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Original Research Article

Effect of the Theory of Life Cycle on Size of Firms in Nigeria Brewery Industry

Dr. Inyiama Oliver Ikechukwu * and Nwankwo Caroline Nkechinyere

Department of Accountancy, Enugu State University of Science and Technology, Enugu State, Nigeria

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ABSTRACT

The study aims at examining the effect as well the magnitude and nature of relationship between firm size and firm age in Nigeria brewery industry from 2004 to 2014. Ordinary least squares method in the form of multiple regression was applied in the analysis, while stationarity test was conducted using the Augmented Dickey- Fuller (ADF) and Phillip Perrons (PP) tests. The outcome of the analysis reveals that firm size is significantly and positively affected by firm age. This implies that as firm increases in age, especially in the capital intensive brewery industry, the firms tend to grow in asset size to meet up with increasing demand for their brands and to also remain competitive. There is no causality running from either FMSIZE to FMAGE or from FMAGE to FMSIZE, both at 1 year and 2 years lagged periods. The implication is that Firm Age does not granger cause Firm Size and vice versa. A positive correlation between firm size and firm age was also indicated from the analysis. This implies that firm size and firm age change/increase in the same direction in the sector. The import of these findings is that in line with life cycle theory, firms in technology driven brewery sector tend to grow in asset base from their growth stage through the maturity stage and when they mature, tend to slow down the growth of their asset base as they concentrate more on giving shareholders returns on their investment.

KEYWORDS: Age, Size, Brewery, Life Cycle, Regression, Nigeria.

1.0 INTRODUCTION

Firms are classified into two distinct life cycle stages, namely growth and maturity. We focus on a snapshot of a firm's history where these stages are more easily determined. Prior work on firm life cycles (Miller and Friesen, 1984) has found that, on average, each stage lasts for six years. Among other things, as cited by Drobetz, Halling and Schröder (2015), the economics literature connects production and investment behavior (Jovanovic and MacDonald (1994)), experience and learning (Spence (1981)), and competition as well as market share (Wernerfelt,1985)) to the corporate life-cycle. They emphasized that, when they refer to the corporate life-cycle, they think about firms following different strategies in different stages to deal with varying constraints and challenges.

*Corresponding Author's E-mail: inyiamaik@yahoo.com

Gort and Klepper [1982], as cited in Zahra and Zadeh (2015), have defined five stages of the life cycle in an assumptive market, that include:

1. Introduction stage: a stage in which the first innovation is formed
2. Growth stage: a stage in which the number of producers is increasing
3. Mature stage: a stage in which the number of producers reaches its maximum
4. Shake-Out stage: a stage in which the number of producers is decreasing
5. Decline stage: a stage in which the net amount of entering the industry is almost zero.

These stages are the results of change in internal factors (such as selecting the strategy, financial resources, management ability) and external factors (such as competitive environment and macroeconomic factors), that most of them are created by strategic activities of the firms. Reviewing the economy theory that includes production behavior, learning, experience, investment, input and output models and the market share, indicates the unique features of the firm life cycle theory [Dickinson, 2011].

Introduction stage: In this stage, the most important special feature of the firms is that they are young, are directed by their owners, and have non-official organizational structure [Stepanyan, 2012, Miller and Friesen, 1984]. The firms enter the market with their incomplete information about the quality and quantity of their products, and get familiar with their potential and actual abilities by starting the operation through accounting and operational feedback. The more ambiguous these feedbacks are, the more risky the second investment for the firm is. So, the firms with higher unreliability level invest less because of risk management [Moors and Yuen, 2001, Miller and Friesen, 1984].

Growth stage: The firms make many investments in this stage due to optimistic expectations related to their abilities (including cost structure and competitive advantage). These investments (primary & surpositive) do not just include tangible and financial assets, but contain organizational capital such as investment in distributional systems, productive infrastructure, and technological ability. Hence, the firms can earn temporary exclusive benefits [Spence,1979]. The studies indicate that although the extent of demand for the products may be increasing, the products of the firms may not still been generally accepted by the consumers; of course they are more acceptable comparing with the emergence stage of the goods [Jovanovic, and MacDonald, 1994,Cox,1967].

