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An Application of Dividend Discount Model to Telecom Service Companies of India

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Abstract

Purpose: The paper aims at applying the single period dividend discount model to ascertain the intrinsic value of the select telecom service companies of India. It also investigates the association between the intrinsic value of select companies' stocks and profitability measures like, ROE, ROCE and net profit. **Design/Methodology/Approach:** A descriptive and an analytical research design are used in the study. The secondary data relating to stock price, beta values, dividend per share and financial ratios were culled from CAPITALINE database. The study covers the nine year time period ranging from 2006 to 2014. The data relating to the risk free rate were taken from the Reserve bank of India website. A stepwise multiple regression analysis is used to examine the relationship between intrinsic value per share and ROE, ROCE and net profit. **Findings:** The study finds that Tata Communications Ltd recorded highest mean intrinsic value during the study period. The results of stepwise multiple regressions suggest that ROCE is statistically significantly related to intrinsic value per share. ROE and net profit are found to be statistically insignificant while explaining variation in the intrinsic value of the sample companies' stocks. Implications: The results of the study imply that by maximizing ROCE managers can enhance the intrinsic value of the company's stock. This will compel managers to focus more on ROCE that in turn will maximize the operational efficiency.

Keywords: Intrinsic Value, ROCE, ROE, Net Profit

1. Introduction

The primary goal of financial management is to maximize the wealth for shareholders. Different models have been recommended by academics and practitioners to measure the value of the financial asset. The dividend discount model is widely used method of measuring the intrinsic value of a stock of the company. The primary reason for using this model is its intuitive appeal and easiness. In finance theory, the value of an asset is defined as the present value of future cash flows expected from owning that asset. In case of stocks, the only visible cash flow is the dividend. In view of this, dividend discount models have been used extensively, to ascertain the intrinsic value of the stock. In this paper, an attempt has been made to apply the single period dividend discount model to appraise the intrinsic value of leading telecom service companies of India.

The remainder of the paper is structured as follows:

The second section discusses the literature review; third section highlights the research methodology; fourth section offers results and discussion; fifth section highlights the implication of the study and last section offers conclusion and scope for further research.

2. Literature Review

Gordon and Eli[6] first introduced the dividend discount model. They opined that the value of stock is simply the present value of future dividends discounted at the cost of equity. They presented the model in an equation as shown below,

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$$P = \frac{D_1}{r - g}$$

Where D_1 stands for dividend expected after one year.
r stands for the cost of equity.
g stands for a growth rate of dividend.

According to Rappaport[9] the Dividend Discount Model (DDM) is a valuation model that is based on the principle that the selling price of a share is derived by discounting expected future dividends.

Fama and French[4] find that the variation in dividend yields explains a large proportion of multi-year return predictability. According to Farifiled[3], dividend discount model equates the firm's price to the discounted value of its expected dividends. Hodrick[1] and Donaldson and Kamstra[2] use time-series models to predict dividend behavior and find that a number of models do a reasonable job of explaining both changes in dividends and changes in prices.

Schreiner[10] highlight that the firm's value could be ascertained based on the future stream of dividend expected to be paid along with the cash paid at the end of the forecast period.

Gottwald[7] used dividend discount model to measure the variation in stock prices. He found that the dividend discount model showed a significant relationship with stock price volatility. Ivanovski, Ivanovska and Narasanov[8] conducted a study on the dividend discount model in the context of the Macedonian Stock Exchange. They found that dividend discount models were useful for bank valuation and for other companies discounted cash flow method and relative valuation were suggested.

3. Research Methodology

3.1 Statement of the Research Problem

The study aims at measuring the intrinsic values of the leading telecom service companies of India using the single period dividend discount model.

3.2 Research Objectives

The following are the main research objectives.

- To empirically ascertain the intrinsic value of Sample companies' stocks using single period dividend discount model.
- To statistically examine the association of ROE, ROCE and Net profit with the intrinsic value of sample companies' stocks.

3.2.1 Research Design

The research designed used in the study is descriptive and analytical. The study aims at analyzing the intrinsic value of sample companies over the period of nine years.

