TESTING THE DIVIDEND LIFE CYCLE THEORY: EVIDENCE FROM SELECTED SUB-SAHARAN AFRICAN COUNTRIES

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Abstract

This paper undertakes a test of the dividend life cycle theory for quoted non-financial firms in selected Sub-Saharan African countries (Nigeria, South Africa, and Kenya). The causal and longitudinal research designs were utilized and four hundred and seventy-nine (479) non-financial companies in eleven (11) sub-sectors listed on Nigerian, Johannesburg, and Nairobi Stock Exchanges make up the population. However, the Utility sector was removed from the final analysis because the sample size for this subsector was not enough to carry out the system GMM analysis. Thus, the analysis was done for ten (10) subsectors. The Taro Yamani and the sample filtering technique were utilized to ascertain the size of the sample. Two hundred and thirty-nine (239) quoted non- financial firms were chosen and data were collected for the period 2007 to 2017. For the data analysis, the system generalized method of moments dynamic panel data regression technique was employed. This was after testing for unit root and other diagnostic tests respectively. The outcome of the empirical analysis indicates that the firms retain Earnings/Total Equity (that is, earned/contributed capital mix) has no meaningful impact on dividend pay-out while firm age has a meaningful and negative impact on dividend pay-out. Thus, the finding of this research is not in tandem with the proposition of the dividend life cycle theory. The study recommended among others that shareholders must consider other means of sustaining dividends for firms since mere age will not guarantee dividend pay-out.

Keywords: Firm Life Cycle Theory, Dividend Pay-outs, Sub-Saharan African, Listed Non-Financial Firms, System Generalized Method of Moments

JEL Classification: G14, G32, G35

1. INTRODUCTION

Life cycles of a firm refer to the changes that occur within the firm as it gets mature ensuing from the firm's activities (Dickinson, 2008). The dividends life cycle

theory describes variations in the dividend policy of firms caused by variations linked to the life cycle stages of the firm. This theory is predicated on the idea that as a company gets old; the company's cash-generating ability will surpass its capability to identify lucrative investment, in such situation it becomes optimal/ideal for such a company to share its free cash flow to stakeholders through the payment of dividends, hence, the dividend life cycle theory state that matured firms are expected to pay dividend (Mueller, 1972). Hence, the dividend pay-out of firm's seems to be influenced by its financial life cycle or "life-cycle". The stage firm occupies in its life-cycle are explained by the retain Earnings/Total Equity (that is, earned/contributed capital mix), hence firms with huge earned/contributed capital mix are considered to be mature/old and are expected to pay-out (high) dividends (Kerstin, 2013).

Researchers such as DeAngelo, DeAngelo & Stulz (2006) and Denis & Osobov (2008) confirm that a company's inclination to pay a dividend is a function of the stage the firm occupies in its life cycle. They categorize companies based on the growth and maturity stages. Specifically, they contend that companies that pay dividends are mature. "Maturity" connotes that firms retained earnings and agency problems are high (Bulan & Subramanian, 2008).

Although studies conducted in developed countries have dominated the literature on the subject matter, Adaoglu and Impson (2000) posit that more pieces have been added to "the dividend puzzle" when current researchers have attempted to describe the behaviour of firms' dividend in developing and emerging markets. Specifically, dividend policy in these markets is usually not similar to the dividend policy obtainable in advanced markets. It has been contended that the findings in advanced nations might not hold for emerging economies (Aivazian, Booth & Cleary, 2003). However, there is still no agreement on the influence of the firm life cycle on dividend pay-out. For instance, researchers such as El-Ansary and Gomaa (2012), Kerstin (2013), Yang (2014), Miletic (2015), Floyd, Li, and Skinner (2015), Major and Ångbäck (2017) reported that firm life cycle stage significantly influences company's dividend policy. Conversely, the studies of Ishikawa (2011), Abdulkadir (2015), and Rafique and Javaid (2017) concluded otherwise: that the stage a firm occupies in its life cycle has no meaningful effect on their dividend policy. Given the mixed findings from these studies, there seems to be no consensus in the empirical literature on the influence of the firm life cycle on the dividend policy of firms.

Also, majority of the researchers (like, DeAngelo et al. (2006), Twu, (2010), Hauser (2012), Abdulkadir (2015) and Rafique and Javaid (2017) among others) that have explored the life cycle theory of dividend in extant literature concentrate on the nexus between firm life cycle and the inclination to pay a dividend along with the nexus between the inclination to initiate a dividend and firm life cycle, few explicitly study dividend pay-out policy and the firm life cycle. We extend the dividends life cycle theory and investigate the nexus between the firm life cycle and dividend pay-out of quoted non-financial firms in selected Sub-Saharan Africa Countries.

