

# **Determinants of Growth - Indian Banking Industry & Auto Industry**

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## ***Abstract***

*This paper analyses various factors that contribute to the growth of any industry and to find out the most important factors among them. The regression model technique is used for over 17 companies of Bankex and 23 companies of BSE Auto Index for the period 1999-2000 to 2004-2005. The primary reason for focusing our study on these two industries is the fact that they play an important role in the economic development of a country by way of providing services and contributing to the manufacturing sector respectively. The paper finds retention ratio, debt-equity ratio are the major factors contributing to the growth of both the industries under study.*

Growth is the fundamental desire and prime objective of any entity in this world. Growth is the basic parameter for valuing any business entity. Every businessman makes an effort to do better in the future and he envisages greater cash flows in the future than in the present. Thus it is the anticipated future cash flows which determine the value of a business entity.

Growth is the fulcrum of any valuation. There are several approaches used to obtain the growth rates for an entity. It can be derived from the past growth of the company, or the estimates can be based on the inferences of an analyst who has been following the company for at least some time, or the estimation can be based on the fundamentals of the company.

In today's competitive world when the world is getting smaller day by day, Companies are following the path of both organic growth and inorganic growth. Companies very often go for acquisition of other companies working in the same market to grow in size and increase its profits. Here arises the need for estimation of the future growth rates which is dependent on future cash flows. Any expert doing valuation of such a company definitely has to look for some determinants of growth.

There are several factors determining the growth prospects of a company like Return on Equity, Retention Ratio, Debt Equity ratio, Interest rate, Tax rate and Beta etc. These factors have always been important for any industry's growth estimation. This research has been done to find the relevance of these factors for the growth of the BSE Bankex and BSE Auto Index companies. BSE Bankex comprises of 17 private and public national banks whereas BSE Auto Index has companies manufacturing auto parts and all types of vehicles. Both these sectors do have their own business dynamics but the measurement of growth can be done by analysing the above factors which have been recognized world over as the determinants of growth.

### **THEORETICAL FRAMEWORK OF RESEARCH**

Growth can be determined by various means such as by past growth rates, or by the views of an active analyst, or through the fundamentals of a company but the basis for all these estimations are the product portfolio of the company, margins of profit, degree of leverage, and the dividend policy followed by the particular company.

Return on Equity (ROE) and Retention Ratio (percentage of earnings retained in the company) can provide the simplest and the most accurate measurement of growth. The relationship is as follows-

$$g_t = b \times ROE$$

Where  $g_t$  = Growth rate in net income  
 $b$  = Retention ratio  
 ROE = Return on Equity

To get the above formula the following method is used

$$g_t = \frac{(NI_t - NI_{t-1})}{NI_{t-1}}$$

Where

$g_t$  = Growth rate in net income  
 $NI_t$  = Net income in year t  
 $NI_{t-1}$  = Net income in year t-1

By the definition of Return on Equity the  $NI_{t-1}$  can be written as-

$$NI_{t-1} = \text{Book value of equity}_{t-1} \times ROE_{t-1}$$

where  $ROE_{t-1}$  = Return on Equity in year t-1

$$NI_t = (\text{Book value of equity}_{t-1} + \text{Retained Earnings}_{t-1}) \times ROE_t$$

If Return on Equity is unchanged then

$$ROE_t = ROE_{t-1} = ROE$$

$$g_t = (\text{Retained earnings}_{t-1} / NI_{t-1}) \times ROE$$

$$g_t = \text{Retention ratio} \times ROE$$

$$\text{So, } g_t = b \times ROE$$

In the above relationship Retention Ratio and ROE are having a direct relation with growth. Thus, growth is an increasing function of both the Retention Ratio and ROE.

## THE REGRESSION MODEL FOR THE RESEARCH

There are two methods of calculating growth - arithmetic mean and geometric mean. Arithmetic mean weighs percentage change in growth equally and ignores compounding effect. On the other hand, the geometric mean considers compounding but deals with only first and last observations in the series so some pattern in the growth in that period could be missed out.

To overcome this problem an average of growth and other factors for the period under study has been used. There are two versions of regression that are linear and log linear. Linear regression gives the unit change in the dependent variable for one unit change in any of the independent variables and log linear regression gives the percentage change in dependent variable for one unit change in any of the independent variable.

Linear regression has been followed so as to overcome the problem of using arithmetic mean or geometric mean, at least to some extent.

