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Article

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Journal of Accounting and Management Information Systems (JAMIS)

Provided in Cooperation with:

The Bucharest University of Economic Studies

Suggested Citation: Imhanzenobe, Japhet; Vincent, Olusegun; Aworinde, Olalekan (2024) : IFRS Adoption and The Value-Relevance of Financial Statements Figures in Nigeria, Journal of Accounting and Management Information Systems (JAMIS), ISSN 2559-6004, Bucharest University of Economic Studies, Bucharest, Vol. 23, Iss. 1, pp. 189-214, <https://doi.org/10.24818/jamis.2024.01008>

This Version is available at:

<https://hdl.handle.net/10419/310888>

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IFRS adoption and the value-relevance of financial statements figures in Nigeria

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Abstract

Research Question: Has IFRS adoption improved the value-relevance of financial statement figures in Nigeria?

Motivation: The informativeness of the reported earnings, book values, and cash flows depends on the accounting standards used in preparing the financial statements. IFRS is a global set of accounting standards that tries to improve the relevance of accounting figures by recommending more realistic measurement and recognition criteria and increasing the level of disclosure of relevant information.

Idea: The value relevance of accounting figures in predicting stock prices is widely acknowledged. However, this study tests whether IFRS adoption significantly improves this value-relevance by increasing the degree of correlation between accounting figures and stock prices in Nigeria.

Data: The data were collected from the Bloomberg market data terminal and Datastream financial database. A sample of 85 listed companies was selected. The sample period was from 2007 to 2016.

Tools: The study applied the Ohlson model (using fixed and random-effect models) along with the Driscoll-Kraay standard errors (DKSE) and Panel-corrected standard errors (PCSE) to anticipate autocorrelation, heteroscedasticity, and cross-sectional dependence biases. The Ohlson model was estimated separately for the pre- and post-IFRS adoption periods to detect changes in value relevance. The interactions of the IFRS dummy with earnings, book values, and cash flows were also estimated separately to detect the significance of IFRS interaction with the accounting figures.

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Findings: The results showed an overall increase in value-relevance by comparing adjusted R^2 s across the pre- and post-IFRS adoption period. Also, the interactions of IFRS with earnings, book value, and cash flows were all significant.

Contribution: The study contributes to the existing literature by including cash flow in the value-relevance test in Nigeria and by applying estimation techniques that control for possible estimation biases. The authors recommend that investors pay more attention to these accounting figures under the IFRS regime when making investment decisions.

Keywords: IFRS adoption, value-relevance, signaling theory, Ohlson price model, Driscoll-Kraay standard errors, panel-corrected standard errors.

JEL codes: M41

1. Introduction

In existing literature, ‘value-relevance’ is a term that has been used to refer to the degree of correlation between reported accounting figures and stock prices (Outa *et al.*, 2017). Earnings and book value figures provide a summary of financial information about a company. These figures are disclosed in financial statements and are subject to the accounting standards used in preparing them. The limited information content of financial statements of companies listed on the Nigerian stock exchange and other African stock markets has created a problem of information asymmetry between managers and investors (Afego, 2015; Imhanzenobe, 2023). This limited information content problem has been traced to the limited scope of the local accounting standards used in preparing these financial statements (Samaha & Khlif, 2016). Due to lack of useful financial statement information, many investors in Nigeria often treat equity investments like passive saving schemes (similar to the treatment of landed properties) and this has led to long periods of inactivity and general illiquidity of the stock markets (Oteh, 2009). This has further led to a depletion in the performance of the Nigerian stock market. There have been significant shrinkages in the number of listed companies and initial public offerings over the years. Between 1998 and 2020, the Nigerian Stock Exchange experienced a 4.84% reduction (i.e. from 186 to 177) in its total number of listed companies (World Bank, 2021).

In response to the limitations of various local accounting standards and practices, the International Accounting Standards Board (IASB) has commissioned a global set of accounting standards known as IFRS. The adoption of IFRS ought to bring accounting figures closer to reality and increase the amount of financial information available to investors (thus reducing the information asymmetry) by increasing the amount of useful financial information available to investors in making investment decisions (Rompotis & Balios, 2023). This ought to improve the value-relevance of

financial statements. This study attempts to investigate the extent to which the adoption of IFRS solves these problems by evaluating the impact of IFRS adoption on the value-relevance of financial statements in Nigeria.

IFRS and value-relevance of financial statements is a prominent topic among accountants, investors, and other financial reporting stakeholders. Although there are several research studies on changes in value-relevance of financial statements following IFRS adoption, most of these studies focused on advanced and emerging economies and have revealed conflicting results (Abdel-khalik *et al.*, 1999; Alomair *et al.*, 2022; Barth *et al.*, 2008; Chua *et al.*, 2012; Clarkson *et al.*, 2011; Iatridis, 2010; Okafor *et al.*, 2016; Roca, 2021; Srivastava & Muharam, 2021; Závodný & Procházka, 2022). Meanwhile, studies in Nigeria and other developing economies are quite scanty. The Nigerian stock market is a major frontier market for foreign investors who want to penetrate African stock markets, thus making the value relevance of the financial statements of its listed companies worthy of investigation (Nellor, 2008). Furthermore, the few studies that have investigated the impact of IFRS adoption on the value-relevance in Nigeria and other developing economies (except for Erin *et al.*, 2017) have mostly focused on earnings and book values while cash flow figures have been relatively ignored in Nigeria. Cash flow figures are particularly important in Nigeria because of the high tendency for earnings management (Imhanzenobe, 2021). Investors tend to trust cash flow figures more when they suspect the presence of earnings management since cash flows are less prone to manipulation (Khanagha, 2011). To fill this gap, our study includes a cash flow dimension in addressing the impact of IFRS adoption on the value-relevance of financial statements among listed companies in the Nigerian Stock Exchange. Also, unlike other studies (including Erin *et al.*, 2017) that fail to control for standard error biases, this study uses the panel-corrected standard errors and Driskoll-Kraay standard errors to control for standard error biases in the form of autocorrelation, heteroskedasticity, and cross-sectional dependence.