Also, from the review of the empirical literature, all the previous studies utilized static panel regression which could not address the endogeneity problem inherent in panel data. It is this perceived methodological gap that makes this research to adopt the dynamic panel data (system generalized method of moments) owing to its superiority in terms of efficiency, correction of endogeneity problem, measurement biases and omitted variables. Finally, since all the previous studies on this topic in sub-Saharan Africa countries were done at a country-specific level, the key contribution of this research is the cross-country level of the analysis of the subject matter. Precisely, our study covers the stock markets of Nigeria, South Africa, and Kenya. Thus, this is one of the few studies conducted for sub-Saharan Africa countries. The aforesaid motivates this study which explicitly, examines how the firm life cycle impacts dividend pay-out of quoted non-financial firms in selected sub-Saharan Africa countries.

The other sections of the paper are arranged in the following manner: Section two covers the review of previous empirical literature; while the third section covers the methodology adopted for the study. The results of the analysis of data and discussion of findings are presented in section four, and the conclusion and recommendations of the study are covered in section five.

2. LITERATURE REVIEW

In this segment, the review of past empirical studies will be carried out to justify the need for this study. One of the earlier studies that test the dividend life cycle theory was conducted in the U.S. by DeAngelo, DeAngelo, and Stulz (2006). They utilize the logit regression to estimate the model to find out if the likelihood of paying dividends is explained by the retained earnings/total equity. The researchers found that the retained earnings/total equity (that is, earned/contributed capital mix) has a positive and meaningful impact on the firm likelihood to pay dividends which is in tandem with the prediction of the dividend life-cycle theory. After including dividend history, total equity, growth, the balance of cash, previous and current year profitability, and company size as control variables, they still confirm that the dividend life cycle theory hold.

In a study conducted for selected advanced financial markets (Canada, Japan, France, Germany, U.S., and the U.K) by Denis and Osobov (2008) were find out the cross-country evidence on the inclination to pay dividends. 1989 – 2002 constitute the period of study. Findings from the Logit regression reveal that the likelihood of paying dividends is linked to growth opportunities, profitability, and company size. The result further reveals that profitability, company size, growth potentials, and the earned/contributed equity mix have a significant effect on dividends. For the six selected nations, the likelihood of paying dividends exerts a positive and meaningful effect on retained earnings/total equity. The percentage of dividend-paying firms is low when retained earnings are negative and high when this fraction is high. Their result is in tandem with the life-cycle theory's suggestion that free cash flow distribution is the major factor influencing pay-outs of dividends.

Von-Eije and Megginson (2008) studied 15 nations who become European Union members before 2004 to find out the link between payment of cash dividends and repurchases of shares. The period of study was from 1989 to 2005. They utilize regression analyses. The result reveals that the proportion of European companies that pay dividends has decline, whereas real total dividends paid went up and repurchases of shares increase. Their result further reveals that the frequency of financial reporting is linked with a rise in the pay-out. Also, the result further reveals that raising the proportion of the retained earnings to equity will not improve the probability of paying out cash, but firm age increases the likelihood of cash payments.

Ishikawa (2011) investigated firm pay-out policies in Japan from the standpoint of the dividend life-cycle theory for the period 1999 to 2007. The researcher adopted the logit regression to estimate the specified model. The result indicates that growing companies in Japan choose to further increase as against mature companies and that such increases in dividends for growing companies are preferred to mature companies in the market. A study conducted in Australian to clarify if the dividend life-cycle theory explains firms pay-out policy using the period spanning 1992 – 2004 by Coulton and Ruddock (2011). The outcome of the panel OLS regression validates the dividend life cycle theory. Specifically, their result reveal that dividend-paying firms have fewer growth options, very profitable, are larger and their retained earnings are higher than firms that do not pay dividends.

Thanatawee (2011) examined whether the prediction of the dividend life cycle theory hold for firms quoted in Thailand bourse and the period of study was from 2002 to 2008. The outcome of the study shows that bigger and more profitable companies that have sustained higher earnings to equity and have free cash flows are likely to pay more dividends. Also, their result indicates that companies with greater growth potentials might have a lower ratio of dividend payment. The result was in line with the dividend life-cycle and free cash flow propositions. Afza and Mirza (2011) explored the "Maturity hypothesis" of dividends using companies quoted in Pakistan for the period 2002 - 2007 using OLS regression. The results show the non-linearity in the link between firm age and dividend pay-outs of firms. The result further reveals that on average companies increase their dividend pay-outs but after the increase, the firms begin to reduce dividend payments. The results agree with the free cash flow and maturity hypothesis.

Ming-Hui, Mei-Chuke, Day-Yang, and Yen-Sheng (2011) investigated the dividend life cycle hypothesis for non-financial firms listed in Taiwan bourse and 2005 – 2009 constitute the period of study. The firm life cycle was proxy by retained earnings to total shareholder equity ratio while profitability, growth opportunity, and firm size were incorporated in the model as control variables. The result reveals that the link between retained earnings/total equity and dividend pay-outs are positive and meaningful thereby validating the prediction of the dividend life cycle hypothesis for Taiwanese firms.

