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DIVIDEND SMOOTHING & IMPLICATIONS OF LINTNER MODEL – AN EMPIRICAL ANALYSIS OF INDIAN AUTO SECTOR

Anjali Rane
Assistant Professor
Department of Commerce & Management
Government First Grade College Karwar
Karnataka

Dr. Guntur Anjana Raju
Professor, HOD,
Department of Commerce,
Goa University,
Goa

Abstract
Dividend smoothing is the strategy used by the managers to avoid adverse reaction of market participant or shareholders while setting dividend level. John Lintner (1956), in his study on dividend policy found that managers target a long-term dividend payout ratio and concluded that dividends are sticky, connected to long-term sustainable earnings, paid by mature firms, and are smoothed from year to year. This study is an effort to find the applicability of dividend smoothing in BSE Sectoral firms. This paper utilizes event study methodology to examine dividend announcement of 42 A& B listed companies in BSE Auto Sector. The empirical analysis of 486 dividend announcements for the period of fifteen years reveals that dividend smoothing prevails in Indian Auto Sector. The study reveals dividend policies of the firms depend strongly on lagged dividend and profit after tax with robust statistical significance of coefficients. The high target payout ratio coupled with high speed of adjustments (SOA), shows presence of dividend smoothing and hence, empirical analysis conducted strongly supports and further confirms Lintner’s (1956) findings. The Section I, presents theoretical background and literature review. Section II describes the data and methodology. In Section III, we examine empirical results of the relation between dividend policy, the dependent variable and independent variable, lagged dividend and profit after tax of BSE auto sector firms measured in terms of regression, speed of adjustment and target payout ratio. Durbin Watson is used to test auto correlation. T-test and p-value is used to find statistical significance of the Lintner model. Section IV concludes the paper.

Key words
Dividend announcement, Indian Healthcare sector, Event study model, Cumulative Abnormal Return (CAR), t Test.

JEL Classification: G2, G3

INTRODUCTION
Dividend smoothing can be described as strategy used by the managers to avoid adverse reaction of market participant or shareholders while setting dividend level. Lintner model incorporates the dominant determinants of corporate dividend decisions and considered as pillar and strong foundation for later research on dividend smoothing. John Lintner (1956) in his survey of corporate Chief Executive Officers and Chief Financial Officers found that dividend policy is an important variable as managers believe stable dividends reduces negative investors’ reactions. The determination of dividend policy indicates the levels of retained earnings and savings are dividend decision byproducts. According to Lintner, shareholders prefer smoothed dividend income and hence firms are primarily concerned with stability of dividends. Managers believe that the market puts a premium on firms with stable dividend policy. Lintner observation indicates earnings were most important determinants of any change in dividends. Lintner also reported that majority of managers develop long-term payout ratio targets and use periodical partial adjustments to reach target levels. Lintner argued that avoidance of erratic changes in dividend policy is crucial to firms. Lintner developed Partial adjustment model specifying dividend smoothening by managers. He presumed changes in the dividend payment are related to the earnings, speed of adjustment and target payout ratio. This study is an effort to find the truth behind these arguments and to demonstrates application of Classic Lintner Model for Indian capital market, in specifically, applicability of dividend smoothing in BSE Auto Sectoral firms.
Literature Review
John Lintner (1956), in his study on dividend policy found that managers target a long-term dividend payout ratio and concluded that dividends are sticky, connected to long-term sustainable earnings, paid by mature firms, and are smoothed from year to year. As per him, investors considering change in the net earning is sole factor behind change in the dividend policy is the reason for managers to target net earnings in the payout ratio. Management avoids erratic changes and follows conservative dividend policy as the stockholders prefer stable dividend over volatile payments. His findings have been further confirmed with more recent empirical evidence examining association of dividend with net profits, cash flow and other variables by Fama and Babiaik (1968), De Anogelo H & De Angelo L (1990), Baker and Powell (2000), Omran and Pointon (2004) Brav et al. (2005), etc. Knyazeva(2008) found that weekly governed managers exhibit more dividend smoothing and less likely to cut dividends. Empirical study conducted by Michaely et al (2002) exhibits that the market punishes dividends reduction way more severely than the dividend increase. Brav et al (2005) argue over reaction of the market for dividend cuts is the reason is to why dividends are sticky. On the other hand, Ogden et al. (2002) argue that since a firm’s financing needs vary over time, so should its dividends.

