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Investigating the predictive power of Lintner's dividend model in South Africa

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Abstract

This paper employs a sample of 119 South African firms in order to determine dividend behaviour within South Africa. I use Lintner's "partial adjustment model" (1956), in order to see to what extent it can predict dividend payout policy, with regards to the speed of adjustment as well as the target rate that firms adopt. The prediction is looked at in terms of adjusted R^2. Lintner's dividend model is then contrasted with a less sophisticated model termed the "percentage model". This study is of general importance, as studies with regards to dividend behaviour have been lacking in developing African countries, when compared to the rest of the world. Dividend policy and its predictability thereof is also widely regarded as an important issue, as it is useful in valuation, investment and risk analysis practices. This study further seeks to extend on a similar study conducted by Wolmarans (2003), by using a larger sample size, as well as an adjustment on the Lintner model, as seen in Fama and Babiak's paper regarding dividends (1968). It was found that to an extent, Lintner's dividend model provides better significant predictive power as opposed to the percentage model. It is further found that predictive power is better in financial industries, whilst the percentage model tends to predict better in cyclical industries. It is lastly concluded that Lintner's model provides better predictability according to a firm's size.

1. Introduction

Dividend policy has been a fiercely debated and controversial topic for both academics and managers alike. This is first and foremost because it is considered a key area of focus for a firm's financial policy regarding the return of cash to investors. Firms can return such cash to their shareholders in a variety of ways, with the two most common methods being dividend payments or share repurchases. In recent years, dividend payments as well as stock repurchases have amounted to a high proportion of earnings, with dividends being considered the most imperative way to distribute value to shareholders (Brealey, Myers, & Allen , 2011). The main deciding factor behind a firm's dividend policy is whether it will choose to distribute profits to shareholders via stock or cash dividends, or if it will retain cash in the form of retained earnings. However, such a decision can affect both the financing and investment decisions within a business. This is because paying extra dividends by a business can result in the cancellation of investment projects. In this sense the payout decision becomes an investment decision. Similarly, if the firm decides to payout dividends by borrowing the amount, thereby replacing the cash spent, the payout decision becomes a borrowing decision.

Therefore, in order to understand payout policy, we need to study such policies in a setting of fixed investments and borrowing, such that changes in dividends paid need to be offset by either new share issues, or share repurchases. If this is not the case, payout policy will also influence the financial structure of a firm. The above-mentioned decision regarding dividend payout has wide implications for a company, as well as investors for the following three reasons: 'firstly, changes in payout policy convey information about a firm to investors. Secondly, dividends are taxed at higher rates than capital gains. Lastly, investors show concern that firms with too much cash will invest this cash into unprofitable projects. This agency problem can be resolved by paying out such cash through dividends' (Brealey, Myers, & Allen , 2011, p. 420).

The dividend payout policy of firms and its implications have been widely studied over the past decades. Past research and its results have led to several models, which try to explain the dividend behaviour of companies. Some of the well-known models include:

Ahorony's and Swary's model (1980), Brittain's model (1964), Lintner's model (1956), and Watt's model (1973). The testing of such models has been done extensively in both qualitative and quantitative forms in developed countries such as the United States, Germany, the UK and France (Denis & Osobov, 2008). However, extensive studies on developing African countries are lacking. Given the importance of this topic, this paper seeks to determine whether one of the most well-known and accepted models, namely Lintner's model, sufficiently predicts dividend behaviour in South Africa. Hence, the aim of this paper is to conduct an empirical analysis to answer the following research question:

To what extent can Lintner's dividend model predict South African payout policy?

To answer the above, I will compare Lintner's dividend model with a less sophisticated model termed the "percentage model" (Wolmarans, 2003). The percentage model simply multiplies current earnings per share by the past average payout ratio of a firm, in order to estimate a predicted dividend value for future years. It is therefore viewed as a less sophisticated model. Through comparing both models in terms of adjusted $R^{2,}$ a conclusion can be made on the predictive power of the Lintner model.

This topic is relevant, as it will become clear to what extent firms stick to the findings of Lintner. Namely, whether firms stick to a target payout ratio, and secondly how fast firms adjust the current level of dividend payout to a new target, known as the adjustment rate (Lintner, 1956). Through knowing the above, predictions can be made on future dividend payments of firms. This is useful in many different fields such as: valuation practices to estimate future dividends paid by a firm, investment practices and risk analysis.

In order to answer the research question, I will conduct an econometric analysis on a self-compiled dataset comprising of 349 South-African companies over the period 2010-2016. Ordinary Least Squares will be performed on the data of each company in order to estimate the unknown parameters given in Lintner's dividend model.

The paper is organized as follows: Section 2 gives an overview of the theoretical literature present on dividend payout policy, Section 3 introduces the data and the

methodology which will be used, Section 4 presents the findings and discusses the results, Section 5 will present conclusions based on the findings, as well as some limitations and recommendations for future research.

2. Theoretical Framework

Dividends are considered to be one of the most important factors when it comes to a firm's financial decision-making. As a result, researchers have performed extensive studies on the rationale behind dividend payout policies, and on the information that dividend payments may contain.

Lintner's Dividend Model

Lintner is most known for one of his seminal studies on how managers from American firms made decisions relating to dividend payments (1956). He did so through studying a sample of 600 well-established companies and chose a further 28 for detailed investigation through surveys and interviews. From the results Lintner obtained, he constructed a model that showed that American firms maintained a target dividend payout ratio, and adjusted their dividend policy to this target. Furthermore, it was concluded that the long-term investment and growth opportunities a firm had, determined the target payout ratio[1]. Lastly, he found that firms pursued a stable dividend policy, and that managers would gradually increase dividends given the target payout ratio. This policy is known as "dividend smoothing", implying that dividend changes follow shifts in long-term sustainable earnings, rather than short-term earnings, so that dividend changes do not have to be reversed or changed in other manners. From the above, it was also found that managers therefore tend to focus more on dividend changes rather than the quantity of dividends itself. Lintner's model, developed in a paper written by Lintner (1956) forms the basis of this study.

[1] A target ratio can be defined as a firm's long-run dividend to earnings ratio. Firms try to set a stable dividend policy by aligning dividend payments with expected earnings

The main idea of Lintner's dividend model is that if a firm maintained a certain target payout ratio, then the dividend payment in the following year (D_1) would be equal to a constant proportion of Earnings per Share (EPS_1). This relationship can be better described by the following formula:

$$(1)\ D_1 = Target\ Ratio * EPS_1,$$

Where, Target Ratio can be defined by the equation:

$$(2)\ Target\ Payout\ Ratio = dividend\ per\ share / earnings\ Per\ Share.$$

Therefore, if a firm stuck to its target payout ratio, it would change dividends according to a change in earnings. However, it was found that management behaviour is such that if a large dividend increase would be warranted due to company circumstances, managers would adjust dividends only partially towards their target dividend. This partial adjustment rate, also termed the adjustment rate, can be defined as the speed at which current dividends adjust to the target dividend rate. This relation can be shown in the equation below:

$$(3)\ D_1 - D_0 = Adjustment\ Rate * [(Target\ Ratio * EPS_1) - D_0],$$

Where, $D_1 = current\ dividend\ per\ share$, $EPS_1 = current\ earnings\ per\ share\ and$ $D_o = previous\ dividend.$

Through appropriate rearranging of this formula, Ordinary Least Squares (OLS) can be used to estimate the adjusted rate and the target rate for any company.