3.3 Sampling Method

The judgment sampling method was used to draw a representative sample of telecom service providing companies. Five leading companies in terms of market capitalization were included in the sample. These five companies were ranking at top five positions respectively according to their market capitalization.

3.4 Data Collection

All financial data relating to the sample companies were culled from CAPITALINE database.

3.5 Period of the Study

The study covers the time period ranging from 2006 to 2014.

3.6 Variables of the Study

In order to calculate single period intrinsic value per share, following variables were considered.

3.6.1 Dividend Per Share

The values were taken from CAPITALIE database.

3.6.2 The Closing Price Per Share

The closing prices at the end of 31st March of each of the year were considered. The closing prices of the stock for the preceding and succeeding years were taken to calculate the intrinsic value. For instance, to calculate the intrinsic value per share as on March 31st 2006, the closing price as on 31st March, 2007 was taken as P1.

3.6.3 Cost of Equity

In order to calculate the cost of equity, Capital Asset Pricing Model (CAPM) was used. According to Francis[5], the CAPM could be used to estimate the cost of equity

for a firm or industry. Cost of equity using CAPM was calculated as per the following equation.

Cost of Equity = Risk Free rate + Beta (Market Risk Premium).

Weight average annual returns on Central government dated securities were taken as risk free rates for the respective years of the study period. These rates were taken from the Reserve Bank of India official website. Betas of companies' stocks were taken from CAPITALINE database. The annual beta values were taken considering the period starting from 1st April of the preceding year ending with 31st March of the succeeding year.

3.6.4 Return on Equity (ROE)

Return on equity is simply the ratio of net profit divided by shareholders' fund.

3.6.5 Return on Capital Employed (ROCE)

ROCE values were directly taken from CAPITALINE database. They define ROCE as below

Adjusted net profit+tax+interest/share capital + reserve+total debt-miscellaneous expense not written off.

3.6.6 Intrinsic Value Per Share

In order to compute the intrinsic value per share, single period dividend discount model was used as shown below.

$$P_0 = \frac{D_1 + P_1}{1 + r}$$

In the above equation, P_0 shows intrinsic value per share, D_1 represents divined per share for the next year and P1 indicates the price of the share at the end of next year.

3.7 Regression Model

A multiple regression model was used to estimate the relationship between the dependent variable-intrinsic value per share and set of independent variables - ROE, ROCE and Net profit. In order to ensure the normality of the variables under study, the log transformation was executed to all the independent variables in the following manner.

Log of (individual independent variable+1). The constant value of 1 was added to the values of all independent variables while carrying out log transformation. Whereas, only a simple log of a dependent variable was considered as it did not have negative values.

Following regression model was employed to test the relationship between intrinsic value per share and the explanatory variables- ROE, ROCE and net profit.

$$LGINTRSV_{it} = \beta_0 + \beta_1 LGROE_{it} + \beta_2 LGROCE_{it} + \beta_3 LGNP_{it}$$

Where $LGINTRSV_{it}$ indicates log of intrinsic value per share of i^{th} company for time period t.

$LGROE_{it}$ indicates log of Return on Equity (ROE) of i^{th} company for time period t.

$LGROCE_{it}$ indicates log of ROCE i^{th} company for time period t.

$LGNP_{it}$ indicates log of Net profit of ith company for time period t.

4. Results and Discussions

4.1 Company-wise Descriptive Statistics

Descriptive statistics for the intrinsic values of sample companies are presented in Table 1. It is clear from the table that Tata Communications recorded highest mean

Table 1. Descriptive statistics for intrinsic value per share of sample companies

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Intrinsic Value per share Bharti Airtel Ltd.	9	154.58	277.12	431.71	313.48	45.92
Intrinsic Value per share Idea Cellular Ltd.	9	102.12	45.96	148.08	94.46	39.00
Intrinsic Value per share Reliance Communications Ltd.	9	573.91	60.07	633.98	162.27	182.56
Intrinsic Value per share Tata Communications Ltd.	9	456.78	187.74	644.52	335.72	144.80
Intrinsic Value per share MTNL	9	154.62	12.51	167.13	49.93	49.08
Valid N (list wise)	9					

intrinsic value of Rs. 335.72 per share during entire nine year period. The stock of MTNL recorded lowest mean intrinsic value of Rs. 49.93 per share during the study period. On the other hand, intrinsic value per share of Reliance Communications ltd witnessed highest volatility with the highest standard deviation of Rs. 182.56 per share. The intrinsic value of Idea Cellular seems to have demonstrated lower volatility with a lowest standard deviation of the intrinsic value of Rs. 39 per share.

