

# Does Lintner's dividend model explain South African dividend payments?

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## Abstract

It is generally accepted that the payment of dividends is the most important and most widely used instrument for the distribution of value to shareholders. Shareholders also prefer to receive regular dividends rather than irregular cash payments. A well-known model that attempts to explain dividend policy is that of Lintner (1956). This study investigates whether Lintner's model can be used to explain South African dividend payments and compares this model with another, less sophisticated, model, namely the "percentage model". Lintner's model does not have a very good fit, probably as a result of the small sample used. Nearly half of the 200 largest companies that are listed on the Johannesburg Securities Exchange were excluded from the study as they were not listed for a sufficiently long period. Other companies were excluded on the grounds of having maintained their dividends on the same level for at least two consecutive years.

## Key words

*Dividend policy*

*Dividend decision*

*Lintner's dividend model*

## 1 Introduction

The dividend decision is widely regarded as one of the most important financial decisions to be taken from a strategic point of view. The dividend decision, which is determined by a firm's dividend policy, affects the level of equity retained in a firm (Lease, John, Kalay, Loewenstein and Sarig 1999:1). If dividends that are paid out are not replaced in value terms by new equity, then this decision also influences the financial structure of the firm, at least briefly. The importance of a dividend decision is therefore based on the fact that it has implications for both the investment decisions and the financing decisions that are taken. The more cash that a firm pays out in the form of dividends, the less

funds it has available to finance future attractive investment opportunities and the greater the probability that it will have to issue new shares to raise more capital.

In this study, the question is asked regarding whether Lintner's dividend model sufficiently explains South African dividend payments. This model is contrasted with a less sophisticated model that is called the "percentage model". The empirical findings indicate that the latter model appears to offer a better explanation of historic South African dividend payments. A need for further research on the important topic of dividend policy is identified.

## **2 The problem and the hypothesis**

The aim of this study is to investigate the extent to which Lintner's (1956) dividend model can be used to explain South African dividend payments. The payment of a dividend is one method whereby a company can distribute value to its shareholders. Another method is the repurchasing of shares (Lease *et al* 1999:153), which method has only been possible in South Africa since the middle of 1999. Although share buy-back could be seen as an important way of distributing shareholder wealth, this study focuses on the payment of dividends only.

The hypothesis to be tested is whether Lintner's dividend model explains the dividend payments of large South African industrial companies better than another, less sophisticated, model. This second model, called the "percentage model", refers to cases in which a company chooses to pay a constant (average) percentage of earnings per share as dividends.

## **3 Literature review**

The dividend decision is one of the most important financial decisions that are taken from a strategic point of view. In the well-known dividend growth model that was developed by Gordon (1959), expected share price is expressed as follows as a function of the dividend one year hence ( $D_1$ ), shareholders' expected rate or return ( $k$ ), and the long-term growth rate of dividends ( $g$ ):

$$E(P_0) = D_1 / (k - g) \quad (1)$$

If the company increased the payout ratio,  $D_1$  would increase and, taken in isolation, it would cause the share price to rise. However, if  $D_1$  were increased, less cash would be available for reinvestment. If less cash were available for reinvestment, it would cause the expected growth rate to decline, which would cause the share price to decline. It can therefore be said that any change in payout policy will have two opposing effects. A firm's optimum dividend policy should strike a balance between current dividends and future growth in order to maximise the current share price (Brigham and Ehrhardt 2002:699).

The payment of dividends has received much attention from researchers internationally. Miller and Modigliani (1961) argue that dividends are irrelevant

and cannot be used to determine the value of a firm's shares (and therefore change shareholder value). On the other hand, Gordon (1963) and Lintner (1962) were the first supporters of the relevance of dividends in creating shareholder wealth. They suggest that there is a direct relationship between a firm's dividend policy and its market value. After Lintner (1956) proposed the so-called two-variable dividend model, Fama and Blahnik (1968:1160) tested this model on the dividend data of 392 major North American industrial firms for the years 1946-1964. Lintner's dividend model succeeded fairly well in explaining the dividend changes of individual firms.

Various researchers have studied the important area of dividend policy in an international context. Despite extensive research being undertaken on the issue, the effect of dividends on share prices remains one of the unsolved issues of finance (Correia, Flynn, Uliana and Wormald 1993:655). Noe and Rebello (1996:637) studied the impact of asymmetric information and managerial opportunism on firms' financing and payout policies. They found that the signalling mechanisms that shareholders prefer most are the restriction of dividends, followed by equity financing and, finally, the underpricing of securities. When managers determine policies on their own, a reversal of this hierarchy may prevail.