Gordon Growth Model

Myron Gordon, who is most known for the Gordon growth model (Gordon, 1959), held similar views to Lintner. In this model, expected share price is expressed as a function of dividends, shareholder's expected rate of return and the long-term growth rate of dividends. This relationship can be more accurately described by the equation below:

$$(4)\ E(P_0) = D_1/(k-g),$$

Where, $P_0 = expected\ current\ share\ price$, $D_1 = current\ dividend$,

$k = required\ rate\ of\ return\ and\ g = growth\ rate\ of\ dividends\ in\ perpetuity$

He concluded that if a company increased the payout ratio, D_1 would increase, and ceteris paribus would cause an increase in share price. However, the increase in D_1 would also mean less cash would be available for reinvestment opportunities, resulting in a decline of the expected growth rate. Lower growth rate would cause a decrease in share price. Therefore, dividend payment was found to have two opposing effects, and a firm's optimum dividend policy would then have to strike a balance between current dividend payment and expected growth rate in order to maximize the expected share price.

Other research

Dividend payout policy has received much attention from other researchers. Miller and Modigliani (1961) proved that in a world with perfect information, no transaction costs and no other market imperfections, dividend policy would be irrelevant and cannot be used when regarding the value of a firm's shares. This theory would further hold if no taxes existed or if dividends and capitals gains were taxed at the same rate. Contrasting to this, Gordon (1963) and Lintner (1962) were one of the first to support the view that dividend payment is relevant in shareholder wealth creation. They suggest that there is a direct correlation between a firm's payout policy and its market capitalization. Following Lintner's paper (1956), in which he introduced the "partial adjustment model", Fama and Babiak (1968) examined the dividend policy of individual firms empirically by analysing past dividend policy of 392 American firms in the period 1947-1964. It was found that Lintner's model was fairly accurate at predicting dividend payout policy of individual firms.

Signalling Theory

Moreover numerous academics found that dividends tend to convey information to investors. It seems obvious that managers have more access to information than investors, and even if they both held the same amount of information, this would not necessarily be perceived in the same way (Quiry, Dallocchio, Le Fur, & Salvi, 2014, p. 481). Therefore, an

investor would view a firm's reported earnings with scepticism unless it was backed up by an appropriate dividend policy, as managers try to always present their company in the best way. In the short run, firms can overstate their earnings and borrow cash in order to payout generous dividend, however in the long run a firm will only be able to pay dividends if it has enough cash to do so. If the firm does not do this, it will have to reduce investments and skip new business opportunities or turn to investors for additional debt or equity financing. All of these consequences are costly. As a result, most managers will not increase dividends unless they are confident that the firm will have a sufficient cash inflow. (Brealey, Myers, & Allen , 2011). Firms can therefore distinguish themselves from other firms by signalling good future prospects.

Furthermore, as dividends are usually not paid in the beginning of the fiscal year, the signal firm's give to investors contains information not only on past earnings, but also on current ones. For example, if current earnings are declining, management could retain its target ratio in order to signal that this level of earnings is only temporary, after which it will improve in the future (Brealey, Myers, & Allen , 2011). Therefore, it seems logical that a decrease in dividends is seen as a permanent signal on the nature of earnings of a firm. This gives some explanation as to why such dividend changes translate into a loss of value. However, at the same time, when a company who has historically paid no dividends initiates dividends, it can be seen as a sign that it is running out of value-creating investment opportunities (Alzomaia & Al-Khadhiri, 2013).

Evidence as to whether dividends do convey information about future and current profitably has been mixed. Several researches find that dividend increases do not predict increased growth in earnings. However, Healhy and Palepu (1988), who focused on companies that paid a dividend for the first time, found that dividend announcement and post-announcement earnings changes were positively related. It was further found that dividend announcement results in a 4% share price increase. Additionally, earnings continued to rise in the following years, which showed that dividend announcements contain information on permanent increase in earnings and not simply on temporary ones. A further study done by Van Eaton (1999) came to the same conclusion, showing strong

negative returns for dividend omissions (-6%) or decreases (-6.5%) respectively, and positive returns (1%) for dividend increases and initiations (3%) respectively.

In South Africa, researchers came to similar conclusions. Bhana (1991) found strong evidence for the information content of dividends. He further found dividend announcements or initiations as a signalling device (1997), as well as a means through which to convey value-increasing information to the market (1998). The above conclusions largely support Gordon's growth model, in that a higher dividend prompts a rise in share price, whereas a dividend cut results in a drop in a share price (Gordon, 1959).

Investors appreciate firms pursuing a relatively stable dividend policy. This can be seen for instance by analysts revising their earnings forecasts, following the announcement of an unexpected dividend change by an amount positively related to the size of the change. These revisions are further also positively related to the change in equity value surrounding the announcement (Ofer & Siegel, 1987). However, it appears that investors do not necessarily react to the amount of dividends paid, but rather to the change in dividends, as this change acts a proxy for the sustainability of earnings.

Agency Theory

Within a company, ownership is separated between management and the board of directors, who represent the shareholders. Given this separation, potential agency conflicts can arise (Jensen & Meckling, 1976). Such conflicts can for instance involve monitoring costs that owners have to incur, in order to see whether managers are acting in the best interest of the firm. Dividends can then be seen as one of the ways in which the board of directors can impose control over management, as cash in the form of dividends would not be available for wasteful re-investment opportunities. Firms with opportunities to grow could therefore not rely on internal financing, but would have to adopt external financing, in the form of asking additional capital input from shareholders. In such a way, shareholders would be able to monitor what such additional capital is spent on. If instead managers choose to take on debt in order to raise funds for re-investment, they would be susceptible to certain constraints such as making regular interest payments, as well as the conclusive repayment

of outstanding debt. It can therefore be said that dividends are viewed positively as they diminish agency conflicts within a company.

Taxes

Taxes also have a significant impact on dividends. According to the "radical left" school of thought in economics and finance, the rule regarding dividend payout is directly related to tax. Namely, when dividends are taxed at a higher rate than capital gains, firms should reduce their payout of cash dividends to the smallest amount possible. Available cash should then either be used for retained earnings, or used for share repurchases. Following the above method, firms are then able to transform dividends into capital gains, and at the same time pay less taxes (Brealey, Myers, & Allen , 2011). It is for the above reasoning that researchers such as Grullon and Michaely (2002) are of the opinion that there is an increased trend in share repurchases as these are taxed at a lower rate than dividend income. This would then directly translate into firms pursuing a lower payout ratio.

