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**Article** · November 2020



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**International Journal in Management and Social Science**
Volume 08 Issue 11, November 2020 ISSN: 2321-1784 Impact Factor: 6.319
Journal Homepage: http://ijmr.net.in, Email: irjmss@gmail.com
Double-Blind Peer Reviewed Refereed Open Access International Journal

# NIGERIAN PERSPECTIVE OF DIVIDEND PAYOUT POLICY OF BANKS

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**Abstract**
The objective of this study is to determine the nature, direction as well as the significance of the relationship of current dividend payout and some explanatory variables such as earnings per share, previous year dividend payout, capital adequacy ratio, cash flow per share, size, and inflation rate in the Nigerian commercial banks. The stationarity of the cross- sectional and time series data was tested for and confirmed, using the Augmented Dickey Fuller (ADF) procedure. Some of the study variables were integrated of the same order (1). This phenomenon signaled cointegration issues and necessitated a cointegration test. The results of the study indicate that previous year dividend, capital ratio and size of a bank are important factors that positively impact its current year dividend payout. On the other hand, cash flow, earnings per share and inflation are negatively associated with dividend payout policy of commercial banks.
**Keywords:** Bank size, Commercial Banks, Cointegration, Dividend Payout, Earnings Per Share.

## Introduction

Allen & Michaely, 2003; Black, 1976; Brealey & Myers, 2005; Olowe & Moyosore, 2011). Aminu-Kano et al remarked that, in spite of the existence of extensive debate and research, the actual motivating factor for paying dividends remained a baffling problem. Imran et al (2013) and Black (1976) made expressions similar to that of Aminu-Kano and others with regard to dividend policy. Several works have advanced a number of reasons to justify the payment, or non-payment, of dividends. Further, a number of hypotheses have been put forward, all in an attempt to remove or unravel the 'mystery'; yet, the issue has remained unsettled.

Most often, firms encounter the onerous task of allocating their after-tax earnings. They face the challenge of deciding on whether to distribute their earnings among their shareholders or to retain them. Retained earnings are considered by firms as a major internal source of finance. However, retaining more earnings implies paying out smaller dividends, and conversely (Black, 1976). In addition, the more profitable firms become, the larger the internal finance that will be in their possession and the larger the size of dividends they are in a position to pay. While representing the distribution of a firm's after-tax earnings to stockbrokers, dividends have implications for financing and investment decisions of the firm as well as its share price (Olowe et al, 2011). Miller and Modigliani (1961), however, argue that, in the presence of a perfect capital market, dividend decision has no effect on the firm's value; hence, it is irrelevant. The traditional schoo,l also nicknamed the rightists, disagree with the irrelevance school of thought. They explain that a given quantity of dividends has some impact on stock prices and retained earnings. Included in this group are the works of Graham and Dodd (1934), Lintner (1956), Gordon (1959), Brittain (1964), Walter (1958), and Walter (1963). Studies like Asquith & Mullins (1983), Healy and Palapu (1988), and Michaely et al (1995) consider dividends as capable of providing important information to shareholders with regard to the firm's performance (signaling effect). In practice, virtually all business firms adopt one kind of dividend policy which provides for keeping back a fraction of net profits and at the same time make provision for dividend disbursements. Nikolaos (2005) and Nsikan-Edet et al (2014) consider the study of dividend policy as deserving serious attention because dividend policy affects the capital structure of the firm and changes the firm's stock value. The fact that the announcement of dividend signals information to investors with regard to its efficiency, profitability, liquidity and investment opportunity is an additional reason why the study of dividend policy has become increasingly important among researchers (Alli et al, 1993). Olowe & Moyosore (2011) observe that most of the studies carried out so far on dividend policy were in the developed countries; few have been done in emerging markets. The studies carried out were mostly focused on non-financial firms. For those that were done in Nigeria, the majority engaged themselves with replicating or modifying Lintner's model. Examples of such studies include Uzoaga and Aloizieuwa (1974), Inanga (1975, 1978), Soyode (1975), Oyejide (1976), Izedonmi as well as Eriki (1976). Among those studies conducted in Nigeria, only few had anything to do with banks (Eriotis & Vasilou, 2008).

Considering the significant role that banks play in facilitating business as financial intermediaries and contributing substantially in investment growth and economic prosperity, this study focuses on the dividend payout decisions of Nigerian deposit money banks. Its cardinal objective is to empirically identify the factors that determine the banking sector's dividend paying behaviour in Nigeria. The study employs six variables in order to test the robustness of an econometric model in explaining and predicting the dividend payout policy of Nigerian commercial banks.

Specifically, this work aims at

(i) determining the effect of earnings per share (EPS), previous year dividend payout (DIVPRE), capital ratio (CR), cash flow per share (CF), bank size (size) and inflation (IF) on the current year dividends (DIV) of commercial banks in Nigeria,

(ii) ascertaining to what extent the six variables can be used in explaining and predicting the dividend payout policy of commercial banks in Nigeria and

(iii) comprehending the sequential significance of the six variables in determining the dividend policy of commercial banks in Nigeria.

The investigation is restricted to listed banks whose financial data are readily available. The remaining part of this paper is organized as follows. Section 2 provides the literature review. Section 3 develops the empirical model as well as the econometric methodology. Section 4 contains the empirical results and discussion while the last section concludes the study.

## 2. Literature Review

## 2.1 Theoretical and Conceptual Underpinnings

Dividend is a kind of distribution of profits earned by a limited liability company among its shareholders. It is mostly paid in cash. Other forms of dividend include stock/scrip dividend and property dividend (Adediran & Alade, 2013). Dividend is the return which goes to shareholders as a result of the fund they invested in acquiring the shares of a given company (Eriki & Okafor, 2002).

Dividend payout policy, on the other hand, is the action plan regarding the sharing of net profit after tax to cater for payments to shareholders and retention for reinvestment for the benefit of shareholders (Kempness, 1980). Olowe & Moyosore (2011) consider dividend policy as the payout policy that managers follow in deciding the size and pattern of cash distribution to shareholders over a period of time. Shareholders seem to generally favour the dividend stability type of dividend policy as against the fluctuating type (Pandey, 1985). The three forms of dividend stability policy include constant dividend per share, constant payout and constant dividend per share plus extra dividend (Pandey, 1985).