The signaling theory of financial reporting suggests that when there is an increase in the volume or transparency of disclosure of information in financial statements, investors will place more value-relevance on such financial statements since more financial information will be made available for investors to anticipate. This study tests the signaling theory by investigating the impact of IFRS adoption on the value-relevance of earnings, book values, and cash flow figures of financial statements among listed companies in Nigeria. Upon investigation, the study showed an overall increase in value-relevance judging by a comparison of the adjusted R^2 across the pre- and post-IFRS adoption period. The authors also found the interactions of IFRS with earnings, book value, and cash flows to be significant.

2. Literature review and hypotheses development

2.1 Accounting standards and value-relevance of financial statements

Value-relevance is a term used to refer to the extent to which investors consider accounting figures in financial statements when making equity investment decisions. Most existing literature have measured value-relevance using the R^2 of the regression model of the market value of equity against earnings and book values (Ames, 2013; Avwokeni, 2018; Khanagha, 2011). These accounting figures are dependent on the accounting standards used in the preparation of financial statements. Accounting standards are the set of rules that govern the recognition, presentation and disclosure of the different kinds of accounting transactions (Imhanzenobe, 2022). The different definitions that different standards give to each financial statement item also reflect the different recognition requirements for such items under those standards. One of the most recent sets of accounting standards that have gained the attention of both scholars and practitioners is the International Financial Reporting Standards (IFRS) and this constitutes the focus of this study.

2.2 Financial reporting environment in Nigeria

The financial reporting environment in Africa has been largely rule-based with each country issuing its own set of generally accepted accounting principles (GAAP). These GAAP standards have been criticized by investors for lack of transparency and disclosure depth (Dasgupta *et al.*, 2010). The Nigerian financial reporting environment also suffers from this limitation (Odoemelam *et al.*, 2019). The lack of transparency and disclosure of relevant financial information in financial statements have led to information asymmetry among business insiders and external investors (Afego, 2015). IFRS tries to address these problems by increasing the volume and disclosure of financial information relevant to predicting the value of companies.

Although rumors of IFRS adoption in Nigeria started in 2010, Nigeria began implementation of IFRS on a mandatory basis in 2012. Thus, practitioners and financial statement preparers had a grace period of 2 years (between 2010 to 2012) to familiarize themselves with the IFRS standards before IFRS adoption was mandated for all listed companies. Between 2010 and 2012, listed companies seldom prepared financial statements in accordance with IFRS (except for a few outliers who prepared two sets of financial statements for tax avoidance purposes). Before the adoption of IFRS, the financial reporting environment was regulated by the Nigerian Accounting Standards Board (NASB) which issued the local accounting standards (Nigerian GAAP). These standards were often criticized for being excessively rule-based, giving more emphasis to the letter of the law rather than the spirit of the law (Nentiaba, 2012). Rule-based systems tend to be characterized by rigidity, excessive government intervention, and restricted disclosure, thus making compliance

demands more difficult and unrealistic (Nakpodia *et al.*, 2018). Some of the variations between the Nigerian GAAP and the IFRS standards can be found in Table 1 below.

Table 1. Some variations between the Nigerian GAAP and IFRS

Financial Reporting Areas	Nigerian GAAP (SAS)	IFRS
Financial statement presentation	Statement of Profit and Loss, Balance sheet, Cash flow statement, Value-added statement, accounting policies, Note to the accounts, and Directors' report.	Statement of comprehensive income (Income statement), Statement of financial position (balance sheet), Statement of changes in equity, Statement of cash flows, accounting policies, Notes to the accounts containing significant management estimates and judgment, Statement of financial position for the beginning of the earliest comparative period when an entity applies an accounting policy retrospectively.
Property, plant and equipment	Measured using the cost model	Measured using cost model for initial recognition with detailed guidance regarding; Componentisation, Useful life, Residual value, Impairment calculations, and identifying cash-generating units. Also allows for fair value measurement for subsequent recognitions.
Related parties	Limited disclosure but expected	Detailed guidance on the identification of related parties and detailed disclosure of related parties and transactions.
Segment reporting	Based on geographical location	Operation segment based on management view. The threshold for reportable segments' results or assets of an individual segment should be 10% or more of all segments. If the aggregate revenue of all reported segments on this basis is less than 75% of the total, then more segments are required until the 75% threshold is reached.
IFRS- first time adoption	Not applicable	Provide guidance and requirements on the transition to IFRS. Also provides relief for certain items in the preparation of opening balance sheet
Financial guarantees	Disclosed as contingent liabilities	Requires financial guarantees to be recognised at their fair value

Financial Reporting Areas	Nigerian GAAP (SAS)	IFRS
Scope of consolidation	General principles	Investment under control is consolidated
Employees benefits	General expenses and disclosure on pension	Complex criteria of accounting. Recognise the undiscounted amount of short-term employee benefits.
Risk management disclosure	Limited disclosure on foreign exchange and credit risk	Credit risk, Liquidity risk, Price risk, Capital risk management, and other Risk management issues.
Leases	Based on general guidelines, operating and finance lease	Fair value and amortised cost are used in valuation. Also addresses certain transactions/contracts containing hidden leases which needed to be accounted for.
Impairment	No specific standard	Requires companies to carry out impairment tests based on trigger events in accordance with IAS 36 (impairment of Assets) for non-financial assets and IFRS 9 (Financial instruments) for financial assets.
Financial assets classification and valuation	Suggests cost model for initial recognition and amortised cost model for subsequent recognition	Suggests cost model for initial recognition. However, it suggested amortised cost model or fair value model for subsequent recognition. The choice of model should depend on the business model and the nature of the financial asset.

Source: Edogbanya & Kamardin, 2014

The compliance level of Nigerian companies to the NASB standards was below the international average of 91% before IFRS adoption (Kasum, 2011). Also, Nigeria is one of the late adopters of IFRS. During the years while Nigeria was enforcing its GAAP standards, many developing and developed countries were adopting IFRS. This meant that the financial statements of Nigerian companies were becoming less comparable to those of other countries.

The new standards have been rumored to provide solutions to the problems of the previous standards, namely lack of depth of disclosure and comparability across borders. Thus, this study tries to evaluate the extent to which IFRS adoption has solved these problems by investigating the impact of IFRS adoption on the value-relevance of financial statements among listed companies in Nigeria following existing theory.