In United States, Hauser (2012) examined the impact of firm maturity (firm life cycle) on dividend policy for the period 1982-2010. The study uses the

NASDAQ, AMEX, and NYSE industrial companies. The firm life cycle was measure by company age, risk, and earned capital ratio. Size, investment opportunities, and profitability were incorporated into the model as control variables. The result of the logit regression reveals that the maturity of the firm directly and significantly impacts the firm likelihood of paying dividends. El-Ansary and Gomaa (2012) examine if the prediction of the dividend life cycle theory holds for firms quoted in Egyptian bourse for the period 2005 to 2010 using panel regression to estimate the model. The result shows that retained earnings to total equity have a direct and meaningful influence on dividend pay-outs and this means that the dividend life cycle theory prediction hold for Egyptian firms.

Hassani and Dizaji (2013) examined whether the dividend life cycle theory hold for companies quoted on Tehran bourse and 2006 – 2011 constitute the period of study. The firm life cycle was measured with retained earnings to total equity and retained earnings to assets ratios. The results of the study indicate that the ratio of retained earnings to assets has a meaningful and direct impact on dividend payment; In growing firms the retained earnings to assets ratio are low, But this ratio is high in older/mature firms and these firms have high retained earnings which make them able to pay dividends. Kerstin (2013) carry out a comparative study of the dividend policies of companies in Germany and the Netherland intending to establish whether they follow the proposition of the dividend life cycle theory. 2006 - 2012 constitute the period of study. The firm life cycle was proxy by the retained earnings to total shareholders' equity and retained earnings to total assets ratios (RE/TE and RE/TA). The researchers also include the rate of growth in sales, profitability, and the ratio of cash equivalents/total assets in the model as control variables. The result from the study reveals that in Germany RE/TE and RE/TA has a significant and direct effect on dividend pay-out. Also, all the control variables except ROA were statistically significant. However, for Dutch firms, only TE/TA ratio was statistically significant. The result of the other variables (cash /total assets) is wrongly signed and they fail the significant test.

Shen and Lu (2014) test the dividend life cycle theory of companies quoted in China Bourse using panel data and the period of study was from 2011 to 2013. Logit panel regression was used to estimate the model. Using a comprehensive index – retained earnings to total assets, growth, and profitability- was used to judge the specific life cycle stage. The finding confirms the expectation of the dividend life cycle theory. Yang (2014) examined the nexus between the company's earned/contributed capital mix and dividend decision for the period 1993 to 2012 using companies quoted in NASDAQ, AMEX, and NYSE. The decision to pay dividends was proxy by a dummy variable one (1) if the firm pays dividends and zero (0) if they don't pay dividends. The ratio of retained earnings to total equity was used to measure the earned/contributed capital mix. The logit regression was used to estimate the model. The result indicates that the ratio of retained earnings to total equity is directly linked to the probability that a firm pays dividends.

Wardhana, Tandelilin, Lantara, and Junarsin (2014) investigate the dividend life-cycle theory and inclination to pay dividends by firms listed in Indonesia bourse

for the period 1995 utilizing three measures of life-cycle (retain earning/total equity, firm age, and firm life cycle index). The results from the logit regression with a random effect model constantly reveal that listed firms in Indonesian bourse follow the dividend life-cycle theory. The results further reveal that companies' inclination to pay dividends in Indonesia bourse is diminishing over time. Javid (2014) investigated the nexus between the firm life cycle stage and dividend pay-out for chemical companies quoted in Pakistan for the period 2006 - 2011. The ratio of retained earnings to total equity was used to proxy the life cycle stage of companies. Other variables that impact dividend pay-out such as firm size, growth rate, age, retained earnings, debt/equity ratio, return on earnings, managerial efficiency are also considered. Regression was used in estimating the specified model. The outcomes of the regression show that there is no meaningful link between the life cycle stage of firms and dividend pay-out. Growth rate, debt/equity ratio, and life cycle stage negatively linked with dividend pay-out whereas age retained earnings, firm size and managerial, efficiency, and return on equity have a direct relationship.

Kouser, Luqman, Yaseen, and Azeem (2015) studied the influence of the 2008 financial crunch on dividend pay-out policy, utilizing the life cycle factors of firms quoted on the Pakistani bourse within the period 2001 - 2011 using panel regression. The firm life cycle was proxy by earned/contributed capital mix while size, investment opportunities, and profitability are the control variables. The result reveals that the dividend payment decision of companies' is not determined only by the company's phase in the life cycle, but also by the company financial strength. Behzad and Ali (2015) studied the influence of free cash flow and life cycle stage on dividend policy of companies quoted on Tehran bourse and the period of study was from 2007 to 2011. The outcome of the regression indicates that free cash flow and firm life cycle stage has a significant and direct nexus with the pay-out of dividend. Abdulkadir (2015) studied the factors influencing the choice "to pay" or "not to pay" dividend in the Nigerian bourse for the period 2003 to 2012 using the panel and multinomial logistic regression. Results show a decrease in the fraction of dividend payers and the volume of dividends paid in previous years. Also, profitability retained earnings to total equity, foreign ownership, cash flow, and past dividends were found to be the key factors influencing the choice "to pay" or "not to pay" dividend. However, the empirical result fails to provide any proof in support of the prediction of the dividend life cycle theory.