Problem statement and purpose of the study:
Across the globe, in various countries we find numerous studies on dividend payout behaviour of companies but still fail to find specific factors driving the payout behavior in corporate firms. Various studies have focused on broad set of independent factors on which dividend is dependent but it may vary across different industrial sectors and countries. Also, size of the company and time horizon may affects dividend payment pattern. After careful review of the literature , it was found that very few studies have focused in depth and majority of aspects of dynamic patterns in dividends payout are understudied on the dividend payout behavior of Indian firms sector wise. This research gap recognizes the need for investigating into as to what Indian corporate sector firms’ dividend payout decision depended on during the last fifteen years period. Thus, the purpose of this study is to examine the implications of basic Lintner model on dividend behavior of eleven BSE Sectoral Indices.

DATA & METHODOLOGY:
Methodology of the study consists of formulating hypotheses, data sampling and observations, a brief discussion of tools of analysis, model development, analysis and interpretation.

Hypotheses
Keeping in view the implications and the factors influencing pay out decision, as revealed in literature survey, the study proposes to test the following hypotheses.

H1: BSE Sectoral Indices firms take dividend payout decision independent of current year’s earnings position and the dividends paid in the preceding year.

H2: Time factor does not have any impact on the dividend payout decision of BSE Sectoral Indices firms.

Model development:
Basic Lintner model is used for investigating the dividend payment behavior of BSE Sectoral Indices firms. The following are the model equations used in the study.

Lintner's Basic Model

\[ D^*t = (TD/P)^*Et \] ................................. (5.1)
\[ Dt - D(t-1) = \hat{a} + SOA(D^*t - D(t-1)) + \mu_t \] ................................. (5.2)
\[ D_t - D(t-1) = \hat{a} + SOA(D^*t - D(t-1)) + \mu_t \] ................................. (5.3)
\[ D_t - D(t-1) = \hat{a} + SOA ((TD/P)Et - D(t-1)) + \mu_t \] ................................. (5.4)
\[ D_t = \hat{a} + (TD/P) SOA Et + (1- SOA) D (t-1) + \mu_t \] ................................. (5.5)

Where,

\( D^*t \) = Desired Dividend in the current year
\( D_t \) = Actual dividend payment in the current year
\( TD/P \) = Target Dividend Payout Ratio
\( Et \) = Earnings per share in the current year
\( D(t-1) \) = Lagged dividend (Dividend in the previous year)

SOA = Partial adjustment factor
\( \hat{\alpha} \) = Intercept related to dividend growth
\( \mu \) = Standard Error term.

In Lintner Model two parameters embedded in the firms dividend behavior, i.e. \((SOA)*(TD/P)\) and \(1-k\) are included in \(\beta_1\) and \(\beta_2\) (regression coefficients) respectively. These parameters are as follows:

**Target Dividend Payout Ratio \((TD/P)\)**

Target payout ratio is a firm's long-run dividend-to earnings ratio. The company's dividend policy is targeted to pay out a certain percentage of earnings, but it pays a stated and stable dividend and adjusts dividend to the target as base line increases in earnings. The target payout ratio is computed using regression coefficients, i.e.

\[
(TD/P) = \frac{\beta_1}{(1-\beta_2)}
\]

**Adjustment factor \((k)\) or Speed of Adjustment \((SOA)\)**

It considers the quantity \((1-\beta_2)\) as a safety factor that firm uses to avoid giving the dividend payment to a level which cannot be maintained in the later years.

\[
(SOA) = 1 - \beta_2
\]

**Simplified version of Multiple Regression Equation of Lintner Model**

\[
Dt = \hat{\alpha} + \beta_1 Et + \beta_2 Dt-1 + \mu 
\]

Sample and data source

The study constitutes BSE Auto Sectoral Indices chosen as the sample. The reference period for the present study is from the year 2001 to 2015, i.e., period of 15 years. However, due to information constraints the sample size differed in few years, throughout out the sampling period. The total good observations considered for the study is 486 dividend announcements for Auto Sector. The list of specific companies for the study is given in Appendix. Prowess database maintained by Centre for Monitoring Indian Economy (CMIE) is the prime source of data for the study purpose.

**Statistical Tools Used in the Model:**

A regression helps to assess up to what extent predictor variables account for variability in a dependent variable. In our study, it is used to check if predictor, Earnings or PAT and Lagged dividend (dividend of the previous year) account for variability in the dividend paid for the current year. A multiple regression allows the simultaneous testing and modeling of multiple independent variables. \(R^2\) is a statistic that gives accurate information about the goodness of fit of a model. In our study, \(R^2\) **Coefficient of determination**, tells about the reasons why the dividend variable can vary, what percent of those reasons can be accounted for by the PAT and lagged dividend. A Coefficient of determination of 1.0 indicates that the regression line perfectly fits the data. Values of \(R^2\) outside the range 0 to 1 can occur where it is used to measure the agreement between observed and modeled values and where the “modeled” values are not obtained by linear regression and based on which formulation of Coefficient of determination \(R^21\) is used.