Mature stage: The capacity of primary investment to meet the high market demand in the mature stage is sufficient and the firm will produce more input cash flow [Nissim, and Penman, 2001]. In this stage, the primary and second investments are obsolete; and their obsolescence depends on technological power of the industry [Jovanovic,1982]. Compared to the firms in other stages of life cycle, active firms have fewer changes in maturity stage. Stable environment leads to financial results that will not deviate much from the results of the previous year. Commercial risk of the maturity stage is relatively less than other stages of the life cycle [Barclay, and Smith, 2005].

Shake-Out stage: In case that the firms cannot restart their operation through structural changes (such as achievement, merging, and specific participation) or cannot enter new markets, entering the recession stage will be imminent. The firms try to convert their non-productive assets to cash or in other words, convert these resources to projects that create positive return [Gort, and Klepper, 1982].

Decline stage: In decline stage, if growth opportunities exist, they are limited. By the firms entrance to decline stage, commercial risk is also increased; as a result, the cost of financial supply of the firm is very high [Aharony and Yehuda, 2006]. Generally, in this stage the firm faces reduction of sale extent and also technology substitution or even outdated products. In this stage the revenue of the firm is probably the minimum or negative and the investment return will be low usually because of the limited investment opportunities, general market drop, and operation loss [Livant and Zarowin, 1990].

Drobetz, Halling and Schröder (2015) observed that an important conceptual advantage of Gort and Klepper [1982] classification is that it does not imply a strict sequence across the stages of the life-cycle and,

in contrast, allows firms to dynamically move back and forth between stages.

DeAngelo, DeAngelo and Stulz (2010), in their study used years a firm is listed as proxy for the life-cycle stage; just as Dittmar and Duchin (2011) also adopted firm age since initial public offer (IPO), as a measure of the corporate life-cycle. The life cycle theory in terms of dividends by DeAngelo et al (2010) as cited in El-Ansary and Gomaa (2012), emphasized that dividends tend to be paid by mature, established firms, plausibly reflecting a financial life cycle in which young firms face relatively abundant investment opportunities with limited resources so that retention dominates distribution, whereas mature firms are better candidates to pay dividends because they have higher profitability and fewer attractive investment opportunities. Hence, the more tangible the firm's assets, the less it relies on retained earnings for its growth plans, having more cash to be distributed as dividends (Al-Ajmi and Abo Hussain, 2011).

Inyiama and Ekwe (2014) disclosed that breweries in Nigeria especially the Nigeria Breweries Plc and Guinness Nigeria Plc, the leaders of the highly capital intensive industry in Nigeria, create reserves for long-term capital investment projects or other large anticipated future expenditures. They emphasized that the reserve is made to guarantee availability of fund to finance their anticipated projects which might include fixed asset replacements. The sector was confirmed by Inyiama and Ekwe (2014) as capital intensive as firms invest so much on heavy equipments and other fixed assets resulting in huge capital outlay which has to be accumulated over their life cycle.

The study examines the effect of the theory of life cycle on size of firms in Nigeria brewery industry. The specific analysis will include the determination of causality, magnitude, nature of effect, relationship between dividend per share and net asset value per share in the Nigeria Oil and Gas Sector. The rest of the research paper is organized into four sections as follows: Section 2 undertakes the review of existing literature in the area of study, section 3 states the methodology to be adopted, section 4 reviews empirical findings while section 5 concludes.

2. REVIEW OF RELATED LITERATURE

Loderer and Waelchli (2009) observed that over time, firms slowly lose their ability to compete, as if they were living organisms; Tobin's Q ratios decline and profits fall. They identified two reasons that could cause corporate aging. The first reason is consistent with cementation of organizational rigidities, costs rise, margins thin, growth slows, assets become obsolete, and investment and R&D activities decline as firms get older. Secondly, aging also seems to advance the diffusion of rent-seeking behavior: corporate governance worsens and CEO pay goes up. Therefore, firms seem to face a serious aging problem.

Leung, Meh and Terajima (2008) examined the relationship between firm size and productivity and in contrast to previous studies, their paper offers evidence of the relationship not only from manufacturing firms, but from non-manufacturing firms as well. Furthermore, the aggregate importance of the firm size productivity relationship is gauged by calculating to what extent shifts in the distribution of employment over firm size categories has affected Canadian aggregate productivity, and whether differences in the employment distribution over firm size categories between Canada and the United States can account for the Canada-U.S. labour productivity gap. The importance of large and small firms to changes in productivity was also examined. A positive relationship between firm size and both labour productivity and TFP was found in both the manufacturing and non-manufacturing sectors. Given this relationship, the difference in the employment distribution over firm sizes between Canada and the United States can account for half of the Canada-U.S. labour productivity gap in manufacturing.