Empirical Studies

Various researchers have also further studied dividend policy empirically on an international level. In a study performed by Denis and Osobov (2008), it was found that in the US, Canada, UK, Germany, France, and Japan, the inclination to pay dividends is higher among larger, more profitable firms, and those for which retained earnings comprise a large fraction of total equity. It was thus concluded that firm size; in the form of market capitalization can significantly influence dividend policy.

Furthermore, in a study conducted by Michel (1979) it was shown that the industry a firm operates in influences dividend policy. A sample of 168 Americans firms from 13 different industries was analysed over the period of 1967-1976. It was then concluded that industry classification relates to the level of dividends and that further research was needed on the systematic industry influence that occurs regarding dividend yields and payout.

Noe and Rebello (1996) examined dividend payout policy by taking information asymmetry, in the form of adverse selection into consideration in capital markets as well as

managerial opportunism. It was concluded that when shareholders determined policies regarding capital structure, debt financing was preferred in the presence of either managerial opportunism or adverse selection. However, when these problems existed conjointly, shareholders preferred dividend restriction as a signalling mechanism the most, followed by equity financing, and finally under-pricing securities. Contrastingly, when managers determined policies regarding capital structure, a reversal of the above-mentioned hierarchy was discovered, namely that under-pricing securities was preferred to equity financing and that equity financing was preferred to dividend restriction. It was further concluded that investors appreciate dividends, in that they can tune their portfolio selection to their income taxes. This was termed by Pettit as the "clientele effect of dividends" (1977). This effect signifies that retired investors and pension funds tend to prefer cash income, and may therefore want a firm to payout a high percentage of its earnings through issuing cash dividends. On the other hand, shareholders in their peak earnings years prefer the reinvestment of cash and low dividend payments.

Shefrin & Statman (1984) obtained similar findings from a behavioural perspective, in that prospect theoretical insights revealed why investors prefer cash dividends to "paper" capital gains. Brav, Graham, Harvey and Michaely (2005) further conducted a survey on 384 American financial executives in order to determine the motives behind payout policy. Three important conclusions were made. Firstly, it was found that managers are reluctant to make dividend changes that may have to be reversed, particularly being worried of decreasing dividends and would if necessary choose to raise new funds to maintain the payout. Secondly, to avoid the reduction in payout, managers "smooth" dividends. As such, dividends contain a lag, as they follow changes in long-run sustainable earnings. Short-run earnings were unlikely to affect dividend payout. Lastly, it was concluded that manager's focus more on dividend changes than absolute levels (Brealey, Myers, & Allen , 2011). The above-findings seem to be largely in line with Linter's model.

South Africa

In South Africa, academic research has mainly focused on the impact that dividends has on stock returns, as well as sentiment held by investors and financial chief executives

with respect to dividend payout. Sénèque and Gourlay (1983) found that the managers of companies listed on the Johannesburg Stock Exchange (JSE) saw dividends as an active variable that continuously changes rather than one which is fixed. More recently, an extensive study performed by Abor and Fiador (2013) concluded that certain corporate governance factors significantly explained dividend policy in Sub-Saharan Africa. Such factors include board size, high percentage of external board members and institutional ownership. The study concluded that good corporate governance structures led to high-dividend payout with respect to South Africa, Kenya and Ghana. Studies performed by both Knight and Affleck-Graves (1987) and Ooms, Archer and Smith (1987) found that dividends do not convey significant information other than that contained in earnings. Botha, Bosch and van Zyl (1987) concluded that dividend policy has no effect on changes in shareholder's wealth. These views are similar to Modigliani and Miller's theoretical views (1961).

Firer (1988) was of the opinion that companies whom grow rapidly are not entitled to withhold dividends from their shareholders. The debate around this issue has increased with the rise of start-ups in the 21st century. The reasoning is that firms, who experience rapid growth, reduce their dividend per share, since there is a negative relationship between growth and dividend per share (Alzomaia & Al-Khadhiri, 2013). This finding can explain part of the general decline in dividend payment by firms as found by Fama and French (2001) as well as DeAngelo, De Angelo and Skinner (2004). Firer (1988) further found that investors support the "bird in the hand" theory of payout policy. This theory was supported by Gordon and Lintner and meant that shareholders would prefer receiving dividends over capitals gains due to the added risks and costs that capital gains impose (Bhattacharya, 1979). Regarding the impact of ownership on dividend policy, Uliana (1988) found that owner-controlled companies had a lower payout ratio (25%) as opposed to conglomerate-controlled companies (42%) or foreign-controlled companies (49%).

In South Africa, until March 1990, all income classes except the lowest had to pay tax on dividends. Then, in 1990, tax on dividend was eliminated completely, where all returns from equity investments were tax-free. However, on 1 October 2001, a capital gains tax was introduced. In 1993, the Secondary Tax on Companies (STC) was introduced. The STC sought to tax a certain percentage of dividends whenever companies declared dividends. It

is therefore different from ordinary dividend tax. Through doing so, the STC intended to increase profit retention within companies, thereby influencing dividend behaviour (SARS, 2017). In 2007, the Minister of Finance of South Africa sought to decrease the STC in two phases, first reducing it to 10% in 2007 and eventually converting it into dividend tax in 2008. More recently, the South African government increased tax on dividends from 15 to 20 per cent (EY, 2017). It can therefore be said that overall, capital gains have been taxed less than dividends. Such differences in taxing could explain why dividend payments in South Africa are less common than share repurchases and may further explain the recent growth in share repurchases.

Recent research has further focused on the explanatory power of earnings per share (EPS) and dividends per share (DPS) when looking at stock returns. Auret and De Villiers (2000) found that EPS carried greater explanatory power as opposed to DPS when he interpreted the current share price of a firm. Additionally, Wolmarans (2001) concluded that portfolios based on earnings yield, significantly outperformed those that were based on dividend yield.

A study performed by Firer, Gilbert and Maytham (2008) showed that the findings of Brav et al (2005) in the United States were similar to the findings in South Africa regarding the determinants of dividend payout policy by conducting a similar survey applied to South African companies. It was found in particular that managers of firms in South Africa act in accordance with Lintner's findings. They for instance tend to target a payout ratio, and are conservative when setting dividends in order to mitigate the chance of having to cut it. It is therefore of interest if quantitative findings in South Africa are similar to qualitative results.

Lastly, Wolmarans conducted a study regarding Lintner's dividend model and whether it explains South African dividend payments. A sample of 97 companies was taken over the period 1994-2000. The Lintner model was further contrasted with the percentage model. The percentage model was estimated through calculating the average payout ratio per firm, and then multiplying this by dividends in order to obtain expected dividends. It was found that the Lintner dividend model predicts dividend behaviour better, although

marginally. The main limitation of this study identified by Wolmarans was the small sample size.

From the above-mentioned literature it is clear that the topic of dividend payout policy has been regarded as important in the past. More specifically, the impact dividends have on investor sentiment; stock returns and the relation between earnings and dividend payments have been of interest both in South Africa and the world as a whole.