2.3 Theoretical background

Some pioneer works in the field of value-relevance and accounting standards have provided a methodological framework for the evaluation of value-relevance. They evaluated changes in value-relevance by comparing the R^2 of the price-earnings model or returns-earnings model over different accounting regimes (Brown *et al.*, 1999; Nwaeze, 1998). This method was first propounded by Ohlson (1995) and is commonly referred to as the Ohlson model. Most of the empirical literature followed this methodology.

The Ohlson model was developed to link the market value of companies to accounting figures (Gibson, 1987; Matsumoto *et al.*, 1995). The theoretical underpinning for the Ohlson model lies in the proposition of the signaling theory which explains the relationship between the disclosure of accounting information and investors' behavior in terms of the value relevance that such investors place on accounting information.

The signaling theory originated as a theory of informational economics. It suggested that, while in search of jobs, potential employees would improve their employment chances by sending signals of their talent to the market to gain competitive advantage over other jobseekers (Penman, 1980; Spence, 1973). It was later applied to the field of financial reporting to suggest that where firms disclose new financial information in their financial statements, this will increase the consideration that investors give to such financial statements in making investment decisions (Morris, 1987). Signaling theory in financial reporting suggests that when there is an increase in the volume and quality of financial information disclosed in the financial statements, investors will place more value-relevance on such financial statements since more financial information will be made available for investors to anticipate. Given that some of the consequences of IFRS adoption include an increase in the volume and quality of disclosure of financial statement information, the signaling theory supports the hypothesis of improvement in the value-relevance of financial statements following IFRS adoption. This is because such financial statements will contain more financial information to be anticipated by investors when making investment decisions. Thus, this study tests the signaling theory using the Ohlson model to evaluate the impact of IFRS adoption on the value-relevance of financial statements in Nigeria.

2.4 Review of previous studies

As mentioned in section 2.3, some pioneer works in the field of value-relevance and accounting standards have provided a methodological framework for the evaluation of value-relevance in form of the Ohlson model. These authors evaluated changes in value-relevance by comparing the R^2 of the Ohlson Price and returns model across

different accounting regimes (Brown *et al.*, 1999; Lev & Zarowin, 1999; Nwaeze, 1998). Most of the empirical literature followed this methodology.

Some more recent empirical studies on value relevance have been done in advanced and emerging economies (Alomair *et al.*, 2022; Barth *et al.*, 2008; Chua *et al.*, 2012; Clarkson *et al.*, 2011; Khanagha, 2011; Iatridis, 2010; Roca, 2021; Srivastava, & Muharam, 2021; Závodný, & Procházka, 2022). Barth *et al.* (2008), Iatridis (2010), Chua *et al.* (2012) and Clarkson *et al.* (2011) all discovered that IFRS adopters experienced less earnings management, more timely recognition of losses, and higher value-relevance of book value and earnings than non-adopters. Clarkson *et al.* (2011) further discovered that the impact of IFRS on value-relevance was more pronounced in code-law countries compared to common-law countries. On the other hand, Khanagha (2011) did a comparative study on changes in value-relevance of earnings, book value, and cash flow per share in the UAE after IFRS adoption and discovered a deterioration in value-relevance of book value and earnings post-IFRS adoption. However, the portfolio approach showed an increase in value-relevance for cash flow figures.

Countries like South Africa and Kenya are much closer to Nigeria given that they have largely similar economic conditions and financial reporting environments. The Nigerian financial reporting environment exhibits characteristics of code-law countries. These three countries have the largest GDP and market capitalization in Sub-Saharan Africa (Ezenwoke & Tion, 2020). Like Nigeria, they also act as frontier markets for foreign investors wanting to penetrate the stock markets in Sub-Saharan Africa (Nellor, 2008). Few studies in these markets have investigated the impact of IFRS adoption on the value relevance of financial statements (Ames, 2013; Chebaane & Othman, 2014; Nyabundi, 2013; Outa *et al.*, 2017; Sixpence & Adeyeye, 2019). Ames (2013) is one of the few studies that have investigated IFRS adoption and accounting quality in South Africa. The study revealed no significant change in overall value relevance after IFRS adoption. On the other hand, Chebaane and Othman (2014) and Sixpence and Adeyeye (2019) discovered an increase in the overall value-relevance of financial statements in South Africa, as well as some other African and Asian countries. However, they traced the increase to be caused by incremental value-relevance of earnings figures only. Contrary to the opinion of Clarkson *et al.* (2011), the results of Chebaane and Othman (2014) also showed that the increase in overall value relevance was positively influenced by a common law legal system, strong investor protection, and economic openness. A few studies have also been done in Kenya. A comparison of the results of Nyabundi (2013) and Outa *et al.* (2017) reveals some conflict. Nyabundi (2013) discovered low value-relevance of earnings and book values in Kenya post-IFRS adoption. The results showed that dividends had more value relevance compared to earnings and book values after IFRS adoption. Meanwhile, Outa *et al.* (2017) discovered an increase in value relevance of earnings and book values in Kenya.

Some empirical studies on value relevance in Nigeria were also reviewed (Avwokeni, 2018; Erin *et al.*, 2017; Odoemelam *et al.*, 2019; Uwuigbe *et al.*, 2017). Uwuigbe *et al.* (2017) did a study on IFRS adoption and value relevance in Nigeria. The sample period was from 2010 to 2013 (2 years before and 2 years after IFRS adoption). Using a sample of 10 companies out of the 26 listed companies in the consumer goods industry, they applied the Ohlson model a significant improvement in the value relevance of earnings and book value figures. However, earnings was found to exhibit stronger explanatory power than book values both in the pre and post-IFRS eras. Erin *et al.* (2017) and Odoemelam *et al.* (2019) revealed largely similar results. However, the study by Erin *et al.* (2017) holds a special place in the value relevance literature in Nigeria since it is the only work that simultaneously evaluates the impact of IFRS adoption on the value relevance of cash flows (one of the major gaps that this study addresses). Using a sample of 52 public companies from the financial services and consumer goods industry in Nigeria, they discovered an increase in value relevance across the pre and post-IFRS adoption period. Although the authors detected a change in value relevance upon IFRS adoption, they failed to further test the significance of this change and control for standard error biases. Our study addresses this gap by individually investigating the significance of the mediation of IFRS adoption on the explanatory power of each of the three accounting variables on share prices using PCSE and DKSE. Avwokeni (2018) also did a study on value relevance of financial statements in Nigeria. The study investigated whether market participants depend on financial statement information or place a premium on the prospect of firms when deciding on equity investment. Using R^2 comparisons, the study revealed a decrease in value relevance during the pre-IFRS regime and an increase during the IFRS regime. Overall, the average value relevance was lower in the IFRS regime.

