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Testing the Gordon's Growth Model

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Abstract
This study tests Gordon's Growth Model. The data was obtained from annual accounts and NSE handbooks from the Safaricom limited website and NSE websites respectively. The model was used to calculate the theoretical value of dividends for Safaricom limited for period 2008 to 2017. The theoretical values were then compared to the actual dividends paid out during the period of study. Paired sample t-test statistic was performed to determine whether there is a statistically significant difference between the means of two values. The findings of the study established that the t- statistics was -4.52 and the significant level was 0.003 meaning that the differences in means are statistically significant at 95% level of confidence. The conclusion was therefore that the Gordon's growth model has not been applied in determining dividend payments amounts at Safaricom limited.
Keywords: Gordon's growth model, dividends, Safaricom Ltd

1.0 Introduction

Dividends are cash payments that companies make to their shareholders. They represent a company's choice to return earnings to shareholders, instead of being used for other alternatives, including retaining earnings to fund investments internally or to strengthen its balance sheet or liquidity position (Bergmann, 2016; Wolmarans, 2003; Lease, John, Kalay, Loewenstein and Sarig, 2000). Whether a firm should pay dividends, how much, how often these dividends are paid remains a key decision for any company. Dividend decision is therefore considered to be one of the most vital financial decisions that corporate managers come across and continues to be one of the main topic of passionate debate at the board level (Baker and Powell, 2001; Zenner, 2015). These passionate debates are not surprising. Firms that allocate "too little" may be perceived as being either not shareholder friendly or undisciplined. On the other hand, firms that allocate "too much" to dividends may be vilified for buying stock at high prices or for chasing near-term gratification and forgoing investments in the future. Even worse, they may also find themselves short of liquidity in a downturn, compelling them to cut their dividend and possibly raise expensive equity to shore up their balance sheets (Zenner, 2015; Wolmarans, 2003). Paying dividends also prevents these companies from having significant agency problems (DeAngelo, DeAngelo, and Stulz, 2006). Lease et al. (2000) called this phenomenon 'the dividend puzzle with pieces that just do not fit together'.

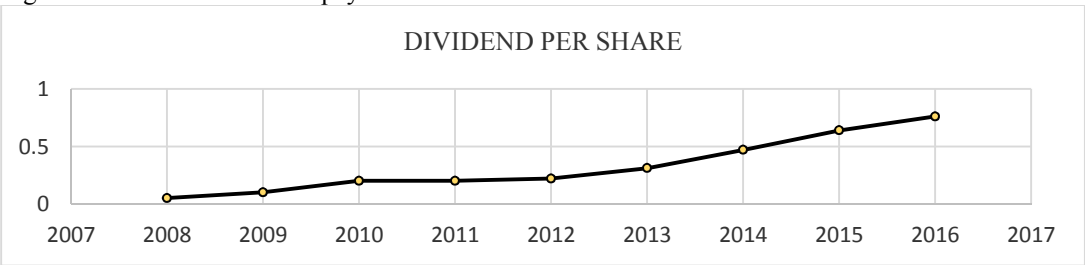
Dividend distributions world over have not just rebounded from post-crisis lows, but have reached new highs (Zenner, 2015; Bergmann, 2016; Page, 2016). Investors seem to be rediscovering the power of dividends as an important element in the pursuit of long-term total returns. Following the financial crisis of 2008/9 and the resultant fall out, traditional sources of income such as government and corporate bonds and cash, lost their luster (Page, 2016). The increase in dividends over recent years could also reflect an increase in shareholder preferences to receive income payments or a perception among company managers that there are fewer viable investment opportunities (Bergmann, 2016). Dividends paid by Australian listed companies have grown substantially since the global financial crisis. In 2015, Australian-domiciled listed companies announced that they would pay $78 billion in Dividends. These payments represented 81 per cent of these companies' underlying earnings for the same period (the 'payout ratio') and 4.8 per cent of the market capitalization of these companies as at end June 2015 (the 'dividend yield'). Dividend payments increased strongly between the 2010 and 2015 financial years, rising by roughly 40 per cent (Bergmann, 2016).