Pettit (1977:419) studied the clientele effect of dividends. Retired investors and pension funds, for example, tend to prefer cash income, and may therefore want the firm to pay out a high percentage of its earnings. On the other hand, shareholders in their peak earning years prefer the reinvestment of cash and low dividend payments. Ang (1998:81) presents an interesting interpretation of Lintner's dividend model by introducing the concept of equilibrium dividends that is not only time dependent, but also utilises a firm's specific parameters to greater effect. This time-dependent equilibrium dividend should be distinguished from the more familiar notion of desired dividend, and is useful for both pedagogical and theoretical reasons. This distinction indicates the usefulness of Lintner's dividend model.

In South Africa, research has focused on the impact that dividends have on share prices as well as on the attitudes of both investors and financial executives in respect of dividends. Sénèque and Gourlay (1983) found that the financial executives of top companies that are listed on the Johannesburg Securities Exchange regard a dividend to be an active rather than a passive variable. Both Knight and Affleck-Graves (1987) and Ooms, Archer and Smit (1987) conclude that dividends convey little or no information other than that contained in the earnings. Sealy and Knight (1987) appear to have found a negative preference for dividends, which is understandable in view of the differential tax treatment of income and capital gains that prevailed in South Africa at that juncture. Botha, Bosch and Van Zyl (1987) found that dividend policy has no effect on changes in shareholders' wealth.

Firer (1988) found that investors do not believe that growth companies are entitled to withhold dividends from their shareholders. Investors also appear to

support the 'bird in the hand' approach to dividend payment. Uliana (1988) found that owner-controlled companies pay out significantly lower percentages of earnings (average 25%) than either conglomerate-controlled companies (42%) or foreign-controlled companies (49%).

Until March 1990, dividends were taxed in the hands of all but the lowest income earners in the economy (Ross, Westerfield, Jordan and Firer, 2001:479). The national budget of that year witnessed the elimination of tax on dividends. Then, in March 1993, the Secondary Tax on Companies (STC) was introduced, in terms of which a certain percentage of dividends, currently 12,5%, is payable as tax if a dividend is declared. The intention of STC was to increase profit retention in companies, thereby moderating dividend behaviour.

Bhana (1991) found strong support for the hypothesis regarding the information content of dividends. Van Rensburg, Slaney and Hardy (1997:173) concluded that researchers that study the impact of dividends on share prices should guard against misrepresenting the economic timing of shareholder return. Bhana (1997:42) found that a significant increase in a company's share price follows an announcement of a share dividend and concluded that investors interpret share dividends to be an important signalling device. Bhana (1998:14) found that the announcement of special dividends convey value-increasing information to the market and that the gains from this positive information accrue to shareholders.

More recently, Auret and De Villiers (2000:39) determined that earnings per share (EPS) have greater explanatory power than dividends per share (DPS) in the interpretation of share prices. Wolmarans (2001:50) found that portfolio strategies that are based on earnings yield significantly outperform those that are based on dividend yield. Marx (2001:50) found that the majority of the financial directors of listed South African companies acknowledge the existence of both signalling and clientele effects.

This literature survey leads to the conclusion that issues regarding dividend policy have been regarded as important in the past. The percentage of earnings that is paid out in the form of dividends, and the impact that this payment has on share prices, have interested both South African and international researchers for many years.

#### **4 Lintner's dividend model**

In the 1950's, Lintner (1956:98) conducted a classic series of interviews with corporate managers about their dividend policy. He then proceeded to formulate a seemingly logical model of how companies decide on dividend payments. The findings of Lintner's survey can be summarised in four "stylised facts", as interpreted by Marsh and Merton (1987:5):

- Firms have long-term target dividend payout ratios.
- Managers focus more on dividend changes than on absolute levels.

- Dividend changes follow shifts in long-term, sustainable earnings. This trend implies that managers tend to “smooth” dividends so that changes in transitory earnings are unlikely to affect dividend payments over the short term.
- Managers are reluctant to make changes to dividends that might have to be reversed. They are particularly concerned about having to rescind a dividend increase.