**Adjusted \(R^2\)**, adjusts for the number of explanatory terms in a model. Unlike \(R^2\), the adjusted \(R^2\) increases only if the new term improves the model more than it would be expected by chance. The adjusted \(R^2\) can be negative, and will always be less than or equal to \(R^2\). When we use the present model on a new data set, it will be the amount of variability accounted for in the new data set. The variation between sample sizes of two data sets would be reason to interpret the adjusted \(R^2\) value. After calculation of \(R^2\), it is important to evaluate the regression beta coefficients \((\beta)\): unstandardized and standardized. The beta coefficients can be either negative or positive, and have a t-value and significance of that t-value associated with it. In statistics, beta coefficients are the estimates resulting from an analysis carried out on variables that have been standardized so that their variances are 1. Therefore, standardized coefficients refer to how many standard deviations a dependent variable, dividend paid for the current year will change, per standard deviation increase in the predictor variable i.e; PAT and lagged dividend. Standardization of the coefficient is usually done to answer the question of which of the independent variables has higher effect on the dependent variable in a multiple regression analysis, when they are measured in different units of measurement. T Statistic is computed by dividing the estimated value of the parameter by its standard error. The larger the absolute value of t, it is less likely that the actual value of the parameter could be zero. If the t-value is not statistically significant, no statistical significance can be interpreted from that predictor about beta coefficient. If the regression beta coefficient is positive, the interpretation is...
that for every 1-unit increase in the predictor variable (PAT & lagged dividend), the dependent variable (Dividend) will increase by the unstandardized beta coefficient value. For example, if the beta coefficient is .60 and statistically significant (t value), then for each unit increase in the predictor variable, the outcome variable will increase by .60 units.

The standard error is the standard deviation of the sampling distribution of a statistic. The term may also be used to refer to an estimate of that standard deviation, derived from a particular sample used to compute the estimate. The standard error of the mean is the standard deviation of those sample means over all possible samples drawn from the population. Secondly, the standard error of the mean can refer to an estimate of that standard deviation, computed from the sample of data being analyzed at the time.

Analysis of Variance (F test) or 'p' value is statistical tool to test the overall significance of the regression model. Particularly, F test finds if the null hypothesis that all of the regression coefficients are equal to zero. It is the ratio of the mean regression sum of squares divided by the mean error sum of squares. We find in the regression output, F-value and significance level of that F-value. If the F-value is statistically significant (typically p < .05), this signifies that the model, the predictors, in our case, PAT and lagged dividend did a good job of predicting the outcome variable and that there is a significant relationship between the set of predictors and the dependent variable, i.e. dividend paid for the current year.

Durbin-Watson statistic test for autocorrelation is a statistic that indicates presence of autocorrelation in residuals. When adjacent observations are correlated it is called as autocorrelation and in that circumstances least-squares regression underestimates the standard error of the coefficients. Thus, predictors might seem to be significant when in reality they may not be. It usually falls between 0 and 4. Durbin-Watson statistic value of 2 implies that there is no autocorrelation in the sample. If the values are approaching towards 0 then the sample has positive autocorrelation and values toward 4 indicate negative autocorrelation.

DATA ANALYSIS OF AUTO SECTOR

Table No.1

Summary Details of Regression Model between Dividends, the Dependent Variable and Profit After Tax (PAT) And Lagged Dividends as the Independent Variable In Auto Sector