In the USA for the first time ever, distributions (repurchases and dividends) by Russell 1000 firms in 2015 surpassed one trillion dollars. At $1,102 billion, these firms distributed 10% more than the previous twelve-month peak of $967 billion over the four quarters of 2007 (Zenner, 2015). According to Bergmann (2016) the divided average payout ratios for years 2005-2015 have been Australia 67%; United Kingdom 60%; Japan 57%; Europe 55%; Canada 52% and United States 48% while a report issued by Meridian Financial Partnres (2016) notes that current dividend yields for selected countries are Australia 4.8%, Norway 4.2 5% , EU 3.45% USA 2.15 %. A survey carried out on five year dividend payments at the Nigeria stock Exchange by Awoyemi and Bagga (2016) revealed that not much attention is given to dividend yield but observed that out of 212 listed companies in the last five years, 124 companies paid dividends. Further analysis showed that 58% of all listed companies pays dividend, 18% of which recorded 100% payment consistency with 27% recording 71-80% consistence in paying dividend.

In Kenya, Njoroge (2016, May 28), reports that top Nairobi Securities Exchange (NSE) listed firms paid ksh 83.7 billion growing their total dividend pay-out by a tenth despite 2015's harsh economic environment.

The growth in investor earnings was mostly powered by telecoms giant Safaricom's huge payout, which at ksh30.4 billion accounted for more than one third of the total dividends. The 20 biggest public listed firms, by market capitalization, increased their dividend pay-out by 9.9 per cent. Safaricom ltd increased its dividend by a fifth to ksh 0.76 per. The dividend payout represented 80 per cent of its Sh38.1 billion net income for the year. The company has been paying steady dividends since its listing in 2008 as per the Figure 1 below.

Figure 1: Safaricom dividend payment 2008-2016



Notwithstanding theoretical considerations, it is not always clear how company boards decide on a particular dividend payment amount. This paper tests the Gordon's growth model using data from Safaricom limited. Section 1 sets the study's background. Section 2 lays the theoretical foundation to the study by discussing dividend theories including the Bird in Hand theory (Gordon's growth model), it also discusses the theoretical application of the model. Section 3 sets out the methodology of the study while section 4 outline the findings. Discussion of the findings is done in Section 5. Section 6 concludes the study and gives suggestions for further study.

2.0 Literature review

2.1 Theoretical foundations

Several dividend theories have been advanced to expound on corporate dividend payments, however there is no agreement about how companies should make the dividend payment choices.

Modigliani and Miller's (1961) theory of dividend irrelevance -The theory suggests that shareholders should be indifferent to being paid a dividend or not, given that in the former case, higher retained earnings should be reflected in a higher share price. This is because dividends can be reinvested in shares, or instead some shares can be sold in exchange for cash, depending on the preferences of the shareholder. Dividends are therefore irrelevant to investors since they can create homemade dividends (Lola-Ebueku, 2016).

Tax Differential Dividend Theory -This theory assumes individual investors pay higher ordinary income taxes on dividends but lower tax rates on long term capital gains (Brigham and Ehrhardt, 2011). This differing tax treatments for capital gains and dividends together with transaction costs brings about a bias towards paying dividends. Farrar and Selwyn (1967) tried to explain this theory, and their position was extended into a market equilibrium framework by Brennan (1971). Farrar and Selwyn used partial equilibrium analysis, assuming that individuals attempt to maximize their after-tax income. Shareholders have two choices: either to own shares in an all equity firms and use homemade leverage or buy shares in a levered firm. The first choice is between corporate and homemade leverage, while the second choice is between the firm paying dividends or retaining the earnings so that shareholders can take their income as capital gains (Lola-Ebueku, 2016).

