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Assessment of the Comparative Ability of Accounting Bases in Predicting Future Cash Flows: Evidence from Nigeria

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Abstract

Purpose of the article: This study examines the comparative abilities of accrual-based and cash-based accounting information to predict future operating cash flows with particular focus on quoted Nigerian non-financial companies. Secondary data were utilized for the study and were extracted from published annual statements and accounts of eighty (80) quoted firms in Nigeria between 2005–2015.
Methodology/methods: Data collected were statistically analysed with the aid of the Ordinary Least Square (OLS) regression method, correlation analysis, variance inflation factor (VIF) tests for multicollinearity, and the Breusch-Pagan/Cook Weisberg test for heteroscedasticity. 5%
level of the test of significance was employed to measure the degree of statistical relationship between stated variables.
Scientific aim: This research is aimed at empirically ascertaining, by means of available statistics, the comparative predictive abilities of accrual-based and cash-based accounting information in forecasting future cash flows for quoted non-financial companies in the Nigerian stock exchange.
Findings: It has been revealed in this study that historical earnings data prepared under the accrual-basis possessed superior predictive ability over operating cash flows data in forecasting future cash flows of quoted non-financial firms in Nigeria.
Conclusions: Company management who are saddled with the responsibility of preparation and presentation of financial statements as part of their management responsibility should, as a matter of utmost priority, uphold integrity and transparency by adhering strictly to the provisions of accounting standards so as to enhance reliability and decision-usefulness of financial disclosures with a view to improving the predictive ability of accounting information.

Keywords: accounting bases, accounting information, accrual accounting, cash accounting, cash-flows predictions

JEL Classification: M40, M41, M49

Introduction

The pristine traditions of the agency theory compulsorily mandate managers (stewards) who are appointed by the shareholders (owners) of the corporate entity to render published corporate reports in order to account for how well they have discharged their management responsibilities. This reporting responsibility is achieved via the financial statements. However, in the process of preparing and presenting corporate reports, managers are at liberty to adopt a suitable basis of accounting that efficiently reflects the firm's operations, reporting obligations, accounting policy, and disclosure requirements. The International Financial Reporting Standards (IFRS) suggest two options, namely the accrual basis or the cash basis of accounting.

The importance of cash and cash flows for the corporate existence of the firm cannot be overemphasised, it is akin to the life preserving role which blood plays to living creatures, hence its crucial role in the decision-making process of users is of utmost importance (Nasrollah, Hassan, 2013). According to the International Accounting Standard Board (IASB), the principal objective of financial statements is to enable users assess the firm's capacity to generate sustainable future cash flows for decision-making purposes (IASB, 2001). The extant literature in differentiating between the accrual accounting basis and the cash accounting basis highlights the information product of these accounting methods. These consists of the accrual based earnings data generated from the income statement and the cash flow data generated from the cash flow statement prepared on the cash accounting basis. The accrual based earnings information is preferred for sundry reasons. Firstly, it is considered meaningful in estimating the entity's performance (Godfrey et a., 2006), as it prevents the distortion of unpredictable variances in cash flows (Kremer, Rizzuto, 2000). Secondly, the idea of matching revenue and expenses to generate accrual-based earnings emphasises the use of assets in generating revenue. However, a growing number of studies have acknowledged the importance of accrual-based earnings in the prediction of a firm's future cash flows (Watts, Zimmerman, 1986; Board, Day, 1989; Ebiaghan, 2017). Despite the above assertion, Arnedo, Lizarraga, Sanchez (2012) reiterated that accruals are also fraught with measurement errors due to the assumptions underlying their determination and the discretion allowed under the GAAP. Other critics of the accrual-based earnings methodology present the argument that computation of accrual-based earnings is hindered by subjective judgment, flexible accounting techniques and manipulative practices (Bernard, Stober, 1989; Lee, 1993; Mulenga, 2015).

It is sufficient to observe that despite extensive research in this area, findings from the existing literature on the comparative abilities of accrual-based earnings versus operating cash flows in the prediction of future operating cash flows are mixed, contradictory and inconclusive.

Rationale / objectives

Prior studies on the comparative examination of the predictive abilities of accrual-based accounting and operating cash flows information were mainly conducted in developed economies predominantly in the United States (Barth *et al.*, 2001; Francis, Smith, 2005; Penham, Yehuda, 2009; Waldron, Jordan, 2010). Although, many studies carried out in the United States of America have presented empirical evidence that accrual accounting basis has predictive ability in forecasting future cash flow, it is yet to be confirmed whether this evidence holds for developing countries such as Nigeria. For one, Nigeria stock markets are far less developed than those in the United States, taking into

account industry characteristics, earnings volatility, accounting practices, and statutory regimes. As already revealed from prior studies on cash flow prediction, there are two schools of thought, one supporting the superiority of accrual accounting basis, while the other upholding cash accounting basis as a superior predictor of future cash flows, it will be necessary to examine the behaviour of Nigerian firms to know which of these categories they fall into, equally given the present economic recession in Nigeria, where businesses are cutting costs and downsizing workforce with a view to achieving optimal liquidity management and sustainability, as inability to strategically predict cash flows from current or potential investment (risk--return analysis) might result in liquidity crises in the short-run, which, if not halted in a timely manner, could lead to insolvency and subsequent bankruptcy of entities. This study therefore aims primarily at bridging these knowledge gaps by replicating the research on cash flow prediction within the Nigerian context to ascertain whether the results are consistent with the findings of prior studies outside Nigeria.