<table>
<thead>
<tr>
<th>Year</th>
<th>Intercept(â)</th>
<th>R</th>
<th>R²</th>
<th>Adjusted R</th>
<th>Std. Error(µ)</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>-75.341</td>
<td>.969</td>
<td>.939</td>
<td>.935</td>
<td>154.9807176</td>
<td>2.109</td>
</tr>
<tr>
<td>2003</td>
<td>-62.261</td>
<td>.985</td>
<td>.970</td>
<td>.967</td>
<td>122.6572323</td>
<td>2.314</td>
</tr>
<tr>
<td>2004</td>
<td>-2.871</td>
<td>.976</td>
<td>.953</td>
<td>.949</td>
<td>191.6304683</td>
<td>2.049</td>
</tr>
<tr>
<td>2005</td>
<td>-27.022</td>
<td>.981</td>
<td>.962</td>
<td>.959</td>
<td>206.4577596</td>
<td>2.032</td>
</tr>
<tr>
<td>2006</td>
<td>20.378</td>
<td>.994</td>
<td>.988</td>
<td>.987</td>
<td>123.8554932</td>
<td>2.038</td>
</tr>
<tr>
<td>2007</td>
<td>-3.578</td>
<td>.981</td>
<td>.963</td>
<td>.961</td>
<td>225.5153844</td>
<td>1.913</td>
</tr>
<tr>
<td>2008</td>
<td>13.884</td>
<td>.933</td>
<td>.871</td>
<td>.864</td>
<td>453.0199040</td>
<td>2.114</td>
</tr>
<tr>
<td>2009</td>
<td>10.931</td>
<td>.947</td>
<td>.897</td>
<td>.891</td>
<td>313.7758764</td>
<td>2.089</td>
</tr>
<tr>
<td>2010</td>
<td>-304.801</td>
<td>.895</td>
<td>.802</td>
<td>.790</td>
<td>1755.5231931</td>
<td>2.049</td>
</tr>
<tr>
<td>2011</td>
<td>-97.430</td>
<td>.985</td>
<td>.971</td>
<td>.969</td>
<td>745.2857498</td>
<td>2.081</td>
</tr>
<tr>
<td>2012</td>
<td>-50.158</td>
<td>.916</td>
<td>.840</td>
<td>.830</td>
<td>1337.3327090</td>
<td>2.022</td>
</tr>
<tr>
<td>2013</td>
<td>-186.131</td>
<td>.957</td>
<td>.915</td>
<td>.910</td>
<td>903.0008636</td>
<td>2.052</td>
</tr>
<tr>
<td>2014</td>
<td>-72.395</td>
<td>.995</td>
<td>.991</td>
<td>.990</td>
<td>330.7797602</td>
<td>2.067</td>
</tr>
<tr>
<td>2015</td>
<td>-4.646</td>
<td>.996</td>
<td>.991</td>
<td>.991</td>
<td>316.4049962</td>
<td>1.877</td>
</tr>
</tbody>
</table>

Predictors: (Constant), PAT, D_{t-1}

The multiple R in the table shows high correlation in all the years between dependent variable and predator variables (PAT & Lagged dividend). R² is a statistic which is explaining that the model is perfectly fitting and relationship explained by the model is strong in all the years for the Auto sector. Regression line perfectly fits the data. Adjusted R² is lesser than R² and adjusts for the number of
explanatory terms in the present model. The table gives picture of standard deviation of the sampling distribution of a statistic referred as standard error of the mean. The Durbin Watson test applied for the purpose to examine the existence of autocorrelation states that the model has been justified as there is no auto correlation across all the years in Auto sector. The below table depicts that beta standardized coefficient of both PAT and Lagged dividends have higher effect on dividend payout. In other words, higher coefficients on PAT and lagged dividend reflect a higher level of dividend smoothing. T test conducted shows the statistical significance of coefficient for all the year for PAT and Lagged dividend except 2007 to 2009 for PAT and 2002 for Lagged dividend respectively. It indicates that in these three years, dividend payout decision was based only on Lagged dividend and not on the PAT. T statistics of the two beta coefficient also reveals that impact of both PAT and lagged dividend was high for all the years of the study period.

1. a Beta Standardized coefficients and ‘t’ values of independent variables (PAT and lagged dividend), F Test, Speed of Adjustment and Target Payout Ratio in Auto Sector