Lintner’s model is consistent with these facts and provides a good intuitive explanation of dividend payments (Brealey and Myers 2003:437). The essence of Lintner’s dividend model is that, if a firm persisted with its target payout ratio, then the dividend payment in the ensuing year ( $Div_1$ ) would equal a constant proportion of earnings per share ( $EPS_1$ ), or

$$Div_1 = \text{target ratio} * EPS_1$$

If a firm adhered to its target payout ratio, it would change its dividend whenever its earnings changed. However, the managers in Lintner’s (1956) survey were reluctant to do this. They believe that shareholders prefer a steady progression in dividends. If, for instance, circumstances appeared to warrant a large increase in their company’s dividend, they would move only partially towards their target dividend. Their dividend changes appear to conform to the following model:

$$\begin{aligned} Div_1 - Div_0 &= \text{adjustment rate} * \text{target change} \\ &= \text{adjustment rate} * [(\text{target ratio} * EPS_1) - Div_0] \end{aligned}$$

This equation can be rewritten in a summarised form as:

$$D_1 - D_0 = a*(TE_1 - D_0) = aTE_1 - aD_0 \tag{2}$$

where  $a$  = adjustment rate;

$T$  = target rate;

$D_1$  = current dividend;

$E_1$  = current earnings; and

$D_0$  = previous dividend.

Equation (2) states Lintner’s model as it is discussed by Brealey and Myers (2003:438). The next question to be addressed is how this equation can be fitted to empirical data, preferably by least squares estimates (LSE), in order to estimate values for the adjustment rate ( $a$ ) and the target rate ( $T$ ) of dividend payments for any specific company.

## 5 A methodology for the estimation of the parameters

Equation (2) can be rewritten as:

$$1 = aTE_1/(D_1 - D_0) - aD_0/(D_1 - D_0); \text{ assuming } (D_1 - D_0) \neq 0$$

and, after dividing by the adjustment rate (a), as:

$$1/a = TE_1/(D_1 - D_0) - D_0/(D_1 - D_0) \text{ assuming } a \neq 0; \text{ then}$$
$$D_0/(D_1 - D_0) = -1/a + TE_1/(D_1 - D_0) \quad (3)$$

Equation (3) is in linear form

$$Y = A + BX, \quad (4)$$

where

$$A = -1/a = -1/(\text{adjustment rate});$$

$$B = T = \text{target rate};$$

$$Y = D_0/(D_1 - D_0); \text{ and}$$

$$X = E_1/(D_1 - D_0).$$

If suitable values for  $D_0$ ,  $D_1$  and  $E_1$  can be determined for a company, and, assuming that  $a \neq 0$  and  $D_1 - D_0 \neq 0$ , it should be possible to use Least Squares Estimation (LSE) methods to determine the best estimated values for the adjustment rate (a) and target rate (T) for any specific company.

## **6 Assumptions and methodology**

In any scientific work, it is necessary to state the assumptions that are made. It is assumed that the distribution of value to shareholders will continue to be important in future. It is also assumed that the more cash that a company pays out in the form of dividends, the less it has available to reinvest in other value-creation opportunities in the company.

This study examines the extent to which Lintner's model can be fitted to the earnings and dividend data of South African companies, and how this fit compares with the fit of the "percentage model". This latter model comprises the calculation of the average percentage payout per company and the calculation of the dividend per year if the average percentage of earnings were paid as dividends.

The largest 200 companies that were listed on the JSE Securities Exchange on 31 December 2000, as identified by the Bureau of Financial Analysis of the University of Pretoria and published by the Financial Mail (2001), were selected. Only companies that had been listed since 1994 (i.e. for at least seven years) and had paid an annual dividend were included in the study.

Companies that had kept their dividends constant for any two consecutive years during the period under investigation were excluded from the study. The reason for the use of this criterion is that the difference between dividends in consecutive years,  $(D_1 - D_0)$ , is used as denominator in equation (3) and, because division by zero is not permissible, this difference may also not be zero.

The result was that the largest dividend-paying companies for each of the 20 sectors were included in the study. The number of companies that were included per sector are given in table 1.

**Table 1 The number of companies per sector included in the study**

Sector	No.	Sector	No.
Mining houses	3	Diversified companies	2
Chemicals	5	Hotels	3
Paper & steel	3	Construction	6
Banks & fin services	10	Electronics	8
Life insurance	6	Information technology	2
Short term insurance	3	Education	1
Beverages	3	Media	4
Food	5	Packaging	3
Retail	13	Health care	3
Clothing	1	Transport	10
Services	3	Total	97

For each company in the sample, values were calculated for X and Y as indicated in equation (4), and values were estimated for the adjustment rate (a) and the target rate (T). A value for  $R^2$  was then calculated to indicate how well this model explains the observed data in terms of the payment of dividends.

For each company in the sample, the dividend divided by earnings was also calculated for each year to indicate the percentage of earnings that was paid out as dividends. For the available years, the average payout ratio was then calculated, and this result was called the “percentage model”. This model was then used ex-post to estimate the dividend for each year, and a value for  $R^2$  was again calculated. Depending on the values for  $R^2$ , either Lintner’s model or the percentage model provided a better explanation of the dividend payments of a company.

