in Debt to Total Assets. The other 3 variables do not have a significant impact.

**Pharmaceutical Industry:**

Regression equation:

$$Y = 0.0004 + 0.51(\text{NFA/TA}) - 0.26 (\text{EBIT/TA}) + 2.69\text{E-}06 (\text{Size}) - 4.07\text{E-}06 (\text{Interest cover}) + 0.07(\text{Growth in revenue})$$

It is observed that for every 0.51 unit increase in NFA/TA there is a 1 unit increase in Debt to Total Assets and for every 0.26 decrease in EBIT/TA there is a 1 unit increase in Debt to Total Assets. The other 3 variables do not have a significant impact.

**Information Technology Industry:**

Regression equation:

$$Y = 0.06 - 0.02(\text{NFA/TA}) - 0.09 (\text{EBIT/TA}) - 1.18\text{E-}07 (\text{Size}) - 7.55\text{E-}06 (\text{Interest cover}) + 0.001(\text{Growth in revenue})$$

It is observed that none of the variables have a significant impact on the debt used to fund total assets.

**Findings:**

Mean Values	Auto/Auto ancillary Industry	Pharmaceutical Industry	Information Technology Industry
Debt/TA	0.15	0.13	0.036
NFA/TA	0.33	0.27	0.14
EBIT/TA	0.14	0.14	0.19
Size (Rs. Cr.)	11,432	5228	11282
EBIT/Interest	256	333	460
Growth in Revenue	0.08	0.15	0.30

It is observed that the average debt to total assets is 15% for automobile/auto ancillary, 13% for pharmaceutical and 3.6% for information technology. IT industry is displaying a very low use of debt.

It is observed that the average NFA to total assets is 33% for automobile/auto ancillary, 27% for pharmaceutical and 14% for information technology. IT industry is displaying a low use of fixed assets compared to the others.

It is observed that the average EBIT to total assets is 14% for automobile/auto ancillary, 14% for pharmaceutical and 19% for information technology. IT industry is displaying a higher profitability compared to the other two.

It is observed that the average size of total assets is Rs. 11,433 crores for automobile/auto ancillary, Rs. 5,228 crores for pharmaceutical and Rs. 11,282 crores for information technology.

It is observed that the average interest cover is 256 times for automobile/auto ancillary, 333 times for pharmaceutical and 460 times for information technology. All three industries have comfortable interest coverage ratios with IT being the highest.

It is observed that the average growth in revenue 8% for automobile/auto ancillary, 15% for pharmaceutical and 30% for information technology. IT industry is displaying the highest average growth rate in revenues.

<b>Correlation Debt/TA to</b>	<b>Auto/Auto ancillary Industry</b>	<b>Pharmaceutical Industry</b>	<b>Information Technology Industry</b>
NFA/TA	0.55	0.47	0.003
EBIT/TA	-0.48	-0.29	-0.22
EBIT/Interest	-0.26	-0.16	-0.19
TA	-0.13	0.01	-0.11
Growth in Revenue	-0.08	0.16	0.05

<b>MLR Coefficient</b>	<b>Auto/Auto ancillary Industry</b>	<b>Pharmaceutical Industry</b>	<b>Information Technology Industry</b>
NFA/TA	0.46	0.51	-0.02
EBIT/TA	-0.73	-0.26	-0.09
Size (Rs. Cr.)	-8.51E-07	2.69E-06	-1.18E-07
EBIT/Interest	1.0E-05	-4.07E-06	-7.55E-06
Growth in Revenue	0.05	0.07	0.001

It is observed that Size, Interest Cover and growth in revenue are not significant for all 3 industries. For the Information Technology Industry Asset Tangibility and Profitability were also not significant – reliance on debt for companies in this sector is extremely low. It was observed that for both the Auto/Auto ancillary Industry and the Pharmaceutical Industry there was a positive association of Asset Tangibility (slightly stronger for the Pharmaceutical Industry) and a negative association of Profitability (slightly stronger for the Auto/Auto ancillary companies). This could imply that while owning fixed assets is a positive indicator for use of debt, higher profitability means higher amounts available through internally generated funds and hence lower dependance on debt.

From the above we can conclude that:

1. There is a significant difference in the influence of the five independent variables of a firm (asset tangibility, profitability, size, interest cover and growth in revenue) on the use of debt to fund for the Auto & Auto Ancillary and Information Technology Industries. **Therefore, we reject H01.**
2. There is a significant difference in the influence of the five independent variables of a firm (asset tangibility, profitability, size, interest cover and growth in revenue) on the use of debt to fund for the Pharmaceutical and Information Technology Industries. **Therefore, we reject H02.**
3. There is a significant difference in the influence of the five independent variables of a firm (asset tangibility, profitability, size, interest cover and growth in revenue) on the use of debt to fund for the Auto & Auto Ancillary and Pharmaceutical Industries. **Therefore, we accept H03.**

### **Conclusion:**

We can conclude the following in terms of the research objectives:

1. The use of debt across the 3 industries selected differed with the observation that automobile/auto ancillary and pharmaceutical industries used more debt compared to the information technology sector.
2. The independent variables that do not significantly influence the debt to total assets ratio for all three industries are size, interest cover and growth in revenue. The independent variables which contribute significantly to debt to total assets ratio for automobile/auto ancillary and pharmaceutical industries are asset tangibility and profitability. However, in the case of the information technology sector none of the independent variables had a significant impact on the use of debt.

### **Summary**

To summarise, asset tangibility and profitability were found to influence the use of debt in the automobile/auto ancillary and pharmaceutical industries. This may be useful for banks and other lenders who look at tangible assets as collateral when making lending decisions.

As companies in the information technology industry do not rely much on debt to fund their assets, bank finance for this sector is marginal.

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