Signalling Dividend Theory- The theory states that investors regard dividends as signals of managements forecast of earnings and is associated with propositions by Bhattacharya (1979); Miller and Rock (1985) and John and Williams (1985). It is based on the idea of information asymmetries between the different participants in the market and in particular between managers and investors. Under such conditions, the costly payment of dividend is used by managers, to signal information about the firm's prospects to the market. For more mature firms, dividend payments may also be seen as a signal of a positive outlook (Miller and Rock, 1985). This can lead to firms placing some emphasis on smoothing dividends through time, as well as a reluctance to cut dividends when earnings fall. According to the theory, firms, despite the distortion of investment decisions to capital gains, may pay dividends to signal their future prospects (Amidu, 2007).

Clientele Effect Theory-Company boards may also be influenced by their shareholders' inclinations for dividends, often referred to as the 'clientele effect' (Baker and Wurgler, 2004). Shareholders' preferences may: be influenced by tax incentives, as mentioned above; differ by investor type, with retail investors thought to favor dividends over capital gains more than institutional investors; and vary cyclically, with dividends providing an income stream in a lower growth environment and posing less of an opportunity cost in terms of the company's investment opportunities.

The firm life cycle theory of dividends-The theory contends that the optimal dividend policy of a firm depends on the firm's stage in its life cycle. Dividend payments are expected to vary over the firm's life cycle (Mueller, 1972). 'Growth 'stocks often initially have large investment expenditures relative to their earnings,

have limited access to finance, and therefore typically pay fewer dividends. More mature firms, on the other hand, are generally more able to pay dividends given their access to more stable sources of funding and income (Bulan & Subramanian, 2009).

Bird-in-Hand Theory-This theory was developed by Myron Gordon and John Lintner as a counter point to Modigliani and Millers dividend irrelevance theory (Lola-Ebueku, 2016). Gordon and Lintner (1963) acknowledged that investors prefer current dividends to capital gains. The theory notes that stockholders are risk averse and prefer current dividends due to their lower level of risk as compared to future dividends. Dividend payments reduce investor uncertainty and thereby increase stock value. If investors view future dividend payments riskier than current payments, they will prefer a bird at hand than two in the bush i.e. 'what is available at present is preferable to what may be available in the future'. Accordingly a relationship exist between firms value and dividend payment and firms should therefore set a high dividend payout ratio and offer a high dividend yield to maximize stock prices (Linter, 1962; Gordon, 1963; Murekefu and Ouma, 2012). Gordon (1963) and Lintner (1962) came up with a model "Myron Gordon's Dividend Growth Model also called Gordon's growth model that explains how dividend policy of a firm is a basis of establishing share value. Gordon's growth model uses the dividend capitalization approach for stock valuation that determines the value of company as the quotient of expected dividend one year from now divided by the difference between the required rate of return of the investor and the dividend growth rate.

The formula used is as follows:

$$P_o = \frac{D_1}{ke - g} \text{----------} \textit{formula (1)}$$

Where:

P_o= Current Stock Price; D_1= Expected dividend per share one year from now; ke= required rate of return for equity investor = Cost of equity; g =Growth rate in dividends forever