In the light of the foregoing, this paper is thus aimed at ascertaining the extent to which accounting bases (accrual or cash based accounting) can predict future operating cash flows with a particular focus on quoted firms in the non-financial sector of the Nigerian Stock Exchange. The specific these objectives are outlined as follows:

(i) To verify the extent to which earnings data can significantly predict future operating cash flows of quoted non-financial firms in Nigeria.

(ii) To ascertain the extent to which operating cash flow data can significantly predict future operating cash flows of quoted non-financial firms in Nigeria.

1. Literature review/hypothesis development

1.1 The concept of future cash flows and cash flow prediction

It has been established thus far that cash is the lifeblood of any business entity. Keown *et al.* (2005) asserts that cash is king, not profits; they went further to claim that cash receipts must exceed the cash payments in the long term to ensure the sustainability of a business. Companies are concerned with the timing of when cash is received, invested and returned to shareholders in the form of dividends. Users of financial information are mainly concerned with the entities' ability to generate favourable cash flows in the future as their decisions are related to amounts, timing and uncertainties of expected cash flows (FASB, 1978). Reported accounting information is often used by users to forecast future cash flows as part of their decision making process (Obinata, 2002). The demand for cash flow forecasts by capital market investors have been increasing in the United States, especially for companies with volatile earnings, highly capital intensive and large accruals. (DeFond, Hung, 2003). Financial analysts forecast the company's performance in areas such as earnings, cash flows and share prices as part of their main activity (Ramnath *et al.*, 2008). Prior studies have also demonstrated that reported accounting information is an essential source of information for financial analysts in carrying out their decision making process (Chang, Khana, Palepu, 2000; Hope, 2003).

The financial information disclosed by companies should be relevant for assisting in making economic decisions. Accounting information is relevant if it affects the outcome from the decision-making process (Riahi-Belkaoui, 2004). Predicting future cash flows from accounting information takes place mainly for the purposes of investment appraisal, securities valuation, assessing long-term versus short-term

investment perspectives, evaluating credit, and facilitating decision-making.

1.2 Accrual accounting basis

The objectives of financial statements are primarily to provide information about the financial position, performance, and variations in the financial position of the company to enable users make economic decisions (IASB, 2001). Accrual accounting is a method of accounting whereby revenue and expenses are identified and reported in the accounting periods when the activity occurred, independent from the timing when cash is received for the income or cash paid for the expense (Elliott, Elliott, 2007; Chong, 2012; Efayena, 2015). Economic transactions under this basis are segmented into the reporting periods when the activity occurred and not necessarily in the same period as the timing of cash flows relating to these transactions. When reporting the firm's financial performance, the accounting standards board in the United States (FASB, 1978) highlighted that the relevance of information reported under accrual accounting on the company's ability to generate continuing cash flows is superior to the limited information content of cash receipts and payments. The financial statements prepared under the accrual convention not only provided information about historical transactions that involved cash receipts and payments but also reported information on future obligations of cash payments or future benefits of cash receipts, which are useful for making economic decisions (Elliott, Elliott, 2007; IASB, 2001).

1.3 Cash accounting basis

The principle of cash accounting recognizes only cash transactions, such as recording cash receipts as income and cash payments as expenses (Birt *et al.*, 2008). Earnings are recorded in the accounting period only when revenue and expenses are realised into cash during that accounting period, which contrasts with accrual accounting. Cash accounting is more prudent than accrual accounting, as it records only realised cash flows and does not anticipate with reasonable certainty the occurrence of cash flows (Elliott, Elliott, 2007). There are fewer assumptions involved in cash accounting and the reported cash transactions can be checked and confirmed. Only actual cash transactions that occurred are reported under cash accounting and it does not anticipate cash flows, while accrual accounting report transactions that are reasonably certain will occur. Consequently, there are fewer requirements for accounting standards or accounting policies disclosures under cash accounting, such as depreciation methods, compared to accrual accounting (Elliott, Elliott, 2007). Decision makers, policymakers, the media, credit rating agencies, and the public often find it difficult to comprehend all the information reported in the accrual based financial statements (Athukorala, Reid, 2003). Cash-based information is generally more easily comprehensible by unsophisticated users than accrual-based information.