Zare, Farzanfar and Boroumand (2013) assessed the firm size, asset structure and age effects on financial leverage; in line with this and by virtue of the most known theories presented in field of capital structure (Pecking Order Theory and Tradeoff Theory) three factors namely firm size, asset structure and age have been defined as the variables influencing financial leverage. In the next step the influence of these factors was examined on financial leverage by virtue of different life cycles (Growth, maturity and decline steps). That is why the data necessary for the study were gathered from 69 firms member of Tehran stock

exchange in 2001–2010. The gained evidences indicated that the firms' financial leverage is influenced by the three variables, namely the firm age, size and asset structure in the firms listed in Tehran stock exchange. Also the firms' life cycle influences the managers' decisions to secure finance.

Ciriaci, Moncada-Paternò-Castello and Voigt (2012) examined serial correlation in employment, sales and innovative sales growth rates in a balanced panel of 3,300 Spanish firms. The main objective was to verify whether the changes (increase/decrease) in these figures are persistent over time, whether such persistence (if any) differs between SMEs and larger firms, and if it is affected by a firm's age. To do so, they adopted a semi-parametric quantile regression approach. This methodology is well suited to cases where outliers (high-growth firms) are the subject of investigation and/or when they have to be assumed as being very heterogeneous. Empirical results indicate that among those innovative firms experiencing high employment growth, the smaller and younger grow faster than larger firms, but the jobs they create are not persistent over time. However, while being smaller and younger helps growing more in terms of employment and sales, it is not an advantage when innovative sales growth is considered: in this case larger firms experience faster growth.

The implications of labour and capital market imperfections for the relationship between firm size and earnings were investigated by Söderbom, Teal and Wambugu (2002). To establish that such a question is of interest, they need to show that the firm size-wage effect cannot be explained by either the observed or unobserved skills of the workforce or the characteristics of the workplace. To do that, they require data where controls are possible for observable time-varying firm and worker characteristics, as well as the unobservable characteristics of both the firm and its workers. Their data is a sample of workers matched with firms over time so such controls are possible. Changes in wages are shown to respond to changes both to profits per employee and the size of the firm. It is argued that these empirical results clearly reject the hypothesis that the firm-size relationship can be explained by the skills of the workers. They can be shown to be consistent with some forms of non-competitive theories of bargaining and efficiency wages.

The relationship between productivity growth, firm size and age was investigated by Palangkaraya, Stierwald and Yong (2005). They asked the question: Are older and/or larger firms more productive? Their paper focused on large Australian firms, i.e., those that employed more than 100 employees, or have assets in excess of $100 million. Making use of the IBISWorld data set, they estimated a translog cost function. The estimated cost function in turn allowed them to construct a productivity index of firms. The results show that larger and older firms are less productive, but the evidence is less than conclusive. They also investigate the variability of firms' productivity by constructing a series of transition matrix. The evidence appears to suggest a strong degree of inertia in firms' productivity position within an industry.

Navaretti, Castellani and Pieri (2012) provide new insights on the firm age and growth nexus along the entire distribution of (positive and negative) growth rates. Using data from the EFIGE survey, and adopting a quantile regression approach they uncovered evidence for a sample of French, Italian and Spanish firms in the period from 2001 to 2008. After controlling for several firms' characteristics, country and sector specificities they found that: (i) older firms are less likely to grow fast, but they experience the same probability of shrinking a lot than younger counterparts; (ii) several qualitative characteristics of the firm linked to its growth attitude, like the age of the CEO, the qualification of the labor-force and its degree of involvement in R&D activities, the innovation attitude of the firm are also significantly related to the process of growth, especially for those firms which grow the most (fast-growing firms). Overall, their results suggest that the process of firm growth is the result of a combination of 'learning' and willingness to grow.