3. Hypotheses

The aim of this study is to add to the research on dividend payout policy by investigating the extent to which Lintner's dividend model predicts the behaviour of South African firms. Payment of dividends is one of the methods of redistributing wealth to shareholders, whereas share repurchases is another method. However, share repurchases have only been possible since 1999 in South Africa, and although growing in nature, will not be addressed in this paper (The South African Institute of Chartered Accounts, 2009). Lintner's dividend model will further be compared with the percentage model in order to find which model is more appropriate. In order to answer my research question as to what extent the Lintner dividend model predicts dividend behaviour in South Africa, I will research the following hypotheses.

The first hypothesis is:

H_0: The Linter dividend model and percentage model are not significant
H_a: The Lintner dividend model and percentage model are significant

Through testing this hypothesis, it can be seen whether the Lintner model, as well as the less sophisticated model, known as the percentage model, as termed by Wolmarans (2003), are significant. If so, the models can be used for the prediction of dividend payments. I further want to contrast Lintner's model with the percentage model in order to

find out whether Lintner's model holds more predictive power. The second hypothesis is then:

H_0: The Linter dividend model does not have a higher predictive power than the percentage model
H_a: The Lintner dividend model does have a higher predictive power than the percentage model

Building upon the works of Michel (1979), I will further investigate whether the type of industry the firm operates in has an effect on the predictability of the Linter dividend model. Specifically, whether the Lintner model in the "banks, diversified financial companies and insurance" industries, defined as financial industries, is better at predicting dividend policy than other industries. The third hypothesis is then:

H_0: The Lintner dividend model does not have a higher predictive power for financial industries
H_a: The Linter dividend model does have a higher predictive power for financial industries

Additionally, I will investigate whether the size of a firm, for which market capitalization is taken as a proxy, has an effect on the Lintner dividend model. In doing so, I seek to build upon the work of many researchers such as Redding (1997) and DeAngelo, DeAngelo and Skinner (2004) and Fama and French (2001), as was stated in the theoretical framework. My fourth hypothesis can then be stated as:

H_0: The Lintner dividend model does not have a higher predictive power for large compan ies H_a: The Lintner dividend model does have a higher predictive power for large compan ies
Large companies will be chosen according to market capitalization. The largest 50 companies will be selected in order to test the fourth hypothesis.

Lastly, it is of interest whether interrelation exists between the adjustment rate and target rate, both of which are the main variables of interest in the Lintner model. The fifth hypothesis can be stated as:

H_o: The variables adjustment rate and target rate do not show interrelationship
H_a: The variables adjustment rate and target rate show interrelationship

This study further seeks to improve on the study done by Wolmarans (2003), who investigated this same topic. This paper can be seen as an extension of the study done by Wolmarans by including a larger sample of firms, which was seen as a major limitation in his study.

4. Data and Methodology

Data

In order to complement the study done by Wolmarans (2003) and analyse a bigger sample of South African firms, all companies listed on the Johannesburg Securities Exchange (JSE) between the periods 2010-2016 will be investigated in this study. By doing so, the sample of companies is larger so that more accurate results could be obtained. Data was retrieved from Bloomberg as well as from the Orbit database. Orbit was first used in order to gain a rough data list of firms listed on the JSE. Although not complete, the list provided a start for further analysis. Through Orbit, information on market capitalization was also gathered. Bloomberg was further used to find data on Dividends per share, Dividend per Share last year, current Earnings per Share, as well as industry group per company according to the Global Industry Classification Standard. Descriptive statistics of these variables can be found in Table 2. A cross-check was then made between the JSE website (2017) and my dataset to identify any missing companies that were not included in the Orbit database. The companies used were then filtered by a two-step process. The first stage included dropping firms who had not paid annual dividends in the last 7 years (2010-2016). The second stage included dropping firms that were not listed at present, had missing data or had paid the same dividends in two consecutive years. The reasoning for the latter is that the difference

between dividends in consecutive years, given by $(D_1 - D_0)$ is used as a dependent variable in equation (5). The final number of companies used per industry group is shown in Table 1.

Table 1: Number of companies per industry group in the sample, as classified by the Global Industry Classification Standard.

Industry Group	Number of Firms	Industry Group	Number of Firms
Automobiles & Components	1	Insurance	8
Banks	5	Materials	14
Capital Goods	14	Media	2
Commercial & Professional Services	2	Pharmaceutical, Biotechnology	1
Consumer Durables & Apparel	1	Real Estate	10
Consumer Services	8	Retailing	9
Diversified Financial Services	15	Software & Services	2
Energy	1	Technology Hardware & Equipment	2
Food & Staples Retailing	5	Telecommucation Services	2
Food Beverage & Tobacco	11	Transportation	3
Healthcare Equipment & Services	3	**Total**	**119**

Table 2: Descriptive Statistics of data

Variable	Observations	Mean	Median	Standard Deviation	Min	Max
DPS last year	714	$0.2763	$0.1495	$0.3462	$0.0019	$2.4398
Current DPS	833	$0.2693	$0.1441	$0.3384	$0.0019	$2.4398
Current EPS	833	$0.5959	$0.3344	$0.8002	$-1.2000	$7.0992

As shown above, all currency is reported in U.S. Dollars, this is done, as a large amount of South African companies are multinational companies with annual reports in differing currencies. Furthermore, a negative EPS value shows that the company is currently losing value per share. In reporting practices this is commonly reported as “not applicable”, however for the purpose of this study, the true values were used.

Methodology

In this paper, necessary assumptions are made for the methodology. It is assumed that the way in which firms distribute cash to shareholders will remain important in the future, as it still remains a vital way of redistributing earnings as is shown in the theoretical framework. It is further assumed that dividends will remain to be a way in which companies

redistribute such cash. It is assumed that the higher the target ratio is of a company, the less cash it has available for reinvestment and other value-creating opportunities. Furthermore, a 5% significance level will be taken in order to test all the hypotheses.

