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IFRS ADOPTION AND ACCRUAL-BASED MANAGED EARNINGS IN NIGERIA

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ABSTRACT

This study aims to evaluate the effects of the adoption of the International Financial Reporting Standards (IFRS) on the accrual-based managed earnings behavior of firms in Nigeria. The panel corrected standard errors (PCSE) multivariate method was employed to analyze firm-level data for 125 firms and covers the 11 sectors on the Nigerian Stock Exchange (NSE). The results of the Welch–Satterthwaite test show a significant difference between the pre-adoption (2003–2011) and post adoption (2012–2020) discretionary accruals. These variables conformed to the a priori expectation and are all significant in the most parsimonious models. Contrary to some developed countries, the data does not support the idea that leverage, growth, and book-to-market value influence managed earnings for Nigeria. Managed earnings are not solely time-driven but are explained by certain firm characteristics (IFRS adoption, post-adoption firm-size, post-adoption audit firm's size, returns on equity and asset turnover). Future research could explore opportunities in the areas of limitation we identified.

Contribution/Originality: Firstly, this study extends the literature by evaluating IFRS adoption and accrual-based managed earnings in Nigeria. Secondly, this study differs from other in terms of the sample selection. While other studies focused on the real estate and banking sectors in Nigeria, this study considers a combination of sectors.

1. THE MOTIVATION

The choice of accounting standards between national and international practices is crucial for firms. These standards establish unified frameworks that guide auditors, accountants, and regulators in deriving consistent and independently verifiable facts regarding the operations of firms on the financial markets. The International Accounting Standards (IAS) were replaced by the International Financial Reporting Standards (IFRS) in 2001, and they provide accounting reports for proper resource allocation and the comparability of financial information valuable for business expansion and investment across borders. IFRS provide a financial reporting system that supports professional judgment, discretion, and interpretation. The standards integrate global stock markets and protect public interests in order to foster trust, financial stability and economic growth (Ball, 2016; Persakis &

Iatridis, 2017). The standards also smoothen harmonization, development and expansion of financial markets (Bertrand, De Brebisson, & Burietz, 2021; IFRS Foundation, 2018). This paper provides new evidence on how the post-IFRS adoption influences the practice of managed earnings among firms in an emerging market country.

The increase in globalization has driven the adoption of IFRS by companies. There has been an unprecedented number of countries adopting IFRS in the last two decades. For some countries, IFRS are mandatory for quoted firms but remain optional for non-quoted firms (Chimonaki & Vergos, 2019; Kousay, 2019; Li & Yang, 2016; Malofeeva, 2018). As noted by the IFRS Foundation (2018), since the formal formulation of the IFRS, over 65% of the global jurisdictions (about 140 countries) have adopted or converged, with only 40% (22 countries) of African countries requiring the standards. The European countries are the harbingers of IFRS adoption based on numerous studies (Cadot, Rezaee, & Benaïs, 2021; Capkun, Collins, & Jeanjean, 2016; Leung & Verriest, 2015; Mongrut & Winkelried, 2019; Ugrin, Mason, & Emley, 2017). There is considerable research in Asia (Baig & Khan, 2016; Rahmaningtyas & Mita, 2017) and Latin America (Mongrut & Winkelried, 2019), but a scanty amount of research on Africa (Ahmed, Neel, & Wang, 2013; Ezenwoke & Tion, 2020; Ozili & Outa, 2019), with South Africa mostly being investigated (Tawiah & Boolaky, 2019).

Nigeria is among the African countries that developed their own national accounting standards based on IFRS before their full implementation, when the federal government mandated in 2012 that all companies that participate on the Nigeria Stock Exchange (NSE) must file IFRS-based financial statements. A number of investigations have been carried out on the implementation, compliance and consequences of IFRS adoption in Nigeria. There is evidence that IFRS have value relevance in the country (Ewereoke, 2018; Odoemelam, Okafor, & Ofoegbu, 2019; Olayinka, Olojede, & Ogundele, 2017) and leads to a significant reduction in audit quality for both financial and non-financial firms (Uthman & Salami, 2021). Ozili and Outa (2019) provide evidence on how IFRS adoption affects managed earnings in Nigeria. They note that IFRS adoption advances the reliability and informativeness of loan-loss provisions, as well as lower managed earnings among Nigerian banks. The study is limited to the banking sector and does not consider interdependence among firms across all industries. Despite the widespread use of IFRS in Nigeria, there is evidence of increasing accounting anomalies and poor disclosure of quality information and managed earnings among corporations due to weak implementation of IAS (Ofoegbu & Odoemelam, 2018; Ozili & Outa, 2019). Therefore, the issue of how IFRS affect earnings management in Nigeria remains unclear.

This paper explores the effects of the adoption of IFRS on managed earnings dynamics in Nigeria. This study contributes to the literature in the following ways. First, some prior studies (Appiah, Awunyo-Vitor, Mireku, & Ahiagbah, 2016; Sellami & Fendri, 2017) note that the adoption of, and compliance with, IFRS have specific firms/sector characteristics, hence, we confirm if there is a significant difference in earnings management in each sector in the pre- and post-adoption periods. Second, the closest precursor to this paper (Ozili & Outa, 2019) only provides evidence for the banking sector in Nigeria, but according to Odoemelam et al. (2019), we should provide a generic firm-level synthesis across all industries (financial and non-financial). This study limits the focus to country-level mandatory IFRS adoption, so it doesn't include voluntary firm-level adoption. The remainder of the paper is structured as follows: section two reviews relevant literature and provides the hypotheses, section three discusses the data and empirical methodology, section four discusses the results, and section five contains the conclusion.

2. LITERATURE AND HYPOTHESES

2.1. Literature

The widespread adoption of IFRS has prompted a number of empirical studies. A vast number of confirmed literature discusses related information on the voluntary or mandatory adoption of IFRS (Bertrand et al., 2021; De George, Li, & Shivakumar, 2016; De Moura & Gupta, 2019; Groff & Mörec, 2021; Guermazi & Khamoussi, 2018; Isaboke & Chen, 2019; Malofeeva, 2018; Mongrut & Winkelried, 2019). These papers focus on the elements of the

adoption, implementation, compliance and impact of IFRS on accounting quality. Some studies considered the consequences of IFRS adoption on managed earnings and income smoothing. Irrespective of whether the adoption is voluntary or mandatory, studies by Guermazi & Khamoussi (2018); Isaboke & Chen (2019); and Rathke, Santana, Lourenço, & Dalmácio (2016) highlight significant mixed results. Some empirical studies (Cadot et al., 2021; Mongrut & Winkelried, 2019) identify the positive benefits of IFRS adoption. They highlight that IFRS adoption leads to a decrease in managed earnings (positive effects). Most studies reveal that IFRS that adoption reduces earning smoothing are singled-country based (Baig & Khan, 2016; Chimonaki & Vergos, 2019; Mongrut & Winkelried, 2019; Ozili & Outa, 2019). Chimonaki and Vergos (2019) observed that IFRS adoption enhances transparency and lowers information costs in Greece. Baig and Khan (2016) found that IFRS adoption explains a decrease in managed earnings. IFRS adoption also contributes to improvement in the quality of accounting information.

Notably, most cross-country studies, e.g., Capkun et al. (2016) and Rahmaningtyas & Mita (2017), support the idea that the IFRS decreases earnings management. Ugrin et al. (2017) noted a non-uniform increase in managed earnings among firms across countries in Europe following the adoption of IFRS. A few other studies show neutral and inconclusive results (Abuda & Rudiawarni, 2014; Bryce, Ali, & Mather, 2015; Kousay, 2019). Abuda and Rudiawarni (2014) found no significant changes in earnings management report after IFRS adoption in Indonesia, while Bryce et al. (2015) observed that accounting quality remained stable under Australian generally accepted accounting principles (GAAP) and post-IFRS. There is no significant enhancement due to adoption.

Empirical studies on the relation between IFRS and earnings smoothing in Africa remain scanty (Ahmed et al., 2013; Outa, Ozili, & Eisenberg, 2017; Ozili & Outa, 2019; Sellami & Slimi, 2016). Nnadi and Soobaroyen (2015) found that IFRS adopters in Africa are yet to harness the anticipated benefits, while Wieczynska (2016) observed that some firms in the accounting industry are experiencing unintended consequences following IFRS adoption. Sellami and Slimi (2016) observed that IFRS adoption is linked to low managed earnings in South Africa. Studies on Nigeria have focused on how IFRS adoption affects value relevance (Ewereoke, 2018; Odoemelam et al., 2019; Olayinka et al., 2017). Ozili and Outa (2019) show that IFRS adoption increases the reliability and informativeness of loan-loss provisions, as well as lower earnings smoothing among Nigerian banks. Table 1 presents a compendium of selected cross-countries on the relationship between earnings management and IFRS adoption, while Table 2 presents the data for single-country studies.

Table 1. Selected cross-countries studies.

Author(s)	Country	# Firms	Methodology	Variables	Remarks	IFRS Effects
Cadot et al. (2021)	European Union	Firm-level: 873	Logit model, pooled ordinary least squares (POLS) (2013–2014)	**Small positive returns; small positive changes of returns; current accruals; discretionary accruals;** leverage; net sales; price-to-earnings ratio.	Except for derivatives firms, managed earnings have faded with IFRS adoption. The flexibility of IFRS regarding derivatives reporting are applied to manage earnings.	Positive
De Moura, Altuwaijri, and Gupta (2020)	5 Latin American countries	Firm-level: 422	Pooled OLS (2005–2015)	**Discretionary accruals;** cost of equity; IFRS adoption dummy; standard deviation of returns; log of market value of equity; leverage; country dummy; dummy for classification system.	There is enhanced disclosure due to IFRS adoption in comparison to previous domestic accounting standards. Also, the cost of debt was reduced after IFRS adoption.	Negative
Mongrut and Winkelried (2019)	6 Latin American countries	Firm-level: 871	Fixed effects, pooled OLS (2000–2016)	**Earnings opacity;** IFRS adoption dummy; audit quality; size (assets); bid–ask spread; concentration.	IFRS adoption does not provide a sufficient guarantee of transparency in emerging markets.	Positive
Rahmaningtyas and Mita (2017)	6 Asian countries	Country-level	Fixed effects (2008–2012)	**Discretionary accruals;** IFRS dummy variable; investor protection index; natural log of total assets; leverage; sales growth rate; operating cash flow; gross domestic product.	Earnings management is higher after IFRS adoption. The relation is lower in countries with strong investor protection.	Negative
Ugrin et al. (2017)	14 European countries	Firm-level: 7469	Fixed effects (1990–2012)	**Discretionary accruals; net income before extraordinary profit margin;** firms' operating cycle; firm size; logarithm of total assets; dummy for the legal system; IFRS dummy.	Earnings management is higher post-adoption. The relationship between IFRS adoption and earnings management is not uniform across countries.	Negative
Capkun et al. (2016)	Cross-continental: 29 countries that transitioned to the IFRS (between 1994 and 2009)	Firm-level: 3853	Fixed effects	**Volatility of changes in net income (NI); volatility of NI scaled by the volatility of cash flows (CF); correlation between CF and accrual residuals;** log of market value of equity; change in total liabilities; leverage; growth; auditor dummy.	There was an increase in managed earnings (smoothing) after 2005 among the three categories of adopters (early, late and mandatory).	Negative
Rathke et al. (2016)	Latin America (Brazil, Chile), Europe (France, Germany), Anglo-Saxon (UK, Australia)	Firm-level: 3164	Pooled regression (2011–2012)	**Absolute discretionary accruals;** profitability; growth potential; size; leverage level investment opportunities; cash flow of operations (CFO); Big Four firm dummy.	Latin American firms display higher earnings smoothing than Anglo-Saxon and Continental European countries. The country-specific characteristics are significant following IFRS implementation.	Mixed

Li and Yang (2016)	40 selected countries	Different sample sets	Difference-in-differences; logit model; (2002–2010)	**Discretionary accruals;** leverage; dummy for IFRS adoption; size; net income divided by total assets (profitability); ratio of book value of equity to market value of equity.	The likelihood of earnings managed increases after IFRS adoption. The increase is larger among firms domiciled in code law countries.	Negative
Leung and Verriest (2015)	18 European countries	Firm-level: 737	Pooled regression	**Segment reporting quality;** size; return on assets; and a dummy for firms that suffer a loss.	The increase in segment disaggregation is not uniform among firms. Firms report more disaggregated segments under IFRS.	Negative
Chebaane and Othman (2014)	Selected cross-continental	Firm-level: 105	OLS regression (1998–2012)	**Price of common stock;** price of equity on earnings per share; IFRS adoption dummy; degree of external economic openness; rate of foreign net inflows; minority stockholders' interest protection; direct investment; dummy for common law; leverage; size; sales growth rate; strength of investor protection in the country.	The role of earnings per share became more important in the post-adoption period.	Negative

Note: The variables highlighted in **bold** are dependent variables. # Firms = Number of firms.

Table 2. Selected single-country studies.