Miletić (2015) studied the influence of life cycle stage on dividend policy of companies quoted on Croatian bourse for the period 2003 – 2011 using the panel data analysis. The firm life cycle was measure as earned equity/total common equity of the company and earned equity/total assets. Investment opportunities were measure as the company relative growth in sales, ratio of book to market value, and relative growth of total asset while log of book value/total asset was used to the proxy size of the company. Dividend pay-out was proxy by dividend per share/earning per share. The Result shows that investment possibilities were significantly and directly impact dividends which are contrary to the dividend life cycle theory of firms and retained earnings/total equity positively and significantly impact dividend decisions.

Rafique and Javaid (2017) explored the impact of catering incentives (measured by dividend premium) and life cycle theory (measure as earn contributed capital mix) on the propensity to pay and decision to change dividend for non-financial firms quoted on Karachi bourse using a time frame of 1998 to 2009. The result of the logistic regression reveals that company age, profitability, market/book value, growth prospects, and cash holding were directly related to dividend increasing companies and inversely related to dividend decreasing companies. But leverage, taxation, and catering incentives have a direct influence on firms paying a dividend and also for decreasing and dividend omitting companies. The results validate the catering theory while there was little evidence for the dividend life cycle theory.

Major and Ångbäck (2017) investigated whether the 2008/2009 financial crunch impacted the dividend pay-out and also examine whether the dividend life cycle theory holds for Swedish listed firms for the period 2004 to 2012. The firm life cycle theory was captured by retained earnings/total equity (that is, earned/contributed capital mix). Investment prospects, company size, and profitability were the control variables while dividend pay-out was proxy by a dummy variable: 0 when the firm pays dividends for the year and 1 if they do not pay a dividend for the year. The model estimation was carried out using logit regression. The outcome of the logit regression confirms the proposition of the dividend life cycle theory in Sweden. Also, the result reveals that the 2008/2009 financial crunch adversely affected Swedish firms' dividend pay-out.

3. METHODOLOGY

The longitudinal and causal research designs were utilized in this study. The study concentrates on the entire listed non-financial firm in the three (3) selected sub-Saharan Africa Countries Bourses – (Nigeria Bourse, Johannesburg Bourse, and Nairobi Bourse) as at 31st December 2017. A total number of Four hundred and seventy-nine (479) non-financial firms in eleven (11) sub-sectors quoted on the three stock exchanges as of 31st December 2017 make up the population. Taro Yamani (1967) and the sample filtering technique were used to ascertain the size of the sample. The Taro Yamane formula for sample selection is given as $n = \frac{N}{[1+(Ne^2)]}$. **n** is the sample size (sample size of the listed non-financial firms), **N** indicates the entire elements in the population (population of listed non-financial firms used), one (1) is a constant, **e** is the error limit (or margin of error) of which is 5% or 0.05 in this paper. Thus, a minimum sample of 218 non-financial firms that represents 45.5% of all the quoted non-financial firms on the Nigerian, South African and Kenyan bourses are selected from the population using Taro Yamane sample selection technique. However, the final sample size of two hundred and thirty-nine (239) was selected using the sample filtering technique based on data availability and possession of requisite information in the period under focus the following three criteria: availability of annual reports from company's website for the period of study (that is, 2007 – 2017). The breakdown of the subsector of the two hundred and thirty-

nine (239) non-financial firms is as follows: Conglomerates (8), Consumer Discretionary (52), Consumer Staples (37), Energy (11), Healthcare (11), ICT (17), Industrial (32), Materials (51) Real Estate (8), Telecom (9) and Utilities (3). However, the Utility sector was left out of the final analysis because the sample size for this subsector was not enough to carry out the system GMM analysis. Thus, the analysis was done for ten (10) subsectors. To group companies in different countries into industries, a standardized industry classification is often used. Hence, we utilized the Global Industry Classification Standard (GICS).

3.1 THEORETICAL FRAMEWORK

The dividend life cycle theory underpins the model used in this study. The firm life cycle theory of Mueller (1972) has been widely tested in literature with empirical proof, on the nexus between firm life cycle and dividend pay-out (see, DeAngelo et al., 2006; Denis and Osobov (2008) and Thanatawee (2011) among others). Mueller (1972) posits that a firm is designed to take advantage of the 'Schumpeterian innovation' that involves new products, methods, organizational, or marketing strategies. If the innovation ends up being feasible, it will lead to the expansion of the company. The notion will become a reality and doubt associated with it would begin to reduce. In the growth stage, stakeholders would need all funds, and also possibly all the incomes are plowed back into the firm to exploit the new knowledge. It might likewise require raising more funds from external sources to show the idea to a larger market. The competition will commence and improve the idea; as it does, the firm will continue to progress and novel innovation to the adopted product. Ultimately the markets get saturate and the prospects for profit begin to decline. Around this time the stakeholders will not gain from the additional cash invested into the firm because of the dwindling profit opportunities.