The dividend policy issue is important for a number of reasons. Firstly, dividend policy can be used as a tool by a firm for financial signaling to the outside investor as regards the firm's stability and growth prospects. Secondly, dividend policy plays a significant role in determining the capital structure of a firm. Three dominant views have arisen from the series of empirical and theoretical works done in the past on dividend policy. Firstly, dividend payments can alter the market value of the firm positively. The proponents of this tenet are Gordon (1963) and Lintner (1956). Secondly, a positive change in dividend payment decreases the value of the firm (Litzenberger and Ramaswamy, 1979). Thirdly, dividend policy does not impact the market value of the firm (Miller and Modighani, 1961).Four of the dividend models which have emerged so far include the dividend relevance model, traditional model, Walter model, Gordon model and the dividend irrelevance model.The traditional model produced by Graham and Dodd( ) lays a clear emphasis on the relationship between dividends and the stock market, According to the duo, stock values respond positively to higher dividend payouts and negatively to low dividend payouts. Their model establishes a relationship between stock market price and dividend payout using a multiplier. Three conflicting views about dividend behavior are as follows:-

(i) High dividend payouts boost the share price and value of a firm because rational investors are risk-averse and will prefer current dividends to future dividends (Gordon, 1962; Walter, 1963).
(ii) A high dividend payout is bad because it will tend to reduce the share price of a firm where dividends are taxed heavily more than capital gains (Litzenberger and Ramaswamy, 1979, 1982).

(iii) The share price of a firm is not affected by its dividend policy (Miller and Modigliani, 1961).

From the remote past, researchers on corporate dividend policy have concentrated their efforts on determining the factors that influence dividend payment decisions. Though a lot of literature is available in that respect, the green-light is yet to surface; the puzzle is still not resolved. Some researchers have adopted a behavioral approach by surveying the opinions of corporate managers in order to gain insight into those factors considered by them as most important in establishing their firm's dividend policy. Studies in this group include Baker et al (1985), Farelly (1988), Pruitt and Gitman (1991), Baker and Powell (1999, 2001) and Mainoma (2001). Those works contend that different managers at different times attach varying levels of importance on a firm's dividend decision. Generally, however, some factors like levels of current and past earnings and patterns of variability of past dividends have been noticed as being consistently important for some years in the past.

Some other researchers have followed a normative approach while studying dividend policy. They developed and empirically tested a number of mathematical models in order to explain the dividend policy of firms. Lintner (1956) is regarded as the first study to develop and test the partial-adjustment model of dividend. John Lintner, a co-inventor with William Sharpe of the CAPM, argued that variation in dividends is a function of the targeted dividend payout minus the last period's dividend payout multiplied by the speed of an adjustment factor. Mathematically, Lintner expressed this formula as: $\Delta DIV_t$ = Constant + SOA [Target $DIV_t - DIV_{t-1}$] + $e_t$ where $DIV_t$ and $DIV_{t-1}$ are the cash dividends paid in periods t and t-1; $\Delta DIV_t$ is the expected change in the dividend from t-1, SOA is the speed of adjustment and $e_t$ is the stochastic error term. Lintner's model demonstrates that dividend policy has two parameters, namely the target payout ratio and the speed at which current dividends adjust to the target. Fama and Babiak (1968) confirmed the robustness of Lintner's model of dividend behaviour. They agreed that managers prefer a stable policy and are reluctant to increase dividends to a level which cannot be sustained. A modified version of Lintner's model was tested by several other empirical works in both developed and emerging economies after refining it. They include Brittain (1975), Oyejide (1975), and Adelegan (2003). Added to the modified models include variables like index of liquidity, measure of sales fluctuation, income variability, indebtedness and cash flow.

Rozeff (1982) developed an alternative model of corporate dividend policy. Rozeff's model has five variables as independent variables and dividend payout ratio as dependent variable. Some of the independent variables include the percentage of stock held by insiders, average growth rate of revenues and natural logarithm of the number of ordinary shareholders. The study finds all the five variables significant in explaining dividend payment. The studies by Demsey and Laber (1992), and Demsey, et al (1993), agreed with Rozeff's view completely.

According to Nsikan-Edet et al (2014), the factors that affect dividend policy can be grouped into internal and external factors. The internal factors are firm-specific. They include profitability, liquidity, investment opportunities, stage of growth of firm, etc. The external factors are government policies, technology, stability of earnings, willingness to dilute ownership, nature of shareholders, dividend payout of rival firm, etc. Fama & French (2001), Grullon et al (2002) and DeAngelo DeAngelo (2005) offered lifecycle explanations for dividends. They opined that dividends rely, explicitly and implicitly, on tradeoffs between the advantages and costs of retention. Imran, et al (2013) contended that firms can run away from agency problems by paying adequate quantity of dividends. They maintained that dividend payouts assist in keeping firms in the market. Some researchers asserted that corporate managers make financial policy trade-offs in order to control agency costs effectively; those researchers include Al-Malkawi (2007), Crutchley and Hansen (1989), Easterbrook (1984) and Naceur et al (2005). According to Amidu and Abor (2006), and Jensen (1986), a free cash flow is helpful for a business concern to share among shareholders as dividends and pay its debt. This will enable the firm to minimize the possibility of wasting the funds on projects which are not profitable. Fama and French (2002), Glen, et al (1995), Naceur, et al (2005), Nacem and Nasr (2007) and Smith and Walts (1992) understood bank's investment policies as having a significant impact on their dividend payout policies. They opined that banks with fewer investment plans have bigger amount of funds to share as dividends. On the contrary, those banks with larger investment plans have smaller amount of funds available to distribute as dividends. Hence, investment opportunities are negatively correlated with dividend payouts. Al-Kuwari (2009), Glen et al (1995) and Adaoglu (2000) argued that dividend policy in emerging markets differs from what it is in developed economies. They seem to be affected by factors like tax-pay procedure, stock market volatility and certain asymmetric information. For Al-Malkawi (2007), Dickens et al (2002), Eriotris (2005), Imran (2011), Javid an Ahamed (2009) and Nishat and Bilgrami (1994) firm's with higher earnings, greater size and foreign ownership pay out higher and constant a amount of dividends according to their earnings and size. Nishat and Saghir (1991), Pettit (1992) and Walts (1973) discovered that higher and consistent dividend payments lead to a higher demand for a firm's share, and, consequently, an upward movement of the share price. To maintain this achievement, firms are usually reluctant to skip or reduce their dividend payouts (Saxena, 1999; Woolridge and Ghosh, 1985). Dickens et al (2002) and Imran (2011) considered investment opportunities, ownership, signaling and risk as having negative relationship with dividend payouts. On the other hand, they view firm size and last year dividends as relating positively with dividend payments. Adaoglu (2000) found that firm's follow stable cash dividend polices in a regulated environment that forces them to have mandatory dividend policies. Casey and Dickens (2000) viewed taxes as an important factor in the dividend policy decision of firms. Relative to the capital gains, the lower the tax rate on income, the higher the dividend payout, and conversely. Onah (2009) observed a positive link between default risk and dividends.