1.4 Empirical review

Several research findings collected from the existing literature on the comparative abilities of accrual-based earnings versus operating cash flows in the prediction of future operating cash flows are mixed, contradictory or inconclusive. For instance, the pioneer study by Greenberg *et al.* (1986) presents empirical evidence corroborating FASB's assertion with respect to the superiority of earnings over cash flow from operations in forecasting future cash flows. The research concluded that earnings are more significant in the prediction of future operating cash flows in the same vein; Kim, Kross (2005), adopting a similar regression model hitherto used by Dechow *et al.* (1998) and the cross-sectional approach, revealed that earnings were more powerful than cash flow from operations in predicting future cash flows, as the coefficients of earnings increased over

the time frame. Refuting these findings, the study of Bowen, Burgstahler, Daley (1986) revealed that earnings were weak in relation to predicting future cash flows, but working capital from operations and earnings plus depreciation and amortization were more powerful. The results were in agreement with the general conclusions of Murdoch, Krause (1990) and Percy, Stokes (1992). However, Jordan, Waldron (2010) claimed that earnings plus depreciation and amortization achieved better outcomes in comparison to other predictor variables utilized in the study.

Al Attar, Hussein (2004), in their study of UK firms, utilized cash flow from operations, earning, and its components and discovered that the cash flow from operations was superior to earnings in predicting future cash flows. McBeth (1993) findings refuted the aforementioned conclusions and held that neither earnings nor cash flows provided superior power in predicting future cash flows of US listed firms. These conclusions refuted FASB's assertion that earnings were a superior predictor of future cash flow.

The research finings of Finger (1994) alluded to the fact that cash flow from operations seemed to be the superior predictor of future cash flow than earnings. Lorek, Willinger (2009) also forecasted future cash flow of US firms by utilizing quarterly cash flow data. They formulated their own model in comparison with Wilson's model and another time series model. They concluded that their model, which was based on quarterly cash flow data, was more superior than other models.

Using a sample of listed Australian companies, Farshadfar *et al.* (2008) and Habib (2010) revealed that cash flow from operations exhibited superior predictive ability for future cash flows when compared to other predictor variables utilized in their study corroborating these findings; Al Debie (2011) also provided evidence for the superiority of cash flow from operations in predicting future cash flows of listed firms at the Amman Stock Exchange.

Similar conclusions were arrived at in India, Iran, and Malaysia by Mulenga (2015); Ahmadi, Ahmadi (2012); Mooi (2007) respectively. Another study by Takhtae, Karimi (2013); Moeinaddin, Ardakani, Akhoondzadeh (2013) forecasted future cash flow of Iranian firms and reported different results. A study by Takhtae, Karimi (2013) revealed that earnings outperform cash flow from operations, which supports the FASB assertion on the superiority of earnings in predicting future cash flows. While Moeinan *et al.* (2013) concluded that earnings and earnings plus depreciation and amortization out-perform other predictor variables in the prediction of future cash flows. However, these results are inconsistent with Ijeoma (2016), and Efayena (2015), who reported that cash flow from operations is a better predictor of future cash flows.

2. Methodology

2.1 Research design

This study adopted the longitudinal survey research design. The justification for this is based on the agency theory upon which the research is anchored The population of this study comprised all 143 non-financial firms listed on the trading floor of the Nigerian stock exchange as at 31st December 2015. From this, a sample of eighty quoted non-financial firms was selected using the judgmental sampling technique; consistently with prior studies, data collected for this study were sourced primarily from the Nigerian Stock Exchange fact book, published annual reports and accounts of the sampled firms which included profit after tax, total assets, and cash flow from operations extracted from the statements of comprehensive income, statements of financial position, and cash flow statements. The accounting data for all companies selected within the period was pooled and analysed so that a firm-year observation represents a case.

In order to allow for thorough analysis, the dependent variable and the independent variable was made to fall within a certain time frame. The annual data were pooled over an eleven-year period from 2005 to 2015. For the one-year-lagged predictor, it was pooled from 2004–2014 for the two year-lag predictors, it was pooled from 2004–2013, while for the three year lag predictors, it was pooled from 2004 to 2012. The annual data matching in different periods is adapted from Chong (2012); Efayena (2015); Ebiaghan (2017).

3. Model specification

Two models were formulated to sufficiently address the hypothesis of the study, *i.e.* the accrual-based earnings model and the cash--flow model as specified below:

Model 1: Earnings Model
Model 1 assumes that historical earnings data do not have the significant ability to predict the future operating cash flows of quoted non-financial firms in Nigeria. Following Chong, (2012) Efayena (2015); Ebiaghan (2017), the multiple regression models developed to test this hypothesis incorporated the lagged earnings up to three years as follows:

$$CFO_t = \beta_0 + \beta_1 EARN_{t-1} + \rho\,, \qquad (1)$$

$$CFO_t = \beta_0 + \beta_1 EARN_{t-1} + \beta_2 EARN_{t-2} + \rho\,, \quad (2)$$

$$CFO_t = \beta_0 + \beta_1 EARN_{t-1} + \beta_2 EARN_{t-2} + \\ + \beta_3 EARN_{t-3} + \rho, \qquad (3)$$

where:

CFO_t — the net cash flow from operating activities for year t scaled by the average total assets,

$EARN_{t-1}$, $EARN_{t-2}$, $EARN_{t-3}$ — stand for profit after tax but before extraordinary items and discontinued operations in year t–1 (one-year lag), year t–2 (two-year lag) and year t–3 (three-year lag) respectively, scaled by the average total assets,

β_0, β_1, β_2 — the unknown regression coefficients,

ρ — captures omitted factors (error terms).