A director that intends to maximize profit for the shareholders would rather increase payment of dividends instead of reinvesting. Thus, the life cycle theory of Mueller (1972) proposes that the more mature the company, the more it pays dividends. As the theory posits, a higher amount of the retained income or earnings will show that the firm is very mature. The company begins to accrue retained earnings from the early and growth phase. At the stage of maturity, the company may have a huge share of retained earnings in the equity. The theory states that companies with a huge portion of retained earnings/total equity are a mature company and thus anticipated to pay out more dividends. The retain earnings/total shareholders' equity and the firm age are the key variables that captured the dividend life cycle theory. It is expected that companies with large earned/contributed capital mix, which is measure as ratio of retained earnings to total shareholders' equity and firms that have been in existence for a long time are mature firms and are expected to pay-out dividends.

3.2. MODEL SPECIFICATION

The model used is a modification of the Javid (2014) model. The model is stated in a functional form in equation 3.1 below:

Dividend Payout = *f* (retain Earnings/Total Equity, Firm Age, Profit, Firm Size) (3.1)

The dynamic panel data model is stated in the econometric form in equation (3.2) as:

$DIVPAY_{it} = \beta_0 + \beta_1 DIVPAY_{it-1} + \beta_2 RE/TE_{it} + \beta_3 FAGE_{it} + \beta_4 PAT_{it} + \beta_5 FSZE_i + \tau_t + \psi_i + \mu_{it}$ (3.2)

$\beta_0 - \beta_5$ are coefficients of the parameters to be estimated. The subscripts *i* and *t* denote the specific firms and period (2007 - 2017) respectively. $DIVPAY_{it-1}$ is a lagged dependent variable and its inclusion in the model is to address the possible endogeneity of the explanatory variable which comprised the possibility of variables omission, simultaneity, and error of variable measurement in the context of dynamic panel data technique.

3.3. VARIABLES DESCRIPTION

$DIVPAY_{it}$ = Dividend pay-out of the firm i at period *t*

$DIVPAY_{it-1}$ = Value of the lagged (previous) dividend pay-out of the firm i at period *t*

RE/TE_{it} = Retained earnings/total shareholder equity of firm i at period t.

$FAGE_{it}$ = Age of firm i at period t.

PAT_{it} = After-tax profit margin of firm i at period t**.**

$FSZE_{it}$ = Firm size i at period t.

τ_t = effect of time.

ψ_i = firm specific fixed effects.

μ_{it} = the stochastic term of firm *i* at period t.

The *a priori* expectations of the study are of the form: $\beta_1>0$, $\beta_2>0$, $\beta_3>0$, $\beta_4>0$, $\beta_5>0$.

From theory, it is expected that previous year dividend pay-out, retain Earnings/Total Equity (that is, earned/contributed capital mix), firm age, profitability, and size of firm are anticipated to be directly linked with dividend pay-out.

3.4. OPERATIONALIZATION OF VARIABLES

The variables adopted are defined in Table 3.1 below and the previous researcher who utilizes the variable in their study is also indicated.

Table 1. *Operational definitions of the variables*

S/N	Variable	Nature of Variable	Measurement	Sources
1	Dividend Payout (DIVPAY)	Dependent Variable	Total yearly dividends paid divided by the Net profit of the company	Hommel (2011)
2	Earned/Contributed Capital mix (RE/TE)	Independent Variable	Total retained earnings/total shareholder equity	DeAngelo, et. al.,(2006).
3	Firm Size (FAGE)	Independent Variable	Firm listing age	Von Eije & Megginson (2008)
4	Profitability (PAT)	Independent Variable/Controlled variable	Profits after tax divided by sales	Agha, et al., (2017)
5	Firm Size (FSZE)	Independent Variable/Controlled variable	The logarithm of total asset	Fodi and Walid (2010)

Source: Compilation of the Researcher's, 2018.

3.5. METHODS OF DATA ANALYSIS

In this paper, descriptive and inferential statistical techniques are used to perform the data estimation. The descriptive statistics include descriptive and correlation analysis. In terms of the inferential statistic, we employed the dynamic panel data regression technique.

4. EMPIRICAL ANALYSIS

4.1. STATISTICAL ANALYSIS

4.1.1. DESCRIPTIVE STATISTICS

The descriptive statistics are reported in Table 4.1 and it contains overall averages across sectors as well as higher moment conditions that guarantee the evaluation of the appropriateness of the panel data analysis. The mean (average) dividend pay-out is $28.47, which is relatively high over the period. There are however very large maximum and also very low minimum values, suggesting that some firms have had quite high pay-outs while others have had very low pay-outs over the period. These large discrepancies are shown in the extremely large coefficient of variation (CoV) value of 80. 81. Moreover, the skewness value of -12.2 indicates that most of the reported dividend pay-out values were higher than the mean value reported in Table 4.1. This implies that few extremely low values were recorded for some of the firms.