## 2.2 Empirical Review

While studying a Korean banking industry, Lee (2009) found that the major factors that influence a bank's dividend decision include profitability, safety of bank and risk. In a Bangladesh banking industry study, Huda and Fara (2011) discovered that the factors influencing bank dividend decision include revenue earnings per share, cash and cash equivalent factors and retained earnings. Marfor, Yadom and Agyei (2011) saw the determinants of dividend policy of banks in Ghana to include profitability, leverage, changes in dividend, collateral capacity, growth and age.

The earliest works on dividend policy in Nigeria concentrated their attention on the dividend behavior of Nigerian firms since the indigenization era. Fodio (2009) considers the results of those studies as not only controversial but also inconclusive. Uzoaga and Aloizieuwa (1974) investigated the pattern of dividend policy pursued by a sample of thirteen (13) companies between 1969 and 1972. The study concluded that fear and resentment rather than the conventional factors used in the Lintner's model can best explain the change in the level of dividend paid by the firms. This view was challenged by studies like Inanga (1975, 1978), Soyode (1975) and Oyejide (1976) who criticized it for failing to empirically investigate the contributions of the conventional factors to changes in the dividends of the relevant companies. These studies advanced both conventional and non-conventional factors as explaining the changes in the dividend behavior of the sampled firms. They failed to empirically investigate the extent to which Lintner's model can be used to explain the dividend policy of Nigerian companies. Later studies such as Oyejide (1976), Izedonmi and Eriki (1976) and Adelegan (2000, 2001) tested the application of the Lintner's model and modified the Lintner-Brittain model as adopted by Charitou and Vafeas (1998) as they tried to explain the dividend policy of Nigerian firms at different periods. The authors unanimously agreed that, owing to the dynamic nature of the Nigerian economy, it is necessary to carryout further research to validate the conclusions arising from their studies.

Only few studies have been carried out on the determinants of dividend payout in the Nigerian banking industry. Examples include Olowe & Moyosore (2011), Nsikan-Edet, et al (2014) and Aminu-Kano, et al (2015). With secondary data spanning from 1989 to 2010, Nsiken-Edet et al (2015) used the ordinary least squares (OLS) regression technique to estimate the major determinants of cash dividend payout in a selection of commercial banks in Nigeria. The study reveals that current earnings, lagged dividend and lending rate are the major determinants of cash dividend payout in the banks, while inflation rate and liquidity ratio fail to explain the variation in dividend payout. The study reveals also that those banks had a profit retention of 69.33 percent during the period under study. Aminu-Kano et al (2015) carried out a similar study. The work was carried out on a sample of seven commercial banks quoted on the Nigerian Stock Exchange (NSE). Both quantitative and descriptive research approaches were used. With the aid of multiple regression technique, the authors estimated the effect of some independent variables (earnings per share, share price and inflation) on the dividend payout pattern of Nigerian commercial banks for the period 1993 to 2012. The study reveals that the three predictor variables had an aggregate significant effect at 1 percent level of significance on the dividend pattern of the sampled seven quoted Nigerian commercial banks. Olowe and Moyosore (2011) investigated the determinants of dividend payout in the Nigerian banking industry covering the period 2006 to 2008 with the aid of pooled regression techniques on the data of Nigerian listed commercial banks. The study finds that profitability, liquidity, size and activity-mix are statistically significant factors that positively influence dividend payout. On the other hand, they discovered that revenue growth, debt-equity ratio, retained earnings, loan-deposit ratio and loan-loss provision negatively influence dividend policy of Nigerian commercial banks.

From the foregoing, we observe that the literature on the determinants of dividend policy of Nigerian firms is full of inconsistency and inconclusiveness of results. This study attempts to contribute to knowledge by extending the investigation on Nigerian firms in the banking sector to cover the period from 2001 to 2015. The study estimates the effect of six explanatory variables (earnings per share, previous year dividend payout, cash flow per share, capital ratio, size and inflation rate) on the dependent variable (current year dividend payout).

## 3. Materials and Methods

This study adopted the *ex post facto* research design. A quantitative research approach was employed since the variables being investigated were amenable to empirical measurement and verification. In addition, the study placed emphasis on statistical data already available. It employed secondary data extracted from the annual reports and audited financial statements of seven commercial banks, quoted on the Nigerian Stock Exchange, for a period covering 2001 to 2015. The relevant time series data used wer extracted from relevant, reliable and valid sources including CBN statistical bulletins, NDIC reports, fact book, audited annual reports and financial statements. Twenty-two licensed commercial banks operating in Nigeria as at 2$^{nd}$ September, 2016 formed the population size of the study. Out of this list, seven quoted commercial banks were selected as sample size based on the sampling model of Yamane (1967) as adjusted by Smith (1983). The seven banks which were selected through judgment sampling technique include Access Bank Plc, First Bank of Nigeria Plc, GTBank Plc, United Bank for Africa Plc, Union Bank of Nigeria Plc, Zenith Bank Plc and Wema Bank Plc. Five of the banks selected were, coincidentally, among the top ten (10) largest banks in Nigeria based on the rankings of the 'Banker' by the Financial Times Group of London (Sherif, 2016). Consequently, the seven sampled banks were adjudged as being sufficiently representative of the Nigerian commercial banking industry for the purpose of this study. This work employed E-views software package (version 9) for data analysis and utilized multiple regression to analyze the time series and cross-sectional data in order to estimate the effect of the explanatory variables on the dependent variable.

**3.1** Variables Definition and Measurement**:** The independent variables used for the study include Earnings Per Share (EPS), Previous Year Dividend ($DIV_{t-1}$), Capital Ratio (CR), Bank Size (SIZE), Cash Flow Per Share (CF) and Inflation Rate (IF). The dependent variable current year dividend payout (DIV). Each of the explanatory variables was expected to have some relationship with dividend policy based on the existing theories on dividend policy. For the purpose of this study, the variables are defined as follows:

(i) Current Year Dividend**:** This is the distribution, generally of assets, made in the current year by a bank to its shareholders.

(ii) Earnings Per Share**:** This is the portion of a bank's profit allocated to each ordinary share outstanding at the end of a financial year.