For the empirical analysis, I used the equation developed by Fama and Babiak (1968), which represents the Lintner dividend model. This equation is given as follows:

$$(5)\ \Delta D_{i,t} = a_i + \beta_{1i} D_{i,t-1} + \beta_{2,i} E_{i,t} + u_{i,t},$$

Where $a_i = constant, \beta_{1.i} = -1 * adjustment\ rate,$
$D_{i,t-1} = dividends\ per\ share\ last\ year\ \ \beta_{2,i} = adjustment\ rate * target\ rate,$
$\Delta D_{i,t} = Change\ in\ Dividend\ Per\ Share\ between\ D_1\ and\ D_0,$
$E_{i,t} = current\ EPS\ and\ u_{i,t} = the\ error\ term$

From the above, if values are determined for D_0, D_1 and E_1 for each company and assuming that $a \neq 0$ and $(D_1 - D_0) \neq 0$, Ordinary Least Squares methods can be used to determine the best estimated values for the adjustment rate and the target rate. A panel-data approach in which the equation will be estimated per company will therefore be suitable. For each company, values were calculated for $\beta_{1,i}$ and $\beta_{2,i}$ as given in equation (5). Based on these values, estimations of the adjustment rate and the target rate could be made. The adjustment rate could be found by multiplying $\beta_{1,i}$ by -1, as given in equation 7. The target rate could further be calculated by dividing the estimates of $\beta_{2,i}\ by$ the adjustment rate, as shown in equation 6 below:

$$(6)\ Target\ Rate = adjustment\ rate / B_{2,i},$$

Where adjustment rate is calculated according to the following equation:

$$(7)\ Adjustment\ rate = \beta_{1,i} * -1.$$

In order to answer the research question, an adjusted R^2 value per company was calculated to indicate how well Lintner's dividend model explains South African firm behaviour regarding dividend payment. R^2 is a suitable measure as it provides a quantifiable

result that indicates the proportion of variance in the dependent variable that is predictable from the explanatory variables. It is further sensible as each company adopts the same dependent variable and has the same amount of independent variables (Brooks, 2015). However, a limitation is that the R^2 always increases when additional independent variables are added. In order to deal with this problem, and to make comparison between the Lintner model and the percentage model possible, the adjusted R^2 is used. This explains variation in terms of the independent variables that significantly affect the dependent variable. If insignificant variables are added the adjusted R^2 will decrease, similarly when significant variables are added the adjusted R^2 will increase.

For each company in the sample, the divided by earnings, known as the payout ratio (Brealey, Myers, & Allen , 2011), was also calculated for each year to indicate the percentage of earnings that was paid out as dividends. For each year examined (2010-2016), the average payout ratio was then calculated, and the result was termed the "percentage model" (Wolmarans, 2003), this can further be described by the following equation:

$$(8)\ Predicted\ Dividends = EPS_1 * Average\ Payout\ Ratio$$

Using this model, a prediction ex-post was made through multiplying the average payout ratio by earnings per share per year in order to estimate predicted dividends per share in each year. A value of R^2 was then calculated in order to see how well the regression model fitted the data. This regression was fitted as follows:

$$(9)\ D_1 = a_i + \beta_i * Predicted\ Dividends + u_i$$

In order to answer the first hypothesis, a pooled OLS regression was performed to test whether Lintner's dividend model is significant and thus whether it can be used in the prediction of dividend behaviour. This was done with the aim of gaining a broad overview of the significance of the data as a pooled OLS regression treats all observations and units of time as the same, which therefore does not take into account the time-varying characteristics of the panel data. Following this, fixed and random effects regressions were estimated in order to decompose the error term into the time-invariant part which is not controlled for.

In a fixed effects model, the assumption is made that there is a different constant for each company, however a common slope coefficient for all companies. We therefore assume that company characteristics impact the outcome of the variables in equation 5 and therefore need to be controlled for. Fixed effects models therefore control for the time-invariant company-specific factors. In contrast, a random effects model makes the assumption that individual effects can be considered independent of all regressors. The factors are therefore randomly drawn from a large population of companies, rather than a specific company. In order to test which of the models is most appropriate a Hausman test was performed. The null hypothesis is that a random effects model better fits the data, whilst the alternative hypothesis is that the fixed effects model better fits the data. Following this test, it could be determined whether Lintner's dividend model does predict dividend policy, according to the first hypothesis. For all the above, significance will be taken at the 5% level.

In order to answer the second hypothesis, the value of both R^2 in the Lintner dividend model and percentage model was then to see which model's regressors explain the dependent variable the best, therefore more generally which model would be a better predictor of dividend payout policy within South Africa. This was done through running an OLS regression in the form of equation 5 and 9 per company, so that the parameters could be estimated, resulting in 119 regressions for Lintner's model and 119 regressions for the percentage model. Following this, in order to answer the third hypothesis, companies could be categorized per industry group. Comparisons were then made per industry group as to whether the adjusted R^2 was higher using the percentage model or the Lintner dividend model. Additionally, an OLS regression was performed per firm on the largest 50 companies, using market capitalization as proxy for size. Through following this methodology, the fourth hypothesis could be answered, namely whether dividend payout policy by larger firms is more accurately predicted by the Lintner model. The fifth and final hypothesis could be answered by employing a contingency test, using the Pearson chi-square statistic, thereby testing for interrelation between the adjustment rate and the target rate. An interrelationship test, better known as a contingency test, is performed in order to test whether one categorical variable affects another categorical variable. An example of this is for instance that firms with high target rates would adjust to these slowly,

namely that target rate affects adjustment rate. The results thereof can then be shown in a contingency table.

5. Results

The individual results for the 119 regressions using Linter's dividend model and the 119 regressions using the percentage model were not included in this paper as it would take up an enormous amount of space. However, the adjusted R^2 and most important figures, namely the target rate and adjustment rate were included below in table 4. The table is further ranked by market capitalization, with the largest companies being shown first. Furthermore, it was proved that all models were overall significant at the 5 % level; they can be seen in table 3 and 5 below. This implies that both the Lintner and percentage model are significant and can therefore be used for dividend prediction in terms of R^2. I can therefore reject the first hypothesis, as both Lintner's model and the percentage model are significant.

By analysing 119 South African companies that are listed on the JSE, it is found that the Linter dividend model predicts dividend behaviour better in 70 companies (58.8% of total companies) whilst the percentage model predicts dividend behaviour in 49 companies (41.2%), this is shown in table 4. I can therefore reject the second hypothesis, as the Lintner dividend model does appear to have higher predictive power.

Table 3: Regression results for Lintner's model, using the Pooled OLS, fixed effects and random effects models, taken on the entire dataset.

	Pooled OLS	*Fixed Effects*	*Random Effects*
	Change in Dividends	Change in Dividends	Change in Dividends
Dividends Per Share Last Year	-0.0868***	-0.6294***	-0.0868***
	(0.0129)	(0.0402)	(0.0129)
Earnings Per Share	0.0269***	0.0281***	0.0269***
	(0.0044)	(0.0048)	(0.0044)
Constant	-0.0067	0.1559***	-0.0067
	(0.0046)	(0.0118)	(0.0046)
Number of observations	714	714	714
Standard errors in parentheses		*** p<0.01, ** p<0.05, * p<0.1	