Author(s)	Country	Adoption	# Firms	Methodology	Variables	Remarks	IFRS Effects
Chimonaki and Vergos (2019)	Greece	2005	231	Fixed effects (2002–2015)	**Change regression in net income**; log of market value of equity; leverage; % change in total liabilities; annual net cash flow; auditor dummy.	IFRS adoption lowers information costs and advances transparency.	Positive
Mensah (2021)	Ghana	2006	120	Fixed effects, pooled OLS (2001–2014)	**Modified Jones' discretionary accruals**; firm size; profitability; growth; asset returns; leverage.	IFRS have a significant effect on managed earnings. IFRS adoption enhances the quality of firms' financial reports.	Positive
Kousay (2019)	Canada	2011	791	Fixed effects (2000–2018)	**Discretionary accruals**; **abnormal discretionary expenses**; change in income; managed earnings; leverage; gross property, plant and equipment; ROA.	IFRS have no direct influence on managed earnings among publicly listed firms.	Neutral
Ozili and Outa (2019)	Nigeria	2012	23	Pooled OLS (2012–2014)	**Ratio of loan loss to total assets**; **change in gross loans**	IFRS lower earnings smoothing among Nigerian	Positive

Author(s)	Country	Adoption	# Firms	Methodology	Variables	Remarks	IFRS Effects
					outstanding; earnings before taxes; natural logarithm of total assets; real GDP growth rate; dummy for listed banks; non-performing loans to gross loans ratio; dummy for difference in income.	banks. IFRS adoption expands the informativeness and reliability of loan-loss provisions.	
Malofeeva (2018)	Russian	2012	361	OLS pooled (2010–2015)	**Discretionary accruals**; industry dummy; dummy for IFRS adoption; size; return on assets; leverage; risk; percentage change in income.	Large firms resort to earnings management more than small firms.	Mixed
Baig and Khan (2016)	Pakistan	2004	100	OLS pooled 2001–2009	**Total accruals**; **non-discretionary accruals**; gross property, plant and equipment; change in receivables; total assets; change in revenue.	IFRS adoption leads to less pervasiveness of managed earnings.	Positive
Sellami and Slimi (2016)	South Africa	2012	276	OLS pool regression (2002–2012)	**Absolute discretionary accruals**; dummy for the post-IFRS adoption; turnover; growth; company size; dummy for company audit; separation Chief Executive Officer (CEO) roles.	IFRS adoption is linked with lower managed earnings. IFRS adoption contributes to improvement in the quality of accounting information.	Positive
Udayakumara and Weerathunga (2016)	Sri Lanka	2012	157	OLS pool (2009/2010–2013/2014)	**Change in annual net cash flow**; **change in net income**; log of book value of total assets; leverage; % change in sales; auditor dummy; % change in book value of equity; turnover; net cash flow.	Sri Lankan firms exhibit higher levels of income smoothing after IFRS adoption, which is indicative of higher earnings management.	Positive

Note: The variables highlighted in **bold** are dependent variables. Adoption = Year of IFRS adoption; # Firms = Number of firms.

Table 2. continued.

Author(s)	Country	Adoption	# Firms	Methodology	Variables	Remarks	IFRS Effect
Bryce et al. (2015)	Australia	2005	200	Fixed effects, OLS pooled (2003–2008)	**Discretionary accruals**; **accruals quality**; company size; turnover; growth; dummy for company audit.	Accounting quality is stable under the generally accepted accounting principles (GAAP) and IFRS. There is no significant enhancement due to adoption.	Neutral
Martinez (2015)	Mexico	2010	75	OLS pooled (2010–2011)	**Ratio of the operating cash flows to total assets**; **ratio of the operating accruals to total assets**; ratio of total assets scaled by the book value of equity; difference in revenues; log of total assets in percent; percentage difference in the total liabilities; auditor dummy; percent difference in the number of shares.	There was a significant decrease in managed earnings from the convergence phase of IFRS adoption.	Positive
Yeboah and Yeboah (2015)	South Africa	2005	181	Fixed effects, pooled OLS (1998–2012)	**Change in net income over small positive target; correlation between accruals and cash flow**; absolute discretionary accruals; percentage change in sales; fixed effects dummy; leverage; turnover; log of total assets; net cash flow divided by total assets.	IFRS improved the accounting quality more than the GAAP. Earnings management reduced in the post-adoption period.	Positive
Abuda and Rudiawarni (2014)	Indonesia	2012	169	Pooled OLS (2010–2012)	**Earnings volatility and discretionary accruals; share price and book value per share;** liquidity; profitability; size; net profit per share; and leverage.	No real change in the extent of managed earnings was reported after the mandatory IFRS adoption. IFRS adoption does not produce any higher value relevance.	Neutral
Brad, Dobre, Ţurlea, and Braşoveanu (2014)	Romania	2011	56	Fixed effects, pooled OLS (2010–2012)	**Radio of accruals to total assets; small positive earnings; change in net income;** growth; change in the number of stocks; ratio of total debts and value of their own equity; ratio of sales to total assets.	There was a significant reduction in managed earnings following IFRS adoption compared to the use of Romanian Accounting Standards.	Positive
Nouri and Abaoub (2014)	France	2005	145	Fixed effects (2000–2009)	**Total accruals; non-discretionary accruals;** change of operating cash flow; leverage; net income to equity; CFO; net income to total assets; market capitalization; dummy for IFRS; growth.	The IFRS contributed to less earnings and income smoothing.	Positive
Dimitropoulos, Asteriou, Kousenidis, and Leventis (2013)	Greece	2005	101	Fixed effects, pooled OLS (2001–2008)	**Discretionary accruals; net income per share;** book value of common equity per share; dummy with a value of one for firms that adopted IFRS prior to 2005.	IFRS contributed to less earnings management, greater value relevance, and more timely loss recognition compared to the domestic GAAP.	Positive

Note: The variables highlighted in **bold** are the dependent variables. Adoption = Year of IFRS adoption; # Firms = Number of firms.

2.2. Research Hypotheses

The consequences of the widespread adoption IFRS in Nigeria remains a topic of interest for researchers. The IFRS provide managers and accountants with the flexibility to employ discreet and professional judgment in presenting financial parameters. The constraints of quality control over the issued reports and inadequate protection of investors' rights may contribute to managers intentionally misreporting the company's financial results. Although, there is evidence of increase earnings anomalies and inadequate disclosure of information and managed earnings among corporations (Ofoegbu & Odoemelam, 2018; Ozili & Outa, 2019; Ugrin et al., 2017). However, it is proposed that IFRS adoption leads to precise reporting (Kousay, 2019) and lower earnings management (DeFond, Gao, Li, & Xia, 2019; Rathke et al., 2016).

Before the official adoption of the IFRS, the harmonization process undertaken in Nigeria aligned the Nigerian GAAP (N-GAAP) with the IAS counterpart. As suggested by Cadot et al. (2021); DeFond et al. (2019); Harakeh, Lee, & Walker (2019); and Mongrut & Winkelried (2019), countries with clear differences between the national accounting standards and the IAS would be expected to benefit more from IFRS adoption. For Nigeria, there is evidence that the N-GAAP only adapted the IAS/IFRS (Assenso-Okofo, Ali, & Ahmed, 2011; Tawiah & Boolaky, 2019). There were no notable differences between the IFRS and N-GAAP at the time of the final adoption. Hence, one would not expect many substantial benefits, particularly a significant reduction in managed earnings. However, the closest precursory to this study (Ozili & Outa, 2019) provides evidence that IFRS adoption lowers earnings smoothing among Nigerian banks. Hence, this paper formally considers these hypotheses:

H1: There is a significant difference between the N-GAAP and IFRS managed earnings in each sector (industry) in Nigeria.

H2: There is a significant difference between the N-GAAP and IFRS managed earnings (overall) in companies in Nigeria.

H3: Discretionary accrual-based managed earnings by listed companies in Nigeria have reduced overtime.

H4: Listed companies audited by Big Four auditors since IFRS adoption accounts for a lower level of managed earnings relative to those audited by non-Big Four auditors.

H5: The extent to which IFRS adoption reduces managed earnings depends on the size of the firm.

3. THE METHODOLOGY

3.1. The Sample and Data

The study examines the long-term relationship between the criterion and control variables. We collected data on these companies on the NSE and collated accounting information from audited annual reports and financial statements from 2003 to 2020 to cover the period of the rule-based national accounting standards (N-GAAP: 2003–2011) to the implementation of the IFRS package (2012–2020). We pool the firm-level variables to obtain stacked firm-level panel data. Figure 1 shows the plot of the number of listed companies in Nigeria between 2000 and 2020. We assessed a total of 177 listed domestic companies reported in 2020 but excluded all quoted firms with insufficient information for the two subsample periods to balance our data structure. Finally, we obtained a total of 125 firms with complete information for the periods. We cover 1125 firm-year observations for the N-GAAP and 1125 firm-year observations for the IFRS with each accounting for 50% of the data sample. This gives 2250 observations and covers almost 60% of quoted firms assessed, including financial and non-financial sectors.

Table 3 presents a breakdown of the final sample adopted for the study. Panel A shows the sample of the firm-year sample distribution, Panel B shows the industry-wise sample breakdown, and Panel C shows the year-wise sample breakdown. The table also shows the number of listed firms per year (# Firms) and the percent of listed firms covered in that year in our study (% Firms).

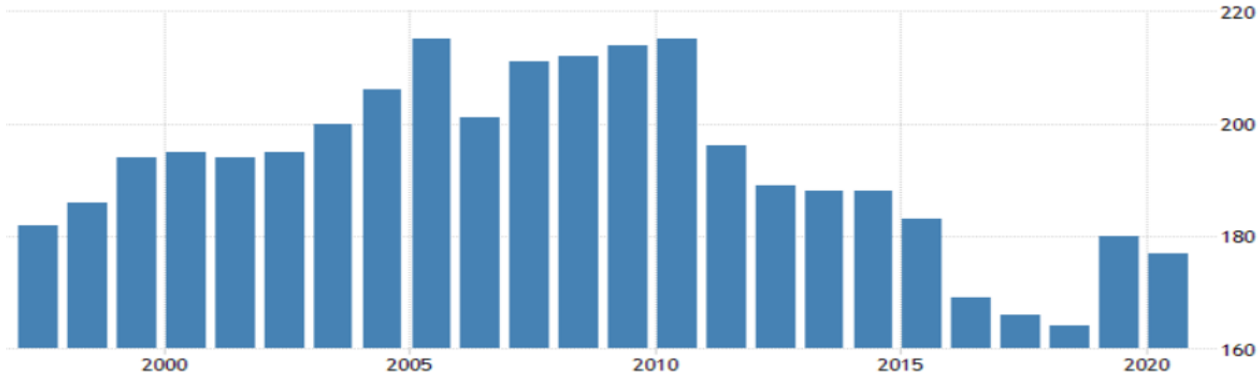

Figure 1. Nigeria number of listed companies (2000–2020).
The figure above reveals that the number of listed companies in Nigeria has been declining since 2011, when it peaked at a total of 216. However, there is a noticeable increase in the number listed firms from a total of 164 in 2018 to 180 in 2019.
Source: WorldBank|Tadingeconomics.com (2022).

Table 3. Breakdown of final sample.

Panel A: Sample breakdown			
Year sample	**No. of Obs.**	**# Firms**	**% Firms**
Firm-year obs.: 2003–2011 (N-GAAP)	1125	125	50.00%
Firm-year obs.: 2012–2020 (IFRS)	1125	125	50.00%
Total	2250	125	100.00%
Panel B: Industry-wise breakdown of sample			
Industry (SiCode)	**No. of Obs.**	**# Firms (industry)**	**% Firms (industry)**
01	72	4	3.20%
02	54	3	2.40%
03	126	7	5.60%
04	288	16	12.80%
05	630	35	28.00%
06	144	8	6.40%
07	126	7	5.60%
08	216	12	9.60%
09	72	4	3.20%
10	162	9	7.20%
11	360	20	16.00%
Total	2250	125	100.00%
Panel C: Year-wise breakdown of sample			
Year	**# Firms(total)**	**# Listed(year)**	**% Listed(year)**
2003	125	200	62.50%
2004	125	207	60.39%
2005	125	216	57.87%
2006	125	202	61.88%
2007	125	213	58.69%
2008	125	215	58.14%
2009	125	214	58.41%
2010	125	216	57.87%
2011	125	196	63.78%
2012	125	190	65.79%
2013	125	188	66.49%
2014	125	188	66.49%
2015	125	183	68.31%
2016	125	169	73.96%
2017	125	163	76.69%
2018	125	164	76.22%
2019	125	180	69.44%
2020	125	177	70.62%
Total	2250	--	--

Notes: # Firms(industry) = number of firms associated with the corresponding industry employed for the study; % Firms (industry) is obtained by dividing # Firms (sample) by 125 (total number of firms employed) and multiplied by 100. # Firms(total) = total number of firms employed for the study per year. This is uniform for each year and is fixed at 125 listed firms.
% Listed (year) = total number of listed firms for the associated year (# listed) divided by the total number of firms employed for the study (i.e., 125), then multiplied by 100. # Listed (Year) = number of firms listed on the NSE based on the year indicated (see Figure 1, for same from 2000–2020).
SiCode is a discrete variable (j) for industrial classification, coded as 01 for Agriculture, 02 for Conglomerates, 03 for Construction/Real Estate, 04 for Consumer Goods, 05 for Financial Services, 06 for Healthcare, 07 for Information and Communication Technology (ICT), 08 for Industrial Goods, 09 for Natural Resources, 10 for Oil & Gas, and 11 for Services in accordance with the NSE listings.