(iii) Previous Year Dividend**:** This is the distribution, generally of assets, made in the previous year by a bank to its shareholders.

(iv) Capital Ratio**:** Otherwise called Capital Adequacy Ratio, Capital Ratio can be defined as the ratio of Equity Capital to Total Assets. It has a number of alternative definitions. However, the definition above was used for the purpose of this study because of its simplicity. Capital Ratio is an important bank-specific variable in determining a bank's profitability. Consequently, it is seen as one of the factors determining a bank's dividend policy. A bank with high capital to-asset ratio is adjudged to be relatively less risky but less profitable when compared with other banks or institutions having low ratios. On the other hand, a bank with low capital ratio is considered riskier but more profitable when compared with other highly capitalized financial institutions (Olowe & Moyosore, 2011). Consequently, a number of studies observe a negative relationship between capital ratio and profit/dividends.

(v) Bank Size**:** For the purpose of this work, bank size was represented by the natural logarithm of its total assets. The size of a bank may have some significant effect on specific bank risks. In a non-competitive environment, like an emerging economy, if larger banks control a greater share of the domestic market, lending rates may be high while deposit rates for larger banks remain lower. This happens because large banks are viewed to be safer. Hence they may enjoy higher profits and patronage. They also enjoy economies of scale, with lower cost and higher profits. The larger banks have a higher ability to pay dividends. According to Ghosh and Woolridge (1988), and Eddy and Seifert (1997), large firms will pay large dividends in order to reduce agency costs. Pasiouras and Kosmidou (2007) and Flamini et al (2009) observed a positive correlation between firm size and profits. On the contrary, Boyd and Runkle (1993) found a significant inverse relationship between the size and rate of return on assets of US banks from 1971 to 1990.

(vi) Cash Flow Per Share**:** This is defined as the amount of free cash flow per ordinary share outstanding at the financial year end.

Cash flow per share is a financial ratio that measures the operating cash flows attributable to each ordinary share. It is regarded as a more concrete figure that is potentially more reliable than earnings per share. It is a measure of a firm's financial strength, a more accurate value of the strength and sustainability of a particular business model. Free cash flow, according to Tijjani & Sani (2016), has a positive correlation with dividend policy.

(vii) Inflation Rate**:** This represents the purchasing power of money at a particular point in time in an economy. In a period when inflation rate is high, companies usually retain huge parentage of their earnings in order to avoid a reduction in their scale of operation and make up for the fall in purchasing power. Consequently, they may not pay much dividend. When this is the case, there is an inverse relationship between inflation rate and dividend payout. On the other hand, in times when inflation rate is high, shareholders may advocate for higher dividend due to the fall in purchasing power. Given such scenario, the relationship between inflation rate and dividend payout might be positive. This study used annual inflation rates as obtained from Index Mundi and based on consumer prices (annual percentage).

## 3.2 Model Specification

After carrying out some unit root test (appendix 1) and cointegration test (table 2) and confirming the stationarity of the cross-sectional and time-series data, the Ordinary Least Squares (OLS) technique was employed to estimate the regression coefficients in the model of the study. OLS technique was used because, according to Imran (2013) and Koutsoyiannis (1973), it is the best linear estimator and most fundamental estimator in panel data sets. According to Johnson and Dinardo (1997), a simple OLS estimator ignores the structure of the data and deals with them as not being serially correlated for a given individual. In addition, the OLS regression assumes constant intercepts and slops in spite of the probable differences in firm types or firm-specific idiosyncrasies. It is adjudged by scholars as the best linear unbiased estimator (BLUE). The econometric model is specified as follows:

$$DIV_{tt} = \beta_0 + \beta_1 EPS_{tt} + \beta_2 DIV_{t-1} + \beta_3 CR_{tt} + \beta_4 Size_{tt} + \beta_5 CR_{tt} + \beta_6 IF_{tt} + \Sigma_{tt} \quad ---- \quad (1)$$

Where,

DIV = Current year dividend payout

EPS = Earnings per share

DIVPRE = Previous year dividend payout

CR = Capital ratio

Size = Natural logarithm of bank's total assets

CF = Cash flow per share

IF = Annual inflation rate

### 3.3 Variables and Expected Signs

| **Explanatory Variable** | **Expected Effect on Dependent Variable (Positive/Negative)** |
|---|---|
| Earnings Per Share (EPS) | Positive |
| Previous Year Dividend (DIVPRE) | Positive |
| Capital Ratio (CR) | Negative |
| Bank Size (SIZE) | Negative/Positive |
| Cash Flow Per Share (CF) | Negative/Positive |
| Inflation Rate (IF) | Negative/Positive |

## 4. Empirical Results and Discussion

**Table 1**

**Descriptive Statistics**

| | CF | CR | DIV | DIVPRE | EPS | IF | SIZE |
|---|---|---|---|---|---|---|---|
| Mean | 938.6700 | 85.34133 | 6.81E+10 | 5.87E+10 | 8.226667 | 11.83067 | 7.08E+12 |
| Median | 1057.990 | 84.65000 | 5.53E+10 | 4.96E+10 | 9.330000 | 11.58000 | 7.77E+12 |
| Maximum | 2067.250 | 110.0300 | 1.63E+11 | 1.63E+11 | 14.50000 | 18.87000 | 1.62E+13 |
| Minimum | 0.350000 | 61.85000 | 7.19E+09 | 2.96E+09 | 1.150000 | 5.380000 | 7.87E+11 |
| Std. Dev. | 736.5679 | 16.45733 | 5.45E+10 | 5.31E+10 | 3.863907 | 3.698638 | 5.48E+12 |
| Skewness | -0.077217 | 0.249396 | 0.468488 | 0.724586 | -0.617823 | 0.236901 | 0.300178 |
| Kurtosis | 1.585550 | 1.681769 | 1.830127 | 2.274562 | 2.572088 | 2.449959 | 1.703759 |
| | | | | | | | |
| Jarque-Bera | 1.096615 | 1.241578 | 1.404080 | 1.641473 | 1.068705 | 0.329396 | 1.275418 |
| Probability | 0.577927 | 0.537520 | 0.495573 | 0.440107 | 0.586049 | 0.848150 | 0.528502 |
| | | | | | | | |
| Sum | 12202.71 | 1280.120 | 1.02E+12 | 8.81E+11 | 123.4000 | 177.4600 | 1.06E+14 |
| Sum Sq. Dev. | 6510387. | 3791.812 | 4.16E+22 | 3.94E+22 | 209.0169 | 191.5189 | 4.21E+26 |
| | | | | | | | |
| Observations | 15 | 15 | 15 | 15 | 15 | 15 | 15 |