Given the above contradictions, the results of the empirical literature on IFRS adoption and value relevance of financial statements in Nigeria remain inconclusive, thus necessitating further investigation. The review of previous studies also reveals some weaknesses in research design and model estimation, thus necessitating the subject to be re-addressed. Firstly, in relation to the Ohlson model, sampling bias has been identified as a common problem (Brown *et al.*, 1999; Gu, 2007). A critical observation of the research design shows that most of the literature used unpaired samples (different companies and unequal periods) for the pre and post IFRS periods. This could lead to sampling bias. In this study, we used a paired sample of only companies that were consistently listed throughout the sample period (5 years before IFRS and 5 years after IFRS). Secondly, most of the existing literature in Nigeria ignored the cash flow figures in the value-relevance test except for Erin *et al.* (2017). Cash flow is a very important determinant of the financial sustainability of any company, and thus plays a major role in predicting stock prices (Imhanzenobe, 2021; Rompotis & Balios, 2023). In our study, we included cash flow per share in the value-relevance tests. Finally, most of the existing literature failed to control for omitted variable biases (in terms of unobserved company-specific effects) as well as

standard error biases (in terms of autocorrelation, heteroscedasticity, and cross-sectional dependence). These biases are very common in panel data models and often lead to spurious results (Hoechle, 2007; Torres-Reyna, 2007). In this study, the necessary post-diagnostic tests were carried out to detect the presence of these biases, and appropriate techniques were used to control for them.

3. Research methodology

The study aims to investigate the impact of IFRS adoption on the value-relevance of financial statements in Nigeria. In line with existing literature, this study adopts a longitudinal research design using historical company and stock market data to test the null hypotheses.

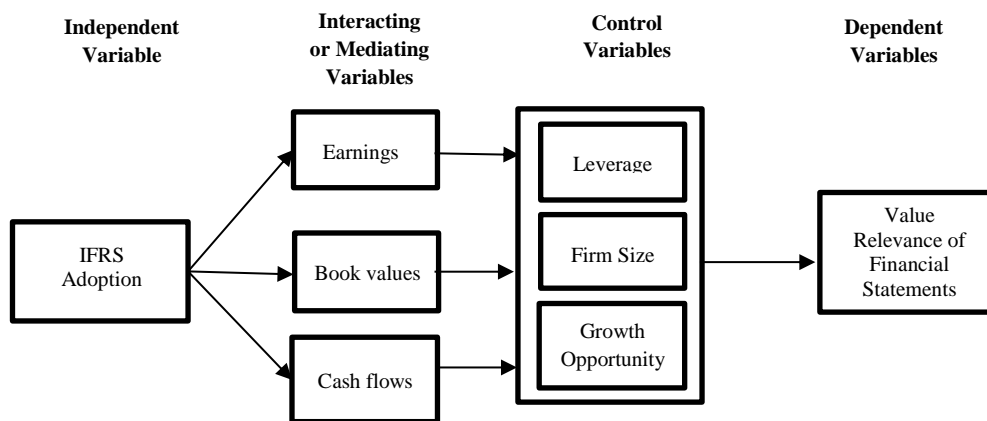


Figure 1. Conceptual framework for IFRS adoption and value-relevance of financial statements

A diagrammatic representation of the hypotheses being tested can also be found in Figure 1 above. The specific null hypotheses to be tested in this study are as follows:

- H1.** *There is no significant interaction between IFRS and earnings in influencing the value-relevance of financial statements in Nigeria.*
- H2.** *There is no significant interaction between IFRS and book values in influencing the value-relevance of financial statements in Nigeria.*
- H3.** *There is no significant interaction between IFRS and cash flows in influencing the value-relevance of financial statements in Nigeria.*

3.1 Sample selection

The population of the study constituted listed companies on the Nigerian Stock Exchange (NGSE). Research hypotheses that test the impact of an event often require

a short time period since the period just before the event and after the event are the key determinants of the results (Abdel-khalik *et al.*, 1999; Iatridis, 2010; Wang & Ngai, 2020). Following the suggestions of Barth *et al.* (2008) and Outa *et al.* (2017), an unbalanced panel dataset was collected for a period of 10 years. To avoid the problem of comparing unpaired models, the 10-year period for each country was designed to span 5 years before IFRS adoption and 5 years after IFRS adoption. Nigeria started implementing IFRS in 2012. Thus, we used a sample period ranging from 2007 to 2016.

A sample of listed companies was selected based on listing status. Only companies that were consistently listed throughout the sample period were selected so that each company acts as its own control, thus preventing sample variation bias (Outa *et al.*, 2017). The number of listed companies in Nigeria was relatively stable at 173 (fluctuated only slightly during the sample period with a peak of 213 in 2010). However, only 85 of these companies were found to be consistently listed through the period from 2007 to 2016. This is because several companies either delisted or shut down during the sample period. These companies were excluded from the sample to prevent sample variation bias. Using the sampling criteria, only the 85 consistently listed companies were selected. Also, due to missing data points, the number of observations for each year was less than 85. This led to an unbalanced panel dataset of 618 (less than 850) observations across the pre and post-IFRS period (Table 2). The companies' data were obtained from the Bloomberg market data terminal and Datastream financial database.

Table 2. Sample selection		
Nigeria Stock Exchange		
(85 consistently listed firms across sample period)		
Pre-IFRS period		
<i>Sample periods</i>	Number of listed firms	Number of complete observations
2007	173	56
2008	173	57
2009	196	58
2010	213	57
2011	198	58
Total		286
Post-IFRS period		
<i>Sample periods</i>	Number of listed firms	Number of complete observations
2012	198	54
2013	186	64
2014	184	70
2015	181	73
2016	173	71
Total		332
TOTAL		618

3.2 Variables measurement

Following the tradition of existing literature, share price was measured with market price per share. Earnings was measured with earnings per share. Book value was measured with book value per share. Cash flow was measured using cash flow per share. IFRS adoption was measured using a dummy variable of 0 for pre-IFRS periods and 1 for post-IFRS periods. Similar to Barth *et al.* (2008) and Chebaane and Othman (2014), leverage, firm size and growth opportunity were included as control variables. The codes, operational definitions, and literature sources for the variables used can be found in Table 3 below.