Vlachvei and Notta (2008) examined the impact of firm level variables on the growth of firms operating in Greece. Using models of optimal firm size as a theoretical framework, the paper analyzes empirically the factors affecting the growth of Greek firms. The study is based on financial data of 178 manufacturing

and trading firms, which are present in Greek Stock Market. The financial data set covers the period 1995-2000. Growth rate is defined in terms of the number of employees and sales. In the estimation of growth rate, we control for various factors characterizing the sample firms, their capital structure and performance. Their results show that the relationship between growth, size and the age of firms is very sensitive with respect to the methods of estimation and growth and size definitions.

Using the Dickinson's (2011) life cycle stages of firms, based on the distinction between operating, investing and financing cash flows, Castro, Tascón and Amor-Tapia (2012) examine the different behavior of the traditionally found explanatory variables across the stages. Taking a wide sample of public companies from UK, Germany, France and Spain, they found that the capital structure explanatory factors evolve across the life cycle stages, changing or rebalancing the prevalence of the static models in play, trade-off, pecking order, and market timing.

Oskouei and Zadeh (2015) investigated the future stock return considering the features of different stages of the life cycle based on the cash flow statement. In their research, the stock return has been considered as dependent variable, Earning per share and the change in earnings as independent variables, and risk factors (the book value of equity to the market value of equity ratio, loss, firm size, market model beta) have been considered as control variables. Firstly, the statistical sample has been separated using cash flow pattern to the firms at the stage of the Introduction, Growth, Mature, Shake-Out and Decline, then in order to analyze the raw data and converting them to the information needed for making decision about hypotheses and explaining the relationships among the variables, the regression testing is used. The results obtained from the investigation of 1123 firms-years during the period indicate that generally, the change in earnings per share has significant and positive effects on predicting the future stock return. But the effect of the earning per share on future stock return is insignificant and positive. In addition, the results of the test show that the lowest of the book value to market value ratio in mature stage has a positive effect on future stock return and the highest ratio in this stage has a negative effect on future stock return.

Drobetz, Halling and Schröder (2015) examined corporate life-cycle and valuations of cash holdings. Their results indicate that firms' cash policies are markedly interacted with their strategy choices. While firms in early stages and post-maturity stages hold large amounts of cash, cash ratios decrease when firms move towards maturity. Much of this variation in cash holdings is attributable to a changing demand function for cash over the different life-cycle stages. Trade-off and pecking order motives are of different importance for cash policies dependent on a firm's life-cycle stage. An additional dollar in cash is highly valuable for introduction and growth firms, while a dollar in cash adds, on average, less than a dollar in market value for firms in later life-cycle stages, most likely due to increasing agency problems. Most of the dynamics in cash holdings are observed at life-cycle transition points rather than during the different life-cycle stages. Finally, the secular trend in cash holdings seems strongly attributable to increases in cash in the introduction and the decline stage.

El-Ansary and Gomaa (2012) shared the view that according to life cycle theory of dividends, dividends tend to be paid by mature firms while young ones face relatively abundant investment opportunities with limited resources so that retention dominates distribution. El-Ansary and Gomaa (2012) test this theory in the Egyptian market using a sample of the most active 100 companies during the period 2005-2010. They used a random-effects panel data model after controlling for the firm's characteristics. They found that returned earnings to total equity ratio has highly significant and positive effect on dividend and that total equity to total asset ratio has no effect. Accordingly, the only part of the shareholder equity that affects dividend is the retained earnings indicating that earned capital not contributed is the main determinant of dividend. This provides evidence for the existence of the life cycle theory of dividends in Egypt. In addition, profitability has a significant positive effect on dividend, the higher the profitability of the company the higher the dividend distributed. Ownership structure has no effect on dividend except

public companies and private holding which have a positive and significant effect on dividend.

Yang and Hong (2014) examines what determines firm growth over the life-cycle. Exploiting unique firm panel data on internal organization, balance sheets and innovation, representative of the entire Canadian economy, they studied recent theories that determine life-cycle patterns for firm growth. These theories include organizational capital accumulation and management practices, financial frictions, learning about demand, and recent endogenous growth models with incumbent innovation. They emphasized the importance of differentiating between pure age effects of these theories and effects on size conditional on age. Their stylized facts highlight both empirical successes and shortcomings of current theory. First, models of organizational capital and innovation are broadly consistent with firm size correlations conditional on age but have difficulties matching the life-cycle dynamics of firm organization and innovation. Second, among theories they analyzed, organizational capital and management practices are the most important determinants to explain intensive margin firm growth over the life-cycle. Third, although less important to explain intensive margin firm growth, financial frictions are an important determinant of firm exit, conditional on firm age.