We have used the multi factor regression model for one study. There are six independent factors taken with one dependent variable. These factors are-

**Dependent factor** - Growth in PAT

**Independent factors** -

- (1) Pre Interest After Tax Margin
- (2) Productivity Ratio (Total Asset Turnover Ratio)
- (3) Post Tax Interest Rate
- (4) Retention Ratio
- (5) Debt Equity Ratio
- (6) Beta of the particular company.

Our study, to determine the factors affecting growth, is based on the relationship between retention ratio and ROE. The simplest form of this relationship is-

$$g_t = b \times ROE$$

Here ROE can also be written as

$$ROE = ROA + D/E [ROA - i(1-t)]$$

Above formulation shows a direct relationship of ROE with D/E and ROA and indirect relationship with post tax interest rate. This formulation indicates that if the pre interest, after tax return on assets (ROA) exceeds after tax interest rate paid on debt than ROE will be positively increased. So growth can be written as

$$g_t = b \times \{(ROA + D/E [ROA - i(1-t)])\}$$

### **Return On Assets (ROA)**

$$\begin{aligned} ROA &= \text{PBIAT/Total Assets} \\ &= (\text{PBIAT/Sales}) \cdot (\text{Sales/Total Assets}) \\ &= \text{Pre Interest After Tax Margin} \cdot \text{Asset Turnover Ratio} \end{aligned}$$

Where PBIAT is Profit before interest but after tax

ROA is an increasing function of both the Pre Interest After Tax Margin And Asset Turnover Ratio. There is a trade off between these two components. It has been found that an increase in Pre Interest After Tax Margin will decrease

Asset Turnover Ratio or vice versa but this will depend upon the demand and supply relations prevailing in the market. So, the lower price of the product can result in lower profit margins but higher turnover, if the quantity sold is so high that it to increases the revenue from the earlier levels.

### **Post Tax Interest Rate**

Post Tax Interest Rate<sub>t</sub> = Interest Payments (1-t)/ Average Borrowings  
where Post Tax Interest Rate<sub>t</sub> is interest in time period t

Interest rates depend on the amount of debt held by the company, its size and time in the market. Small and growing companies generally pay higher interest rate as they are having higher risk of default due to higher growth. As time progresses and the size of the company increases the interest rate goes down and the pay back period increases.

Borrowings have an inverse relationship with interest rate. As the company grows in size, it is able to finance its projects from its reserves and retained earnings. So, the size of debt decreases and in turn the interest rate also, falls.

Tax paid is directly related to the Profit Before Tax (Tax Rate = Tax Provision/PBT). So, with the increase in profits the tax payment also increases and the Post Tax Interest Payments decrease as Post Tax Interest Rate goes down.

### **Retention Ratio**

Retention Ratio (b<sub>t</sub>) = Retained Earnings/PAT

where- b<sub>t</sub> is the retention ratio for t time period

Retention Ratio is related to financial restructuring decisions of the company. Amount of retained earnings depends upon the capital requirement of the company for future projects and its decision to finance them. If a company has a project on the anvil then the dividend paid to the investors could be low. Thus, this ratio also, has an indirect effect on the D/E ratio. If a company goes for high Dividend payments (low Retention Ratio) then for financing the new projects it has to take debt (if it doesn't use reserves or they are insufficient) which will increase the D/E ratio and in turn can affect ROE positively (also depends on ROA and interest rate).

Thus, a higher Retention Ratio can lead to higher growth for the company but the effect will be affected by the change in the other factors also.

### **Leverage (D/E Ratio)**

Leverage has a direct impact on the growth of the company. With higher D/E ratio a firm can grow faster if ROA is more than the Post Tax Interest Rate. D/E ratio signifies the capital structuring decision of the firm.

$$g_t = b \{ROA + \frac{D}{E}[ROA - i(1-t)]\}$$

Capital structuring determines the amount of risk with which the firm is faced. Changing the asset mix leads to a change in the risk level of the firm.

D/E ratio is also affected by the retention ratio. A higher Retention Ratio can lead to a Higher D/E ratio when company has to finance the new projects by debt because of inadequate reserves or low cost of debt financing. All the small companies start with debt financing and with the passage of time they go for equity financing. So in the initial years the D/E ratio is higher than the later years.

### **Beta**

Beta signifies how much the company is prone to market changes or how much will be the change in the company's earnings with one unit change in the market earnings. It shows the market specific return for a company.

Companies in high growth phase and small in size generally have higher beta. As the company grows in size the market dependency takes a more mature form. This is the reason why small companies generally outperform the big companies in terms of returns (at least in short term). Also the credit-worthiness of companies increases with the growth which will decrease the beta.

### **Data used for the study**

This research has been conducted for the BSE Bankex and BSE Auto Index. The data is taken from PROWESS (Centre For Monitoring Indian Economy) database.