Table 3. Variables measurement and representation

Variables	Code	Operational definition	Source of measurement
Market Price per Share	MPS	Share price (3 months after year end)	(Brown <i>et al.</i> , 1999; Gu, 2007; Odoemelam <i>et al.</i> , 2019)
Earnings per share	EPS	Profit after tax divided by number of outstanding ordinary shares	(Avwokeni, 2018; Francis & Schipper, 1999; Nwaeze, 1998)
Book Value per share	BVPS	Book value of total equity (assets minus liabilities) divided by number of outstanding ordinary shares	(Iatridis, 2010; Lev & Zarowin, 1999; Outa <i>et al.</i> , 2017)
Cash flow per share	CFPS	Operating cash flow divided by number of outstanding ordinary shares	(Khanagha, 2011; Lev & Zarowin, 1999; Okafor <i>et al.</i> , 2016).
IFRS adoption	IFRS	Dummy variables of 0 (for the pre-IFRS period) and 1 (for the post-IFRS period)	(Elhamma, 2023; Iatridis, 2010; Odoemelam <i>et al.</i> , 2019;)
Leverage	LEV	(Total Debt divided by Total Equity) / 100	(Barth <i>et al.</i> , 2008; Chebaane & Othman, 2014; Iatridis, 2010)
Firm Size	SIZE	Natural Log of total assets	(Barth <i>et al.</i> , 2008; Chebaane & Othman, 2014; Iatridis, 2010)
Growth Opportunity	GROWTH	Market value of equity divided by book value of equity	(Barth <i>et al.</i> , 2008; Chebaane & Othman, 2014; Iatridis, 2010)

4. Empirical results

4.1 Descriptive statistics

The descriptive statistics of all variables were extracted to show the sample distribution characteristics (Table 4). To test the different hypotheses of the study, the data collected were analyzed using Stata. All the figures were calculated in the local currencies. The stock price figures were collected for 3 months after the fiscal year end of each sample company. The average earnings per share figure was N1.720. The positive average EPS figures indicate that the sample companies are relatively profitable. The average book value per share figure was N8.90. This indicates the net asset belonging to shareholders per unit of shares owned which the company uses to generate the earnings per share. The average figure for the book value per share, when compared to the average earnings per share, indicates an average return on investment (i.e. EPS/BVPS) of about 19.33%. The average cash flow per share figure was N3.91. Upon comparison with the EPS figures, the cash flow figures were found to be greater. This suggests that the sample companies had significant amounts of accrued and non-operating expenses.

Table 4. Descriptive statistics of all variables

Nigeria			
85 sample listed firms			
Sample period - 2007 to 2016			
	Obs	Mean	Std. Dev.
MPS	618	32.207	91.089
IFRS	618	0.537	0.499
EPS	618	1.720	5.872
BVPS	618	8.903	11.419
CFPS	618	3.914	17.193
LEV	618	69.903	208.306
SIZE	618	10.459	0.917
GROWTH	618	3.101	12.110

Following the methodology of some recent existing literature (Elhamma, 2023; Rompotis & Balios, 2023), a preliminary test was done to detect if there has been an increase in overall value relevance as a result of IFRS adoption. Afterward, H1, H2, & H3 were tested by investigating the significance of such increase using the interactions of IFRS with the different accounting figures. For the preliminary test, a basic OLS estimation was done using the Ohlson model to test for changes in the overall value relevance of the accounting figures. Tests for omitted variable biases were also carried out to determine which of pooled, fixed, and random effect model was more appropriate. Finally, standard error biases were anticipated (depending on the results of the post-diagnostic tests) using the panel-corrected standard error or Driscoll-Kraay standard error to ensure that the model results were unbiased. This

process was also followed to test the interactions of IFRS with the different accounting figures (i.e. to test null hypotheses H1, H2, & H3).

4.2 Pre-IFRS adoption model estimation

OLS models were estimated for pre-IFRS adoption and post-IFRS adoption respectively. According to the basic OLS results, an increase was observed (from 43.6% to 70.1%). Some post-diagnostic tests were then carried out to confirm the fitness of the models as well as the appropriateness of the estimation techniques. Omitted variable bias tests were done to detect omitted variable biases in form of fixed or random effects. The Breusch and Pagan Lagrangian Multiplier test (BPLM test) for random effect and the joint test (testparm) were used to detect the presence of random and fixed effects respectively. The Hausman test was then used to determine whether to use the fixed-effect model (FEM) or random-effect model (REM) in controlling for the omitted variable bias and achieving good model fitness. The results of the omitted variable bias tests can be seen in Table 5 below.

The BPLM tests (F-Stat = 273.03) and the testparm (F-Stat = 78.01) were all significant ($p < 0.05$), thus indicating the presence of omitted variable bias in form of random and fixed effects in the basic OLS model. This necessitated estimating the model with either the random or fixed-effect model. The choice between the random-effect model and the fixed-effect model was informed by the Hausman test (Table 5).

The Hausman test statistic was insignificant (Hausman Stat = 11.40; $p > 0.05$), thus indicating a preference for the random-effect model. The fixed and random-effect models are better suited for our estimation because they control for omitted firm-specific characteristics that are relatively fixed or random over time and can influence the dependent variable (e.g. firm culture, organizational policies, industry classification, etc.).

Although fixed and random-effect models control for omitted variable bias, further post-diagnostic tests were run to detect standard error biases. Standard error bias in panel data could occur in form of autocorrelation, heteroskedasticity, and cross-sectional dependence (Torres-Reyna, 2007).