2.2 Application of Gordon's Growth Model

Ivanovski (2015) applied Gordon's growth model at Macedonian Stock-Exchange (MSE). The study reported significantly big discrepancies between average prices and intrinsic values calculated using the model in 6-years' time series leading to the conclusion that the model is useful only as additional tool for valuation of stock quoted at MSE. The study noted that the model is a useful tool for bank stocks valuation at MSE, while for other companies they suggest use of DCF. Suraj (2014) conducted a study to establish the reliability of the Gordon's growth model on the valuation of bank stocks at Bombay Stock Exchange (BSE). The study selected 14 banks that are listed in BSE. The findings were that the Gordon's growth model cannot be relied on by investors in the valuation of majority of the bank stocks at the BSE due to the higher prediction errors. The results were attributed to among other factors, inappropriate discounting factors, information differentials and measurement and evaluation problems. Bujang (2007) tested the Gordon's growth Model on selected components stocks of Bursa, Malaysia. The models showed practical usefulness depending upon economic conditions and the conclusion was that the models is relevant in appraising stock value. Sapp & Forester (2006) using information on the share price, dividend payments and earnings for Bank of Montreal over a period of more than 120 years, compared the actual share price to the expected price—calculated using several of the most commonly used fundamental valuation methods. Over the entire sample period, they found that Gordon growth model performed well at explaining actual prices. Acheampong (2013) investigated the actual share price on the Ghana Stock Exchange with its predicted prices based on estimates using the Gordon's growth model for the selected banks. The results indicated that the current market prices of these banks did not match up with the actual fundamental values of these banks. The results further indicated that the Ghana Stock Exchange (GSE) bourse is inefficient. Olweny (2011) conducted a study to establish the reliability of the Gordon's growth model on the valuation of common stock at the Nairobi Stock Exchange. The study concluded that the Gordon's growth model is not reliable in the valuation of common stock at the Nairobi Stock Exchange. Aduda & Kimathi (2011) tested the applicability of Gordon's growth model on dividend payments by companies listed at the Nairobi stock exchange. The findings of the research established that the Gordon's growth model was not employed by the companies listed at the Nairobi stock exchange. Gottwald (2012) undertook a study on how to use the Gordon's model to measure stock price volatility. The study confirmed that the changes in stock prices can be measured by the Gordon's growth model. He also confirmed that it is also possible to compare the volatility and return related to one state with the same parameters related to other state. Sapp and Forester (2005) found that the Gordon's growth model does a reasonably good job of explaining variations in the S&P 500 index, though there are systematic differences over time on how investors value future dividends. Harris, Chaplinsky & Kenneth (2008) noted that the model focus closely on growth, risk, and the reinvestment opportunities that firms possess in comparison with other firms and is useful in determining the value of an equity share and in estimating the required return on equity. The model has been used by Fama and French (2002) and Harris and Marston (1992; 2001) to estimate the equities and market risk premiums. Engstedy & Pedersenz (2012)

documented strong cross-country differences in the rent-price ratio as predictive power for returns and rent growth using the Gordon growth model, in which the rent-price ratio summarized market expectations of future real estate returns and rent growth.

3.0 Research methodology

The study used qualitative research design. Two types of data was used in the study. Actual secondary data and theoretical values of dividend calculated using the Gordon's growth model. The secondary data was collected from the published financial statements of the Safaricom Ltd for the period of 9 years from 2008 to 2016 and other data published by NSE in their NSE handbooks. The data was obtained from the Safaricom ltd website and NSE websites. Additional data was also used for calculating the theoretical values of dividends. Data on the Treasury bill rates and LIBOR to help work out the weighted average cost of debt was obtained from the central bank of Kenya and global rates websites respectively.

According to Gordon (1962) expected share price is expressed as a function of the dividend in year one (D_1), divided by the difference of shareholders' expected rate of return (ke), and the long-term growth rate of dividends (g). The model assumes that dividends, earnings, and stock values grow at the same constant rate *g*

$$P_o = \frac{D_1 (1-g)}{ke-g} \text{ ----------} \textit{formula (2)}$$

The theoretical values of dividends between 2008 and 2016 were calculated using equation below which was derived from the Gordon's growth model (Ivanovski, 2015; Anunda & Kimathi, 2011; Acheampong, 2013; Suraj, 2014).

$$D_1 = P_0 * (ke - g) \text{ ----------} \textit{formula (3)}$$

Where:

D_1= Dividend paid in the following year; P_0= Current share price; g= Dividend Growth rate and ke= Required rate of return on a stock.