Table 4: Most important results of the 119 individual regressions

	Company Name	Adjustment Rate	Target Rate	Lintner Model Adjusted R^2	Percentage Model Adjusted R^2
1	**NASPERS LIMITED**	0.5493	-0.0668	0.7458	0.0059
2	**FIRSTRAND LIMITED**	0.4325	-0.0878	0.0357	0.0169
3	**SASOL LIMITED**	0.8703	0.3534	0.8063	0.8663
4	**STANDARD BANK GROUP LIMITED**	1.5327	0.0848	0.6068	0.3210
5	**VODACOM GROUP LTD**	0.9674	1.0117	0.8717	0.9304
6	**MTN GROUP LIMITED**	0.6340	0.5835	0.9250	0.7496
7	**SANLAM LTD**	0.7543	0.2568	0.6767	0.1543
8	**SHOPRITE HOLDINGS LIMITED**	1.2661	0.4185	0.9185	0.8953
9	**BARCLAYS AFRICA GROUP LIMITED**	0.7649	0.5357	0.9852	0.2695
10	**REMGRO LIMITED**	1.7534	-0.0839	0.5140	0.1228
11	**NEDBANK GROUP LIMITED**	0.7208	0.2933	0.9510	0.6551
12	**CAPITEC BANK HOLDINGS LIMITED**	0.9912	0.3745	0.9992	0.9998
13	**DISCOVERY LTD**	0.7809	0.0400	0.7768	0.2677
14	**RMB HOLDINGS LIMITED**	0.4480	-0.1018	0.1428	0.2659
15	**TIGER BRANDS LIMITED**	0.4944	0.3418	0.2807	0.7659
16	**WOOLWORTHS HOLDINGS LIMITED**	0.9790	0.6958	0.9167	0.9637
17	**GROWTHPOINT PROPERTIES LIMITED**	0.5231	-0.1246	-0.2773	0.4028
18	**RAND MERCHANT INVESTMENT HOLDINGS LIMITED**	0.5778	0.6943	0.7083	0.4607
19	**REDEFINE PROPERTIES LIMITED**	0.6786	0.0653	0.6177	0.0170
20	**PSG GROUP LIMITED**	-0.0359	-1.1662	-0.5770	0.2890
21	**THE BIDVEST GROUP LIMITED**	0.5727	-0.0349	0.9513	0.5098
22	**RESILIENT REIT LIMITED**	0.5932	0.0267	0.1943	0.2736
23	**LIFE HEALTHCARE GROUP HOLDINGS LTD**	0.9058	0.1439	0.9142	0.5796
24	**MONDI LIMITED LTD**	0.6141	0.3833	0.4262	0.9358
25	**NETCARE LIMITED**	1.3742	0.0023	0.6667	0.0610
26	**PIONEER FOOD GROUP LIMITED**	0.3181	0.2460	-0.3220	0.1187
27	**MR PRICE GROUP LTD**	0.9334	0.6572	0.9983	0.9975
28	**TRUWORTHS INTERNATIONAL LIMITED**	0.7405	0.5823	0.9880	0.7094

29	**MMI HOLDINGS LTD**	1.1859	0.2920	0.9710	0.0918
30	**GOLD FIELDS LIMITED**	0.9135	0.2569	0.9060	0.8919
31	**THE SPAR GROUP LIMITED**	1.1894	0.3912	0.4857	0.4525
32	**AVI LIMITED**	0.5059	1.1265	0.9092	0.7334
33	**FOSCHINI GROUP LIMITED (THE)**	0.8122	0.4715	0.8968	0.8338
34	**EXXARO RESOURCES LIMITED**	1.0398	0.1693	0.3228	0.5873
35	**CLICKS GROUP LIMITED**	0.5662	0.8756	0.8140	0.5964
36	**IMPERIAL HOLDINGS LIMITED**	0.5315	0.6403	0.9533	0.6067
37	**PICK N PAY STORES LIMITED**	0.6475	0.5416	0.5068	0.8230
38	**LIBERTY HOLDINGS LTD**	3.1455	0.2438	0.3847	0.3473
39	**DISTELL GROUP LIMITED**	0.1268	1.0864	-0.5557	0.4030
40	**INVESTEC LIMITED**	0.2319	-0.2262	-0.1048	0.3139
41	**ASSORE LIMITED**	0.8316	0.0929	0.6053	0.5176
42	**SANTAM LTD**	0.0702	1.0560	-0.1975	0.0606
43	**MASSMART HOLDINGS LTD**	-1.2422	0.4827	0.2993	0.6786
44	**TSOGO SUN HOLDINGS LIMITED**	0.8571	0.0323	0.7093	0.3959
45	**BARLOWORLD LIMITED**	0.7601	0.2177	0.8972	0.9067
46	**EOH HOLDINGS LIMITED**	0.8528	0.2633	0.7648	0.9890
47	**FORTRESS INCOME FUND LIMITED**	0.2099	0.1773	0.8477	0.0199
48	**CORONATION FUND MANAGERS LIMITED**	0.9099	1.0990	0.9957	0.9918
49	**AFRICAN RAINBOW MINERALS LIMITED**	0.6918	0.2532	0.8558	0.6804
50	**TONGAAT HULETT LIMITED**	0.9312	0.3517	0.7758	0.8770
51	**FAMOUS BRANDS LIMITED**	0.8313	1.0465	0.9802	0.9881
52	**ITALTILE LIMITED**	1.0409	0.2786	0.9863	0.9829
53	**AECI LIMITED**	0.2250	1.1697	0.7258	0.6623
54	**OCEANA GROUP LIMITED**	1.0054	0.6143	0.6797	0.7646
55	**SA CORPORATE REAL ESTATE LIMITED**	0.3448	-0.3175	0.4618	0.5031
56	**VUKILE PROPERTY FUND LTD**	0.9076	0.5030	0.7490	0.8419
57	**REUNERT LIMITED**	0.3529	0.2829	-0.0718	0.3636
58	**ZEDER INVESTMENTS LIMITED**	-0.0539	0.4289	-0.4088	0.0104
59	**HOSKEN CONSOLIDATED INVESTMENTS LTD**	0.3707	0.0021	0.6607	0.0153
60	**DATATEC LIMITED**	0.6636	-0.0459	0.0037	0.0462