Table 5. REM model for pre-IFRS adoption using DKSE
Random effect Model (with Driscoll-Kraay standard errors)

MPS	Coef.	Driscoll-Kraay St.Err.	t-value
EPS	3.890	2.754	1.41
BVPS	0.893	0.390	2.29*
CFPS	0.407	0.198	2.06
LEV	0.013	0.004	2.98**

Random effect Model (with Driscoll-Kraay standard errors)			
MPS	Coef.	Driscoll-Kraay St.Err.	t-value
GRT	0.059	0.017	3.47**
SIZE	4.690	4.139	1.13
Const	-38.336	35.480	-1.08
Within R-squared			0.431
F-test			6664.38
Prob > F			0.000
Number of obs			286
Breush-Pagan LM tests			273.03 (0.000)
Testparm tests			78.01 (0.000)
Hausman tests			11.40 (0.077)
Wooldridge tests			11.33 (0.001)
Modified Wald tests			9.5e+09 (0.000)
Pesaran CD tests			12.25 (0.000)

*** $p < .01$, ** $p < .05$, * $p < .1$

The results of the post-diagnostic tests can be seen in Table 5 above. The Wooldridge test for panel autocorrelation was conducted on the pre-IFRS random-effect model. The test showed a statistic of 11.330 with p-value of 0.0014, thus indicating a presence of autocorrelation. The Wald test was also done to detect any presence of panel heteroskedasticity. The statistic showed some presence of heteroskedasticity ($p < 0.05$). Finally, the Pesaran test for cross-sectional dependence was also carried out to detect any presence of panel cross-sectional dependence. The test showed presence of cross-sectional dependence (Pesaran CD test stat = 12.25 with $p < 0.05$).

The presence of autocorrelation, heteroskedasticity, or cross-sectional dependence could lead to biased standard errors which could in turn affect the t-statistics for the independent variables. Empirical research works have suggested the use of the Panel-Corrected Standard Errors (PCSE) and Driscoll-Kraay Standard Error (DKSE) techniques for controlling for standard error biases in panel regression analysis (Hoechle, 2007; Torres-Reyna, 2007). The PCSE technique uses robust standard errors that adjust for autocorrelation and heteroskedasticity while the DKSE technique uses robust standard errors that adjust for autocorrelation, heteroskedasticity, and cross-sectional dependence. The pre-IFRS random-effect model was then re-estimated using the DKSE to control for the heteroskedasticity and cross-sectional dependence respectively (Table 5).

4.3 Post-IFRS adoption model estimation

The entire process done for the pre-IFRS OLS model was also carried out for the post-IFRS adoption model. The results can be seen in Table 6 below. The BPLM test

(F-Stat = 277.98) and the testparm (F-Stat = 233.50) were both significant ($p < 0.05$). The Hausman test was also significant (Hausman stat = 1035.38; $p < 0.5$). Thus, Fixed effect model (FEM) was selected for the post-adoption model. The Wooldridge test, Wald test, and Pesaran test were also carried out. The FEM model showed a presence of autocorrelation (Wooldridge Stat = 41.65; $p < 0.5$) and heteroskedasticity (Wald stat $p < 0.05$). However, there was absence of cross-sectional dependence (Pesaran stat = 0.29, $p > 0.5$). Thus, the Panel-corrected standard errors were used (Table 6).

Table 6. FEM model for post-IFRS adoption using PCSE
Fixed effect Model (with Panel-Corrected standard errors)

MPS	Coef.	Panel-corrected St.Err.	t-value
EPS	4.901	1.644	2.98***
BVPS	1.856	0.519	3.57***
CFPS	1.151	0.384	2.99***
LEV	0.014	0.006	2.27**
GRT	10.283	1.685	6.10***
SIZE	1.324	1.959	0.68
Const	-36.648	22.188	-1.65*
<hr/>			
Within R-squared			0.610
F-test			86.62
Prob > F			0.000
Number of obs			332
Breush-Pagan LM tests			277.98 (0.000)
Testparm tests			233.50 (0.000)
Hausman tests			1,035.38 (0.000)
Wooldridge tests			41.65 (0.000)
Modified Wald tests			1.5e+32 (0.000)
Pesaran CD tests			0.29 (0.769)

*** $p < .01$, ** $p < .05$, * $p < .1$

The DKSE and PCSE models show an increase in the adjusted R^2 (within R^2) figures across the pre- and post-IFRS adoption models (Tables 5 & 6). The modified post-IFRS adoption model had adjusted R^2 s of about 61.0% while the pre-IFRS adoption model had adjusted R^2 s of about 43.1%, thus suggesting an increase in value relevance by about 41.5%.

Similar to the study by Ames (2013), the study goes on to test H1, H2, & H3 by estimating the interactions of the IFRS dummy variable with the focal independent variables individually to establish the channel for the increase in value relevance discovered across Tables V and VI. This estimation covered both the pre- and post-IFRS periods. The first, second, and third hypotheses (H1, H2, and H3) of this study were tested using the IFRS interaction variables. The resulting models were also

subjected to similar omitted variable bias and post-diagnostic tests as the previous models.

4.4 Model estimation for the interaction of IFRS with earnings (H1)

To test H1, the IFRS and earnings interaction model was run with basic OLS and subjected to the different post-diagnostic tests (Table 7). The BPLM test (F-Stat = 723.89) and the testparm (F-Stat = 157.12) were both significant ($p < 0.05$). The Hausman test was also significant (Hausman stat = 138.96), thus FEM was selected. The Wooldridge test, Wald test, and Pesaran test were also carried out. There was significant evidence of autocorrelation (Wooldridge Stat = 46.78; $P < 0.05$). and heteroskedasticity ($p < 0.05$). There was also some presence of cross-sectional (Pesaran stat = 23.75; $p < 0.05$). Thus, the Driscoll-Kraay technique was used to estimate the IFRS-Earnings interaction FEM models.

**Table 7. FEM model for the IFRS and EPS interaction using DKSE
Fixed effect Model (with Driscoll-Kraay standard errors)**

MPS	Coef.	Driscoll-Kraay St.Err.	t-value
IFRS	-3.363	3.639	-0.92
EPS	-2.640	1.478	-1.79
IFRS*EPS	6.505	1.139	5.71***
LEV	0.002	0.003	0.51
SIZE	18.145	7.502	2.42**
GRT	0.307	0.197	1.55
Const	-158.180	77.677	-2.04*
Within R-squared			0.206
F-test			20.78
Prob > F			0.000
Number of obs			618
Breush-Pagan LM tests			723.89 (0.000)
Testparm tests			157.12 (0.000)
Hausman tests			138.96 (0.000)
Wooldridge tests			46.78 (0.000)
Modified Wald tests			1.0e+11 (0.000)
Pesaran CD tests			23.75 (0.000)

*** $p < .01$, ** $p < .05$, * $p < .1$

The result in Table 7 shows that the IFRS dummy and EPS in isolation were both negative and insignificant ($t = -0.92$ & -1.79 ; $p > 0.05$ for both). However, the interaction of IFRS with EPS was positive and significant ($t = 5.71$ & $p < 0.05$). This shows evidence of a significant impact of IFRS adoption on the value relevance of earnings figures in Nigeria. This is consistent with the result of the pre- and post-

IFRS model which showed pre-IFRS earnings to be insignificant and post-IFRS earnings to be positive and significant (Tables 5 & 6).