<table>
<thead>
<tr>
<th>Year</th>
<th>PAT (Et)</th>
<th>Lagged Dividends (Dt-1)</th>
<th>F Test (P Value)</th>
<th>SOA</th>
<th>TD/P Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>0.911</td>
<td>12.687***</td>
<td>0.075</td>
<td>1.048</td>
<td>0.000°</td>
</tr>
<tr>
<td>2003</td>
<td>0.577</td>
<td>8.786***</td>
<td>0.444</td>
<td>6.763***</td>
<td>0.000°</td>
</tr>
<tr>
<td>2004</td>
<td>0.288</td>
<td>4.490***</td>
<td>0.737</td>
<td>11.503***</td>
<td>0.000°</td>
</tr>
<tr>
<td>2005</td>
<td>0.258</td>
<td>4.214***</td>
<td>0.76</td>
<td>12.418***</td>
<td>0.000°</td>
</tr>
<tr>
<td>2006</td>
<td>0.138</td>
<td>3.651***</td>
<td>0.875</td>
<td>23.191***</td>
<td>0.000°</td>
</tr>
<tr>
<td>2007</td>
<td>0.170</td>
<td>2.853</td>
<td>0.837</td>
<td>14.084***</td>
<td>0.000°</td>
</tr>
<tr>
<td>2008</td>
<td>0.359</td>
<td>3.280</td>
<td>0.616</td>
<td>5.632***</td>
<td>0.000°</td>
</tr>
<tr>
<td>2009</td>
<td>0.233</td>
<td>2.461</td>
<td>0.748</td>
<td>7.890***</td>
<td>0.000°</td>
</tr>
<tr>
<td>2010</td>
<td>-0.130</td>
<td>-0.861</td>
<td>1.006</td>
<td>6.660***</td>
<td>0.000°</td>
</tr>
<tr>
<td>2011</td>
<td>0.264</td>
<td>7.003***</td>
<td>0.796</td>
<td>21.138***</td>
<td>0.000°</td>
</tr>
<tr>
<td>2012</td>
<td>0.407</td>
<td>3.392</td>
<td>0.553</td>
<td>4.608***</td>
<td>0.000°</td>
</tr>
<tr>
<td>2013</td>
<td>0.344</td>
<td>4.901***</td>
<td>0.687</td>
<td>9.789***</td>
<td>0.000°</td>
</tr>
<tr>
<td>2014</td>
<td>0.114</td>
<td>4.105***</td>
<td>0.903</td>
<td>32.546***</td>
<td>0.000°</td>
</tr>
<tr>
<td>2015</td>
<td>0.412</td>
<td>23.460***</td>
<td>0.780</td>
<td>44.378***</td>
<td>0.000°</td>
</tr>
</tbody>
</table>

***- denotes Statistical Significance at 1% level (p<.001)

b- Predictors: (Constant), DL1, PAT1

Significance F or ‘p’ value in all the years was below 0.00 and hence it can be concluded that dividend decision of the firms depends on earnings and lagged dividends. Hence, on bases this observation, we reject null hypothesis, H1 and prove that dividend decision of BSE SENSEX firms did consider current year earnings position and the dividends paid in the preceding year while deciding on their payout ratio in every year. The target payout ratio for Auto sector is around 100%. This payout ratio is higher than target payout ratio of 50 % suggested by Lintner. As regards the speed of adjustment coefficient the value lays around 20% to 30% which is perfect as compared to suggested by Lintner. This right amount of speed of adjustment coefficient denotes that actual changes in the dividend matching the desired changes. This high target payout ratio coupled with adequate speed of adjustment factor shows the high presence of dividend smoothing and dividend signaling. The Auto sector firm’s dividend payout ratio do not fluctuates with changes in the earnings. This suggests that higher dividend payout is witnessed in Auto industry even in case of less or no profitability of the companies. Any variation in the earnings is not reflected in dividend payment.

CONCLUSION:

This study purpose was to identify whether dividend smoothing is a pertinent phenomenon in Indian Auto sector firms and to find out the determinants that drive dividend smoothing. The interpretation of dividend smoothing was made through Partial Adjustment Model of Lintner. The study has confirmed BSE Sectoral firms follow Lintner’s description of dividend policy as they firstly, smooth dividends, secondly, they are
reluctant to cut dividends even in case of fewer earnings (PAT), and they increase dividends by small percentages with increase in the earnings. The results uses Lintner model to examine difference in dividend smoothing in various BSE Sectoral segments in India. The dependent variable, dividend is regressed on PAT and lagged dividend. Higher coefficient of on PAT and lagged dividend reflects a higher level of dividend smoothing. The analysis indicates dividend smoothing corresponds negatively to Speed of Adjustment.

The target payout ratio of a firm depend on various factors such as growth and earnings prospects, investment opportunities, working capital requirements, firms access to the capital markets, capital structure policies of the company related to debt and new equity issues, internal fund flows judged by past experience, the higher importance attached by management to long-term capital gain than current dividend income for its shareholders, and firms forecasting of budgets, future sales and profits etc. The dividend payout ratio also depends on speeds of adjustment of competitive companies and substitutes investment alternatives and financial strength of the company. The main contribution of the research is to show that Lintner Model better fits to Indian capital market. The study reveals Auto sector firm’s dividend payout ratio does not fluctuate with the changes in the earnings. Higher dividend payout is witnessed even in case of less or no profitability of the companies and hence, any variations in earning are not reflected in dividend payment. Thus, it can be concluded, that high target payout ratio coupled with adequate speed of adjustment factor shows the high presence of dividend smoothing and signalling.Further research can be conducted to address any differences between different industries as it is interesting to target differences in dividend smoothing between industries and the various characteristics that might influence dividend smoothing. Also, further research within this subject is desired, to know international differences in the degree of dividend smoothing. It is further recommended to make a comprehensive comparison between a large set of countries in order to capture national level determinants.

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