## 7 Results

From a total of 97 companies, the percentage model provided a better explanation of dividend payments in the case of 50 companies (52%), whereas Lintner’s model provided a better explanation of the dividend payments in the case of 47 companies (48%). For the 50 largest companies by market capitalisation, the percentage model provided a better explanation of the dividend payments of 44% of the companies, whereas Lintner’s model provided a better explanation of the dividend payments of 56% of the companies. Therefore the size of the company does not appear to affect the degree of fit for Lintner’s model.

The median values for the target rate (T) and for the adjustment rate (a) were 0.3483 and 0.8357 respectively. If the median values were taken as representative of the average South African company, equation (2) could be rewritten as:

$$D_1 - D_0 = 0.8357 * 0.3483 E_1 - 0.8357 * D_0 \quad \text{or}$$

$$D_1 = 0.2911 * E_1 + 0.1643 * D_0$$

These numbers indicate that South African companies appear to aim to pay out on average 35% of their earnings over the long term, but that there is also a definite lag effect. This trend is evident from the fact that the pay out constitutes only 29% of current earnings plus 16% of the value of the previous year's dividend.

An attempt was made to determine which model provides the best explanation of dividend payments per sector. For the purposes of this analysis, only those sectors that were represented by five or more companies were included. The results of the analysis are summarised in table 2.

**Table 2 The percentage of companies for which each of the two dividend models provides a better explanation**

Sector	n	Lintner	Percentage
Construction	6	83%	17%
Banks and financial institutions	10	70	30
Insurance	9	67	33
Retail	13	46	54
Transport	10	40	60
Food	5	40	60
Electrical/electronic	9	33	67
Chemicals	5	20	80

It is evident from table 2 that Lintner's model appears to provide a better explanation of the dividend payments of construction companies, banks, financial institutions and insurance companies than the percentage model does. With the exception of construction companies, the companies that are included in these sectors could be considered to be generally more conservative than many other companies. Conversely, the percentage model appears to provide a better explanation of the dividend payments of the companies that are included in the electrical, electronic and chemical sectors. These companies are more exposed to fluctuations and cyclical international markets. At first glance it therefore appears that Lintner's model provides a better explanation of the dividend payments of financially conservative companies, whereas the percentage model is more successful in respect of cyclical companies. However, this conclusion does not explain why the companies in the (cyclical) construction sector provide the best fit for Lintner's model and why the companies in the food sector (which are typically more stable) provide a good fit for the percentage model. However, these findings should be interpreted with circumspection, because the number of companies in each sector is quite small.

The various combinations of the adjustment rate and target rate in terms of the dividend data of the 97 companies were also tested to determine whether there are patterns in respect of these rates. For example, does a company that has a high target rate also tend to have a low adjustment rate? Does a company

that has a high adjustment rate also tend to have a low target rate? The companies were categorised into three groups in terms of their target rate, namely low, medium and high. They were also categorised into three groups in terms of their adjustment rate, namely low, medium and high. The resulting 3x3 contingency table appears as table 3 below.

**Table 3 The levels of adjustment rate and target rate of 97 companies**

		Target rate			
		Low	Medium	High	Total
Adjustment rate	Low	11	12	10	33
	Medium	9	9	13	31
	High	12	11	10	33
	Total	32	32	33	97

A contingency test was performed on the data in table 3 to test for interrelationships between adjustment rate and target rate. This resulted in a chi-square statistic (with 4 degrees of freedom) of only 1,36, versus a table value of 7,78 at 10% level of significance. Therefore no significant relationship between adjustment rate and target rate was found.

A major limitation of this study is that it was limited to 97 companies that are listed on the the Johannesburg Securities Exchange. If other large companies were included (perhaps large international companies), the study might have led to different results in terms of the fit of Lintner’s model.

## 8 Conclusion and areas for further research

In general it appears that Lintner’s model does not explain dividend payments as well as one would like to believe. The fact that the relatively unsophisticated percentage model appears to explain as much variability in dividend payments as Lintner’s model does, is somewhat disappointing. The fact that approximately half of the 200 largest companies that are listed on the Johannesburg Securities Exchange were excluded from the study, because some were not listed for a sufficient period of time and others maintained their dividends at the same level for at least two consecutive years, restricts the generalisation of the results of the study. More research may be required on the fitting of Lintner’s model, because there may be structural reasons why the percentage model is favoured in respect of its fit to a company’s dividend data.

The important area of dividend policy justifies further research. In particular, research could focus on determining whether the companies that were explained better by either of the two models have been more successful in creating shareholder wealth in the past. Further research could also investigate whether a specific dividend model would fit better in respect of companies that have consistently been ranked in the top 100 for a number of years.

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