Thanatawee (2011) examined dividend policy of Thai listed companies over the period 2002-2008. The results show that larger and more profitable firms with higher free cash flows and retained earnings to equity tend to pay higher dividends. In addition, the evidence indicates that firms with higher growth opportunities, proxied by market-to-book ratio, tend to pay lower dividend payout ratio but higher dividend yield. Collectively, the findings from this paper provide much support for the free cash flow and life-cycle hypotheses. Further, it is found that financial leverage is positively related to dividend payouts, a finding which casts doubt whether Thai firms rely on debt to pay dividends.

Kim and Suh (2009) presented evidence of a distinctive inverted-U-shaped relation between leverage and retained earnings (RE) ie proxy for financial life cycle stage. Their results suggest that (i) low-RE firms have low leverage because of their heavy reliance on external equity due to financial constraints, (ii) medium-RE firms have high leverage because of their active use of debt in funding high growth, and (iii) high-RE firms have low leverage because of their ability to generate internal funds that exceed funding requirements. The traditional leverage regression that does not account for this inverted-U-shaped relation grossly underestimates the leverage of medium-RE firms but overestimates the leverage of low- and high-RE firms. The data show that retained earnings convey information about both asset growth and profitability. Thus, the inverted-U-shaped relation arises because capital structure decisions are determined by the interplay between funding requirements (i.e., asset growth) and the availability of internal funds (i.e., profitability). They found that the relation between leverage and profitability is also inverted-U-shaped and reflects a similar interplay between funding requirements and the availability of internal funds.

Bulan and Yan (2010) identified firms according to two life cycle stages, namely growth and maturity, and test the pecking order theory of financing. They found a strong maturity effect, i.e. the pecking order theory describes the financing behavior of mature firms better than growth firms. Their findings show that firm maturity is an alternative proxy for debt capacity. In particular, mature firms are older, more stable and highly profitable with good credit histories. Thus, they naturally have greater debt capacity. After controlling for firm maturity, the pecking order theory describes the financing behavior of firms fairly well.

3.0 METHODOLOGY

- **Data**

Annual data was obtained for firm age and firm size from annual report and accounts of Guinness Nigeria Plc and Nigeria Breweries Plc from Nigeria Stock Exchange website .

- **Description of Variables under Study**

Firm Age (FmAge): This is the age of the firm from the date of incorporation (1950 for Guinness Nig. Plc and 1946 for Nigeria Breweries Plc).

Firm Size (FmSize): This is the sum total of Current Assets and Fixed Assets of the firms under consideration. The study centres on the two biggest firms in the Nigeria brewery sector in terms of firm size, i.e. Guinness Nigeria Plc and Nigeria Breweries Plc.

The research variables were structured into dependent and independent variable for the purpose of analysis. The dependent variable of the study is firm size (FmSize) while the independent variable is firm age (FmAge). The study used simple regression analysis in the form of Ordinary Least Square (OLS) method to test the effect of (FmAge) on firm size (FmSize) of selected firms in Nigeria brewery sector. Correlation analysis is applied to determine the extent of the relationship between firm size (FmSize) and firm age (FmAge).

$FmSize_{ti} = \beta_o + \beta_1 FmAge_{t-1i}, + et$
……(1)
Where,
FmSize = Firm Size
FmAge = Firm Age
B_o = Coefficient (constant) to be estimated
t = Current period
t-i (i = 1) = One year lag period
e = Stochastic disturbance (error) term

The EViews software provides the signs and significance for interpretation of the result for test of regression and correlation analysis. The output from Eviews software tallies with the decision rule that the coefficient is significant if the p-value is equal to or less than 0.05.

4.0 DISCUSSION OF FINDINGS

The time series data is expected to be stationary to ensure the absence of unit root issues. To achieve stationarity of the time series data, the data were examined using the Augmented Dickey- Fuller (ADF) test (Dickey and Fuller 1981) unit root test which is complemented for robustness of the estimates with the Phillip – Perrons (PP) Test.

Unit Root Test
The Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) procedure were applied in testing for existence of unit root or stationarity of time series data and the order of integration of both variables.