Operating Cash flows Model
Model 2 assumes that historical operating cash flows data do not have the significant ability to predict the future operating cash flows of quoted non-financial firms in Nigeria. Following Chong, (2012); Efayena, (2015); Ebiaghan (2017), the multiple regression models developed to test this hypothesis incorporated the lagged operating cash flows up to three years as follows:

$$CFO_t = \varsigma_0 + \varsigma_1 CFO_{t-1} + \rho\,, \qquad (4)$$

$$CFO_t = \varsigma_0 + \varsigma_1 CFO_{t-1} + \varsigma_2 CFO_{t-2} + \rho\,, \quad (5)$$

$$CFO_t = \varsigma_0 + \varsigma_1 CFO_{t-1} + \varsigma_2 CFO_{t-2} + \\ + \varsigma_3 CFO_{t-3} + \rho, \qquad (6)$$

where:

CFO_t, CFO_{t-1}, CFO_{t-2}, CFO_{t-3} — are the net cash flow from operations for year t, year t–1 (one-year lag), year t–2 (two-year lag) and year t–3 (three-year lag) respectively, scaled by the average total assets,

ς_0, ς_1, ς_2, ς_3 — are the unknown regression coefficients and ρ captures omitted factors (error terms).

Operational description of variables

Earnings measurement
The earnings predictors were lagged up to three years, following Chong (2012). The earnings predictors were scaled by the

average total assets to eliminate the potential spurious correlations from size effects and heteroscedasticity problems (Farshadfar *et al.* 2008; Efayena 2015). The earnings predictor was measured as follows:

$$EARN = \frac{Profit\ after\ tax\ but\ before\ extraordinary\ items}{Average\ Total\ Assets}, \quad (7)$$

where:

EARN the earnings or profit after tax but before extraordinary items and discontinued operations scaled by the average total assets,

Average Total Assets – (Total assets book value at the beginning period + closing book value balance at the end of the period) divided by 2.

Operating cash flows measurement

Following Chong (2012); Efayena (2015); Ebiaghan (2017), these operating cash flows predictors were lagged up to three years in the regression models. These were scaled by average total assets to eliminate potential spurious correlations from size effects and heteroscedasticity problems (Farshadfar *et al.* 2008; Chong, 2012; Efayena, 2015).

The cash flows predictor was measured as follows:

$$CFO = \frac{Net\ cash\ flows\ from\ operating\ activities}{Average\ Total\ Assets}, \quad (8)$$

where:

CFO is the actual net cash flows from operating activities reported in the cash flow statement scaled by the average total assets,

Average Total Assets – (Total assets book value at the beginning period + closing book value balance at the end of the period) divided by 2.

Presentation and analysis of results

This study examined the predictive ability of accounting information (lagged for 1, 2 and 3 years) in predicting future operating cash flow on the assumption that the predictive ability of such accounting information may diminish beyond three years. The descriptive statistics for the dependent variable (Operating Cash Flow: *CFO*) and independent variable (Earnings) were reported along with their respective correlation analysis. The Shapiro-Wilk W test for normal data is also reported for operating cash flow and earnings. Finally, validations of the relevant hypotheses were analysed. Thi paper concludes with the discussion of findings/results along with specific recommendation.

Table 1 reports the descriptive statistics of the data obtained for the variables under investigation. It encapsulated the mean, standard deviation, minimum and maximum value, variance, skewness and kurtosis for the un-lag observations involving earnings (*EARN*) and cash flow operations (*CFO*). The above table shows that the mean for earnings (*EARN*) and operating cash flow (*CFO*) are positive. The implication is that companies quoted on the Nigerian Stock Exchange selected for this study are, on average, profitable and have positive net cash flows arising from continuing business operations. These characteristics were consistent with the studies conducted by Chong (2012); Chotkunakitti (2005). The low value in

Table 1. Descriptive statistics for earnings (EARN) and cash flow from operations (CFO).

Variable	Obs	Mean	Std. Dev.	Min Value	Max. Value	Var.	Skewness	Kurtosis
CFO	880	5.468	105.938	–429.62	2756.45	11222.92	21.52055	533.4586
EARN	880	.238	2.514	–3.51	63.57	6.324969	20.58227	482.3072

Source: Secondary data analysed via STATA 13.0.

Table 2. Correlation results for all the aggregated components of CFO and EARN.

	CFO	***EARN***
CFO	1.000	
EARN	–0.0012	1.000

Source: Secondary data analysed via STATA 13.0.

Table 3. Result for Shapiro-Wilk W Test for Earnings (EARN) and Cash flow operations (CFO).

Variables	**Obs.**	***W***	***V***	***Z***	**Prob.>*z***
CFO	880	0.04688	535.087	15.476	0.00000
EARN	880	0.08615	513.036	15.373	0.00000

Source: Secondary data analysed via STATA 13.0.

Table 4. Normality test for the residuals.

Variables	**Obs.**	**Pr (Skewness)**	**Pr (Kurtosis)**	**Adj. chi2(2)**	**Prob.>chi2**	**Jarque-Bera**
Residual	880	0.0000	0.0000	0.0000	0.0000	0.0000

Source: Secondary data analysed via STATA 13.0.