Table 2 depicts year-wise descriptive statistics for the intrinsic value of the entire sample. It was used to show the mean and standard deviation of intrinsic value of the stocks of select companies during the study period. Standard deviation by its very nature measures the volatility in the observed variable. As shown in Table 2 the average intrinsic value of the entire sample was highest in the year 2006 with the average of Rs. 399.58 per share. Whereas, it was lowest to Rs. 128.582 in the year 2010. The average intrinsic value of the entire sample was highly volatile in the year 2006 (SD = Rs. 248.92) and least volatile in the year 2011 (SD = Rs. 106.39).

4.2 Year-wise Descriptive Statistics for Entire Sample

4.3 Test of Normality

To test the normality assumption of the data set, the following null hypothesis was tested.

H_0: The observed distribution fits the normal distribution

H_1: The observed distribution does not fit the normal distribution.

Table 3. Tests of normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
LGROE	.104	38	.200*	.978	38	.651
LGROCE	.099	38	.200*	.971	38	.427
LGNP	.122	38	.169	.942	38	.049
LGINTRSV	.155	38	.021	.944	38	.057

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction.

The results of the normality test have been presented in Table 3. As the significance values of the Shapiro-Wilk test for each of the variables is greater than 0.05, we fail to reject the null hypothesis and conclude that the distribution follows a normal distribution.

4.4 Descriptive Statistics for Multiple Regression Model

Table 4 depicts the descriptive statistics for the multiple regressions. The mean of log of the intrinsic value of the entire sample was found to be 5.0845 with a SD of 0.733. Whereas the mean values of the log of ROE, ROCE and Net Profit (NP) were 2.1175, 2.256 and 2.0576 respectively. The lowest SD was recorded to be 0.154 for the log of net profit.

4.5 Correlation Analysis

The results of correlation between dependent and individual independent variable are shown in Table 5. The results show that intrinsic value per share and ROE were significantly correlated ($r = 0.38$ $p<0.05$). Although the value of $r = 0.38$, but it was statistically significant ($p = 0.009$)

Table 2. Year-wise descriptive statistics for intrinsic value per share for the entire sample

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Intrinsic value per share 2006	5	523.95	120.57	644.52	399.58	248.92	61962.72
Intrinsic value per share 2007	5	390.70	45.96	436.66	212.29	164.42	27034.75
Intrinsic value per share 2008	5	243.61	49.87	293.48	168.42	117.24	13745.40
Intrinsic value per share 2009	5	265.28	47.96	313.24	153.00	112.61	12681.13
Intrinsic value per share 2010	5	282.80	19.52	302.32	128.52	115.51	13341.80
Intrinsic value per share 2011	5	255.14	21.98	277.12	131.57	106.39	11318.63
Intrinsic value per share 2012	5	276.87	12.51	289.38	165.03	116.39	13545.85
Intrinsic value per share 2013	5	364.95	23.92	388.86	183.21	156.30	24428.22
Intrinsic value per share 2014	5	354.22	18.33	372.56	178.94	152.66	23305.59
Valid N (listwise)	5						

ROCE and net profit were also found to be statistically correlated with intrinsic value per share, with r = 0.455, and 0.289 respectively.

The correlation coefficient was calculated so as to know the nature of relationship between dependent variable, intrinsic value per share and individual independent variables, ROCE, ROE, and NP.