Table 1. *Descriptive statistics*

Variable	Mean	Max.	Min.	Std. Dev.	CoV	Skewness	J-B	Pr.
Divpay	28.467	72739.2	-91700	2300.5	80.81	-12.2	1980.0	0
re_te	41.224	69701.1	-2160.1	1382.3	33.53	49.1	6640.0	0
Fage	24.324	123	0	18.5	0.759	1.3	1432.4	0
Pat	-18.451	6946.5	-13191.9	503.5	-27.28	-16.9	1602.0	0
Size	11.774	17.22	0	2.3	0.191	-1.2	3839.6	0

Source: Author's computations, 2018.

The J-B value for the dividend pay-outs (*divpay)* is very high at 1980.0 and it passes the significant test at the 1 percent level. This indicates that the *divpay* series are highly non-normally distributed in terms of their probability functions. Hence, the panel data appears to be extremely heterogeneous with large reflections of the firm- or sector-specific influences. This shows that the use of panel data analysis technique is quite appropriate for the analysis. The J-B value is consistently high for each of the variables in the panel analysis.

4.1.2. CORRELATION ANALYSIS

Table 4.2 reports the initial patterns of association between pairs of variables in the model using the correlation analysis. In particular, we seek to establish the strength and direction of the relationships among the explanatory variables in the specified models.

Table 2. *Correlation matrix*

	Divpay	re_te	Fage	Pat
re_te	-0.06			
	(1.00)			
Fage	0.019	-0.003		
	(0.33)	(0.87)		
Pat	0.000	0.002	0.032	
	(0.99)	0.94	0.11	
Size	-0.015	-0.034**	0.201**	0.038**
	(0.45)	(0.09)	(0.00)	(0.05)

Note: * and ** means significance at 5% and 1% respectively.
Source: Researcher's computations, 2018.

From Table 4.2, it is seen that the retain Earnings/Total Equity (that is, earned/contributed capital mix) has an insignificant relationship with each of the other variables in the analysis, suggesting that this variable does not move together with any of the other variables, including firm age. Firm age, in contrast, has a positive correlation with firm size which shows that older/mature firms are generally large. The correlation analysis also indicates that profit has no significant correlation with the other explanatory variables whereas the size of the firm was significant and directly linked to all the explanatory variables.

4.2. PANEL UNIT ROOT ANALYSIS

In the GMM estimation procedure, data used are assumed to be time-invariant and to possess mean and variances that are constant over time. Thus, the first stage in analysing panel data is to test the characteristics of the time series in the data, beginning with the test of stationarity. Given that panel data are utilized in the study, a panel unit root test is therefore adopted in confirming the features of the time series of the data. Thus, the unit root tests should possess firm-specific characteristics, different from the pure time series analysis. This is done through the homogenous panel unit root tests [Levin, Lin & Chu (LLC)] and heterogeneous panel unit root tests [Im, Pesaran, and Shin (IPS) and Augmented Dickey-Fuller Fisher test]. Both tests' outcomes are shown in Table 4.3. Indeed, if the data possess mean and time-dependent variances then the panel is said to be non-stationary and would not likely generate estimates that are efficient or consistent.

Table 3. *Result of the panel unit root test*

	Homogeneous Unit Root Process				**Heterogeneous Unit Root Process**			
	Level		**1st Diff**		**Level**		**1st Diff**	
Variables	**LLC**	**Breitung**	**LLC**	**Breitung**	**IPS**	**ADF-Fisher**	**IPS**	**ADF-Fisher**
re_te	-13.8**	-1.13	-7.49**	-5.01**	-2.18**	51.1**	59.9**	97.9**
Pat	-0.99	-0.51	-7.95**	-4.18**	1.75	51.7	-3.27**	109.6**
Size	-8.11**	-1.02	-6.48**	-3.00**	-0.89	117.5	-2.96**	166.6**

Note: * and ** indicate significance at 5 and 1 percent respectively.
Source: Author's computations

From Table 4.3 of unit root tests result, the levels variables are all significant concerning the test statistics at either the 1 percent levels based on the LLC, IPS, and ADF-Fisher tests. Only the Breitung test reports non-significant test values for all the variables in levels. This shows that for all the variables, the null hypothesis of the stationarity should be accepted and cannot be rejected in levels, suggesting that the variables among the firms do not follow a defined pattern of movement over any given period. The variables are not time-dependent. However, the result also shows that for the first difference variables, all the test statistics are significant, thereby resulting in the rejection of the null hypothesis of no unit roots in the first differences. These results stoutly signify that most of the variables are stationary both in level and at first differences. The homogenous and heterogeneous panel unit root tests also support this finding since the variables are also stationary after the first difference; we then go on to ascertain their long-run relationship. Note that the test for firm age is excluded since the variable is exclusively time-based.

4.3. PANEL COINTEGRATION TEST

Since we have confirmed that the panel series in the analysis are characterized by unit-roots, and are integrated of order I(I), there is a need to

investigate if they are cointegrated. The result from the Pedroni's and Kao panel cointegration tests as display in Table 4.4.