### **Study of the Banking Industry**

BSE Bankex is the benchmark Index for the Banking Sector which comprises of 17 Nationalized Banks. Some of the banks from this index are-Allahabad

Bank, Bank of Baroda, Canara Bank, HDFC Bank, ICICI Bank, Punjab National Bank and State bank of India etc.

The data has been taken for the period 2000- 2001. For calculating the growth of 2000 the Profit after tax (PAT) of 1999 has been also used.

<i>Allahabad Bank</i>	<i>Indusind</i>
<i>Andhra Bank</i>	<i>Karnataka Bank Ltd.</i>
<i>Bank Of Baroda</i>	<i>Kotak Mahindra Bank Ltd.</i>
<i>Bank Of India</i>	<i>Oriental Bank Of Commerce</i>
<i>Canara Bank</i>	<i>Punjab National Bank</i>
<i>Centurion</i>	<i>State Bank Of India</i>
<i>HDFC Bank Ltd.</i>	<i>UTI</i>
<i>ICICI</i>	<i>Bank Of India</i>
<i>Indian Overseas Bank</i>	

BSE Auto Index comprise of 23 companies. Few of these companies are auto manufacturers-two, three or four wheeler and others are auto parts manufacturer. These auto manufacturers not only sell the vehicles in India but also export them. Same is with the auto part manufacturers.

With the demand increasing overseas auto parts export have witnessed a sea change in recent years. Companies like Bharat Forge, Exide Industries, Kirloskar Oil Engineering Ltd., MRF, Motor Industries Co. Ltd., Punjab Tractors Ltd., Rico Auto, Tube Investment Of India Ltd., Sundaram Fasteners have grown big in size.

### **Study of the Auto Industry**

The data was taken for the period of 2001-2005. For calculating the growth for 2001 the PAT of 2000 has been also used.

Companies in the BSE Auto Index are-

<i>Amtek Auto Ltd.</i>	<i>M R F Ltd.</i>
<i>Apollo Tyres Ltd</i>	<i>Mahindra &amp; Mahindra Ltd.</i>
<i>Asahi India Glass Ltd.</i>	<i>Maruti Udyog Ltd.</i>
<i>Ashok Leyland Ltd.</i>	<i>Motherson Sumi Systems Ltd.</i>

<i>Bajaj Auto Ltd.</i>	<i>Motor Industries Co. Ltd.</i>
<i>Bharat Forge Ltd.</i>	<i>Punjab Tractors Ltd.</i>
<i>Cummins India Ltd.</i>	<i>Rico Auto Inds. Ltd.</i>
<i>Escorts Ltd.</i>	<i>Sundram Fasteners Ltd.</i>
<i>Exide Industries Ltd.</i>	<i>T V S Motor Co. Ltd.</i>
<i>Hero Honda Motors Ltd</i>	<i>Tata Motors Ltd.</i>
<i>Hindustan Motors Ltd.</i>	<i>Tube Investments Of India Ltd.</i>
<i>Kirloskar Oil Engines Ltd.</i>	

### Formulae used in the study

The variable for representing growth is taken as growth in PAT over the years. The determinants of growth are taken as-

- Pre interest after tax margin
- Post tax interest rate
- Total asset turnover ratio
- Retention ratio
- Debt-equity ratio
- Beta

The formulae used for calculating the above indicators are-

#### (1) Growth in PAT

(a) When PAT is positive for both the years

$$\% \text{ growth in PAT} = \frac{\text{PAT}_t - \text{PAT}_{t-1}}{\text{PAT}_{t-1}}$$

(b) When PAT is negative in one of two consecutive years

$$\% \text{ growth in PAT} = \frac{\text{Max} (\text{PAT}_t - \text{PAT}_{t-1})}{\text{Max} (\text{PAT}_{t-1})}$$

$$(2) \text{ Pre Interest After Tax margin} = \frac{\text{PBIAT}}{\text{Sales}}$$



$$\begin{aligned}
 (3) \text{ Post Tax Interest rate} &= \frac{\text{Interest payments}(1 - \text{Tax})}{\text{Average Borrowings}} \\
 (4) \text{ Tax rate} &= \frac{\text{Tax Provision}}{\text{PBT}} \\
 (5) \text{ Total Asset Turnover ratio} &= \frac{\text{Sales}}{\text{Total Assets}} \\
 (6) \text{ Retention Ratio} &= \frac{\text{Retained Profit}}{\text{PAT}} \\
 (7) \text{ Debt -Equity Ratio} &= \frac{\text{Debt}}{\text{Equity}}
 \end{aligned}$$

Note: Beta for the companies has been taken from the PROWESS database.