ι = Individual explanatory variable (1---- 6)

t = Time period (year 2001 ----- 2015)

Σ = Stochastic error term

**Table 2**

**Cointegration Result**

| | | | | |
|---|---|---|---|---|
| Date: 10/15/16 Time: 16:46 | | | | |
| Sample (adjusted): 3 15 | | | | |
| Included observations: 13 after adjustments | | | | |
| Trend assumption: Linear deterministic trend | | | | |
| Series: LOG(DIV) LOG(IF) | | | | |
| Lags interval (in first differences): 1 to 1 | | | | |
| | | | | |
| Unrestricted Cointegration Rank Test (Trace) | | | | |
| Hypothesized | | Trace | 0.05 | |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.** |

| | | | | |
|---|---|---|---|---|
| None | 0.552267 | 12.18798 | 15.49471 | 0.1481 |
| At most 1 | 0.125392 | 1.741730 | 3.841466 | 0.1869 |
| Trace test indicates no cointegration 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 | | Max-Eigen | 0.05 | |
| No. of CE(s) | Eigenvalue | Statistic | Critical Value | Prob.** |
| None | 0.552267 | 10.44625 | 14.26460 | 0.1842 |
| At most 1 | 0.125392 | 1.741730 | 3.841466 | 0.1869 |
| Max-eigenvalue test indicates no cointegration at the 0.05 level | | | | |
| * denotes rejection of the hypothesis at the 0.05 level | | | | |
| **MacKinnon-Haug-Michelis (1999) p-values | | | | |
| | | | | |
| Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I): | | | | |
| LOG(DIV) | LOG(IF) | | | |
| 0.928463 | 5.060740 | | | |
| 1.053574 | -0.165244 | | | |
| | | | | |
| Unrestricted Adjustment Coefficients (alpha): | | | | |
| D(LOG(DIV)) | -0.014968 | -0.089729 | | |
| D(LOG(IF)) | -0.250751 | 0.030215 | | |
| | | | | |
| 1 Cointegrating Equation(s): | | Log likelihood | 0.042029 | |
| Normalized cointegrating coefficients (standard error in parentheses) | | | | |
| LOG(DIV) | LOG(IF) | | | |
| 1.000000 | 5.450662 | | | |
| | (1.26267) | | | |
| | | | | |
| Adjustment coefficients (standard error in parentheses) | | | | |

| | | | | |
|---|---|---|---|---|
| D(LOG(DIV)) | -0.013897 | | | |
| | (0.07853) | | | |
| D(LOG(IF)) | -0.232813 | | | |
| | (0.07470) | | | |

**Table 3**
**Regression (OLS) Result**

| | | | | |
|---|---|---|---|---|
| Dependent Variable: LOG(DIV) | | | | |
| Method: Least Squares | | | | |
| Date: 10/15/16 Time: 16:51 | | | | |
| Sample (adjusted): 3 15 | | | | |
| Included observations: 13 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| LOG(EPS) | -0.084279 | 0.093095 | -0.905306 | 0.4002 |
| LOG(DIVPRE) | 0.069952 | 0.320977 | 0.217935 | 0.8347 |
| LOG(CR) | 0.268669 | 0.411298 | 0.653223 | 0.5378 |
| LOG(CF) | -0.019401 | 0.024781 | -0.782933 | 0.4634 |
| LOG(SIZE) | 0.845376 | 0.375336 | 2.252317 | 0.0652 |
| LOG(IF) | -0.114929 | 0.219289 | -0.524100 | 0.6190 |
| C | -2.476071 | 3.600282 | -0.687744 | 0.5173 |
| R-squared | 0.975632 | Mean dependent var | | 24.76470 |
| Adjusted R-squared | 0.951263 | S.D. dependent var | | 0.902870 |
| S.E. of regression | 0.199322 | Akaike info criterion | | -0.084062 |
| Sum squared resid | 0.238374 | Schwarz criterion | | 0.220142 |
| Log likelihood | 7.546401 | Hannan-Quinn criter. | | -0.146589 |
| F-statistic | 40.03663 | Durbin-Watson stat | | 1.928760 |
| Prob(F-statistic) | 0.000139 | | | |

Table 1 presents the summary statistics (descriptive).

The summary statistics of the variables disclose that the average value of current year dividend payout (DIV) and previous year dividend payout (DIVPRE) of the sampled Nigerian commercial banks were 6.81E + 10 and 5.87E + 10 respectively. This shows an increase of the average dividends paid in previous year (t-1) by 0.94E + 10 during the current year (t). The standard deviation of DIV and DIVPRE were 5.45E + 10 and 5.31E + 10 respectively. The mean Cash Flow

Ratio (CF) of the commercial banks was 938.67 while 736.5679 was the corresponding standard deviation. The Earnings per share (EPS) of the deposit money banks of Nigeria was, on the average, 8.231 and its standard deviation was 3.863. Nigerian inflation rate had a mean value of 11.83 percent during the period while its standard deviation was 3.70 percent. The average size of the deposit money banks in Nigeria during the period of study was 7.08E + 12 while its standard deviation was 5.48E + 12. The distribution of most of the variables showed positive skewness implying the incidence of non-normality. The kurtosis of all the variables were below 3 suggesting that the distribution of the variables were kleptokurtic. All the same, ed Jarque-Bera statistics show that the variables do not exhibit strong departure from normality.

**Unit Root Test**

This study employed the Augmented Dickey Fuller (ADF) procedure (appendix) to test for the existence of unit root. This was aimed at establishing the stationarity of the time series data as well as the order of integration of the variables. The unit root test had to be conducted as the stationarity of the variables is a pre-condition for using the OLS technique. In addition, unit root test will assist us in (1) knowing the order of integration which is crucial for setting up the econometric model and drawing inferences, and (2) investigating the properties of the variables. Furthermore, it was necessary to conduct unit root test as economic theory suggests that certain variables have to be integrated, a random walk or a martingale process. The rule of thumb is that when the ADF statistic is less than the test critical values at 1%, 5% and 10%, it is assumed that the time series data under unit root test are stationary at all the levels. Appendix 1 discloses that some of the time series data from the banks (Access bank, First bank, GTbank, Union bank, Zenith bank, UBA and Wema banks) achieved stationarity procedure at the order of 1(O) and 1(1). According to Engle and Granger (1985), when time series data of variables are integrated of the same order 1(1), the data series tend to cointegrate. When they cointegrate and some linear combinations of them are stationary, the two series are cointegrated. The effects of such cointegration are that

(1) cointegrated series have a stochastic component in common as well as some long term relationship and
(2) any deviations from the equilibrium relationship owing to shocks will be corrected over time (Engle and Granger, 1985).