The required rate of return (ke) was obtained by calculating the weighted average cost of capital (WACC) (Kaplan & Ruback, 1996). WACC represents a weighted average of the after-tax costs of different sources of capital (equity and debt), in which each one is weighted by the fraction of the capital structure it represents (Luehrman, 1997). The weighted average cost of capital (WACC) combines the rates of return required by shareholders and creditors and is calculated as follows:

$$WACC = kd(1-Tx)*(D/V) + ke*(E/V) \text{ ----------} \textit{formula (4)}$$

Where ke is the cost of equity and kd is the cost of debt, E is the equity and D the debt, and Tx is the corporate tax rate; V is market value. Cost of debt is estimated by using recent bank borrowing history and computing the weighted average cost of debt for each year using the interest rates given in the financial statements and using treasury bill rates and LIBOR rates where borrowing were pegged on the treasury bill rates or on LIBOR rates respectively (Damodaran, 2005). Growth (g) was estimated using the equation: (1 –payout ratio) * return on equity (Aduda & Kimathi, 2011).

The analysis of the data was done using Microsoft excel and SSPS. Paired sample t test statistic was used to determine whether there is a significant difference between the dividend paid and the theoretical values obtained from the computations.

4.0 Findings

4.1 Required rate of return

Table 1 below shows the details of the required rate of return over years 2008 to 2016.

Table 1: Required Rate of Return (ke)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	Mean	Std Dev.
Required Rate of Return	67%	72%	79%	93%	127%	84%	43%	39%	33%	71%	30%

The average ke-required rate of return over the 9 year period was 71% and the standard deviation was 30%.

4.2 Dividend growth rate

The dividend growth rate for 2008 to 2016 is set out in table 2 below.

Table 2: Dividend Growth Rate (g)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	Mean	Std Dev.
Growth	57%	45%	37%	36%	39%	24%	8%	8%	7%	29%	18%

The mean growth dividend growth rate over the 9 year period was 29% and the standard deviation was 18%.

4.3 Dividend Payout Ratio

Table 3 below sets out the dividend payout ratio for the period 2008 to 2016.

Table 3: Dividend Payout Ratio

	2008	2009	2010	2011	2012	2013	2014	2015	2016	Mean	Std Dev
Payout Ratio	0.14	0.38	0.53	0.61	0.70	0.71	0.82	0.80	0.80	61%	23%

Over the 9 year period the average pay-out ratio was 61% and the standard deviation was 23%.

4.4 Actual Dividend paid

The actual dividend paid over 2008 to 2016 is as shown in table 4 below.

Table 4: Actual Dividend Paid

	2008	2009	2010	2011	2012	2013	2014	2015	2016	Mean	Std Dev
Dividend paid	0.05	0.10	0.20	0.20	0.22	0.31	0.47	0.64	0.76	0.33	0.24

The actual dividend paid in years 2008 to 2016 averaged Kshs 0.33 per share. The standard deviation was Kshs 0.24.

4.5 Theoretical Value of Dividend

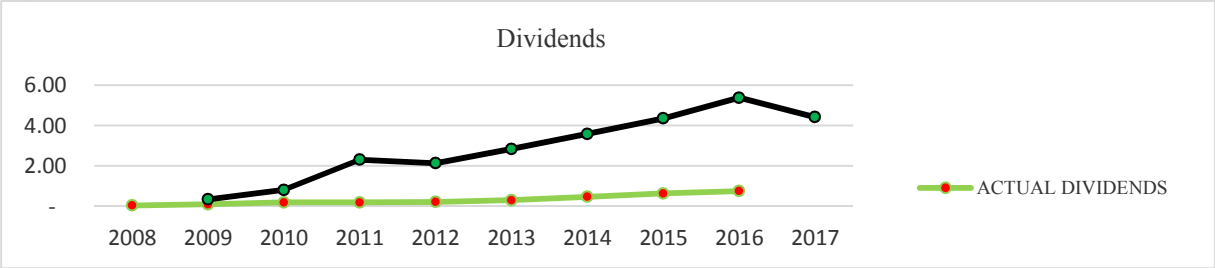
Table 5 below shows the theoretical value of dividend for the years 2008 to 2017