Table 5. Robust regression for the aggregated variables.

Source	***SS***	***Df***	***MS***
Model	9864944	2	2466236.25
Residual	.0197	875	.000
Total	9864945	877	11222.918
Number of obs. = 880 *F*(2, 877) = 0.000 Prob. > *F* = 0.000 R-Squared = 1.000 Adj R-Squared = 1.000 Root MSE = .004			

Source: Secondary data analysed via STATA 13.0.

earnings may be attributable to depreciation and amortization expenses incurred by companies. The variables are positively skewed (*CFO*=21.52055 and *EARN*=20.58227). The above result suggests a low degree of variability of the data between the pooled samples for the variables.

Analysing Table 2, it is obvious that *CFO* shows a weak and negatively correlation with *EARN* with value (–0.0012)

The results in Table 3 showed the occurrence of outliers in the variables given that the critical value of *V* in all situations was established outside the accepted range of values (values between 1.2 & 2.4). This implies that the ordinary regression result built on the model cannot be relied upon, as the result of the *t–Stat* may be invalid. Owing to the above scenario, the Jarque-Bera test was adopted in order to test the normality of the error term in the study's model. The results of Jarque-Bera test is presented below:

Table 4 shows the normality test for the residuals and it has revealed Jarque-Bera->X^2crit of 5.99. This means that the hypothesis that the residuals are normally distributed is rejected. On the basis of the above results, the robust regression analysis is conducted in order to reflect the non-normality nature of the variables and error term in our

model. The results of the robust regression for the aggregated variables are presented in Table 5:

Judging by the F-ratio, which is used to test the joint variables, suggests that all the aggregated variables under investigation were normally distributed (prob.=0.0000). Thus, it can be inferred that all the aggregated variables under investigation are normally distributed in our study.

Earnings model: Hypothesis one

Ho_1: The earnings data do not have the significant ability to predict future operating cash flows of quoted non-financial firms in Nigeria.

For this analysis, operating cash flows was substituted by future operating cash flows and regressed systematically on the basis of one-, two- and three-year lag of earnings in three different regression models

Since the mean VIF of 1.00 from the above table is below the minimum benchmark of 10 for one-year lag, the Ordinary Least Square regression result was used for the earnings model 1. However, the mean VIF for two- and three-year lag are above the benchmark, thus adopting the robust regression results for the earnings model 1 and 2.

Table 7 captured the model parameters for the one-, two- and three-year lag earnings models. The one-year-lag earnings model (model 1), which has only one predictor ($EARN_{t-1}$) was significant in explaining 0.11% (adjusted R^2=0.0011) of operating capital flow (F(1,878=0.00, P>0.05). When the two years-lag earnings predictor ($EARN_{t-2}$) was also included, the two years-lag earnings model (Model 2) was also significant in explaining CFO_t variations (F(2,877=0.00, P>0.05) and the explanatory powers increased to 0.23% (adjusted R^2=0.0023). However, the three years-lag earnings model (model 3) significantly explained the CFO_t variations (F(3,876=0.00, P>0.05), including the three years-lag earnings predictor ($EARN_{t-3}$), which increased the explanatory powers of the model to 0.34% (adjusted R^2=0.0034). Comparing the adjusted R^2 of all the earnings models, the three years-lag earnings model (Model 3: adjusted R^2=0.0034) has the strongest explanatory powers, while the one year-lag earnings model (model 1, adjusted R^2=0.0011) has the weakest explanatory powers. In addition, the results revealed that the relative contribution of the one-year-lag predictor ($EARN_{t-1}$) within the one year-lag earnings model (model 1) was not significant in explaining CFO_t variations ($EARN_{t-1}$: F=0.00, P>0.05), however, it became highly significant in subsequent years-lag ($EARN_{t-2}$: F=4750.08; P<0.05) and

Table 6. Test results for Hypothesis I.

S.E. of Regression		3.589237_{Lag1} $.0069986_{Lag2}$ 3.593443_{Lag3}	Coefficient	5.479963_{Lag1} $.095065_{Lag2}$ 5.480154_{Lag3}
Mean VIF	(1 year-lag)	1.00	Degree of Freedom	1/878
	(2 year-lag)	50.28		2/877
	(3 year-lag)	70.39		3/876

Source: Researcher's computation via STATA 13.0.

Table 7. Regression summary of future operating cash flows (CFO) and past earnings (EARN).

Model(s)	No. of Years-Lag	*N*	Adj. R^2	*F*-Ratio	Sig. *p*-value	Degree of Freedom
1	One	878	–0.0011	0.00	p>0.05	3.89
2	Two	877	–0.0023	4750.08	P<0.05	3.04
3	Three	876	–0.0034	1695.10	P<0.05	2.65

Source: Researcher's computation via STATA 13.0.

($EARN_{t-3}$: F=1695.10; P<0.05) respectively. The results revealed that only the past one year-lag predictor ($EARN_{t-1}$) in earnings model 1 was negative and insignificant, while the other two-year lag and three-year lag predictors ($EARN_{t-2}$, $EARN_{t-3}$) were positive and significant in explaining CFO_t variations.