3.2. The Model

Before the main hypothesis is examined, the behavior of the data is extended by presenting the basic deterministic statistics and correlation matrix. In addition, some pre-estimation (multicollinearity, panel effect, cross-section dependence, and Hausman) tests are conducted to confirm the stochastic characterization of the stacked panel. A univariate approach was applied to assess the first hypothesis (H1), and a multivariate regression analysis was used to assess the other hypotheses (H2 − H4).

As noted by Malofeeva (2018), the discretionary accruals detect the opportunistic behavior of management in smoothing earnings. The GAAP provides a wider discretion for managers in the amount of earnings managed through the use of discretionary accruals (Choi, Mao, & Upadhyay, 2015; Dechow, Sloan, & Sweeney, 1995; Irani & Oesch, 2016; Lo, Ramos, & Rogo, 2017; Malofeeva, 2018; Nouri & Abaoub, 2014). Discretionary accruals are not a mandatory fragment of the operating activities of firms, but they represent a measure of the direction (increase or decrease) in earnings managed due to the application of professional judgments by managers. To proxy the earnings management, this paper applies discretionary accruals that measure the extent of managers' strategic reporting of overestimated or underestimated cash flows (accruals) in order to generate momentous hedge returns. To obtain data on discretionary accruals, we adopt the Kothari method (Kothari, Leone, & Wasley, 2005), which is a modified Jones model (Jones, 1991) model. The measure provides directional values of performance-matched discretionary accruals (our criterion variable for this study, denoted by $DACC_{i,t}$). The $DACC_{i,t} \equiv \varepsilon_{i,t}$ is obtained from the OLS regression of model (1) as follows:

$$\frac{TACC_{i,t}}{A_{i.t-1}} = \pi_0 + \pi_1\left(\frac{1}{A_{i,t-1}}\right) + \pi_2\left(\frac{\Delta REV_{i,t}}{A_{i,t-1}}\right) + \pi_3\left(\frac{PPE_{i,t}}{A_{i,t-1}}\right) + \pi_4 ROA_{i,t} + \varepsilon_{i,t} \qquad (1)$$

Where:

$TACC_{i,t}$: Total accruals of firm i in year t is the difference between net income and cash flow.

$A_{i.t-1}$: Lagged value of total assets i in year t-1.

$\Delta REV_{i,t}$: Difference (change) in sales revenues of firm i in year t.

$ROA_{i,t}$: Return on assets (or operating income scaled by lagged assets) of firm i in year t.

$PPE_{i,t}$: Gross property, plant & equipment.

As a measure against heteroscedasticity, $TA_{i,t}$, $\Delta REV_{i,t}$ and $PPE_{i,t}$ in (1) are scaled by the lagged value of total assets. Larger values of discretionary accruals imply higher earnings management practices.

We apply the univariate approach to assess H1 and determine if there is significant difference in the sample means of each of managed earnings reported for the N-GAAP and IFRS regimes in the individual industry. Specifically, we employed the Welch–Satterthwaite t-test and the analysis of variance (ANOVA) F-test to test for difference in the means of the values of the performance-matched discretionary accruals. The Siegel–Tukey test and Bartlett's test were used to test for difference in the variability or spread in the values of the performance-matched discretionary accruals (DACC). This helps to establish if the difference (change) between the mean values of DACC for the N-GAAP and the IFRS regimes is due to chance or is statistically significant. Table 8 reports the results of this test.

Next, in order to confirm the effects of IFRS adoption on a firm's earnings management behavior and evaluate our hypotheses, we adapt prior studies and assume that the performance-matched discretionary accruals ($DACC_{i,t}$) of firm i in year t align with the multivariate static model of a generic form, defined by:

$$DACC_{i,t} = \alpha_0 + \alpha' CVar_{i,t} + \sum_{2012}^{2020} \tau_i T_i + \eta_i + \varepsilon_{i,t} \qquad (2)$$

Whereas, when we add the interactive control variables $\left[\sum_{j=1}^{s} \varphi_j \left(\tilde{z}_{i,t} \times D_{i,t}\right)\right]$ in order to evaluate H4 and evaluate H5, (2), would modify as:

$$DACC_{i,t} = \alpha_0 + \alpha' CVar_{i,t} + \sum_{j=1}^{s} \varphi_j \left(\tilde{z}_{i,t} \times D_{i,t}\right) + \sum_{2012}^{2020} \tau_i T_i + \eta_i + \varepsilon_{i,t} \quad (3)$$

We next add a time trend variable ($\text{Trend}_{i,t}$) in (3) in order for the model to be able to capture trend movement on $|\text{DACC}|_{i,t}$, and a panel model to assess co-movement among the covariates. The time trend variable is used to assess the third hypothesis (H3) that $DACC_{i,t}$ is purely time-driven and would naturally decrease overtime. Since our aim to determine whether the apparent trend over time is statistically significant, we simply assume the time to be linear and ignore concerns over the non-linear dynamics of the time trend in complex (higher-order parabolic, noisy or 'wavy') situations. Also, the simpler linear or quadratic time trend variables provide better parsimony of the model.

$$DACC_{i,t} = \alpha_0 + \alpha' CVar_{i,t} + \sum_{j=1}^{s} \varphi_j \left(\tilde{z}_{i,t} \times D_{i,t}\right) + \gamma \text{Trend}_{i,t} + \sum_{2012}^{2020} \tau_i T_i + \eta_i + \varepsilon_{i,t} \quad (4)$$

Where:

α_0: The intercept.

$CVar$: Vector of control variables or covariates described in Table 4.

s: Number of control variables ($\tilde{z}_{i,t}$) to interact with $D_{i,t}$ ($\equiv DIFRS_{i,t}$).

φ_j: Coefficient of the interaction dummies.

γ_1: Linear trend included, with power or order 1.

T_i: The set of dummy variables that capture any unobserved firm-invariant (time) effects not included explicitly in the linear static regression. To prevent multicollinearity and the inability to estimate the model due to the interaction of T_i with the constant and other firm-invariant effects included in $CVar_{i,t}$, we only include time dummies in the 2012–2020 period.

η_i: The firm-specific characteristics (fixed effects) that are constant over time but vary across firms.

$\varepsilon_{i,t}$: The stochastic error term assumed to generally obey all standard restrictions.

The specific linear regression models that capture the post-IFRS implementation explains managed earnings:

$$\begin{aligned} DACC_{i,t} = {} & \alpha_0 + \alpha_1 FLEV_{i,t} + \alpha_2 OCF_{i,t} + \alpha_3 GROWTH_{i,t} + \alpha_4 ROE_{i,t} + \alpha_5 ROA_{i,t} \\ & + \alpha_6 BTM_{i,t} + \alpha_7 SIZE_{i,t} + \alpha_8 DAFS_{i,t} + \alpha_9 DLOSS_{i,t} + \alpha_{10} DIFRS_{i,t} \\ & + \sum \tau_i T_i + \eta_i + \varepsilon_{i,t} \end{aligned} \quad (5)$$

$$\begin{aligned} DACC_{i,t} = {} & \alpha_0 + \alpha_1 FLEV_{i,t} + \alpha_2 OCF_{i,t} + \alpha_3 GROWTH_{i,t} + \alpha_4 ROE_{i,t} + \alpha_5 ROA_{i,t} \\ & + \alpha_6 BTM_{i,t} + \alpha_7 SIZE_{i,t} + \alpha_8 DAFS_{i,t} + \alpha_9 DLOSS_{i,t} + \alpha_{10} DIFRS_{i,t} \\ & + \varphi_1 (DAFS * \text{DIFRS})_{i,t} + \varphi_2 (\text{SIZE} * \text{DIFRS})_{i,t} + \varphi_3 (\text{BTM} * \text{DIFRS})_{i,t} \\ & + \sum \tau_i T_i + \eta_i + \varepsilon_{i,t} \end{aligned} \quad (6)$$

$$\begin{aligned} DACC_{i,t} = {} & \alpha_0 + \alpha_1 FLEV_{i,t} + \alpha_2 OCF_{i,t} + \alpha_3 GROWTH_{i,t} + \alpha_4 ROE_{i,t} + \alpha_5 ROA_{i,t} \\ & + \alpha_6 BTM_{i,t} + \alpha_7 SIZE_{i,t} + \alpha_8 DAFS_{i,t} + \alpha_9 DLOSS_{i,t} + \alpha_{10} DIFRS_{i,t} \\ & + \varphi_1 (DAFS * \text{DIFRS})_{i,t} + \varphi_2 (\text{SIZE} * \text{DIFRS})_{i,t} + \varphi_3 (\text{BTM} * \text{DIFRS})_{i,t} \\ & + \gamma \text{Trend}_{i,t} + \sum \tau_i T_i + \eta_i + \varepsilon_{i,t} \end{aligned} \quad (7)$$

All variables are as defined in Table 4. Equations 5–7 assess hypotheses $H2 - H5$. The model shows how our primary variable of interest, $DIFRS_{i,t}$ (which stands for IFRS adoption) and other control variables explain the directional values of performance-matched discretionary accruals, $DACC_{i,t}$. The coefficient of $DIFRS_{i,t}(\alpha_{10})$ is interpreted to evaluate $H2$ relative to the specified a priori in Table 4. A positive (negative) coefficient indicates that the IFRS has increased (decreased) the accrual-based managed earnings in the IRFS periods. In the estimation, $DIFRS_{i,t}$ is coded as 0 for N-GAAP (2004–2011) periods and 1 for post-IFRS (2012–2020) periods.

We include some continuous and dichotomized control variables (see Table 4). Table 4 summarizes the a priori expectations (column 4) based on prior research (column 5).

Table 4. Summary of variables.

Variable	Description	Definition	Pred*	References
Criteria				
$DACC_{i,t}$	Discretionary accruals	Residuals ($\varepsilon_{i,t}$) obtained from the OLS regression total accrual model (1).	NA	Malofeeva (2018); Ugrin et al. (2017)
$\|DACC\|_{i,t}$	Absolute discretionary accruals	Absolute values of $DACC_{i,t}$.	NA	Malofeeva (2018); Rathke et al. (2016)
Control				
$FLEV_{i,t}$	Financial leverage	Obtained from the total liabilities divided by the total assets for firm i in year t.	±	DeFond et al. (2019); Rathke et al. (2016)
$OCF_{i,t}$	Cash flow from operation volatility	Measured as the standard deviation (σ) of cash flow of operations divided by firm i total assets in year t.	−	Rathke et al. (2016)
$GROWTH_{i,t}$	Firm growth rate	Sales growth rate is the sales in year t less sales in t−1, divided by sales in year t−1 for firm i in year t. This measures the year-by-year percentage changes in revenue.	+	Malofeeva (2018); Ugrin et al. (2017); Rathke et al. (2016)
$ROE_{i,t}$	Return on equity	Asset turnover. This is measured by dividing the firm's revenue by its total assets.	−	Malofeeva (2018), DeFond et al. (2019)
$ROA_{i,t}$	Return on assets	Measured as net profit to lagged total assets for firm i in year t (profit margin).	+	De Moura et al. (2020); Ugrin et al. (2017)
$BTM_{i,t}$	Book-to-market value	The ratio between a firm's book value and market value of total assets.	−	DeFond et al. (2019); Rathke et al. (2016)
$SIZE_{i,t}$	Firm size	Natural logarithm of market value of equity at year end. The effect of size is ambiguous.	±	DeFond et al. (2019); Ugrin et al. (2017)
$\mathbf{DAFS_{i,t}}$	Audit firm size	Coded as 1 if the firm is audited by one of Big Four auditors, and 0 otherwise.	−	De Moura et al. (2020); DeFond et al. (2019); Malofeeva (2018)
$\mathbf{DLOSS_{i,t}}$	Loss before extraordinary items	Coded as 1, if firm i reports a negative income before extraordinary items in year t−1.	+	Malofeeva (2018); Ugrin et al. (2017)
$\mathbf{DIFRS_{i,t}}$	Adoption	Dummy coded 1 for periods of the adoption of IFRS, and 0 otherwise.	−	De Moura et al. (2020); DeFond et al. (2019); Rathke et al. (2016)
Interactions:				
$(\mathbf{DAFS} * \mathbf{DIFRS})_{i,t}$	Audit firm's size after adoption	The interaction between $DAFS_{i,t}$ and $IFRS_{i,t}$. Measures how $DAFS_{i,t}$ influences the relationship between the test variable $DACC_{i,t}$ and $DIFRS_{i,t}$.	−	Malofeeva (2018)
$(SIZE * DIFRS)_{i,t}$	Firm's size after adoption	The interaction between $SIZE_{i,t}$ and $DIFRS_{i,t}$. Measures how $SIZE_{i,t}$ affects the relationship between $DACC_{i,t}$ and $DIFRS_{i,t}$.	±	Malofeeva (2018)
$(BTM * DIFRS)_{i,t}$	BTM value after adoption	The interaction between $BTM_{i,t}$ and $DIFRS_{i,t}$. Measures how $BTM_{i,t}$ affects the relationship between $DACC_{i,t}$ and $DIFRS_{i,t}$.	−	---
Time Trend:				
$Trend_{i,t}$	Time trend	Measures the overall direction of $DACC_{i,t}$ across time.	−	---

Note: *Pred. = Predicted (a priori) sign. NA = A priori sign is not applicable for the dependent variable. The items in **bold** are dichotomous (dummy) variables, the others are continuous variables, except for $Trend_{i,t}$, which is a discrete variable. All the continuous tests and control variables are winsorized at the 1st (top) and 99th (bottom) percentiles.