In this study, current year dividends and inflation rate were observed as being integrated of the same order 1(1), hence the cointegration trace tests and the necessity for obtaining the results as contained in table 2 before proceeding to employ the OLS regression technique.

Regression Estimates

The regression presented the dividend equation as follows:

$$DIV = \underset{(3.600282)}{-2.47601} + \underset{(0.411298)}{0.268669\,CR} + \underset{(0.375336)}{0.845376\,SIZE} + \underset{(0.320997)}{0.069952\,DIVPRE}$$
$$\underset{(0.093095)}{-0.084279\,ERS} - \underset{(0.024781)}{0.019401\,CF} - \underset{(0.219289)}{-0.114929\,IF} + \mu$$

(Standard errors in parentheses)

The Ser. = 0.199322 and the $R^2$ = 0.975632. The model above shows that while capital ratio (CR), bank size (SIZE), and previous year dividend payout (DIVPRE) had positive impact on current year dividend, the impact of earnings per share (EPS), cash flow ratio (CF) and inflation (IF) on current year dividends was negative. The standard errors in parentheses directly below the associated coefficients are portrayed as a measure of uncertainty about their true values. Given the p-values of the variables of the study (prob. > 0.05), the impact of each of them on current year dividend payout was statistically insignificant. A unit increase in CR, SIZE and DIVPRE would approximately occasion a corresponding increase of 0.269, 0.845, and 0.0700 in current year dividend payout (DIV) respectively. On the other hand, a unit increase in EPS, CF, and IF was estimated to result to a decrease in DIV by 0.084, 0.019 and 0.115 respectively. The $R^2$, which measured the overall fit of the regression, was 0.9760. This implies that the regression accounted for about 98 percent of the variations in the dependent variable (DIV). The standard deviation of the error term was 0.199. On the other hand, the standard deviation of the dependent variable (DIV) was 0.903. This figure is by far larger than the standard deviation of the error term, implying that the regression had explained most of the variations in DIV. The F-statistic (40.03663) was a computation of the standard F-test of the joint hypothesis. It reveals that all the coefficients, except the intercept, were equal to zero while the 'Prob' (F-statistic) had the corresponding p-value to the F-statistic of 0.000139. This p-value implies that there was essentially no chance that the coefficients of the explanatory variables all equal zero. The rule of thumb about Durbin Watson is that when it is 2 or close to 2, there is the absence of serial correlation while a number close to 0 implies that there is probably some serial correlation in the regression equation. The Durbin Watson (DW) of this regression was 1.928760. This is an indication of a near- absence of serial correlation among the variables of this study.

From the regression results, we observed that capital ratio (CR), size (SIZE) and previous year dividend (DIVPRE) all carried positive signs while the signs of earnings per share (EPS), cash flow ratio (CR) and inflation (IF) were negative. The coefficients of capital ratio, size, previous year dividend payout, earnings per share, cash flow ratio and inflation were not statistically significant. This means that they tended to be poor indicators of dividend per share. The negative and insignificant coefficient of inflation rate has the implication that probably the management of Nigerian commercial banks did not pay much cash dividend during the inflationary period. On the contrary, they probably preferred to retain earnings in order to ameliorate the inflationary impact on the value of money. The $R^2$ value of 0.976 implies that slightly more than 97 percent of the variability in current year dividends of Nigerian commercial banks is explained by the explanatory variables. It also means that about 2.50 percent of the changes in current year dividends is explained by other variables which have not been included in the model.

According to Imran et al (2013), Adediran and Alade (2013), Lintner (1956) and Oloidi and Adeyeye (2014) earnings per share has a positive effect on current year dividend payout. On the contrary, and in agreement with Inyamah and Ugah (2015), this study finds the long-run coefficient of earnings per share as having a negative influence on current year dividend payout. This result can be rationalized by the fact that as the earnings per share appreciate over a period of time the banks have the tendency to retain more of their earnings and pay less cash dividends in favour of capital growth.

In agreement with the study of Imran et al (2013), the results of this work indicate that capital ratio has a positive effect on the dividend payout of Nigerian commercial banks. On the contrary, a negative association between capital adequacy and dividends was observed by the works of Olowe and Moyosore (2011), Athanasogbou, et al, (2006), Berger (1995), Dietricha and Wanzenried (2009) who argued that a bank with high capital-to-asset ratios is considered relatively less risky but less profitable. Consequently, such a bank is expected to be capable of paying less dividends than those with low CR.

This study finds positive relationship between the size of a commercial bank and its dividend payout. Agreeing with this finding are the works of Ghosh and Woolridge (1988) Eddy and Seifert (1988) and Redding (1997). They justified their findings by arguing that larger banks announce more dividends when compared to smaller ones. With lower costs and higher profits, the larger banks have a higher ability to pay dividends and they pay large dividends in order to reduce agency costs. Boyd and Runkle (1993), on the other hand, observed significant inverse relationship between bank size and current dividend payout.

While Tijjani and Sani (2016) found a positive correlation of cash flow with dividend policy, this study, in agreement with Imran et al (2013), observes a negative impact of cash flow per share on current dividend payouts. This may mean that Nigerian commercial banks keep more cash flow in order to have several options to use it and plough back instead of distributing it among shareholders as dividend payouts.

In line with the findings of Nsikan-Edet et al (2014), this study finds inflation as having an inverse relationship with dividend payout. In inflationary periods, like was the case in Nigeria during the study period, companies usually keep back huge part of their earnings in order to avoid a reduction in their scale of operation and to make up for the fall in purchasing power. For that reason, banks may not pay much cash dividend during inflationary periods. Hence, inflation has a negative effect on dividend payout.

The findings of this study that previous year dividend has a positive effect on current year dividend payout is consonant with the findings of studies like Imran et al (2013), Lintner (1956), DeAngelo and DeAngelo (1990), Bodia, et al (2007), Al-Ajimi (2010) and some others carried out for developed as well as developing economies. From those results, banks were seen as not wanting to pay their dividend amounts below what they paid previously. Hence, dividend payout is a positive function of its lag.