4.5 Model estimation for the interaction of IFRS with book values (H2)

The IFRS and book value interaction model was run with basic OLS to test H2. The BPLM test (F-Stat = 1193.85) and testparm (F-Stat = 141.06) were both significant. However, the Hausman test was insignificant (Hausman stat = 4.08; $P > 0.05$). Thus, the REM model was selected. There was also significant evidence of autocorrelation (Wooldridge Stat = 90.85; $p < 0.05$), heteroskedasticity ($p < 0.05$), and cross-sectional dependence (Pesaran stat = 12.52; $p < 0.05$). Thus, the REM model was estimated using DKSE (Table 8).

Table 8. REM model for the IFRS and BVPS interaction using DKSE
Random effect Model (with Driscoll-Kraay standard errors)

MPS	Coef.	Driscoll-Kraay St.Err.	t-value
IFRS	-10.764	-1.658	-6.49***
BVPS	1.129	0.333	3.39***
IFRS*BVPS	1.959	0.597	3.28***
LEV	0.003	0.002	1.27
SIZE	1.154	6.412	0.18
GRT	0.397	0.352	1.13
Const	1.346	62.887	0.02
Within R-squared			0.315
F-test			129.90
Prob > F			0.000
Number of obs			618
Breusch-Pagan LM tests			1,193.85 (0.000)
Testparm tests			141.06 (0.000)
Hausman tests			4.08 (0.538)
Wooldridge tests			90.85 (0.000)
Modified Wald tests			4.5e+39 (0.000)
Pesaran CD tests			12.52 (0.000)

*** $p < .01$, ** $p < .05$, * $p < .1$

The result in Table 8 shows that the IFRS dummy was negative and significant ($t = -6.49$ & $p < 0.05$) while BVPS in isolation was positive and significant ($t = 3.39$ & $p < 0.05$). However, the interaction of IFRS with BVPS was positive and significant ($t = 3.28$ & $p < 0.05$). This provides evidence of a significant impact of IFRS on the value relevance of book values in Nigeria. This is also consistent with the result of the pre- and post-IFRS model which showed pre-IFRS book values to be insignificant and post-IFRS book values to be significant (Tables 5 & 6).

4.6 Model estimation for the interaction of IFRS with cash flows (H3)

Finally, to test H3, the IFRS and cash flow interaction model was run with basic OLS and subjected to similar tests. The BPLM test (F-Stat = 1232.2) and the testparm (F-Stat = 41.72) were both significant ($P < 0.05$). The Hausman test was also significant (Hausman stat = 35.72; $P < 0.05$), thus the FEM model was selected. There was evidence of autocorrelation (Wooldridge Stat = 106.85; $p < 0.05$). There was also significant evidence of heteroskedasticity ($p < 0.05$) and cross-sectional dependence (Pesaran stat = 37.66; $p < 0.05$). Thus, the DKSE technique was used to estimate the IFRS-cash flow interaction FEM model (Table 9).

Table 8. FEM model for the IFRS and cash flows interaction using DKSE
Fixed effect Model (with Driscoll-Kraay standard errors)

MPS	Coef.	Driscoll-Kraay St.Err.	t-value
IFRS	3.840	4.353	0.88
CFPS	-0.266	0.434	-0.61
IFRS*CFPS	0.741	0.232	3.20**
LEV	-0.003	0.002	-1.32
SIZE	23.885	7.410	3.22**
GRT	0.285	0.179	1.60
Const	-221.113	7.065	-2.87**
Within R-squared			0.062
F-test			21.48
Prob > F			0.000
Number of obs			618
Breush-Pagan LM tests			1,232.20 (0.000)
Testparm tests			41.72 (0.000)
Hausman tests			35.72 (0.000)
Wooldridge tests			106.85 (0.000)
Modified Wald tests			7.0e+38 (0.000)
Pesaran CD tests			37.66 (0.000)

*** $p < .01$, ** $p < .05$, * $p < .1$

The result in Table 9 shows that the IFRS dummy was positive but insignificant ($t = 0.88$ & $p > 0.05$) while CFPS in isolation was negative and insignificant ($t = -0.61$ & $p > 0.05$). However, the interaction of IFRS with CFPS was positive and significant ($t = 3.20$ & $p < 0.05$). This shows evidence of a significant impact of IFRS on the value relevance of cash flows in Nigeria. This is also consistent with the result of the pre- and post-IFRS model which showed pre-IFRS cash flows to be insignificant and post-IFRS cash flows to be significant.

4.7 Discussion and comparison of results

Using the unbiased model (Tables 5 & 6), we observed an increase in the overall value-relevance among the sample companies in Nigeria (judging from the comparison of the R^2 figures across the pre- and post-IFRS adoption models). This indicates that value-relevance of financial statements has improved during the IFRS regime. This result confirms the signaling theory which suggests an increase in anticipation of new financial information in terms of transparency and proximity of accounting figures to reality. This result is similar to those of Barth *et al.* (2008), Chebaane and Othman (2014), Chua *et al.* (2012), Iatridis (2010), Odoemelam *et al.* (2019) and Závodný and Procházka (2022) who predicted increase in value-relevance upon IFRS adoption. However, the result contradicts those of Ames (2013), Avwokeni (2018), and Roca (2021) who detected a reduction in value-relevance.