By and large, all three earnings models (model 1, model 2 and model 3) were highly significant in explaining operating cash flows in year t (CFO_t) variations (p<0.05). The above result invalidates the null hypothesis based on the fact that the *F-cal* is 1695 (*F--crit*=2.65) and has a p-value of 0.0000. This shows that all the earnings model have highly significant predictive abilities in explaining future operating cash flows prediction. Thus, the null hypothesis is rejected and the alternate hypothesis is accepted, as the earnings data have significant ability to predict future operating cash flows of quoted non-financial firms in Nigeria. The three-year lag earnings model (model 3: adjusted R^2=0.0034) has the strongest explanatory powers while the one-year lag earnings model (model 1, adjusted R^2=0.0011) has the weakest explanatory powers in predicting future operating cash flows. Within all the earnings model (model 1, model 2 and model 3), only the past-one-year lag predictor ($EARN_{t-1}$) within the one year-lag earnings model (model 1) was not significant in explaining CFO_t variations ($EARN_{t-1}$: F=0.00, P>0.05); however, it became highly significant in subsequent years lag ($EARN_{t-2}$: F=4750.08; P<0.05) and ($EARN_{t-3}$: F=1695.10; P<0.05) respectively.

Operating cash flows model: Hypothesis two

Ho_2: Operating cash flow data do not have the significant ability to predict future operating cash flows of quoted non-financial firms in Nigeria.

Since the mean VIF of 1.00 for one-year lag, 1.07 for two-years lag and 1.18 for three-year lag were below the minimum benchmark of 10, the Ordinary Least Square regression result was adopted for the test of hypothesis 2.

Table 9 summarises the model parameters for the one-, two- and three-year lag operating cash flows models. The one-year lag operating cash flow model (model 4), which has only one predictor (CFO_{t-1}), was significant in explaining 100% (adjusted R^2=1.0000) of CFO_t (F(1,878=0.00, P>0.05). When the two-year lag operating cash flows predictor (CFO_{t-2}) was also included, the two-year lag operating cash flows model (model 5) was also significant in explaining CFO_t variations (F(2,877=0.00, P>0.05) but the explanatory powers remained

Table 8. Test results for hypothesis II.

S.E. of regression	$.0060795_{Lag1}$ $.0060877_{Lag2}$ $.0060943_{Lag3}$	Coefficient	-3.50006_{Lag1} -3.19006_{Lag2} -3.82006_{Lag3}
Mean VIF (1-year lag) (2-year lag) (3-year lag)	1.00 1.07 1.18	Degree of freedom	1/878 2/877 3/876

Source: Researcher's computation via STATA 13.0.

Table 9. Regression summary of future operating cash flows (CFO) and past earnings (EARN).

Model(s)	No. of years-Lag	*N*	Adj. R^2	*F*-Ratio	Sig. *p*-value	Degree of freedom
1	One	878	1.0000	0.00	p>0.05	3.89
2	Two	877	1.0000	0.00	P<0.05	3.04
3	Three	876	1.0000	0.00	P<0.05	2.65

Source: Researcher's computation via STATA 13.0.

Table 10. Summary of adjusted R^2 for all the models.

No. of lagged years	Earnings model	Operating cash flows model
	Adj. R^2	Adj. R^2
One	–0.0011**	1.0000**
Two	–0.0023**	1.0000**
Three	–0.0034**	1.0000**

Source: Developed from STATA Output 13.0.

** Significant at 0.05 level (2-tailed test).*

unchanged (adjusted R^2=1.0000). However, the three-year lag operating cash flows model (model 6) significantly explained the CFO_t variations (F(3,876=0.00, P>0.05), including the three-year lag operating cash flow predictor (CFO_{t-3}), the explanatory powers of the model remained unchanged (adjusted R^2=1.0000). Comparing the adjusted R^2 of all the operating cash flows models, one-, two- and three-year lags operating cash flow model recorded strong and similar explanatory powers. In addition, the results revealed that the relative contribution of the one-, two- and three-year lags predictor (CFO_{t-1}, CFO_{t-2}, & CFO_{t-3}) within the one-, two- and three-year lags operating cash flows model (model 4, model 5 and model 6) were not significant in explaining CFO_t variations (CFO_{t-1}: F=0.00, P>0.05), (CFO_{t-2}: F=0.00; P>0.05) and (CFO_{t-3}: F=0.00; P>0.05) respectively.

The results revealed that only the past one--year lag predictor (CFO_{t-1}) in operating cash flows model 4 was positive and significant, while the other two-year lag and three-year lag predictors (CFO_{t-2}& CFO_{t-3}) were negative and insignificant in explaining CFO_t variations. By and large, all three earnings models (model 4, model 5 and model 6) were insignificant in explaining operating cash flows in year t (CFO_t) variations (p<0.05).