Theory (political costs hypothesis) propounds that the bigger the firm, the more they apply discretion to smooth earnings downward to reduce political costs. Big firms have efficient internal control structures, which provide a consistent system of information making income smoothing difficult compared to small firms. Malofeeva

(2018) notes that the quality of the audit firms would restrain managed earnings following the use of international standards. Contrary to some studies, we do not exclude 2012 being the first year IFRS adoption. This is because before the official adoption, Nigeria had already commenced substantial harmonization between 2004 and 2011, which aligned the N-GAAP with its IAS counterpart. Several listed firms have pulled additional resources for the training of their employees and also to acquire facilities in order to ensure smooth implementation of the anticipated adoption of the standards. Therefore, by the time of the official adoption, the benefits of the IFRS would begin to emerge immediately or within a short period (Cadot et al., 2021; Odoemelam et al., 2019; Ozili & Outa, 2019). We pool the firm-level discretionary accruals and control variables to obtain stacked firm-level panel data. In order to test hypotheses $\mathrm{H2}-\mathrm{H5}$, we applied the multiple regression approach.

Before the estimation, the theoretical algorithm requires us to confirm whether the stacked firm-level data has panel effects. We employ the Breusch–Pagan Lagrange Multiplier (LM) test to verify whether a panel analysis is required by comparing the result of a pooled OLS regression of (2) to that of a random effects estimation based on the Breusch–Pagan LM null specification. If a random effect is confirmed, we then apply the Hausman test to determine the most appropriate model. The fixed and random effects do not account for the possible presence of cross-sectional correlation, which is inherent in panel data. Hence, we perform the cross-sectional dependence tests. If we establish the presence of individual unit dependence, in order to present estimates that are robust and unbiased, we estimate (2) using the panel corrected standard errors (PCSE), which resolves the cross-sectional heteroskedasticity, according to Beck and Katz (1995). The PCSE correct the OLS estimates (of variance) for cross-sectional correlation using a sandwich estimator. The method has recently been proven popular and efficient in panel data estimation where heteroskedasticity is almost inevitable. During the estimation, we use the weighted PCSE as a coefficient covariance method. The influence (signs and significance test) of the coefficients of the control variables on the discretionary accruals management are used to examine the null $(\mathrm{H2}-\mathrm{H5})$.

4. THE RESULTS

4.1. Basic Statistics

Before we test the hypotheses, we considered a number of pre-estimation issues to understand the nature of the data, as well as to ensure that the result of our model is unbiased and efficient. We report the basic deterministic and stochastic (econometric test) descriptions of the main variables in Table 5. Panel A shows the entire sample information, which covers the period between 2003 and 2020, with 2250 sample observations. Panel B and Panel C provide information for the pre-IFRS (2003–2011) and post-IFRS (2003–2020) periods, both containing 1125 sample observations. Panel D contains the normality and multicollinearity (second-order econometric) test results. For the control variables, the means of $\mathrm{FLEV}_{i,t}$, $\mathrm{OCF}_{i,t}$, $\mathrm{GROWTH}_{i,t}$, $\mathrm{ROE}_{i,t}$, $\mathrm{ROA}_{i,t}$, and $\mathrm{DLOSS}_{i,t}$ are all positive but lower for the post-IFRS adoption regime compared to the pre-IFRS period. This suggests that the adoption of the IFRS may have positively impacted these estimates since they showed some increase during the IFRS period. The mean of $\mathrm{ROE}_{i,t}$ is also lower but negative (-0.44) for the post-IFRS period compared with pre-IFRS (0.23). The mean values of the other covariates ($\mathrm{BTM}_{i,t}$, $\mathrm{SIZE}_{i,t}$ and $\mathrm{DAFS}_{i,t}$) are positive and larger for the post-IFRS period. The descriptive statistics do not control for deterministic and noisy factors that could influence the discretionary accruals; however, the results suggest evidence of firms' earnings management behavior.

The data suggest that the mean of discretionary accruals, $\mathrm{DACC}_{i,t}$, increased post-IFRS to 0.09 compared to its mean of 0.08 in the pre-IFRS period. The median for $\mathrm{DACC}_{i,t}$ is also positive and larger for the post-IFRS period compare to the N-GAAP period. With a standard deviation (σ) of 0.23, there is evidence of a lesser spread in the earnings management practices during the N-GAAP period compared with the IFRS periods (with σ = 0.44). Figure 2 in Appendix A displays selected statistical snapshots (diagrams) of the winsorized values of the discretionary accruals. Table 7 shows that there is noticeable difference in earnings management across all sectors. We found a post-IFRS increase in managed earnings based on discretionary accruals for all except the service

sector. Taken together, this univariate approach provides evidence that firms managed their earnings more during the IFRS adoption than they did in the N-GAAP regime. Table 6 presents the correlation matrices, Table 7 reports the descriptive statistics of the $\mathrm{DACC}_{i,t}$ based on individual sectors, and Table 8 shows the test of differences (in mean and variance) for the overall and sectoral $\mathrm{DACC}_{i,t}$.

Although correlation does not indicate causation, it provides an indication of the direction and strength of association between the various covariates. Table 6 presents the correlation matrices for $\mathrm{DACC}_{i,t}$, $\mathrm{FLEV}_{i,t}$, $\mathrm{OCF}_{i,t}$, $\mathrm{GROWTH}_{i,t}$, $\mathrm{ROE}_{i,t}$, $\mathrm{ROA}_{i,t}$, $\mathrm{BTM}_{i,t}$, $\mathrm{SIZE}_{i,t}$, $\mathrm{DAFS}_{i,t}$, $\mathrm{DLOSS}_{i,t}$, as well as three components used in the computation of the residual to proxy $\mathrm{DACC}_{i,t}$ – total accruals ($TACC_{i,t}$); difference (change) of sales revenues ($\Delta\mathrm{REV}_{i,t}$); and gross property, plant and equipment ($PPE_{i,t}$). For the entire sample (Panel A), we observed that $\mathrm{DACC}_{i,t}$ is positively correlated with $\mathrm{OCF}_{i,t}$, $\mathrm{GROWTH}_{i,t}$, $\mathrm{ROE}_{i,t}$, $\mathrm{ROA}_{i,t}$ and $\mathrm{SIZE}_{i,t}$ but negatively correlated with $\mathrm{FLEV}_{i,t}$, $\mathrm{GROWTH}_{i,t}$, $\mathrm{BTM}_{i,t}$, $\mathrm{DAFS}_{i,t}$, and $\mathrm{DLOSS}_{i,t}$. As observed in the pre-IFRS periods (Figure 2 in Appendix A), except for $\mathrm{ROE}_{i,t}$, $\mathrm{ROA}_{i,t}$, and $\mathrm{DAFS}_{i,t}$, all the variables are negatively correlated with $\mathrm{DACC}_{i,t}$; however, only $\mathrm{FLEV}_{i,t}$, $\mathrm{ROE}_{i,t}$, $\mathrm{ROA}_{i,t}$, $\mathrm{SIZE}_{i,t}$, $\mathrm{DAFS}_{i,t}$, and $\mathrm{DLOSS}_{i,t}$ are significant. A negative degree of correlation is a sign of reduction in managed earnings since it suggests that firms manipulate accruals when cash flow seems to be lower (Iatridis, 2010). For the post-IFRS sub-periods (Figure 2 in Appendix A), only $\mathrm{FLEV}_{i,t}$, $\mathrm{GROWTH}_{i,t}$, $\mathrm{ROE}_{i,t}$, $\mathrm{ROA}_{i,t}$, $\mathrm{SIZE}_{i,t}$, $\mathrm{DAFS}_{i,t}$, and $\mathrm{DLOSS}_{i,t}$ are significantly correlated with the performance-matched discretionary accruals regime. By applying the variance inflation factor (VIF), the results contained in Panel D of Table 5 reveal that the highest VIF is less than 10, suggesting no multicollinearity.

Table 5. Basic descriptive statistics.

Panel A: Full sample information						**Panel D: Econometric Test**		
Full (2003−2020):		**No. of obs. = 2250**				**Normality**	**Multicollinearity (VIF*) Test**	
$z_{i,t}$	**Mean**$(z_{i,t})$	**Med**$(z_{i,t})$	σ	$\tilde{\mu}_3$	$\tilde{\mu}_4$	$\rho(JB)$	**Uncentered**	**Centered**
$DACC_{i,t}$	0.09	0.10	0.35	15.00	409.60	0.06	NA	NA
$FLEV_{i,t}$	0.54	0.44	0.44	7.00	79.50	0.00	2.77	1.09
$OCF_{i,t}$	0.47	1.59	20.38	-3.02	12.32	0.00	1.02	1.02
$GROWTH_{i,t}$	0.43	0.08	9.86	-2.35	14.18	0.00	1.03	1.02
$ROE_{i,t}$	-0.10	0.59	5.51	-6.27	58.41	0.00	1.21	1.21
$ROA_{i,t}$	0.09	0.09	1.21	-23.09	655.90	0.00	1.01	1.00
$BTM_{i,t}$	1.41	0.64	3.28	9.50	137.64	0.00	1.19	1.00
$SIZE_{i,t}$	9.03	7.06	5.54	1.36	3.92	0.00	3.68	1.01
$DAFS_{i,t}$	0.60	1.00	0.49	-0.40	1.16	0.00	2.50	1.01
$DLOSS_{i,t}$	0.18	0.00	0.45	7.39	156.04	0.00	1.34	1.15

Panel B: N-GAAP (2003–2011):		**No. of obs. = 1125**				**Panel C: IFRS (2012−2020):**				**No. of obs. = 1125**
$z_{i,t}$	**Mean**$(z_{i,t})$	**Med**$(z_{i,t})$	σ	$\tilde{\mu}_3$	$\tilde{\mu}_4$	**Mean**$(z_{i,t})$	**Med** $(z_{i,t})$	σ	$\tilde{\mu}_3$	$\tilde{\mu}_4$
$DACC_{i,t}$	0.08	0.09	0.23	0.90	36.19	0.09	0.10	0.44	15.05	327.69
$FLEV_{i,t}$	0.55	0.45	0.43	7.45	99.42	0.54	0.44	0.44	6.59	61.84
$OCF_{i,t}$	0.57	2.05	21.18	-2.88	11.38	0.37	1.34	19.56	-3.18	13.46
$GROWTH_{i,t}$	0.46	0.08	9.74	-2.42	13.62	0.41	0.08	9.99	-2.28	14.68
$ROE_{i,t}$	0.23	0.59	3.69	-7.97	88.65	-0.44	0.59	6.85	-5.19	40.71
$ROA_{i,t}$	0.13	0.09	0.50	-5.05	147.80	0.06	0.09	1.63	-18.53	391.17
$BTM_{i,t}$	1.34	0.65	2.52	6.93	69.48	1.49	0.62	3.90	9.45	125.88
$SIZE_{i,t}$	8.90	6.79	5.45	1.38	4.03	9.15	7.20	5.62	1.33	3.81
$DAFS_{i,t}$	0.58	1.00	0.49	-0.30	1.09	0.62	1.00	0.49	-0.50	1.25
$DLOSS_{i,t}$	0.20	0.00	0.40	1.52	3.31	0.17	0.00	0.49	10.43	215.92

Note: NA ≡ not applicable, since DACC is the (dependent) variable in the test. All variable definitions are presented in Table 4.

$z_{i,t}$ ≡ [DACC, FLEV, OCF, GROW, ROE, ROA, BTM, SIZE, DAFS, DLOSS], Mean$(z_{i,t})$ ≡ Arithemetic mean $z_{i,t}$; Med$(z_{i,t})$ ≡ Median for each of $z_{i,t}$, σ ≡ Standard deviation, $\tilde{\mu}_3$ ≡ Skewness, $\tilde{\mu}_4$ ≡ Kurtosis and, $\rho(JB)$ ≡ Probability value for the reported, The Jarque–Bera (JB) statistics is a goodness-of-fit test that confirms if the sample skewness and kurtosis match normal distribution. The statistic is computed as: $JB-\text{statistic} = 1/6 * [(\tilde{\mu}_3)^2 + 0.25\,(\tilde{\mu}_4 - 3)^2]$. The data has a non-normal distribution if the JB value is far from zero.