Table 1: Augmented Dickey Fuller (ADF) Unit Root Test Results

VARIABLES	TEST CRITICAL VALUES			TEST STATISTICS	STATUS
	1%	5%	10%	ADF	STATIONARITY
FIRM SIZE	-3.689194	-2.971853	-2.625121	-4.884094	I(1)
FIRM AGE	-3.689194	-2.971853	-2.625121	-5.291503	I(1)

Source: Researcher's EView 8.0 Computation

Table 2: Phillips Perron (PP) Unit Root Test Results

VARIABLES	TEST CRITICAL VALUES			TEST STATISTICS	STATUS
	1%	5%	10%	PP	STATIONARITY
FIRM SIZE	-3.689194	-2.971853	-2.625121	-5.729715	I(1)
FIRM AGE	-3.689194	-2.971853	-2.625121	-5.292275	I(1)

Source: Researcher's EView 8.0 Computation

Tables 1 and 2 reveal that the time series data from the firms (Guinness Nig. Plc and Nigeria Breweries Plc), under the Augmented Dickey Fuller (ADF) and **Phillips Perron (PP)** procedure, achieved stationarity

at first difference. Hence, when time series data of the variables are integrated of the same order, the data tend to cointegrate (Engle and Granger, 1985). The consequences of such cointegration are that;

- Cointegrated series share a stochastic component and a long term equilibrium relationship.
- Deviations from this equilibrium relationship as a result of shocks will be corrected over time.
- We can think of $\Delta FMSIZE_t$ as responding to shocks from FMAGE over the short and long term.

Therefore the outcome of the unit root tests resulted in the generation of new time series data which the researcher used in the analysis.

Table 3: **Descriptive Statistics of the Variables**

STATISTICS	FIRM SIZE	FIRM AGE
Mean	7.898137	72.00000
Median	7.886574	72.00000
Maximum	8.404207	81.00000
Minimum	7.417598	63.00000
Std. Dev.	0.265318	4.842342
Skewness	0.193940	0.250231
Kurtosis	2.674963	2.116609
Jarque-Bera	0.320126	0.975475
Probability	0.852090	0.614014
Sum	236.9441	2160.000
Sum Sq. Dev.	2.041421	680.0000
Observations	30	30

Source: Author's EView 8.0 Output.

Table 3 describes the statistics of the study. The coefficient of skewness for FMSIZE (0.193940) and FMAGE (0.250231) have values less than (1) signifying normal frequency distribution. Kurtosis coefficient is 2.674963 and 2.116609 for FMSIZE and FMAGE. Jarque-Bera statistic shows that FMSIZE and FMAGE have insignificant p- values of 0.320126 and 0.975475 respectively. Both Kurtosis and Jarque-Bera statistic confirm that the time series data were normally distributed. The standard deviations were not significantly volatile as it stood at 0.265318 for FMSIZE and 4.842342 for FMAGE.

Granger-Causality test is conducted in the context of linear regression models and specified in bivariate linear autoregressive model of two variables X_1 and X_2 based on lagged values as applied by Pasquale (2006)*:*

$$X_1(t) = \sum_{j=1}^{P} A_{11,j}X_1(t-j) + \sum_{j=1}^{p} A_{12,j}X_2(t-j) + E_1(t) \quad \ldots\ldots(2)$$

$$X_2(t) = \sum_{j=1}^{P} A_{21,j}X_1(t-j) + \sum_{j=1}^{p} A_{22,j}X_2(t-j) + E_2(t) \quad \ldots\ldots(3)$$

Where;

p is the maximum number of lagged observations included in the equation, the matrix A contains the coefficients of the equation (i.e., the contributions of each lagged observation to the predicted values of $X_1(t)$ and $X_2(t)$,

X_1 is the FMSIZE which is constant while X_2 is the FMAGE, and

$E1$ and $E2$ are residuals (prediction errors) for each time series data.