Table 5: Theoretical Value of Dividend

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Mean	Std Dev
Theoretical Value Of Dividend		0.35	0.82	2.31	2.14	2.84	3.59	4.35	5.37	4.41	2.91	1.69

The theoretical value of dividends was calculated using the dividend growth model. All the recalculated values are very high compared to the actual dividends paid. The calculated dividends steadily increased each year. The model estimated the dividend payable for 2017 to be Kshs 4.41 per share. Average dividends based on the model was Kshs 2.91 per share and standard deviation was Kshs 1.69 per share. The graph (Figure 2) below shows the trend of the actual dividends paid and the theoretical values calculated dividends using Gordon's growth model per year.

Figure 2: Comparative trends



4.6 Inferential Statistics

The statistical paired t-test as per annex 1 shows the mean of the differences was -2.358 and standard deviation was 1.474. The t- statistics was -4.52 and the significant level was 0.003 meaning that the differences in means are statistically significant at 95% level of confidence.

5.0 Discussion of the findings

The findings indicate that the Gordon's growth model is not used in dividend calculation at Safaricom limited. These findings are consistent with findings by Aduda & Kimathi (2011) who tested the applicability of the model on dividend computation on selected firm listed at the Nairobi Securities Exchage.The findings are also consitent with findings by Ivanovski (2015) who tested the model on share valuation on Mecedonia Stock Exchange and concluded that its not reliable. Suraj (2014) also assessed the models applicability at the Bombay Stock Exchage and came up with similar results, while Acheampong (2013) testing the same model on share value determination at the Ghana Stock Exchange concluded that its not reliable. The findings however contradicts the finding of Bujang (2007) who used the model in share value determination in Malaysia Stock Exchange and found that its explains the share value. Sapp & Forester (2006) also concluded that the model could be used to explian the share values of the Bank of Montreal, Canada for a period of 120 years.

The reason why the model does not explain the dividend payments at Safaricom limited can be attributed to two reasons. First, the calculation based on Gordon's growth model relies on the assumption that future

dividends will grow at a constant rate in perpetuity, taking no account of the possibility that rapid near-term growth could be offset by slower growth further into the future or vis versa. A review of Safaricom financial statements shows that the company's dividend has been growing steadily, however the divided experienced rapid growth in 2014, 2015 and 2016. Safaricom limited is also not a very old company being only 9 year old. This assumption of constant growth makes the Gordon growth model less suitable for use in rapidly growing industries with less predictable dividend patterns, such as Safaricom ltd. Its use is typically more appropriate in relatively mature industries or stock-market indices where companies demonstrate more stable and predictable dividend growth patterns.

Secondly, although the model's simplicity can be regarded as one of its major strengths, in another sense this is its major drawback, as the purely quantitative model takes no account of qualitative factors such as industry trends or management strategy. For example, even in a highly cash-generative company, near-future dividend pay outs could be capped by management's strategy of retaining cash to fund a likely future investment. The simplicity of the model affords no flexibility to take into account projected changes in the rate of future dividend growth. Safaricom limited has a dividend policy that permits dividends to be paid if the management finds that the payments are sustainable after taking into account the sufficiency of distributable reserves and liquidity to ensure that the company's operational need and business growth are not limited by the availability of funds.

6.0 Conclusions and Suggestions for further study

The empirical results of the study show the Gordon's growth model is not applicable in determining dividend payments at Safaricom limited. A different study can be done to test if the two stage-growth model can be used to explain the dividends payments in Safaricom limited. Further studies can be done to find the role of the model in share pricing, volatility and business valuation. Yet still further studies can be done using different methods of estimating the growth rate and return on equity from the ones used in this study.

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Annex 1: Paired t-tests

Paired Samples Test

	Paired Differences		t	df	Sig. (2-tailed)
	Mean	Std. Deviation			
Pair 1 Actual dividend - theoretical Value	-2.35875000	1.47489891	-4.523	7	.003