We perform the multicollinearity test to ensure that one endogenous variable does not linearly predict the others' accuracy, since there is some degree of correlation among the predictors. We use the variance inflation factor (VIF) test for multicollinearity relation. *VIF = $(1/(1-R_j^2)$, and R_j^2 is the coefficient of determination of multiple regression of one control variable j on other covariates. A VIF value $\geq$ 10 indicates the existence of multicollinearity. The (untabulated) regression for obtaining R_j^2 is based on the firm's fixed effects model (Panel A) and random effects model (Panel B) with exclusion of the intercept term.

Table 6. Pearson's (ordinary) correlation coefficients.

	$DACC_{i,t}$	$FLEV_{i,t}$	$OCF_{i,t}$	$GROWTH_{i,t}$	$ROE_{i,t}$	$ROA_{i,t}$	$BTM_{i,t}$	$SIZE_{i,t}$	$\Delta REV_{i,t}$	$TACC_{i,t}$	$PPE_{i,t}$	$DAFS_{i,t}$	$DLOSS_{i,t}$
Panel A: Full sample (2003 – 2020) correlation coefficients													
$DACC_{i,t}$	1.000												
$FLEV_{i,t}$	**-0.028**	1.000											
$OCF_{i,t}$	0.027	**-0.089**	1.000										
$GROWTH_{i,t}$	**-0.016**	**-0.047**	**0.035**	1.000									
$ROE_{i,t}$	**0.032**	**-0.265**	**0.092**	**0.119**	1.000								
$ROA_{i,t}$	**0.086**	**0.014**	0.022	**0.017**	**0.019**	1.000							
$BTM_{i,t}$	-0.029	0.035	0.014	**-0.029**	**0.021**	0.019	1.000						
$SIZE_{i,t}$	**0.038**	**-0.040**	**0.029**	0.035	**0.018**	**-0.042**	**0.036**	1.000					
$\Delta REV_{i,t}$	**0.092**	-0.011	0.015	0.026	**0.031**	**0.112**	-0.106	0.020	1.000				
$TACC_{i,t}$	**0.082**	**-0.004**	**-0.037**	**-0.058**	**0.021**	**0.036**	**0.012**	**-0.203**	**0.077**	**1.000**			
$PPE_{i,t}$	**-0.062**	**-0.008**	**0.007**	**0.014**	**0.014**	**0.047**	**-0.023**	**0.022**	**0.196**	0.001	1.000		
$DAFS_{i,t}$	**-0.023**	0.017	0.101	**0.055**	**0.032**	**0.023**	-0.012	**0.012**	**-0.037**	**-0.033**	-0.013	1.000	
$DLOSS_{i,t}$	**-0.042**	**0.133**	**-0.116**	**-0.102**	**-0.338**	-0.015	**-0.029**	-0.016	-0.013	0.014	**-0.048**	-0.007	1.000
Panel B: N-GAAP $(2003-2011)$ and IFRS $(2012-2020)$ correlation coefficients													
$DACC_{i,t}$	1.000	**0.029**	0.016	**-0.013**	**0.035**	**0.074**	-0.008	**0.047**	0.193	0.117	-0.009	**-0.038**	**-0.056**
$FLEV_{i,t}$	**-0.025**	1.000	**-0.052**	**-0.029**	-0.316	0.012	0.038	**-0.059**	-0.010	**-0.028**	-0.011	-0.010	**0.133**
$OCF_{i,t}$	-0.008	**-0.124**	1.000	0.026	**0.070**	0.026	0.022	**-0.005**	**0.052**	-0.214	-0.003	0.015	**-0.097**
$GROWTH_{i,t}$	-0.024	**-0.066**	**0.043**	1.000	**0.110**	**0.031**	**-0.062**	**-0.049**	**0.018**	**0.011**	0.006	**0.061**	**-0.106**
$ROE_{i,t}$	**0.027**	**-0.204**	**0.143**	**0.149**	1.000	0.017	0.028	**0.026**	**0.039**	0.208	**0.011**	**0.065**	**-0.349**
$ROA_{i,t}$	**0.172**	**0.025**	-0.016	-0.021	0.021	1.000	0.010	**-0.074**	**0.135**	0.019	**0.041**	0.015	-0.021
$BTM_{i,t}$	-0.012	**-0.047**	0.035	**0.023**	0.0305	0.010	1.000	**0.057**	0.304	**0.026**	**-0.036**	**-0.031**	**-0.033**
$SIZE_{i,t}$	**0.023**	-0.020	**0.061**	**0.062**	**0.048**	**0.045**	0.034	1.000	0.008	**0.025**	**0.010**	**0.043**	**-0.007**
$\Delta REV_{i,t}$	**-0.136**	-0.013	-0.026	-0.018	0.015	**0.068**	**-0.025**	**0.034**	1.000	**0.090**	**0.113**	-0.009	**-0.020**
$TACC_{i,t}$	**0.027**	0.021	**-0.069**	**-0.131**	-0.014	**0.110**	-0.108	**-0.032**	**0.062**	1.000	-0.005	**-0.051**	0.001
$PPE_{i,t}$	**-0.225**	-0.004	**0.023**	0.002	**0.020**	**0.082**	0.009	**0.046**	**0.364**	0.010	1.000	-0.005	**-0.065**
$DAFS_{i,t}$	**0.022**	**0.046**	0.007	**0.049**	-0.016	**0.071**	0.015	-0.022	**-0.071**	-0.014	-0.023	1.000	**-0.026**
$DLOSS_{i,t}$	**-0.010**	**0.134**	**-0.139**	**-0.099**	**-0.343**	-0.003	-0.021	-0.025	-0.001	**0.031**	**-0.017**	0.020	1.000

Note: The table presents Pearson's ordinary correlation coefficients between the explanatory variables and the performance-matched discretionary accruals. We present the estimates for the centered correlation coefficients $(r_{x_1x_2})$ between two sample pairs, x_i and x_j having n-set $[(x_{1,1}, x_{2,1}), (x_{1,2}, x_{2,2}), \ldots, (x_{1,n}, x_{2,n})]$, computed as: $r_{x_1x_2} = \sum_i^n (x_{1,t} - \bar{x}_1)(x_{2,t} - \bar{x}_2)\left[\sqrt{(x_{1,t} - \bar{x}_1)^2}\sqrt{(x_{2,t} - \bar{x}_2)^2}\right]^{-1}$. The measures lie between −1 and +1, with a mid-point of 0, indicates non-existence of a linear correlation. The **bold** figures display statistical significance using probability, $p|t| = 0$, and indicates significance only at 1%, 5% or 10%. In Panel B, the values above the diagonal represent correlation coefficients for the post-IFRS period, and the values below are the correlations for the pre-adoption regime. The table reports correlation matrices of 125 sample firms from 2003–2020 (full sample, with 2250 observations), from 2003–2011 (the pre-adoption and N-GAAP, with 1125 observations) and from 2012–2020 (the post-IFRS adoption period, also containing 1125 observations). The variable definitions are contained in Table 4.

4.2. Univariate Test: Differences in Discretionary Accruals

Table 9 reveals the Welch–Satterthwaite t-test for testing the hypothesis that there is no significant difference in the discretionary accruals (DACC) for the N-GAAP and IFRS regimes. For the overall sample, the mean test confirms that a difference of 0.01 [0.09–0.08] between the means for the discretionary accruals of the pre- and post-IFRS periods is insignificant. This supposes that the changes in the means cannot be solely attributed to IFRS adoption but is due to chance. It is possible that other factors may also influence the change.

Table 7. Sectoral basic statistics for $DACC_{i,t}$

Sample(j)	No. of obs.	$Mean_j$	Med_j	σ_j	$\tilde{\mu}_{3j}$	$\tilde{\mu}_{4j}$	ρ_j(JB)
N-GAAP (2003–2011)							
00	1125	0.08	0.09	0.23	0.90	36.19	0.000
01	36	0.06	0.07	0.12	-0.07	3.77	0.634
02	54	0.05	0.10	0.16	-1.93	6.69	0.000
03	63	0.07	0.10	0.16	-2.42	16.19	0.000
04	144	0.03	0.08	0.21	-1.47	8.27	0.000
05	315	0.10	0.10	0.23	-1.09	13.84	0.000
06	72	0.01	0.08	0.32	-1.79	7.64	0.000
07	63	0.05	0.10	0.25	-4.31	29.60	0.000
08	108	0.04	0.07	0.22	-2.64	13.65	0.000
09	36	0.05	0.11	0.17	-0.82	4.33	0.036
10	81	0.08	0.09	0.18	-0.29	17.27	0.000
11	180	0.10	0.11	0.12	-1.53	9.99	0.000
IFRS (2012–2020)							
00	1125	0.09	0.10	0.44	15.05	327.69	0.000
01	36	0.11	0.11	0.07	-0.45	4.31	0.151
02	27	0.03	0.10	0.20	-1.67	4.88	0.000
03	63	0.09	0.09	0.14	3.94	28.59	0.000
04	144	0.08	0.08	0.33	4.04	43.16	0.000
05	315	0.12	0.10	0.32	9.32	139.39	0.000
06	72	0.10	0.10	0.36	1.18	13.59	0.000
07	63	0.33	0.09	1.55	5.54	34.99	0.000
08	108	0.06	0.09	0.23	-1.77	7.53	0.000
09	36	0.07	0.10	0.15	-2.69	11.25	0.000
10	81	0.08	0.10	0.12	-0.72	7.14	0.000
11	180	0.08	0.10	0.24	0.65	39.64	0.000
Full sample (2003–2020)							
00	2250	0.09	0.10	0.35	15.00	409.60	0.061
01	72	0.09	0.10	0.10	-0.47	4.61	0.005
02	27	0.08	0.10	0.12	-1.48	5.68	0.000
03	126	0.08	0.09	0.15	0.04	21.73	0.000
04	288	0.06	0.08	0.28	3.19	45.87	0.000
05	630	0.11	0.10	0.28	6.97	129.04	0.000
06	144	0.05	0.08	0.34	-0.04	11.78	0.000
07	126	0.19	0.10	1.12	7.70	68.35	0.000
08	216	0.05	0.08	0.22	-2.18	10.51	0.000
09	72	0.06	0.10	0.16	-1.56	6.68	0.000
10	162	0.08	0.09	0.16	-0.39	17.72	0.000
11	360	0.09	0.10	0.19	0.43	52.43	0.000

Note: SiCode is a discrete variable (j) for industrial classification, coded as 00 if the data used is for the whole sector in the corresponding period indicated (N-GAAP, IFRS or full period). 01 for Agriculture, 02 for Conglomerates, 03 for Construction/Real Estate, 04 for Consumer Goods, 05 for Financial Services, 06 for Healthcare, 07 for ICT, 08 for Industrial Goods, 09 for Natural Resources, 10 for Oil & Gas, and 11 for Services in accordance with NSE listings.

The difference is statistically significant at the 5% level, providing sufficient evidence to refute the null for only four of the sectors – agriculture, conglomerates, financial services and ICT. For the other sectors, the difference in the mean of the discretionary accruals for the N-GAAP and the post-IFRS regimes can be attributed to chance. The limitation of the test is worth noting – the data used is solely univariate (discretionary accruals) and do not control for compounding effects in confirming the predictions. The test provides evidence from a univariate

perspective but does not explain how much earnings are managed due to adoption. We apply the multivariate analysis to resolve these limitations and evaluate the other nulls.

Table 8. Univariate test of equality means and variability.