## FINDINGS OF THE STUDY

### BSE Bankex

- The banks belonging to BSE Bankex have seen a significant increase in their growth over the period of study. The pre interest after tax margins have been more or less stagnant during the period of study. Banks have witnessed high turnover ratios. For few banks it is 6 -7 times and on an average maintained at 2 - 3 times.
- Retention ratio is very high ranging between 60 %-100 % which corroborates our earlier finding that companies are growing at an increasing rate. Also, D/E ratio is increasing which may be because banks have greater confidence in the easily available capital raised from other banks or RBI. Post Tax Interest Rate has been increasing which also indicates the higher debt portion in the balance sheets of the banks.

### BSE Auto Index

- Auto and auto parts manufacturing companies have achieved a bigger size in recent years but the growth of the companies has been volatile. Companies are having higher turnover ratio which shows efficient utilization of the

installed capacity. Pre Interest After Tax Margins are low ranging between 4 % - 14 %.

- D/E ratio has been declining, though marginally, which shows greater participation by these companies in the market. Companies have grown in size and are having availability of cheap debt which can be inferred from the low Post Tax Interest Rate.

Beta of most of the companies is ranging between 0.5-.90 on an average. Thus, companies are having a significant relation with the market movements. Retention ratio is between 50%-80%. It may be because companies are having plans to invest in new projects.

## EMPIRICAL RESULTS

### BSE Bankex

- The regression model is based upon PAT as dependent variable and Pre Interest after Tax Margin, Turn Over Ratio, Retention Ratio, D/E Ratio, Post Tax Interest Rate and Beta as independent variables.
- The regression model achieved finally was having Retention Ratio and D/E Ratios as the factors determining growth.

Variables	Coefficients	t value	P-value	R <sup>2</sup>
Debt-Equity	-0.649	-2.24	0.0483	0.9841
Retention	-8.45	-21.400	0.000	

From the above table it can be seen that both D/E ratio and retention ratios are negatively related with growth of the banking industry and they are significant at 5% level of significance. R<sup>2</sup> of the model is on the high side 98.41% which indicates that 98.41% variation in growth of the banking industry is explained by these two variables.

This model is applicable to BSE Bankex only because though companies belong to same economy or market but different industries are faced with different competitive environment and the factors determining the growth could vary.

### BSE Auto Index

- The cross section data for the FY 2005 was taken for the study. The regression model found that Pre Interest After Tax Margin, Retention Ratio, Debt-Equity Ratio and Post Tax Interest rate are affecting the growth of the BSE Auto Index companies the most. These three factors are significant at 10% significance level.

Variables	Coefficients	t value	P-value	R <sup>2</sup>
Pre Interest After Tax Margin	5.262	3.190	0.006	
Retention	0.860	1.715	0.1006	0.5547
Debt-Equity	0.028	1.896	0.077	
Post Tax Interest rate	5.896	1.901	0.076	

All the factors to growth are positively related to it. The value of R<sup>2</sup> is 0.5547 which shows that 55.47 % variation in the value of growth is explained by these four factors. The model is significantly well fitted. Pre Interest After tax Margin and Post Tax Interest Rate are having very high positive coefficients 5.26 and 5.89 respectively. Thus, the value of growth will be increased by 5.26 times with 1 unit increase in Pre Int. After tax Margin and by 5.89 times with 1 unit increase in Post Tax Interest Rate. Retention ratio is also, having significant direct relationship with growth as every unit change in retention ratio will increase growth by 0.86 units.

### CONCLUSION

The objective of the research was to determine the factors contributing to growth of BSE Bankex Index and BSE Auto Index. In the start there were six factors taken as proxy of growth. These factors were Pre Interest After Tax Margin, Turn Over Ratio, Retention Ratio, D/E ratio, Post Tax Interest Rate and Beta. PAT growth was taken as the proxy for growth.

However, in the regression analysis it was found that only Retention Ratio and D/E Ratio are the determinants of growth of BSE Bankex companies. Apart from the above two factors two more factors were found significant for the growth of BSE Auto Industry Pre Interest After Tax Margin & Post Tax Interest Rate.

This study can be extended to a much longer time period and it can be studied how these different factors evolve over time. On the basis of this it can be judged what are those factors that contribute most to the growth of any industry, as per this study on banking and auto industry. Similar study can suggest whether these factors also contribute in a similar manner to the growth of other industries/sectors or other benchmark indexes like IT Index/BSE 30/BSE100/BSE 500 etc.