The above result invalidates the alternate hypothesis based on the fact that the *F-cal* is 0.00 (*F-crit*=2.65) and has a p-value above 0.05. This shows that all the operating cash flow models have insignificant predictive abilities in explaining future operating cash flows prediction. Thus, the alternate hypothesis is rejected and the null hypothesis is accepted that operating cash flows data do not have significant ability to predict future operating cash flows of quoted non-financial firms in Nigeria. The one-, two- and three--year lags operating cash flow models have strong and similar explanatory powers within all the operating cash flow models (model 4, model 5 and model 6).

Table 10 shows the strengths of the models in predicting future operating cash flows based on the adjusted R^2 values obtained from our regression results. It is suggested that operating cash flows have the strongest predictive abilities for future operating cash flows for all the one-, two- and three-year lag models examined. Furthermore, all the years-lags for earnings (*EARN*) models have superior predictive abilities

Conclusions

This paper sought to investigate the comparative ability of accounting bases in predicting future cash flows using eighty (80) non-financial firms quoted on the Nigerian Stock Exchange during the period 2005 – 2015. Based on the analysis of data, it has been discovered that earnings data prepared under the accrual accounting basis, when compared with cash basis, have significant ability to predict future operating cash flows of quoted non-financial firms in Nigeria. Thus corroborating the FASB (1979) and IASB (1989) assertion on the superiority of the accrual accounting basis over the cash

accounting basis in the prediction of future performance.

The findings from this research provide direct empirical evidence substantiating that accrual-based accounting information is superior to cash-based accounting information for future cash flows prediction within the Nigerian context. These findings are consistent with prior studies such as Greenberg *et al.* (1986); Simons (1994); Dechow *et al.* (1998); Kim, Kross (2005); Pae (2005); Ebaid (2011); Chong (2012).

Consequently, it is recommended thatwhen preparing budgets, managers should de--emphasise the over-reliance on historical cash flow trends in making projections, as this could be misleading and result in poor budget performance; rather they should focus more attention on other relatively stable company variables such as earnings, interest paid, and dividend received so as to improve budget planning and performance.

References

Ahmadi, A., Ahmadi, V. (2012). Evaluating the ability of operating cash flow predictive indexes. *Interdisciplinary Journal of Contemporary Research in Business*, 4(7), pp. 45–67.

Al-Attar, A., Hussain, S. (2004). Corporate data and future cash flow. *Journal of Business Finance and Accounting*, 31(78), pp. 861–903.

Al-Debie (2011). Are operating cash flows a superior predictor of future operating cash flows than earnings? Evidence from Jordan. *European Journal of Economics, Finance and Administrative Sciences*, (40).

Arnedo, L., Lizarraga, F., Sanchez, S. (2012). The role of accounting accruals for the prediction of future cash flows: evidence from Spain. SERIE, 3, pp. 499–520.

Athukorala, S., Reid, B. (2003). Accrual budgeting and accounting in government and its relevance for developing member countries, Asian Development Bank, Manila.

Barth, M., Cram, D., Nelson, K. (2001), Accruals and the prediction of future cash flows. *The Accounting Review*, 76(1), pp. 27–58.

Bernard, V., Stober, T. (1989). The nature and amount of information in cash flows and accruals. *The Accounting Review*, 64(4), pp. 624–52.

Birt, J., Chalmers, K., Beal, D., Brooks, A., Byrne, S., Oliver, J. (2008). *Accounting: business reporting for decision making*. 2nd ed. Milton: John Wiley and Sons, pp. 23–56.

Board, J., Day, J. (1989). The information content of cash flow figures. *Accounting and Business Research*, 20(77), pp. 3–11.

Bowen, R., Burgstahler, D., Daley, L. A. (1986). Evidence on the relationships between earnings and various measures of cash flow. *The Accounting Review*, 64, pp. 713–725.

Chang, J., Khana, T., Palepu, K. (2000). Analyst activity around the world, Working Paper, Harvard Business School.

Chong, K. W. (2012). *Prediction of operating cash flows using accrual-based and cash-based accounting information among Malaysian industrial corporations*. DBA thesis, Southern Cross University, Lismore, NSW.

Chotkunakitti, P. (2005). *Cash flows and accrual accounting in predicting future cash flow of Thai listed companies.* PhD thesis, Southern Cross University. Lismore, NSW.

Dechow, P., Kothari, S., Watts, R. (1998). The relation between earning and cash flows. *Journal of Accounting and Economics*, 25(2), pp. 133–68.

DeFond, M., Hung, M. (2003). An empirical analysis of analysts cash flow forecasts. *Journal of Accounting and Economics*, 35(1), pp. 73–100.

Ebaid, I. (2011). Accruals and the prediction of future cash flows: empirical evidence from an emerging market. *Management Research Review*, 34(7), pp. 1–32.

Ebiaghan, F. (2017). Assessment of accounting

bases on future cash flow predictions: evidence from Nigerian quoted firms. PhD dissertation, Nnamdi Azikiwe University Awka, Anambra State, Nigeria.

Efayena, O. (2015). The role of accounting Basis in the prediction of future cash flows: the Nigerian evidence. *Research Journal of Accounting and Finance*, 6(4), pp. 171–80.

Elliott, B., Elliott, J. (2007). *Financial Accounting and Reporting.* 11th ed. Essex; Pearson Education.