								Equality Test			
		N-GAAP		IFRS				Means		Variance	
Industry(j)	Obs.	Mean	σ	Nobs	Mean	σ	Diff.	WST(t)*	Welch(F)*	ST	Bart.
00	1125	0.08	0.23	1125	0.09	0.44	0.01	0.417	0.417	0.088***	0.000*
Breakdown											
01	36	0.06	0.12	36	0.11	0.07	0.05	0.045**	0.045**	0.078***	0.001*
02	27	0.03	0.20	27	0.08	0.12	0.06	0.015**	0.015**	0.013**	0.011**
03	63	0.07	0.16	63	0.09	0.14	0.02	0.428	0.428	0.870	0.248
04	144	0.03	0.21	144	0.08	0.33	0.05	0.159	0.159	0.015**	0.000*
05	315	0.10	0.23	315	0.12	0.32	0.01	0.031**	0.031**	0.161	0.000*
06	72	0.01	0.32	72	0.10	0.36	0.09	0.137	0.137	0.976	0.389
07	63	0.05	0.25	63	0.33	1.55	0.28	0.019**	0.019**	0.000*	0.022**
08	108	0.04	0.22	108	0.06	0.23	0.02	0.537	0.537	0.375	0.829
09	36	0.05	0.17	36	0.07	0.15	0.02	0.586	0.586	0.100***	0.092
10	81	0.08	0.18	81	0.08	0.12	0.00	0.859	0.859	0.001*	0.001*
11	180	0.10	0.12	180	0.08	0.24	-0.01	0.533	0.533	0.100***	0.000*

Note: * Test allows for unequal cell variances. WST = Welch–Satterthwaite t-test. ANOVA F-test. ST = Siegel–Tukey, Bart. = Bartlett's test, Welch F-test**. Diff.: Difference in means. The Welch t-statistic is computed as $t_w = \overline{x_1} - \overline{x_2}/\sqrt{s_1^2/n_1 + s_2^2/n_2}$, where $\overline{x_1}$ and $\overline{x_2}$ are the means of two independent random samples; $x_{11}, x_{21}, \ldots, x_{n1}$ and $x_{12}, x_{22}, \ldots, x_{n2}$ are from two populations with means (or expected values) $\mu_q = E(x_q)$ and variances $\sigma_q^2 = Var(x_q)$. The sample counterparts of μ_q and σ_q^2 are $\overline{y} = n^{-1}\sum_{q=1}^{n_q} x_q$ and $s_{i^2} = (n_q - 1)^{-1}\sum_{q=1}^{n_q}(x_q - \overline{x})^2$, respectively, for $q = 1,2$. The test verifies the hypothesis that the sample means of variables is equal for both the N-GAAP and post-IFRS regimes. Welch's t-test provides more robust results than the Student's t-test, as it ensures type I error rates close to the nominal value for unequal variances under the assumption of normality. *** indicates significant difference in managed earnings between N-GAAP and post-IFRS at the 5% level (two-sided). σ = Standard deviation for the test variables. To ensure that the Welch test corresponds with [H1], we applied a two-sided test to establish that the means of $DACC_{i,t}$ for the post-adoption period are likely the same from that of the pre-adoption regime. SiCode is a discrete variable (j) for industrial classification, coded as 00 if the data used is for all sectors in the corresponding period indicated (N-GAAP, IFRS or full period). 01 for Agriculture, 02 for Conglomerates, 03 for Construction/Real Estate, 04 for Consumer Goods, 05 for Financial Services, 06 for Healthcare, 07 for ICT, 08 for Industrial Goods, 09 for Natural Resources, 10 for Oil & Gas, and 11 for Services, in accordance with NSE listings.

4.3. Pre-Estimation for Multivariate Test

Table 9 presents the results of the pre-estimation tests for the multivariate panel regression. We test for the existence of panel (individual and time unobserved random) effects in the pooled data. According to Breusch and Pagan (1980) and Honda (1985) we reject the test nulls. This supposes that the random effects is preferred over the pooled regression (untabulated).

Table 9. Pre-estimation for multivariate analysis.

Panel A: LM test for random effects			
H_0: No effects (data has no panel structure)[a]			
Test	**Cross-sectional**	**Time**	**Both**
Breusch–Pagan LM*	17.941* (0.000)	1.181 (0.277)	19.122* (0.000)
Honda*	4.236* (0.000)	-1.087 ---	2.227* (0.013)
Panel B: Hausman test			
H_0: Random effects, and H_1: fixed effects			
Test	Statistic		
Cross-sectional random, χ^2	44.022*		(0.000)
Panel C: Residual cross-sectional dependence test			
H_0: No cross-sectional dependence in residuals			
Test	Statistic		
Breusch–Pagan LM	8237.154*		(0.000)
Pesaran scaled LM	2.909*		(0.004)

Note: [a] The test was reported for the three cases: no time, cross-sectional or both cross-sectional and time effects. *p ≤ 1% with a 2-tailed test. LM = Lagrange Multiplier.

We used the Hausman Test (with the null of random effects) to confirm whether the discretionary accruals model (3) would be best fitted with a fixed or random effects model. The Hausman test reported in Panel B of Table 9 indicates the chi-squared (χ^2) statistic of 44.022 with a prob > $(\chi^2) = 0.000$, which is significant and provides evidence to reject the null. Hence, we suppose that the discretionary accruals and its control is best modelled with the fixed effects (untabulated) over the random effects (untabulated). The fixed and random effects regressions are estimated with the OLS. We perform the cross-sectional dependence tests to check dependence in the weighted residuals for the pooled equation. The results in Table 9 (Panel C) indicate the existence of cross-sectional dependence.

4.4. Parsimonious Multivariate Model

We estimate (5)–(7) with the PCSE, which corrects for heteroskedasticity and cross-sectional correlation using a sandwich estimator (generalized least squares (GLS) cross-sectional weights). Table 10, Table 11 and Table 12 show the results of the PCSE (parsimonious) models for (5), (6) and (7), respectively, controlling for fixed effects. While controlling for the time effects, we only consider the post-adoption periods to foil multicollinearity traps. The coefficient of the IFRS adoption (α_{10}) is negative and significant at the 5% level for the four variants ([1] – [4]) of fixed effects and is therefore consistent with expectation [H2] that IFRS adoption reduces managed earnings. Although not all the assumptions hold as predicted, both audit firm size $(\alpha_8, \mathrm{DAFS}_{i,t})$ and firm size $(\alpha_7, \mathrm{SIZE}_{i,t})$ are in accordance with literature (De Moura et al., 2020; DeFond et al., 2019; Malofeeva, 2018; Ugrin et al., 2017). This we attribute to spill-over effect of the development of audit reporting quality after adoption. Hence, we confirm their interactions with IFRS adoption in Table 11.

In Table 11, the main variables of interest and hypotheses verified are α_{10} (IFRS adoption, [H2]), φ_1 (post-adoption auditor firm size, [H4] and φ_2 (firm size after adoption, [H5]. The coefficient of IFRS adoption (α_{10}) corresponds with same in Table 10 and again confirms [H2] for [9]–[14]. In Table 11, although [H4] was not confirmed in model [5], [H5] was established in [6] and both are proved in the most parsimonious model [8]. The results show that the post-adoption auditor firm size reduces earnings managed, according to Malofeeva (2018), and firm size after adoption supports the political costs hypothesis on the effect of firms size (De Moura et al., 2020; DeFond et al., 2019; Malofeeva, 2018). The coefficient of the BTM was positive and insignificant, confirming no influence on earnings management behavior in [7] and [8].

Table 12 presents parsimonious models [9]–[14] to further evaluate [H2], [H3], [H4] and [H5] for the direction value of the performance discretionary accruals. Here, we exclude fixed for two reasons. First, prior models [4] (in Table 10) and [5]–[8] (in Table 11) show that inclusion was insignificant (untabulated) and did not contribute to substantial changes in the models' explanatory power ($\bar{R}^2$) as observed. We adopt Table 12 to evaluate the coefficients of trend γ, and try to avoid conflicts between the time 'trend' (a distinct time trend variable) and time 'dummies' (time dummies for every year in the model). Model [9] in Table 12 is used to evaluate whether earnings management is time-driven without the adoption of IFRS, hence the adoption variables [$\mathrm{DIFRS}_{i,t}$] and its interactions, [$(\mathrm{DAFS} * \mathrm{DIFRS})_{i,t}$, $(\mathrm{SIZE} * \mathrm{DIFRS})_{i,t}$, $(\mathrm{BTM} * \mathrm{DIFRS})_{i,t}$], are not captured. We confirmed that the coefficients of time trend (γ) was highly insignificant, and we failed to reject [H3]. This was also established for models [10]–[14] (when we allow adoptions alongside time to explain discretionary accruals). Overall, the time passage is not a motivation for the downward trend in managed earnings, as the discretionary accruals and accounting quality would often reflect IFRS adoptions (De Moura et al., 2020; DeFond et al., 2019; Rathke et al., 2016; Ugrin et al., 2017; Uthman & Salami, 2021).

Concerning the other controls variables, the models in Tables 10–12 suppose that the coefficients of firms' profitability and return on assets ($\mathrm{ROA}_{i,t}$) are consistent and significantly increase the discretionary accruals, according to De Moura et al. (2020) and Ugrin et al. (2017). The coefficient of $\mathrm{ROE}_{i,t}$ is well signed and consistent in the models, except with reversionary effects. The signs of the covariates ($\mathrm{DLOSS}_{i,t}$ and $\mathrm{GROWTH}_{i,t}$) over time,

which positively and significantly explain discretionary accruals, indicate that weak performance leads to a higher tendency to manage earnings (Malofeeva, 2018; Ugrin et al., 2017; Zéghal, Chtourou, & Sellami, 2011). There are indications that the operations of cash flow convey reversionary effects. The $\mathrm{OCF}_{i,t}$ coefficient (α_2), although very small, appears stable, which has consistent signs in all models and contributes to managed earnings contrary to our expectations (Malofeeva, 2018; Rathke et al., 2016; Ugrin et al., 2017).

Table 10. Parsimonious model for $\mathrm{DACC}_{i,t}$ with no interactions and no time trend: [Equation 5].

$z_{i,t}$	Pred.	[1]	[2]	[3]	[4]
α_0	+	0.094* (0.002)	0.092* (0.000)	0.093* (0.000)	0.095* (0.000)
α_1	±	0.011 (0.549)	0.000 (0.966)	-0.002 (0.601)	-0.002 (0.645)
α_2	−	0.000 (0.739)	0.000 (0.490)	0.000 (0.475)	0.000 (0.285)
α_3	+	-0.001 (0.436)	-0.001* (0.006)	-0.001** (0.011)	-0.001** (0.014)
α_4	−	0.002 (0.317)	0.001** (0.020)	0.001** (0.023)	0.001** (0.037)
α_5	+	0.042* (0.000)	0.021* (0.002)	0.022* (0.001)	0.024* (0.001)
α_6	−	0.002 (0.445)	0.000 (0.874)	0.000 (0.893)	0.000 (0.923)
α_7	±	0.001*** (0.097)	0.001 (0.105)	0.001*** (0.064)	0.001*** (0.095)
α_8	−	-0.022 (0.113)	-0.002 (0.109)	-0.003 (0.155)	-0.003 (0.147)
α_9	+	-0.012*** (0.060)	-0.011*** (0.056)	-0.009 (0.105)	-0.011*** (0.066)
α_{10} [H2]	−	- 0.006** (0.024)	-0.005** (0.031)	-0.005** (0.017)	-0.005** (0.016)
Fixed effects:					
Industry		N	Y	N	Y
Year(τ)		N	N	Y	Y
Statistics					
$\bar{R}^2$		0.2884	0.2924	0.2917	0.2851
ρ(F)		(0.000)*	(0.000)*	(0.000)*	(0.000)*
DW		1.9979	1.7794	1.7766	1.7723

Note: The PCSE models provide parsimonious estimations for Equation 5. Y(≡ Yes) indicates that the fixed effects ($\sum_{2012}^{2020}\tau_i T_i + \eta_i$) are included. N (≡ No) indicates that the fixed effects ($\sum_{2012}^{2020}\tau_i T_i + \eta_i$) are excluded. Based on the Hausman test and the cross-sectional dependence test (untabulated), the PCSE is the most suitable and parsimonious model, hence we only present and interpret its sign and statistical relevance. The figures in parentheses below each estimate are the p-values (i.e., the probability of t-statistics) using $prob|t| = 0$, where *p ≤ 1%; ** p ≤ 5%; *** p ≤10%, with a 2-tailed test. The ρ(F) is the probability of the F-statistic and is highly significant at 1% (for models [1]–[4]) of variants in Equation 5. The $\bar{R}^2$ = Adjusted R-squared, and DW = Durbin–Watson statistics. During the estimation, we use all 2250 observations, while all the continuous variables are winsorized at the 1st (top) and 99th (bottom) percentiles over the sample periods. All coefficients are as defined earlier. [H2] is the hypothesis evaluated by α_{10}. Pred = predicted sign based on theory. Industry means (Sector) effects, Year(τ) means (Year) effect.