Although the results showed an increase in value-relevance, the study also went further to test the interaction of IFRS with each of earnings, book values, and cash flow to trace the incremental value-relevance to specific accounting figures (Table 7, 8 & 9). For the interaction of IFRS with earnings (Table 7), the results showed that IFRS had a significant interaction with earnings figures in predicting stock prices, thus improving the value-relevance of financial statements in Nigeria. Following this result, the first null hypothesis (H1) can be rejected. This result confirms the signaling theory as applicable in Nigeria with regard to earnings. The result is similar to those of Chebaane and Othman (2014), Erin *et al.* (2017), Outa *et al.* (2017), Uwuigbe *et al.* (2017), Sixpence and Adeyeye (2019), Odoemelam *et al.* (2019), Srivastava and Muharam (2021) and Závodný and Procházka (2022) but contradicts those of Ames (2013), Nyabundi (2013), Avwokeni (2018), Roca (2021) and Alomair *et al.* (2022).

For the interaction of IFRS with book values (Table 8), the results showed that IFRS had a significant interaction with book value figures in improving the value-relevance of financial statements in Nigeria. Following this result, the second null hypothesis (H2) can be rejected. This result also confirms the signaling theory as applicable in Nigeria with regard to book values. The results are similar to those of Erin *et al.* (2017), Uwuigbe *et al.* (2017), Alomair *et al.* (2022) and Závodný and Procházka (2022) but contradicts those of Ames (2013), Nyabundi (2013), Chebaane and Othman (2014), Sixpence and Adeyeye (2019), Odoemelam *et al.* (2019), Roca (2021) and Srivastava and Muharam (2021).

Finally, the interaction of IFRS with cash flows (Table 9) also showed that IFRS had a significant interaction with cash flow figures in improving the value-relevance of financial statements in Nigeria. Following this result, the third null hypothesis (H3) can be rejected. This result further confirms the signaling theory as applicable in

Nigeria with regard to cash flows. This result is similar to those of Erin *et al.* (2017) and Závodný and Procházka (2022).

The uniqueness of the financial reporting environment in many countries has led to different results emanating from IFRS adoption across the globe. This result is in line with the existing literature that suggests that IFRS adoption tends to have a more significant effect on value-relevance of financial statements in code-law countries like Nigeria (Clarkson *et al.*, 2011). The excessive rigidity of the previous local rule-based standards in Nigeria (Nigerian GAAP) before the adoption of IFRS made full compliance difficult and unrealistic. The use of the historical cost model across all asset classes, as well as other conventions that may not reflect reality, made financial statements have relatively poor value-relevance. IFRS has improved the quality of financial statements by making them more realistic and comparable across borders. The increase in voluntary financial disclosure brought about by IFRS has led to an increase in the value-relevance of earnings and book value figures among listed Nigerian companies. Furthermore, cash flow figures tend to be preferred by investors when they perceive aggressive earnings management (Imhanzenobe, 2021). As such, IFRS-based cash flow figures are given more value-relevance in Nigeria because they are simpler to understand and are less prone to earnings management.

5. Conclusion

The market value of listed companies reflects available financial information about those companies and a substantial amount of this financial information can be found in financial statements. The transparency and comparability of the reported performance and position of a company are dependent on accounting standards that govern the preparation of financial statements. The earnings, book value, and cash flow figures are key aspects of the financial performance of a company. The value-relevance of financial statement figures refers to the degree to which investors consider these figures when making investment decisions.

The lack of transparency and comparability of information in financial reports of listed companies in Nigeria has created significant information asymmetry between managers and potential investors. This problem has been traced to the irrelevance of accounting figures in predicting share prices. The signaling theory of financial disclosure suggests that where there is additional financial information (or improvement in the quality of existing financial information), existing and potential investors will take advantage of such information in a way that will be reflected in the share prices. IFRS is a global accounting standard that tries to improve the relevance of accounting figures by recommending more realistic measurement models and recognition criteria for financial statement items as well as increasing the level of disclosure of relevant financial information. This study investigated the impact of IFRS adoption on value-relevance of financial statements in Nigeria. The

results revealed an overall increase in value-relevance. On further investigation, it was discovered that the increase in value-relevance in Nigeria was traced to the interaction of IFRS with earnings, book values, and cash flow figures. The significance of the increase in value-relevance of accounting figures after IFRS adoption may be because the previous local accounting standards in Nigeria possessed attributes of code-law systems (i.e. largely rule-based and highly restrictive in terms of disclosure). The difference is more conspicuous and appreciable when code-law countries adopt IFRS compared to common-law countries.

Many Nigerian investors have been known to treat equity investments like passive saving schemes due to lack of financial expertise and limited information content of financial statements. IFRS has come to increase the significance of accounting information in explaining share prices. Several code-law countries like Egypt, Sudan, Mozambique, India, and Indonesia share similar institutional characteristics (in terms of size, population, and economic development) and are yet to adopt IFRS standards. The authors recommend that these code-law countries that share similar institutional characteristics with Nigeria and are yet to adopt IFRS should consider adopting IFRS to enjoy the benefits of increased disclosure and improvement in the value-relevance of accounting figures. Furthermore, the study concludes that the extent to which Nigerian investors consider accounting figures in making investment decisions has improved after the adoption and implementation of IFRS. Thus, the authors also recommend that investors should give more attention to accounting figures like earnings, book values, and cash flow in making investment decisions under the IFRS regime.

The results of this study are of significant usefulness to companies, accounting regulators, governments, and researchers. Companies that report their financial position and performance under IFRS may enjoy more information symmetry with their stakeholders and this will improve their growth opportunities through the increase in investors' confidence. Also, where accounting figures are more transparent, accounting regulators will have a clearer picture of the position and performance of regulated companies and will be able to provide proper oversight. Thirdly, improvement in the value relevance of accounting figures and investor confidence may increase the performance of stock markets in adopting countries and this will strengthen the economic power of governments. Enhancements in comparability and transparency of financial statements across borders will also enhance foreign portfolio investment. Lastly, the results of this study are useful to researchers since filling the identified literature gap will help to increase the knowledge base and provide a foundation for further research.

Finally, a review of the IFRS adoption literature reveals that, although most of the studies discovered significant changes in the value relevance of financial statements, the authors failed to investigate the implications for the performance of stock

markets. Where investors place more or less relevance on financial statement information in predicting share prices, it ought to influence investors' behavior and investment decisions, which in turn will affect the performance of the overall stock market. Thus, following the discovery of an increase in value relevance of financial statements figures upon IFRS adoption in Nigeria. Further studies could be conducted to investigate the impact of IFRS adoption on the performance of the Nigerian stock market.

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