## 4. Conclusion

The present study aims at finding out the factors that explain the dividend policy of commercial banks listed on the Nigerian Stock Exchange. Employing the data of seven banks, the study concludes that previous year dividends, capital ratio and bank size are among the factors that positively determine commercial bank's dividend payout behavior in Nigeria. On the other hand, cash flow, earnings per share and inflation are negatively associated with dividend payouts of Nigerian commercial banks. Based on the results of this study, we can conclude that commercial banks in Nigeria follow a stable dividend pattern and do not want to reduce current dividend payout ratio below that of the previous year.

In summary, this study has made a modest contribution to the literature on dividend payout policy by unveiling the relationships existing between some bank-specific factors and the dividend payout policy of Nigerian commercial banks.

The study relied entirely on the data made available by the sampled banks in their audited annual financial reports. We recommend that future research be carried out to include some other aspects of banking and non-banking macroeconomic variables. Such investigation could make use of quarterly data and expand the scope to cover longer periods and the entire banking sector in Nigeria. When such extensive analysis is conducted, the relationship between dividend policy and bank-specific factors will become more evident.

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**APPENDIX**

**UNIT ROOT TEST**

| | | | | |
|---|---|---|---|---|
| Null Hypothesis: D(DIV) has a unit root | | | | |
| Exogenous: Constant | | | | |
| Lag Length: 1 (Automatic - based on SIC, maxlag=3) | | | | |
| | | | t-Statistic | Prob.* |
| Augmented Dickey-Fuller test statistic | | | -3.155131 | 0.0492 |
| Test critical values: | 1% level | | -4.121990 | |
| | 5% level | | -3.144920 | |
| | 10% level | | -2.713751 | |
| *MacKinnon (1996) one-sided p-values. | | | | |
| Warning: Probabilities and critical values calculated for 20 observations | | | | |
| and may not be accurate for a sample size of 12 | | | | |
| | | | | |
| Augmented Dickey-Fuller Test Equation | | | | |
| Dependent Variable: D(DIV, 2) | | | | |
| Method: Least Squares | | | | |
| Date: 10/15/16 Time: 16:33 | | | | |
| Sample (adjusted): 4 15 | | | | |
| Included observations: 12 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| | | | | |

| | | | | |
|---|---|---|---|---|
| Null Hypothesis: D(DIVPRE, 2) has a unit root | | | | |
| Exogenous: Constant | | | | |
| Lag Length: 2 (Automatic - based on SIC, maxlag=3) | | | | |
| | | | t-Statistic | Prob.* |
| Augmented Dickey-Fuller test statistic | | | -3.323190 | 0.0424 |
| Test critical values: | 1% level | | -4.297073 | |
| | 5% level | | -3.212696 | |
| | 10% level | | -2.747676 | |

| | | | | |
|---|---|---|---|---|
| *MacKinnon (1996) one-sided p-values. | | | | |
| Warning: Probabilities and critical values calculated for 20 observations | | | | |
| and may not be accurate for a sample size of 10 | | | | |
| | | | | |
| Augmented Dickey-Fuller Test Equation | | | | |
| Dependent Variable: D(DIVPRE, 3) | | | | |
| Method: Least Squares | | | | |
| Date: 10/15/16 Time: 16:35 | | | | |
| Sample (adjusted): 6 15 | | | | |
| Included observations: 10 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(DIVPRE(-1),2) | -2.831958 | 0.852181 | -3.323190 | 0.0159 |
| D(DIVPRE(-1),3) | 1.256403 | 0.580299 | 2.165096 | 0.0736 |
| D(DIVPRE(-2),3) | 0.506813 | 0.375460 | 1.349845 | 0.2258 |
| C | 6.57E+09 | 7.08E+09 | 0.927863 | 0.3893 |
| R-squared | 0.779058 | Mean dependent var | | -1.29E+09 |
| Adjusted R-squared | 0.668587 | S.D. dependent var | | 3.66E+10 |
| S.E. of regression | 2.10E+10 | Akaike info criterion | | 50.66683 |
| Sum squared resid | 2.66E+21 | Schwarz criterion | | 50.78787 |
| Log likelihood | -249.3342 | Hannan-Quinn criter. | | 50.53406 |
| F-statistic | 7.052157 | Durbin-Watson stat | | 2.125609 |
| Prob(F-statistic) | 0.021543 | | | |

| | | | | |
|---|---|---|---|---|
| Null Hypothesis: EPS has a unit root | | | | |
| Exogenous: Constant | | | | |
| Lag Length: 0 (Automatic - based on SIC, maxlag=3) | | | | |
| | | | t-Statistic | Prob.* |
| Augmented Dickey-Fuller test statistic | | | -3.600166 | 0.0207 |
| Test critical values: | 1% level | | -4.004425 | |
| | 5% level | | -3.098896 | |

| | | | | |
|---|---|---|---|---|
| | 10% level | | -2.690439 | |
| *MacKinnon (1996) one-sided p-values. | | | | |
| Warning: Probabilities and critical values calculated for 20 observations | | | | |
| and may not be accurate for a sample size of 14 | | | | |
| | | | | |
| Augmented Dickey-Fuller Test Equation | | | | |
| Dependent Variable: D(EPS) | | | | |
| Method: Least Squares | | | | |
| Date: 10/15/16 Time: 16:36 | | | | |
| Sample (adjusted): 2 15 | | | | |
| Included observations: 14 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| EPS(-1) | -1.041903 | 0.289404 | -3.600166 | 0.0036 |
| C | 8.560356 | 2.650564 | 3.229635 | 0.0072 |
| R-squared | 0.519254 | Mean dependent var | | -0.097857 |
| Adjusted R-squared | 0.479192 | S.D. dependent var | | 5.777448 |
| S.E. of regression | 4.169414 | Akaike info criterion | | 5.824992 |
| Sum squared resid | 208.6082 | Schwarz criterion | | 5.916286 |
| Log likelihood | -38.77494 | Hannan-Quinn criter. | | 5.816541 |
| F-statistic | 12.96120 | Durbin-Watson stat | | 1.988330 |
| Prob(F-statistic) | 0.003645 | | | |

| | | | | |
|---|---|---|---|---|
| Null Hypothesis: CR has a unit root | | | | |
| Exogenous: Constant | | | | |
| Lag Length: 0 (Automatic - based on SIC, maxlag=3) | | | | |
| | | | t-Statistic | Prob.* |
| Augmented Dickey-Fuller test statistic | | | -3.168647 | 0.0443 |
| Test critical values: | 1% level | | -4.004425 | |
| | 5% level | | -3.098896 | |
| | 10% level | | -2.690439 | |