Table 11. Parsimonious (PCSE) model for $DACC_{i,t}$ with interactions but no trend: [Equation 6]

$z_{i,t}$	Pred.	[5]	[6]	[7]	[8]
α_0	+	0.095* (0.000)	0.110* (0.000)	0.115* (0.000)	0.100* (0.000)
α_1	±	-0.002 (0.651)	-0.002 (0.634)	-0.002 (0.644)	-0.002 (0.636)
α_2	−	0.000 (0.265)	0.000 (0.249)	0.000 (0.305)	0.000 (0.247)
α_3	+	0.000** (0.016)	0.000** (0.014)	-0.001** (0.013)	-0.001** (0.014)
α_4	−	0.001** (0.029)	0.001 (0.042)**	0.001** (0.037)	0.001** (0.033)
α_5	+	0.024* (0.001)	0.024 (0.001)*	0.023* (0.001)	0.024* (0.001)
α_6	−	0.000 (0.874)	0.000 (0.869)	0.000 (0.816)	0.000 (0.853)
α_7	±	0.001 (0.111)	0.000*** (0.095)	0.001*** (0.090)	0.000 (0.112)
α_8	−	-0.002 (0.132)	-0.003 (0.136)	-0.003 (0.132)	-0.002 (0.125)
α_9	+	-0.011*** (0.065)	-0.011*** (0.060)	-0.011** (0.060)	-0.011*** (0.054)
α_{10} [H2]	−	-0.007** (0.012)	-0.004** (0.033)	-0.006** (0.042)	-0.005*** (0.056)
$(\tilde{z}_{i,t} \times D_{i,t})$					
φ_1 [H4]	−	-0.002 (0.102)			-0.003** (0.042)
φ_2 [H5]	±		0.001** (0.043)		0.001 (0.021)*
φ_3	−			0.000 (0.762)	-0.001 (0.719)
Fixed effects:					
Industry		Y	Y	Y	Y
Year(τ)		Y	Y	Y	Y
Statistics					
$\bar{R}^2$		0.255	0.265	0.251	0.262
ρ(F)		(0.000)*	(0.000)*	(0.000)*	(0.000)*
DW		1.778	1.774	1.773	1.782

Note: The PCSE models provide parsimonious estimations for Equation 6. Y(≡ Yes) indicates that the fixed effects $(\sum_{2012}^{2020} \tau_i T_i + \eta_i)$ are included. N (≡ No) indicates that the fixed effects $(\sum_{2012}^{2020} \tau_i T_i + \eta_i)$ are excluded. Based on the Hausman test and the cross-sectional dependence test (untabulated), the PCSE is the most suitable and parsimonious model, hence we only present and interpret its sign and statistical relevance. The Interactions ≡ $(\tilde{z}_{i,t} \times D_{i,t})$ and the figures in parentheses below each estimate are the p-values (i.e., the probability of t-statistics) using $prob|t| = 0$, where * p ≤ 1%; ** p ≤ 5%; *** p ≤10%, with a 2-tailed test. The ρ(F) is the probability of the F-statistic and is highly significant at 1% (for models [5]–[8]) of variants of Equation 6. The $\bar{R}^2$ = Adjusted R-squared, and DW = Durbin–Watson statistics. During the estimation, we use all 2250 observations, while all the continuous variables are winsorized at the 1st (top) and 99th (bottom) percentiles over the sample periods. All coefficients are as defined earlier. [H2], [H4] & [H5] are the hypotheses evaluated by the coefficients identified. Pred = predicted sign based on theory. Industry means (Sector) effects, Year(τ) means (Year) effects.

Table 12. Parsimonious (PCSE) model for $DACC_{i,t}$ with Interactions and Trend: [Equation 7].

$z_{i,t}$	Pred.	[9]	[10]	[11]	[12]	[13]	[14]
α_0	+	0.104* (0.000)	0.095* (0.000)	0.094* (0.000)	0.110* (0.000)	0.095* (0.000)	0.100* (0.000)
α_1	±	-0.002 (0.635)	-0.002 (0.644)	-0.002 (0.652)	-0.002 (0.631)	-0.002 (0.642)	-0.002 (0.632)
α_2	−	0.000 (0.313)	0.000 (0.276)	0.000 (0.250)	0.000 (0.242)	0.000 (0.294)	0.000 (0.235)
α_3	+	-0.001** (0.014)	0.000* (0.015)	0.000** (0.017)	0.000** (0.015)	-0.001** (0.014)	0.000** (0.015)
α_4	−	0.001** (0.039)	0.001** (0.045)	0.001** (0.037)	0.001* (0.050)	0.001** (0.045)	0.001** (0.040)
α_5	+	0.024* (0.001)	0.024* (0.001)	0.024* (0.001)	0.024* (0.001)	0.024* (0.001)	0.025* (0.001)
α_6	−	0.000 (0.916)	0.000 (0.935)	0.000 (0.885)	0.000 (0.879)	0.000 (0.829)	0.000 (0.874)
α_7	±	0.001*** (0.088)	0.001*** (0.100)	0.001 (0.120)	0.000*** (0.085)	0.001*** (0.095)	0.000*** (0.082)
α_8	−	-0.003 (0.162)	-0.003 (0.158)	-0.002 (0.119)	-0.003 (0.138)	-0.003 (0.140)	-0.002 (0.105)
α_9	+	-0.011*** (0.069)	-0.011*** (0.072)	-0.011*** (0.072)	-0.011*** (0.065)	-0.011*** (0.066)	-0.011*** (0.061)
α_{10} [H2]	−		-0.004*** (0.088)	-0.005*** (0.095)	-0.004 (0.105)	0.002 (0.122)	-0.002*** (0.091)
$(\tilde{z}_{i,t} \times D_{i,t})$							
φ_1 [H4]	−			-0.002*** (0.085)			-0.002*** (0.054)
φ_2 [H5]	±				-0.004** (0.041)		0.001** (0.015)
φ_3	−					0.000 (0.784)	-0.001 (0.648)
γ [H3]	−	0.001 (0.551)	0.001 (0.924)	0.001 (0.948)	0.002 (0.248)	0.001 (0.644)	0.001 (0.745)
Fixed effects:							
Industry		N	N	N	N	N	N
Year (τ)		N	N	N	N	N	N
Statistics:							
$\bar{R}^2$		0.219	0.225	0.224	0.224	0.228	0.235
ρ(F)		(0.000)*	(0.000)*	(0.000)*	(0.000)*	(0.000)*	(0.000)*
DW		1.771	1.771	1.778	1.773	1.772	1.992

Note: The PCSE models provide parsimonious estimations for Equation 7. Y(≡ Yes) indicates that the fixed effects $(\sum_{2012}^{2020} \tau_i T_i + \eta_i)$ are included. N (≡ No) indicates that the fixed effects $(\sum_{2012}^{2020} \tau_i T_i + \eta_i)$ are excluded. Based on the Hausman test and the cross-sectional dependence test (untabulated), the PCSE is the most suitable and parsimonious model, hence we only present and interpret its sign and statistical relevance. The Interactions ≡ $(\tilde{z}_{i,t} \times D_{i,t})$, and the figures in parentheses below each estimate are the *p*-values (i.e., the probability of t-statistics) using $prob|t| = 0$, where * p ≤ 1%; ** p ≤ 5%; *** p ≤10%, with a 2-tailed test. The ρ(F) is the probability of the F-statistic and is highly significant at 1% (for models [9]–[14]) of variants of Equation 7. The $\bar{R}^2$ = Adjusted R-squared, and DW = Durbin–Watson statistics. During the estimation, we use all 2250 observations, while all the continuous variables are winsorized at the 1st (top) and 99th (bottom) percentiles over the sample periods. All coefficients are as defined earlier. [H2]–[H5] are the hypotheses evaluated by the coefficients identified. Pred = predicted sign based on theory. Industry means (Sector) effects, Year(τ) means (Year) effects.

4.5. Sensitivity

For sensitivity and robustness checks, we estimate another model with the absolute value of discretionary accruals, $|DACC|_{i,t}$ in accordance with studies by Malofeeva (2018) and Rathke et al. (2016). We estimate (9) recursively to prevent endogeneity problems and to confirm the impact of only 'significant' variables in earlier models on the absolute value of the performance-matched discretionary accruals, $|DACC|_{i,t}$. The $|DACC|_{i,t}$ uses the modulus of $DACC_{i,t}$, but unlike $DACC_{i,t}$ provides a measure of the extent (upward or downward direction) to which the firms apply managerial discretion on earnings manipulation (Malofeeva, 2018; Rathke et al., 2016). It also helps us to understand the movement and motivations of earnings management practices according to discretionary

accruals. Hence, we also include the time trend variable ($\text{Trend}_{i,t}$) in the sensitivity model in order for the regression to capture trend movement of criterion ($|\text{DACC}|_{i,t}$), and co-movement with covariates (controls).

$$|\text{DACC}|_{i,t} = \gamma \text{Trend}_{i,t} + \beta_0 + \beta' CVar_{i,t} + \sum_{j=1}^{s=3} \delta_j \left(\tilde{z}_{i,t} \times D_{i,t}\right) + e_{i,t} \quad (8)$$

Where:

γ is the coefficient of the time trend, β is as previously defined for α, δ_j for φ_j, and $e_{i,t}$ for $\varepsilon_{i,t}$ and, $\sum_{2012}^{2020} \tau_i T_i + \eta_i = 0$ in the specification of Equation 4. The specific static linear regressions that capture the post-IFRS managed earnings recursively are:

$$\begin{aligned}
|\text{DACC}|_{i,t} &= \gamma \text{Trend}_{i,t} + \beta_0 + e_{i,t} \\
|\text{DACC}|_{i,t} &= \gamma \text{Trend}_{i,t} + \beta_0 + \beta_1 DIFRS_{i,t} + e_{i,t} \\
|\text{DACC}|_{i,t} &= \gamma \text{Trend}_{i,t} + \beta_0 + \beta_1 DIFRS_{i,t} + \beta_2 DAFS_{i,t} + e_{i,t} \\
|\text{DACC}|_{i,t} &= \gamma \text{Trend}_{i,t} + \beta_0 + \beta_1 DIFRS_{i,t} + \beta_2 DAFS_{i,t} + \beta_3 SIZE_{i,t} + e_{i,t} \\
&\vdots \qquad\qquad \vdots \qquad\qquad \vdots \qquad\qquad (9) \\
|\text{DACC}|_{i,t} &= \gamma \text{Trend}_{i,t} + \beta_0 + \beta_1 DIFRS_{i,t} + \beta_2 DAFS_{i,t} + \beta_3 SIZE_{i,t} \\
&\quad + \beta_4 BTM_{i,t} + \beta_5 ROE_{i,t} + \beta_6 ROA_{i,t} + \delta_1 (DAFS * \text{DIFRS})_{i,t} \\
&\quad + \delta_2 (\text{SIZE} * \text{DIFRS})_{i,t} + \delta_3 (\text{BTM} * \text{DIFRS})_{i,t} + e_{i,t}
\end{aligned}$$

We conduced robustness and sensitivity check to establish more dynamics on the behavior of the data. The parsimonious model supposes that the endogeneity problem is eliminated but reveals that assumptions may not always hold. As noticed, Equation 9 and Table 10 evaluate hypotheses $(\text{H2} - \text{H5})$. The $|\text{DACC}|_{i,t}$ is assumed in prior literature as the extent of managerial discretion on reporting discretionary accruals (Malofeeva, 2018; Rathke et al., 2016). Equations [1]–[9] obtained recursively (in Table 13) are well-posed; however, model [23] is the most parsimonious. The coefficient on the time trend $\gamma \text{Trend}_{i,t}$ is small, positive, and insignificant in all models, suggesting that, overall, the $|\text{DACC}|_{i,t}$ linearly increases across time, but the changes generated across years is not insignificant. γ provides evidence to reject [H2] that $|\text{DACC}|_{i,t}$ is not purely time driven (or decreasing as the sign suggests). This is consistent with the finding of the univariate test presented in Table 8 and is seen from Figure 2 in Appendix A. This provides no strong evidence to refute H3. The resort to absolute value is consistent with earlier results (Tables 10–12) in support of H3 that IFRS adoption reduce earnings management. Table 13 reveals that β_1 – the coefficient of post-adoption – is negative and significant, according to De Moura et al. (2020); DeFond et al. (2019) and Rathke et al. (2016). However, this produces a reversionary accruals effect according to some earlier studies (Landsman, Maydew, & Thornock, 2012; Malofeeva, 2018; Zéghal et al., 2011). Malofeeva (2018) found that IFRS adoption has a positive influence on the absolute discretionary accruals in Russia. Bryce et al. (2015) stated that managed earnings remained stable with no significant change after the adoption of IFRS in Australia.

Table 13. The parsimonious model for $|DACC|_{i,t}$: [Equation 9 variants].