Table 4. *Panel cointegration test results*

Pedroni Test					**Kao Test**
Eqtn: a Governance mechanism					
Alternative hypothesis: common AR coefs. (within-dimension)					
	Statistic	Prob.	Weighted Statistic	Prob.	-4.684 Probability = 0.00
Panel v	-10.77	1	-11.82	1	
Panel rho-	15.93	1	15.94	1	
Panel PP-	-21.01	0	-24.96	0	
Panel ADF-	0.11	0.54	-2.54	0.0056	
Alternative hypothesis: individual AR coefs. (between-dimension)					
Group rho-	21.68	1			
Group PP-	-41.89	0			
Group ADF-	-2.73	0.00			

Source: Author's computations, 2018.

Given that the study focuses on the long run, the test for the presence of a regular stochastic trend was carried out in this paper because the focus of the study is on long and integrated processes. This involves the presence of a cointegrating relationship between dividend and firm life cycle variables. This test also helps to confirm the application of the GMM technique in the estimation. Table 4.4 reveals the test result for the Pedroni's and Kao panel cointegration on the series that is between the dependent variable and the independent variables for the specified model. The calculated value of the statistics based on estimators that pool the autoregressive coefficient across different countries for the unit root tests on the estimated residuals is shown on the columns labelled within-dimension while the calculated figure of the statistics based on estimators that average individually computed coefficients for each country is shown on the section labelled between-dimension. In the test results, the null hypothesis is "there is no cointegration among the variables".

From the outcomes of the test, it is obvious that for the tests based on Pedroni residual, all reported values are significant at the 1 percent level for both the grouped and ungrouped tests. All test processes, including rho, PP, and ADF are significant for both the within and between tests (at the 1 percent level). Hence, the null hypothesis of no cointegration for the combination of the variables, with each of the dependent variables is rejected.

4.4. ANALYSIS OF THE GMM ESTIMATES

The results of the estimated model that was specified in the previous section are presented and analysed in this section. The goal is to demonstrate the appropriate aspects of the results estimated in terms of its overall importance, the relevance of

the individual coefficients, as well as the usefulness of the equations for hypotheses testing. The estimated equations are based on the dynamic panel data (DPD) estimations using the system GMM. Hence, the estimations do not report the constants or the regular diagnostic test outcomes (such as the R-squared and its adjusted counterpart, or the F-values). Rather the focus is on the appropriateness of the selected instruments (based on the Hansen J-statistic), and the Arellano-Bond AR tests for autocorrelations of the differenced terms. While the J-statistic measures the appropriateness of the instruments used for the GMM estimation, the Arellano and Bond (AB) test is employed to ascertain the system of autocorrelation among the differenced stochastic terms.

4.4.1. FIRM LIFE CYCLE EFFECT ON DIVIDEND PAYOUT

The outcomes of the panel estimations of the effect of the firm life cycle on pay-out of dividend for listed non-financial firms in the three selected Sub-Saharan Africa countries are presented in Table 4.5. Both the instruments and serial correlation tests are impressive based on the diagnostic indicators. The Hansen-J statistic probabilities are in the region that suggests an appropriate selection of instruments used for the GMM estimation. Also, the Arrelano-Bond AR statistic for the first and second lags both show that the estimates are free from serial correlation for the panel variables in levels.

Table 5. *Results of the influence of firm life cycle on dividend pay-out*

	1		**2**		**3**	
Variable	**Coefficient**	**Prob.**	**Coefficient**	**Prob.**	**Coefficient**	**Prob.**
divpay $_{t-1}$	-0.002	0.83	0.215**	0.00	-0.002	0.827
re_te	0.023	0.93	0.012	0.43	-	-
Fage	-1.904**	0.00	-	-	-1.905**	0.000
Pat	0.014**	0.00	0.008	0.29	0.001**	0.005
Size	0.744**	0.00	0.190	0.08	0.744**	0.000
Hansen J-stat (prob.)	0.139		0.188		0.234	
A-B AR(1)	-10.25**		-8.29**		-10.22**	
A-B AR(2)	-2.36*		0.37		-2.37*	
N	2629		2629		2629	

Note: * and ** indicate significance at 5 and 1 percent levels respectively
Source: Author's computations, 2018.

The lagged dependent variable coefficient is only significant for the estimate that contains only as the life cycle factor. This suggests that only RE/TE (that is, earned/contributed capital mix) has the capacity of ensuring log run equilibrium for the dividend pay-out. The implication of this is that while firm age does not contribute to the stability and long-run sustenance of dividend pay-out, the proportion of earned to the contributed capital mix of the firms tends to ensure such

stability. Thus, it is not the age of firms that makes the firms continue a particular dividend pay-out structure; it is the nature of earned/contributed capital mix in the firms. The results however show that retain Earnings/Total Equity, that is, earned/contributed capital mix in the firms has no meaningful influence on pay-out of dividend, irrespective of whether firm age is controlled for. Thus, it is seen that it does not matter whether a larger proportion of capital was earned or contributed concerning the structure of the pay-out of dividends by the firms. In contrast, the coefficient of firm age passed the test for both the baseline estimates and the controlled result. The coefficient is also negative and shows that firm age significantly and adversely influence dividend pay-out. This implies that the older the firms, the fewer chances of paying high dividends. With reference to the control variables, the result reveals that profitability exerts a direct and meaningful impact on pay-out of dividend. Lastly, the influence of firm size on the pay-out of dividends was direct and significant. This finding implies that as the firms grow bigger its pay-out of dividends will also rise.