61	**JSE LTD**	1.3063	0.2113	0.9708	0.5694
62	**NAMPAK LIMITED**	-0.3938	-0.2552	-0.5728	0.1479
63	**BLUE LABEL TELECOMS LIMITED**	0.3810	1.1787	0.3862	0.1980
64	**PSG KONSULT LTD**	-0.0986	-0.1163	-0.6273	0.2599
65	**ADCOCK INGRAM HOLDINGS LIMITED**	1.2813	0.3741	0.4452	0.8273
66	**ADVTECH LIMITED**	0.1261	2.3930	0.4340	0.2997
67	**WILSON BAYLY HOLMES - OVCON LIMITED**	0.3933	0.2329	0.9812	0.6493
68	**CASHBUILD LIMITED**	0.8982	0.5216	0.9358	0.8661
69	**GRINDROD LIMITED LTD**	0.8426	0.0757	0.9562	0.7105
70	**SUN INTERNATIONAL LIMITED**	0.8766	0.1617	0.3017	0.3823
71	**CAPEVIN HOLDINGS LTD**	1.0711	0.8388	0.2295	0.0331
72	**TRENCOR LIMITED**	0.7338	0.1292	0.6317	0.6898
73	**EMIRA PROPERTY FUND LIMITED**	0.0629	0.0657	-0.6550	0.0219
74	**AFRICAN OXYGEN LIMITED**	1.1723	0.3134	0.8258	0.7761
75	**ASTRAL FOODS LIMITED**	0.7336	1.0495	0.9647	0.8652
76	**CITY LODGE HOTELS LIMITED**	1.1272	0.1797	0.9460	0.4372
77	**INVICTA HOLDINGS LIMITED**	1.4674	0.2482	0.5557	0.7715
78	**PEREGRINE HOLDINGS LIMITED**	0.4226	0.1344	0.2170	0.0526
79	**CLIENTELE LTD**	1.3092	0.7828	0.8288	0.8121
80	**HUDACO INDUSTRIES LIMITED**	0.4814	0.2254	0.1100	0.3545
81	**CAXTON AND CTP PUBLISHERS AND PRINTERS LIMITED**	0.8605	0.1984	0.5673	0.6042
82	**METAIR INVESTMENTS LIMITED**	1.0472	0.1678	0.5227	0.5022
83	**RAUBEX GROUP LIMITED**	1.2023	0.4891	0.8918	0.9200
84	**AFRIMAT LIMITED**	0.6943	0.4206	0.1950	0.9289
85	**LEWIS GROUP LIMITED**	0.5877	0.6451	0.8970	0.8235
86	**SPUR CORPORATION LIMITED**	0.6661	0.4405	0.8405	0.5295
87	**CLOVER INDUSTRIES LIMITED**	0.7101	0.3008	0.8637	0.5759
88	**PHUMELELA GAMING AND LEISURE LIMITED**	-0.1002	0.6596	-0.6457	0.1639
89	**DRDGOLD LIMITED**	1.4559	0.0234	0.2138	0.0002
90	**GROUP FIVE LIMITED**	0.5372	0.0894	0.6000	0.0458
91	**SASFIN HOLDINGS LTD**	0.6741	0.6252	0.9693	0.1677
92	**GRAND PARADE INVESTMENTS LIMITED**	1.5961	0.0262	0.8760	0.3206

93	**COMBINED MOTOR HOLDINGS LIMITED**	0.5423	-0.6704	0.7575	0.7672
94	**ADAPTIT HOLDINGS LIMITED**	1.0776	0.2253	0.7592	0.9479
95	**ARB HOLDINGS LTD.**	0.8531	0.4518	0.9427	0.8858
96	**ADCORP HOLDINGS LIMITED**	0.1597	0.1414	-0.3840	0.3974
97	**CROOKES BROTHERS LIMITED**	0.6180	0.0450	-0.0867	0.2278
98	**TRANSPACO LIMITED**	0.8605	0.1331	0.7308	0.5409
99	**PETMIN LIMITED**	0.3870	0.0681	0.2828	0.4276
100	**NU-WORLD HOLDINGS LIMITED**	0.8811	0.4372	0.9722	0.9327
101	**SABVEST LTD**	0.6942	0.0051	0.8807	0.2347
102	**ELB GROUP LIMITED**	0.6070	0.1530	0.9978	0.8506
103	**VALUE GROUP LIMITED**	0.7837	0.3146	0.9087	0.9132
104	**TREMATON CAPITAL INVESTMENTS LIMITED**	1.0424	0.0340	0.8682	0.8799
105	**BRIMSTONE INVESTMENT CORPORATION LIMITED**	0.5590	0.0102	0.6547	0.0001
106	**BOWLER METCALF LIMITED**	0.1779	0.3618	-0.0895	0.0607
107	**INSIMBI REFRACTORY AND ALLOY SUPPLIES LIMITED**	1.1330	0.1920	0.8525	0.7556
108	**MUSTEK LIMITED**	0.3036	1.1484	0.8582	0.7414
109	**PUTPROP LIMITED**	1.6566	-0.0880	0.7145	0.4775
110	**MAZOR GROUP LIMITED**	1.0749	-0.0145	0.8565	0.1570
111	**CARGO CARRIERS LIMITED**	1.2583	0.1878	0.9767	0.9217
112	**COGNITION HOLDINGS LIMITED**	0.4089	1.2359	0.6248	0.2165
113	**BHP BILLITON PLC**	-1.8628	-0.1551	0.5873	0.3430
114	**BRAIT SE**	0.6085	0.0264	0.8773	0.0096
115	**BRITISH AMERICAN TOBACCO**	0.0644	-4.9951	0.9158	0.5184
116	**INTU PROPERTIES PLC**	1.1359	0.0166	-0.2318	0.0522
117	**NEW EUROPE PROPERTY INVESTMENTS PLC**	1.1525	0.2432	0.9557	0.9179
118	**OLD MUTUAL PLC**	0.4711	0.2297	0.0938	0.2776
119	**TRUSTCO GROUP HOLDINGS LIMITED**	1.1885	-0.0191	0.2160	0.0000
	Total Count Higher Prediction			**70 Companies**	**49 Companies**
	Percentage of Total: Higher Prediction			**58.8%**	**41.2%**

Table 5: Regression results for the percentage model, using the Pooled OLS method on the entire dataset.

	Pooled OLS
	Current Dividend Per Share
Predicted Dividends	0.1574***
	(0.0117)
Constant	0.2166***
	(0.0113)
Number of Observations	714
Standard errors in parentheses	*** p<0.01, ** p<0.05, * p<0.1

Although the interpretation of the regressions results is not the main focus of this study, some attention is needed. The negative sign of the "dividends last year" variable in table 3 indicates that for every 1 dollar increase in the variable, the change in dividends between the current dividends and last years dividends becomes smaller. This makes intuitive sense, as when the dividend payment of last year increases, the gap between the potential current year and last year decreases. More practically, the larger the increase in dividend last year, the lesser the dividend increase in the current year, and therefore the more likely a decrease in the "change in dividend" variable. Additionally, the positive sign of the "earnings per share" variable can be understood as earnings being directly related to dividend payments. It essentially means that a 1 dollar increase in earnings increases the change in dividend payments between the current and last year. More broadly, an increase in earnings has a positive significant effect on dividends. The R^2 is further not included in table 3 and 5, as regressions are run on a per company level as shown in table 4. Including the R^2 of the overall model, essentially grouping all companies would therefore not be suitable. Looking at table 3 it can be further seen that the fixed effects model also fits the data better as is shown by the Hausman test, which resulted in a Pearson chi-square statistic (with 2 degrees of freedom) equal to 223.55; the resulting P-value is equal to 0.000. Therefore, the null hypothesis of a random effects model being more appropriate is rejected. This makes intuitive sense as time-invariant errors can arise as for instance companies are in the same industry groups for several years. However, at the same time company-specific errors can affect parameters, an example of this can for instance be the systematic and unsystematic risk a company faces.

When looking at the size of the companies in terms of market capitalization, it is found through individual regression analysis, that in the largest 50 companies, the Lintner dividend model predicts dividend behaviour better in 30 of the companies (60% of total companies). This result can be seen in table 4 as the companies are listed from largest to smallest. Therefore, the size of a company does increase the predictive power of Lintner's dividend model; hence the fourth hypothesis can be rejected. However, caution should be taken when analysing this result, as the total sample of companies is still rather small, making the difference in predictability marginal.