Farshadfar, S. Ng. C., Brimble, M. (2008). The relative ability of earnings and cash flow data in forecasting future cash flows. *Pacific Accounting Review*, 20(3), pp. 235–240.

Financial Accounting Standards Board (1978). Statement of Financial Accounting Concepts No. 1: Objectives of Financial Reporting by Business Enterprises, Financial Accounting Standards Board (FASB), Stamford.

Finger, C. (1994). The ability of earnings to predict future earnings and cash flows. *Journal of Accounting Research*, 32(2), pp. 210–23.

Francis, J., Smith, M. (2005). A re-examination of the persistence of accruals and cash flows. *Journal of Accounting Research*, 43(3), pp. 413–451.

Godfrey, J. M., Hodgson, A., Holmes, S., Tarca, A. (2006). *Accounting Theory*. 6th ed. Australia, Milton; John Wiley and Sons.

Greenberg, R., Johnson, G. L., Ramesh, K. (1986). Earnings versus cash flows as a predictor of future cash flow measures. *Journal of Accounting, Auditing and Finance*, 1, pp. 266–77.

Hope, O. (2003). Accounting policy disclosures and analysts forecasts. *Contemporary Accounting Research*, 20(2), pp. 295–321.

Ijeoma, N. B. (2016). Relationship between earnings and cash flow in estimating cash flows: evidence from listed Nigerian banks. *Journal of Research in Business, Economics and Management*, 6(1).

International Accounting Standards Board (2001). *Framework for the Preparation and Presentation of Financial Statement*. International Accounting Standards Board (IASB), London.

Keown, A., Martin, J., Petty, J., Scott, D. (2005). Financial management: Principles and Application, 10th ed. Upper Saddle River: Pearson Education.

Kim, M., Kross, W. (2005). The ability of earnings to predict future operating cash flows has been increasing– not decreasing. *Journal of Accounting Research*, 43(5), pp. 753–780.

Kremer, C., Rizzuto, R. (2000). Three bottom lines. *Executive Excellence,* 17(9), pp. 6–7.

Lee, T. A. (1993). Cash Flow Reporting: Recent History of an Accounting Practice. New Works in Accounting History, New York: Garland Pub.

Lorek, S., Kenneth, L., Willinger, G. (2009). New evidence pertaining to the prediction of operating cash flows. *Review Quantitative Finance*, 32, pp. 1–15.

McBeth, K. (1993). Forecasting operating cash flow: Evidence on the comparative predictive abilities of net income and operating cash flow from actual cash flow data. *The Mid-Atlantic Journal of Business*, 29(2), pp. 173–87.

Moeinaddin, M., Ardakani, S., Akhoondzadeh, F. (2013). Examination of the ability of earning and cash flow in predicting future cash flows. *Interdisciplinary Journal of Contemporary Research in Business*, 4, pp. 94–101.

Mooi, T. (2007). Predicting future cash flows: Does cash flow have incremental information over accruals earnings? *Malaysian Accounting Review*, 6(2), pp. 67–74.

Mulenga, M. (2015). The relative ability of earnings and cash flow from operations in predicting future cash flows: Evidence from India. *International Journal of Accounting and Financial Reporting*, 5(2), pp. 56–78.

Nasrollah, T., Hassan, K. (2013). Relative Ability of Earnings Data and Cash flow In Predicting Future Cash flows. *International Journal of Accounting and Financial Reporting*, 3(1), pp. 214–226.

Obinata, T. (2002).Concept and relevance of income. *Working Paper*, University of Tokyo.

Pae, J. (2005). Expected accruals models: The impact of operating cash flows and reversals of accruals. *Review of Quantitative Finance and Accounting*, 24(1), pp. 5–22.

Penham, S., Yehuda, N. (2009). The pricing of earnings and cash flows and the affirmation of accrual accounting. *Review of Accounting Studies,* 14(4), pp. 453–479.

Percy, M., Stokes, D. J. (1992). Further evidence on empirical relationships between earnings and cash flows. *Accounting and Finance*, 32(1), pp. 27–49.

Ramnath, S. Rock, S., Shane, P. (2008). The financial analyst forecasting literature: a taxonomy with suggestions for further research. *International Journal of Forecasting*, 24(1), pp. 34–75.

Riahi-Belkaoui, A. (2004). *Accounting Theory*. 5th ed. Singapore, Thomson Learning.

Simons, K. (1994). The relationship between dividend changes and cash flow: an empirical analysis. *Journal of Business Finance and Accounting*, 21(4), pp. 577–587.

Takhtaei, N., Karim, H. (2013). Relative ability of earnings data and cash flow in predicting future cash flows. *International Journal of Accounting and Financial Reporting*, 3(1).

Waldron, M., Jordan, C. E. (2010), The comparative predictive abilities of accrual earnings and cash flows in periods of economic turbulence: the case of the IT bubble. *The Journal of Applied Business Research*, 26(1), pp. 85–97.

Watts, R., Zimmerman, J. (1986). Positive Accounting Theory, Englewood Cliffs, Prentice-Hall.

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