4.5. DISCUSSION OF FINDINGS

The retain Earnings/Total Equity (that is, earned/contributed capital mix) exerts a direct and insignificant impact on dividend pay-out of listed firms in selected Sub-Saharan Africa countries. Therefore, the retain Earnings/Total Equity, that is, earned/contributed capital mix in the firms does not have a meaningful effect on dividend pay-out, irrespective of whether firm age is controlled for. Thus, it is seen that it does not matter whether a larger proportion of capital was earned or contributed with respect to the structure of dividend pay-out by the firms. The finding is not in tandem with the prediction of the life cycle theory of dividends. This outcome is consistent with that of Von-Eije & Megginson (2008); Javid (2014) and Abdulkadir (2015) who found that the proportion of retained earnings to total equity has no meaningful impact on pay-out of dividend. The result however contradict the results of De Angelo et al. (2006); Coulton & Ruddock (2011); Hauser (2012); Kerstin (2013), Yang (2014), Miletic (2015) Major & Ångbäck (2017) who found a significant and direct nexus between the proportion of retained earnings to total equity and pay-out of dividend.

The firm's age has a meaningful and indirect impact on the pay-out of the dividend of quoted non-financial firms in selected Sub Saharan Africa countries. The implication of this finding is that mature/long established companies having low growth and investment potentials are not expected to pay-out dividends. This outcome is not in tandem with the *firm life cycle* and the free cash flow theory of dividends. These results are inconsistent with the prior research of Von-Eije & Meggainson; Afza & Mirza (2011); Hauser (2012) and Javid (2014), who found that the age and the pay-out level are directly and significantly related.

Lagged or previous year value of dividend pay-outs is found to have a direct and meaningful effect on the current year dividend. The implication of this is that previous year payment of dividend increase the likelihood of payment of dividend for the current year. This finding is in support of Lintner (1956) and Twu (2010).

Profitability is found to exert direct and meaningful influence on the pay-out of dividends. These findings imply that an increase in profitability will bring about an increase in dividend payment. Therefore, individual investor who desires high dividend should invest in the profitable firms, while management should announce the dividend after considering their profit. The significant positive nexus found between profit and pay-out of dividends is in tandem with the results of Denis & Osobov (2005), Coulton & Ruddock (2011), Afza & Mirza (2011), who have reported a direct nexus between profitability and dividend pay-outs. Profitable companies are likely to pay a higher amount of dividends. This finding agrees with the agency costs hypothesis. Finally, firm size exerts a significant and direct impact on the pay-out of dividends for listed non-financial companies in the selected Sub Saharan Africa countries. The implication of this is that bigger companies the higher dividend they will pay. This outcome is in tandem with that of Denis & Osobov (2008) and Coulton & Ruddock (2011) who reported a direct and significant link between company size and dividend pay-out.

5. CONCLUSION AND RECOMMENDATION

5.1. CONCLUSION

Dividend life cycle theory proposes that the more mature the firm, the more it pays dividends. The theory predicts that firms with high earned/contributed capital mix, which is measure as ratio of retained earnings to total equity and firms that have been in existence for a long time are mature companies and are more likely to pay-out dividends. The goal of this paper was to empirically test this theory using data of non-financial firms in selected Sub-Saharan Africa countries (Nigeria, South Africa, and Kenya) spanning the period 2007 to 2018. The system GMM estimator was employed in estimating the model. The outcomes of the empirical analysis revealed that earned/contributed capital mix in the firms has no meaningful influence on pay-out of dividend, irrespective of whether firm age is controlled for. Thus, it is seen that it does not matter whether a larger proportion of capital was earned or contributed to the structured pay-out of dividends by the firms. Conversely, the coefficient of firm age passed the test for both the baseline estimates and the controlled result. The coefficient is also negative and shows that firm age exerts an inverse and meaningful influence on the pay-out of dividends. This implies that the older/matured the firms, the fewer chances of paying high dividends. Thus, the outcome of this study is not in tandem with the dividend life cycle theory prediction.

5.2. RECOMMENDATIONS

Based on the findings it is necessary to make policy recommendations. It is recommended that:

(i) Shareholders must consider other means of sustaining dividends for firms that are mature since mere age will not guarantee dividend pay-out. More work needs to be put in place by shareholders who seek more dividends, especially

as the study has shown that larger proportions of contributed resources in the capital mix may reduce dividend pay-out by the firms.

(ii) Regulators in the selected Sub-Sahara Africa countries stock markets should not consider the life cycle stage of the firms concerning payment of dividends. Payment of dividends by companies should be a function of the level of profit, and actions should only be taken against those firms who do not pay dividends although they should be able to pay, according to their level of profitability and not whether they are mature firms.

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