In order to provide a more general account of the predictability of the Lintner's model, the median values of the target rate (T) and the adjustment rate (a) were 0.2438 and 0.7336 respectively. The median values are taken as the data does not have a normal distribution and contains extreme scores. The values are further found by taking the median of all individual regression results for the adjustment rate and target rate of the 119 companies as shown in table 4. Using the median therefore offers a better representative value of South African firms and their adjustment and target rate. This leads to the equation below, which is an essentially refers to the previously used equation 3:

$$(10)\ D_1 - D_0 = 0.7336 * 0.2438 EPS_1 - 0.7336 * DIV_0$$

This equation can then further be rewritten as:

$$(11)\ D_1 = 0.1789 * EPS_1 + 0.2664 * D_0$$

The above results indicate that South African firms on average are aiming to payout 24% of their long-term earnings on average. However, a lag effect can also be observed, as the payout comprises of 18% of current earnings plus an additional 26% of the value of previous dividend per share. These findings tend to be largely comparable with the qualitative findings of Firer, Gilbert and Maytham, in that firms still appear to hold to a target ratio and that they are conservative with setting dividends in fear of potential dividend cuts (2008). It is further apparent that a significantly smaller target ratio is noted as compared to Lintner's findings of on average 40% (1956). The reasoning for this could be in

line with previous literature, in that capital gains are taxed at a lesser rate as opposed to dividends in South Africa.

It was further investigated whether Lintner's dividend model provides better prediction according to industry group. For the purpose of this analysis, and the limited sample size, industries with 5 or more companies were included. The results of the analysis are summarized in table 6.

Table 6: The percentage of companies for which the Lintner model or the percentage model provides better prediction according to adjusted R^2. The percentages are to be viewed as percentage of number of companies.

Industry Group	Number of Companies	Lintner Model	Percentage of Total	Percentage Model	Percentage of Total
Financial	28	19	68%	9	32%
Capital Goods	14	8	57%	6	43%
Consumer Services	8	5	63%	3	38%
Food Beverage & Tobacco	11	5	45%	6	55%
Materials	14	8	57%	6	43%
Real Estate	10	4	40%	6	60%
Retailing	9	7	78%	2	22%
Total	**94**	**56**		**38**	

Looking at the results of Table 6, it can be seen that the Lintner model provides better predictive power in financial industry groups, as defined by the Bank, Diversified Financial Services and Insurance industry groups. Hence, this leads to the rejection of the third hypothesis. Further it appears that the Lintner model provides better prediction amongst all industry groups, except for the Real Estate and Food, Beverage & Tobacco industry groups. The latter industry groups are exposed to cyclical fluctuations and the international market as a whole to a larger extent. This could therefore be reasoning as to why the Lintner model fails to predict dividend behaviour better than the percentage model. However, these conclusions should be viewed at with caution, as the sample size for each industry group is quite small.

To further test the relationship between the adjustment rate and target rate of a company, a test on interrelation was performed for the 119 companies. Through performing

a contingency test, it could be determined whether a pattern existed between the adjustment rate and target rate. Namely, whether a company with a high target rate would for instance have a low adjustment rate, or vice versa, whether a company with a high adjustment rate would have a low target rate (further explanation on the contingency test is given in the "Hypotheses" section). The firms were categorized into three groups in terms of target rate and adjustment rate. The division was done in terms of magnitude of each rate, namely a low, medium or high adjustment or target rate. The results of the 3x3 contingency table are shown below:

Table 7: Contingency table for testing the interrelation between adjustment rate and target rate

Key:

Frequency
Percentage

		Target Rate			
	Categorization	**Low**	**Medium**	**High**	**Total**
Adjustment Rate	**Low**	17 *42.50%*	10 *25.64%*	13 *32.50%*	40 *33.61%*
	Medium	13 *32.50%*	11 *28.21%*	15 *37.50%*	39 *32.77%*
	High	10 *25.00%*	11 *46.15%*	12 *30.00%*	40 *33.61%*
	Total	40 *100.00%*	39 *100.00%*	40 *100.00%*	119 *100.00%*

A contingency test was performed on the data presented in table 7 in order to test whether interrelationship exists between the adjustment rate and the target rate. This resulted in a Pearson chi-square statistic (with 4 degrees of freedom) equal to 5.0768; the resulting P-value is equal to 0.280. Given this value, we cannot reject the fifth hypothesis, in other words there is no interrelationship between adjustment rate and target rate.

6. Conclusions, Limitations and Recommendations

This paper's intention was to test whether Lintner's dividend model is better at predicting dividend payment for South African firms as opposed to the percentage model, and to what extent this is the case.

The results suggest that first of all, Lintner's dividend model predicts dividend behaviour significantly better than the less sophisticated percentage model and that both models are significant to the 5% level in their findings. Furthermore, it is shown that last year's dividend has a significant negative effect on the change in dividends between the current year and last year. Additionally, it is shown that current earnings per share have a positive significant effect on change in dividends, indicating earnings are tied to dividends. Lintner's model provides superior predictability in terms of adjusted R^2 in a larger percentage of companies. It can also be concluded that the Linter model significantly performs better regarding financial industries. However, the percentage model appears to predict dividends better in cyclical industries. Moreover, Lintner's model provides better explanation for large firms. However, this is to be viewed with caution, as the difference between predictability of large and other companies is marginal. Through looking at the variables adjustment rate and target rate, it becomes apparent that quantitative findings agree with qualitative findings of studies such as Firer, Gilbert and Maytham's (2008) survey, in that firms do appear to set a target payout ratio, and do avoid cutting dividends as a whole. Comparing the adjustment rate and target rate, it can further be concluded that they are independent, in that no interrelationship exists.

Through employing a larger data set as opposed to Wolmarans study on dividends (2003), I intended to resolve part of its limitations, namely lack of data. It is however still an issue that after analysing 349 firms for dividend that are listed on the Johannesburg Securities Exchange, only 119 were sufficient for analysis. Reasons for this included not being listed for an extended period of time, or not having paid dividends in one of those years. This issue is especially troubling as regressions could only be performed using 6 observations per company. The suggestion is then to conduct other studies once more firms are incorporated into the JSE, as South Africa's development continues.

Given the importance of dividend policy, especially in developing countries, further research is needed. This could focus on a more comprehensive study on actual dividend policies of JSE listed firms, as this has not yet been done. Therefore, not only accounting for the predictability of dividends, but also the determinants that shape dividends within South Africa. Further studies can also be performed on how companies predicted better by either

the Lintner model or the percentage model have been more successful in creating shareholder wealth in the past. The last consideration that could be of interest is to what extent management myopia affects dividend payment. With share repurchases having been allowed in 1999, it is interesting whether newer firms have abstained from paying dividends altogether, and whether other firms have decreased their dividend payout as was seen in my findings. Based on such studies, analysis could focus on the extent to which management short-sightedness prevents companies from cutting dividend payments.

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