Table 4: Pairwise Granger Causality Tests

Date: 05/11/16 Time: 23:51

Sample: 0001 0030

Lags: 2

Null Hypothesis:	Obs	F-Statistic
FMSIZE does not Granger Cause FMAGE	28	1.57232
FMAGE does not Granger Cause FMSIZE		2.53293

Source: EViews 8.0 Output

Table 5: Pairwise Granger Causality Tests

Date: 05/11/16 Time: 23:53

Sample: 0001 0030

Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
FMSIZE does not Granger Cause FMAGE	29	2.84989	0.1033
FMAGE does not Granger Cause FMSIZE		0.43475	0.5155

Source: EViews 8.0 Output

On causalities as shown in Table 4 and 5, there is no causality running from either FMSIZE to FMAGE or from FMAGE to FMSIZE, both at 1 year and 2 years lagged periods. The implication is that Firm Age does not granger cause Firm Size and vice versa.

Table 6: Regression Analysis Result

Dependent Variable: FMSIZE
Method: Least Squares
Date: 05/11/16 Time: 23:58
Sample: 0001 0030
Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FMAGE	0.053086	0.002563	20.70994	0.0000
C	4.075950	0.184961	22.03679	0.0000

R-squared	0.938718	Mean dependent var	7.898137
Adjusted R-squared	0.936529	S.D. dependent var	0.265318
S.E. of regression	0.066843	Akaike info criterion	-2.508604
Sum squared resid	0.125103	Schwarz criterion	-2.415191
Log likelihood	39.62906	Hannan-Quinn crite	-2.478720
F-statistic	428.9015	Durbin-Watson stat	0.772182
Prob(F-statistic)	0.000000		

Source: EViews 8.0 Output

Table 6 reveals that Firm Age has a significant positive effect on Firm Size at 5 and 10 % level of significance. This implies that as firm increases in age, especially in the capital intensive brewery industry, the firms tend to grow in asset size to meet up with increasing demand for their brands and to also remain competitive.

Table 7: Correlation Results

	FMSIZE	FMAGE
FMSIZE	1.000000	
FMAGE	0.968874	1.000000

Source: EView 8.0 Computation Output.

Table 7 reveals a positive correlation between firm size and firm age in the brewery sector. The relationship between firm age and firm size is very strong and stands at about 97%.

Table 8: Johansen Cointegration Test

Date: 05/12/16 Time: 00:08
Sample (adjusted): 0003 0030
Included observations: 28 after adjustments
Trend assumption: Linear deterministic trend
Series: FMSIZE FMAGE
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.430438	17.35037	15.49471	0.0260
At most 1	0.055187	1.589511	3.841466	0.2074

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.430438	15.76086	14.26460	0.0288
At most 1	0.055187	1.589511	3.841466	0.2074

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

5.0 SUMMARY AND CONCLUSION

The study aims at examining the effect as well the magnitude and nature of relationship between firm size and firm age in Nigeria brewery industry from 2004 to 2014. Ordinary least squares method in the form of multiple regression was applied in the analysis, while stationarity test was conducted using the Augmented Dickey- Fuller (ADF) and Phillip Perrons (PP) tests. The outcome of the analysis reveals that firm size is significantly and positively affected by firm age. This implies that as firm increases in age, especially in the capital intensive brewery industry, the firms tend to grow in asset size to meet up with increasing demand for their brands and to also remain competitive. There is no causality running from either FMSIZE to FMAGE or from FMAGE to FMSIZE, both at 1 year and 2 years lagged periods. The implication is that Firm Age does not granger cause Firm Size and vice versa. A positive correlation between firm size and firm age was also indicated from the analysis. This implies that firm size and firm age change/increase in the same direction in the sector.

The import of these findings is that in line with life cycle theory, firms in technology driven sectors such as the brewery sector tend to grow in asset base from their growth stage through the maturity stage. The companies at old age upon maturity tend to slow down the rate of growth of their asset base as they

concentrate more on giving shareholders returns on their investment. In the early stage of a firms' life according to life cycle theory, the firm tends to save or retain more profit after tax to enable it invest, diversify and grow. However, at a particular age of maturity, it is assumed that the firm would have used up or taken up all available investment opportunities. Consequently, the firm will no longer be keen to retain its earnings but will prefer to increase its dividend payout rate in order to compensate the shareholders for their patience all this period of deprivation.

The two companies under study are yet to reach their saturation stage, hence, their asset base is directly and very significantly related to their age. The firm size is also significantly affected by the age of the firm in tandem with the underpinning theory. This implies that age does not cause firm size increase but to a very significant extent, it associates and influences it positively in Nigeria brewery sector.

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