4.6 Regression Analysis

A stepwise multiple regression analysis was run in order to examine the association between the dependent variable and a set of independent variables. A stepwise regression model is the most robust model used widely to examine the association between a dependent variable and set of independent variables. It will help eliminate the independent variables that are correlated among themselves and thus ward off against the problem of multicollinearity. To derive the best fitted model, thus stepwise regression method was used in this study. Table 7 shows the summary of the regression model. Only ROCE was allowed to enter into the regression model while ROE and Net profit were excluded from the model. The model was considered to be the best fit as R square value was 0.207. Although the value of R square was 20.7% only, the model seemed to be statistically significant (F = 9.397, p = 0.004) which implies that we can proceed with the

Table 4. Descriptive statistics for multiple regression model

	Mean	Std. Deviation	N
LGINTRSV	5.0854	.73321	38
LGROE	2.1175	.85150	38
LGROCE	2.2557	.66664	38
LGNP	2.0576	.15494	38

Table 6. Variables entered/removed[a]

Model	Variables Entered	Variables Removed	Method
1	LGROCE		Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).

a. Dependent Variable: LGINTRSV.

Table 5. Correlations

		LGINTRSV	LGROE	LGROCE	LGNP
Pearson Correlation	LGINTRSV	1.000	.380	.455	.289
	LGROE	.380	1.000	.954	.738
	LGROCE	.455	.954	1.000	.674
	LGNP	.289	.738	.674	1.000
Sig. (1-tailed)	LGINTRSV		.009	.002	.039
	LGROE	.009		.000	.000
	LGROCE	.002	.000		.000
	LGNP	.039	.000	.000	
N	LGINTRSV	38	38	38	38
	LGROE	38	38	38	38
	LGROCE	38	38	38	38
	LGNP	38	38	38	38

Table 7. Model summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.455[a]	.207	.185	.66194	.853

a. Predictors: (Constant), LGROCE.
b. Dependent Variable: LGINTRSV

interpretation of the model to test the statistical significance of the model F test was conducted. The results of the same are shown in Table 8. The model with ROCE as the only independent variable was found to be statistically significant ($F = 9.397$, $p < 0.05$). In order to examine the statistical significance of independent variables, t test was executed. Table 9 represents these results. These results indicate that ROCE is statistically significantly related to intrinsic value per share ($t = 3.065$, $p < 0.05$). The results of independent variables excluded from the regression model are presented in Table 10. Both ROE and net profit were found to be statistically insignificant with $p = 0.228$, and $p = 0.879$ respectively.

5. Implications of the Study

The results of the study imply that in comparison to ROE and net profit, ROCE explained 20.7% variations in intrinsic value per share. This will compel managers to focus more on ROCE as against ROE and net profit that in turn, will maximize the operational efficiency.

6. Conclusion and Scope for Further Research

This study empirically ascertains the intrinsic values of leading telecom service companies of India. It thus provides a first-hand exposure to the investor regarding the intrinsic value of these companies over a nine year period. In the sample companies, Bharti Airtel stands out as a leader in terms of highest average intrinsic value per share during the study period. The regression results of the study also confirm that ROCE is statistically significantly related to the intrinsic values of the stocks. The study does not find a significant relationship between

Table 11. Collinearity diagnostics[a]

Model		Eigenvalue	Condition Index	Variance Proportions	
				(Constant)	LGROCE
1	1	1.960	1.000	.02	.02
	2	.040	7.001	.98	.98

a. Dependent Variable: LGINTRSV.

Table 8. ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.117	1	4.117	9.397	.004[b]
	Residual	15.774	36	.438		
	Total	19.891	37			

a. Dependent Variable: LGINTRSV
b. Predictors: (Constant), LGROCE

Table 9. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	3.957	.384		10.316	.000		
	LGROCE	.500	.163	.455	3.065	.004	1.000	1.000

a. Dependent Variable: LGINTRSV.

Table 10. Excluded variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics		
						Tolerance	VIF	Minimum Tolerance
1	LGROE	-.605[b]	-1.226	.228	-.203	.089	11.202	.089
	LGNP	-.031[b]	-.154	.879	-.026	.546	1.831	.546

a. Dependent Variable: LGINTRSV.
b. Predictors in the Model: (Constant), LGROCE.

intrinsic value on one hand and ROE and net profit on the other hand. The future study could be conducted across the different sectors using different valuation models like; free cash flow to equity and free cash flow to firm to arrive at a more robust estimation of the intrinsic value of the stocks.

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