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|---|---|---|---|---|
| *MacKinnon (1996) one-sided p-values. | | | | |
| Warning: Probabilities and critical values calculated for 20 observations | | | | |
| and may not be accurate for a sample size of 14 | | | | |
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| Augmented Dickey-Fuller Test Equation | | | | |
| Dependent Variable: D(CR) | | | | |
| Method: Least Squares | | | | |
| Date: 10/15/16 Time: 16:37 | | | | |
| Sample (adjusted): 2 15 | | | | |
| Included observations: 14 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| CR(-1) | -0.843139 | 0.266088 | -3.168647 | 0.0081 |
| C | 73.50873 | 23.31878 | 3.152340 | 0.0083 |
| R-squared | 0.455543 | Mean dependent var | | 0.888571 |
| Adjusted R-squared | 0.410172 | S.D. dependent var | | 20.96331 |
| S.E. of regression | 16.09988 | Akaike info criterion | | 8.527064 |
| Sum squared resid. | 3110.473 | Schwarz criterion | | 8.618358 |
| Log likelihood | -57.68945 | Hannan-Quinn criter. | | 8.518613 |
| F-statistic | 10.04032 | Durbin-Watson stat | | 2.051741 |
| Prob. (F-statistic) | 0.008090 | | | |

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| Null Hypothesis: CF has a unit root | | | | |
| Exogenous: Constant | | | | |
| Lag Length: 0 (Automatic - based on SIC, maxlag=2) | | | | |
| | | | t-Statistic | Prob.* |
| Augmented Dickey-Fuller test statistic | | | -3.976856 | 0.0127 |
| Test critical values: | 1% level | | -4.121990 | |
| | 5% level | | -3.144920 | |
| | 10% level | | -2.713751 | |

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|---|---|---|---|---|
| *MacKinnon (1996) one-sided p-values. | | | | |
| Warning: Probabilities and critical values calculated for 20 observations | | | | |
| and may not be accurate for a sample size of 12 | | | | |
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| Augmented Dickey-Fuller Test Equation | | | | |
| Dependent Variable: D(CF) | | | | |
| Method: Least Squares | | | | |
| Date: 10/15/16 Time: 16:38 | | | | |
| Sample (adjusted): 4 15 | | | | |
| Included observations: 12 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| CF(-1) | -1.164551 | 0.292832 | -3.976856 | 0.0026 |
| C | 1177.624 | 355.9965 | 3.307966 | 0.0079 |
| R-squared | 0.612634 | Mean dependent var | | 39.89500 |
| Adjusted R-squared | 0.573897 | S.D. dependent var | | 1124.335 |
| S.E. of regression | 733.9269 | Akaike info criterion | | 16.18571 |
| Sum squared resid | 5386487. | Schwarz criterion | | 16.26653 |
| Log likelihood | -95.11425 | Hannan-Quinn criter. | | 16.15579 |
| F-statistic | 15.81538 | Durbin-Watson stat | | 1.616848 |
| Prob(F-statistic) | 0.002614 | | | |

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| Null Hypothesis: D(SIZE, 2) has a unit root | | | | |
| Exogenous: Constant | | | | |
| Lag Length: 0 (Automatic - based on SIC, maxlag=3) | | | | |
| | | | t-Statistic | Prob.* |
| Augmented Dickey-Fuller test statistic | | | -4.254283 | 0.0081 |
| Test critical values: | 1% level | | -4.121990 | |

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| | 5% level | | -3.144920 | |
| | 10% level | | -2.713751 | |
| *MacKinnon (1996) one-sided p-values. | | | | |
| Warning: Probabilities and critical values calculated for 20 observations | | | | |
| and may not be accurate for a sample size of 12 | | | | |
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| Augmented Dickey-Fuller Test Equation | | | | |
| Dependent Variable: D(SIZE,3) | | | | |
| Method: Least Squares | | | | |
| Date: 10/15/16 Time: 16:39 | | | | |
| Sample (adjusted): 4 15 | | | | |
| Included observations: 12 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(SIZE(-1),2) | -1.294519 | 0.304286 | -4.254283 | 0.0017 |
| C | 1.02E+11 | 2.84E+11 | 0.358603 | 0.7273 |
| R-squared | 0.644114 | Mean dependent var | | -2.44E+10 |
| Adjusted R-squared | 0.608526 | S.D. dependent var | | 1.56E+12 |
| S.E. of regression | 9.77E+11 | Akaike info criterion | | 58.20399 |
| Sum squared resid | 9.54E+24 | Schwarz criterion | | 58.28480 |
| Log likelihood | -347.2239 | Hannan-Quinn criter. | | 58.17406 |
| F-statistic | 18.09892 | Durbin-Watson stat | | 2.101559 |
| Prob(F-statistic) | 0.001678 | | | |
| Null Hypothesis: D(IF) has a unit root | | | | |
| Exogenous: Constant | | | | |
| Lag Length: 0 (Automatic - based on SIC, maxlag=3) | | | | |
| | | | t-Statistic | Prob.* |
| Augmented Dickey-Fuller test statistic | | | -4.302708 | 0.0066 |
| Test critical values: | 1% level | | -4.057910 | |
| | 5% level | | -3.119910 | |
| | 10% level | | -2.701103 | |

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| *MacKinnon (1996) one-sided p-values. | | | | |
| Warning: Probabilities and critical values calculated for 20 observations | | | | |
| and may not be accurate for a sample size of 13 | | | | |
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| Augmented Dickey-Fuller Test Equation | | | | |
| Dependent Variable: D(IF,2) | | | | |
| Method: Least Squares | | | | |
| Date: 10/15/16 Time: 16:40 | | | | |
| Sample (adjusted): 3 15 | | | | |
| Included observations: 13 after adjustments | | | | |
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| D(IF(-1)) | -1.182378 | 0.274799 | -4.302708 | 0.0013 |
| C | -0.448577 | 1.099853 | -0.407852 | 0.6912 |
| R-squared | 0.627287 | Mean dependent var | | 0.534615 |
| Adjusted R-squared | 0.593404 | S.D. dependent var | | 6.083358 |
| S.E. of regression | 3.879048 | Akaike info criterion | | 5.689695 |
| Sum squared resid | 165.5171 | Schwarz criterion | | 5.776610 |
| Log likelihood | -34.98302 | Hannan-Quinn criter. | | 5.671830 |
| F-statistic | 18.51330 | Durbin-Watson stat | | 2.096297 |
| Prob(F-statistic) | 0.001250 | | | |