$z_{i,t} \Rightarrow$	$Trend_{i,t}$		$\beta' CVar_{i,t}$						$(\tilde{z}_{i,t} \times D_{i,t})$			$\sum_{2012}^{2020} \tau_i T_i + \eta_i = 0$		Statistics		
Model ⇓	γ [H3]	β_0	β_1 [H2]	β_2	β_3	β_4	β_5	β_6	δ_1 [H4]	δ_2 [H5]	δ_3	Industry	Year	$\bar{R}^2$	ρ(F)	DW
[15]	0.001 (0.962)	0.134* (0.000)										N	N	0.099	(0.035)**	1.699
[16]	0.001 (0.695)	0.133* (0.000)	-0.011** (0.042)									N	N	0.125	(0.031)**	1.700
[17]	0.001 (0.611)	0.127* (0.000)	-0.009** (0.049)	-0.007** (0.042)								N	N	0.125	(0.011)**	1.715
[18]	0.001 (0.854)	0.123* (0.000)	-0.008** (0.045)	-0.007*** (0.057)	0.000 (0.222)							N	N	0.236	(0.008)*	1.707
[19]	0.001 (0.840)	0.123* (0.000)	-0.009*** (0.099)	-0.007*** (0.057)	0.000 (0.230)	0.000 (0.758)						N	N	0.222	(0.001)*	1.707
[20]	0.001 (0.964)	0.126* (0.000)	-0.009 (0.120)	-0.014* (0.005)	0.000 (0.294)	0.000 (0.613)	0.015** (0.034)					N	N	0.208	(0.000)*	1.708
[21]	0.001 (0.857)	0.124* (0.000)	-0.010*** (0.088)	-0.014* (0.006)	0.000 (0.722)	0.000 (0.694)	0.014** (0.049)	0.001*** (0.100)				N	N	0.241	(0.000)*	1.705
[22]	0.001 (0.861)	0.125* (0.000)	-0.009*** (0.052)	-0.014* (0.006)	0.000 (0.733)	0.000 (0.882)	0.014** (0.048)	0.001 (0.123)	-0.001*** (0.083)			N	N	0.260	(0.000)*	1.707
[23]	0.001 (0.628)	0.123* (0.000)	-0.009** (0.049)	-0.014* (0.006)	0.000 (0.381)	0.000 (0.596)	0.014*** (0.055)	0.001** (0.046)	-0.001** (0.048)	0.001** (0.023)		N	N	0.250	(0.000)*	1.707
[24]	0.001 (0.792)	0.124* (0.000)	-0.009*** (0.082)	-0.014* (0.005)	0.000 (0.545)	0.000 (0.901)	0.013*** (0.056)	0.001*** (0.081)	-0.001*** (0.062)	-0.001*** (0.091)	0.027 (0.683)	N	N	0.248	(0.000)*	1.723

Note: This PCSE model checks the sensibility of the earlier models to an alternative definition of discretionary accruals – absolute discretionary accruals ($|DACC|_{i,t}$). Y(≡ Yes) indicates that the fixed effects ($\sum_{2012}^{2020} \tau_i T_i + \eta_i$) are included. N (≡ No) indicates that the fixed effects ($\sum_{2012}^{2020} \tau_i T_i + \eta_i$) are excluded. The Interactions ≡ $(\tilde{z}_{i,t} \times D_{i,t})$, and the figures in parentheses below each estimate are the *p*-values (i.e., the probability of t-statistics) using $prob|t| = 0$, where * p ≤ 1%; ** p ≤ 5%; *** p ≤10%, with a 2-tailed test. The ρ(F) is the probability of the F-statistic and is significant at 5% (for recursive estimation of models [15], [16] & [17]), and is highly significant at 1% (of recursive estimation of [18]–[24]). Based on the Hausman test and the cross-sectional dependence test (untabulated), the PCSE is the most suitable and parsimonious model, hence we only present and interpret its sign and statistical relevance. The $\bar{R}^2$ = Adjusted R-squared, and DW = Durbin–Watson statistics. During the estimation, we use all 2250 observations, while all the continuous variables are winsorized at the 1st (top) and 99th (bottom) percentiles over the sample periods. All coefficients are as defined earlier. [H2] – [H5] are the assumed hypotheses evaluated by the coefficient identified. Pred = predicted sign based on theory. Industry means (Sector) effects, Year(τ) means (Year) effects.

Except for the coefficient of the book-to-market value, $BTM_{i,t}$ which is contrary to expectation, the parsimonious models support the earlier positions on hypotheses $\mathrm{H2}-\mathrm{H5}$. The main coefficients of the variables of interest, β_1 (IFRS adoption), δ_1 (firm size after adoption, $\mathrm{SIZE}_{i,t}$) and, δ_2 (Big Four after adoption, $\mathrm{DAFS}_{i,t}$) on $|\mathrm{DACC}|_{i,t}$ are well signed, statistically significant, and consistent with Malofeeva (2018). β_1 provides enough evidence to reject $\lceil \mathrm{H2} \rceil$ that the adoption of IFRS explains decreases in discretionary accrual-based managed earnings behavior. The coefficient δ_1 supports the theory that bigger firms generally exercise restraint toward managed earnings. They have efficient internal control structures that provide reliable systems of information to financial market viewers, making earnings smoothing difficult compared to small firms (DeFond et al., 2019; Ugrin et al., 2017). The coefficient δ_2 represents the use of Big Four audit firms after adoption $(\mathrm{DAFS} * \mathrm{DIFRS})_{i,t}$ – an unintended consequence of IFRS (Tawiah, 2019; Tawiah & Musvosvi, 2017; Wieczynska, 2016) – and has a negative impact on the discretionary accruals. This leads us to conclude that IFRS contribute to a reduction in managed earnings for listed companies audited by the Big Four firms.

5. CONCLUSIONS

We investigate the effects of IFRS adoption on the behavior of firms' earnings management in Nigeria. Our results reveal that assumption may not always hold, as some of our predictions are not supported by the data. We provide univariate evidence that managed earnings practices vary across industries following the adoption of IFRS. We found evidence that the reduction in the discretionary accrual-based earnings management practices among listed firms in the country is not purely driven by the passage of time. The decrease is explained by, and attributed to, the implementation of IFRS, the type of auditor firms, return on equity, and asset turnover. The data used do not support a statistically significant influence of the size of firms or the book-to-market-value post-IFRS adoption. These findings are important for regulations, the operations of multinational firms, and future research.

The limitations of this paper are as follows: We do not consider firms' voluntary adoption prior to the official implementation, we only considered mandatory IFRS adoption since the announcement by the federal government. We also assumed that discretionary accrual is linear in motivation and pattern. Some studies have observed that managed earnings may adopt characteristically non-linear dynamics in discretionary accruals (Balboa, López-Espinosa, & Rubia, 2013) and piecewise linear or asymmetric recognition in discretionary accruals (Anderson, Woodhouse, Ramsay, & Faff, 2009; Moreira & Pope, 2007). Future research could carry out a survey-based investigation on the association between IFRS adoption and earnings management behavior in Nigeria. Lastly, future researchers may consider the effects of IFRS on firms during voluntary transition before the official announcement. Future research may also consider the influence of ownership structure – foreign and government ownership (or partnership) – on discretionary accrual dynamics of companies in Nigeria's financial and non-financial sectors.

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APPENDIX

Appendix A

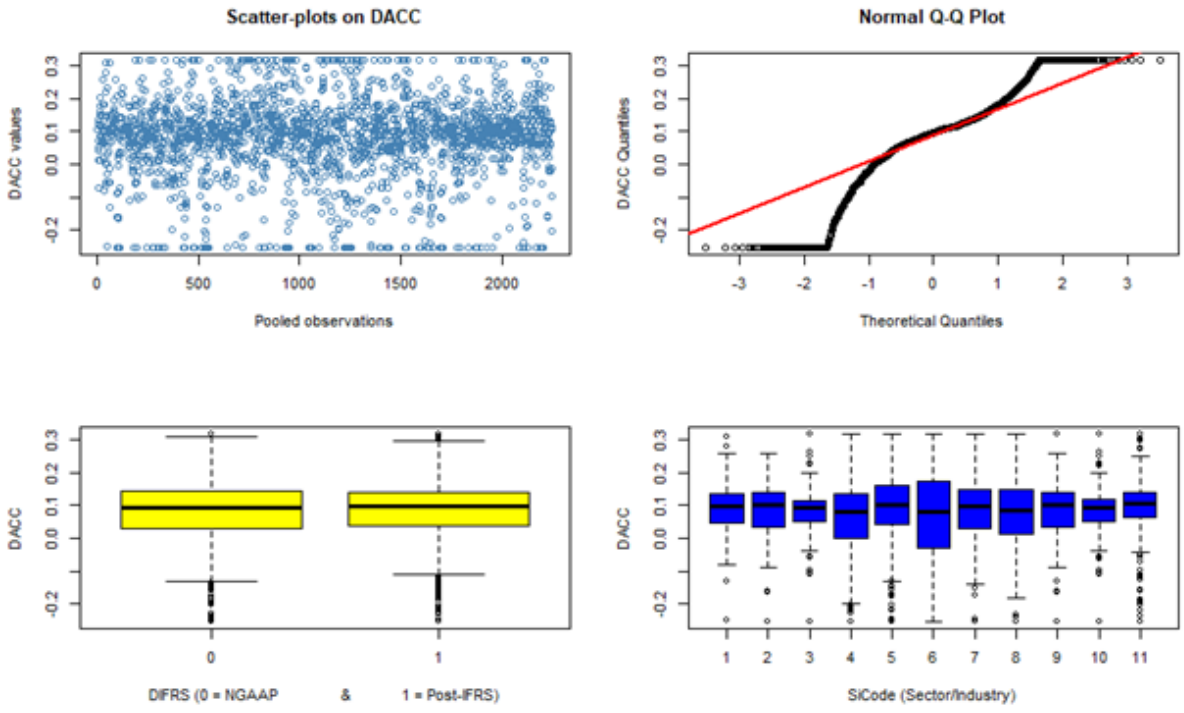

Figure 2. Statistical plots for discretionary accruals ($DACC_{i,t}$: Full sample).

Note: The box diagram for the entire sample of 2250 observations classified based on the samples for pre-IFRS (0) and post-IFRS (1)], and the box diagram for the entire sample of 2250 observations [classified based on the industry SiCode (01–11)].

Appendix B: Present summary of firm selected for the study.

Table A. Presents the list of quoted companies on the Nigerian Stock Exchange (NSE).

Company	Ticker	Sector	Listed	Incorporated	Company	Ticker	Sector	Listed	Incorporated
11 Plc.	MOBIL	10	-	-	Deap Capital Management & Trust Plc.	DEAPCAP	05	Dec. 17, 2007	Jun. 5, 2002
7up Bottling Company Plc.	7UP	04	-	-	DN Tyre & Rubber Plc.	DUNLOP	04	-	Oct. 21, 1961
Abbey Mortgage Bank Plc.	ABBEYBDS	05	-	Aug. 26, 1991	Ecobank Transnational Incorporated	ETI	05	Sep. 11, 2006	Oct. 3, 1985
Academy Press Plc.	ACADEMY	11	Jun. 15, 1965	Jul. 28, 1964	Ekocorp Plc.	EKOCORP	06	-	Oct. 9, 1991
Access Bank Plc.	ACCESS	05	-	Feb. 8, 1989	Ellah Lakes Plc.	ELLAHLAKES	01	-	Jul. 2, 1980
Africa Prudential Plc.	AFRIPRUD	05	Nov. 1, 2013	Mar. 23, 2006	Eterna Plc.	ETERNA	10	-	Jan. 13, 1989
African Alliance Insurance Plc.	AFRINSURE	05	Sep. 17, 2009	May 6, 1960	E-Tranzact International Plc.	ETRANZACT	07	Aug. 7, 2009	May 7, 2003
Afromedia Plc.	AFROMEDIA	11	May 18, 2009	Oct. 28, 1959	Eunisell Interlinked Plc.	EUNISELL	11	Nov. 13, 1993	Nov. 17, 1981
Aiico Insurance Plc.	AIICO	05	-	Jul. 14, 1970	Evans Medical Plc.	EVANSMED	06	-	-
Airtel Africa Plc.	AIRTELAFRI	07	Jul. 9, 2019	Jul. 12, 2018	FBN Holdings Plc.	FBNH	05	Nov. 26, 2012	Aug. 13, 2012
Aluminum Extrusion Ind. Plc.	ALEX	09	Dec. 29, 1987	Oct. 26, 1982	FCMB Group Plc.	FCMB	05	Jun. 21, 2013	Nov. 20, 2012
Arbico Plc.	ARBICO	03	-	Jun. 18, 1958	Fidelity Bank Plc.	FIDELITYBK	05	May 17, 2005	Nov. 19, 1987
Ardova Plc.	ARDOVA	10	-	Nov. 12, 1964	Fidson Healthcare Plc.	FIDSON	06	Apr. 6, 2008	Mar. 13, 1995
https://ngxgroup.com/exchange/data/company-profile/?isin=NGASOSAVING3&directory=companydirectory	ASOSAVINGS	05	Apr. 25, 2008	Nov. 9, 1995	Flour Mills Nig. Plc.	FLOURMILL	04	-	Sep. 29, 1960
Associated Bus Company Plc.	ABCTRANS	11	Dec. 20, 2006	Apr. 5, 1993	FTN Cocoa Processors Plc.	FTNCOCOA	01	-	Aug. 26, 1991
Austin Laz & Company Plc.	AUSTINLAZ	08	-	Jul. 13, 1982	Glaxo Smith Kline Consumer Nig. Plc.	GLAXOSMITH	06	-	Jun. 23, 1971
Axamansard Insurance Plc.	MANSARD	05	Nov. 19, 2009	Jun. 23, 1989	Global Spectrum Energy 11 Plc.	GSPECPLC.	11	Nov. 27, 2017	Mar. 14, 2006
B.O.C. Gases Plc.	BOCGAS	09	-	-	Golden Guinea Brew. Plc.	GOLDBREW	04	-	Sep. 26, 1962
Berger Paints Plc.	BERGER	08	-	Sep. 1, 1959	Goldlink Insurance Plc.	GOLDINSURE	05	Feb. 12, 2008	Sep. 8, 1993
Beta Glass Plc.	BETAGLAS	08	Jul. 2, 1986	Jun. 2, 1974	Greif Nigeria Plc.	VANLEER	08	-	Jan. 20, 1940
Briclinks Africa Plc.	BAPLC.	07	Feb. 5, 2021	Jul. 30, 2015	Guaranty Trust Holding Company Plc.	GTCO	05	Jun. 24, 2021	Jul. 24, 2020
Bua Cement Plc.	BUACEMENT	08	Jan. 9, 2020	May 30, 2014	Guinea Insurance Plc.	GUINEAINS	05	-	Dec. 3, 1958
C & I Leasing Plc.	CILEASING	11	Dec. 1, 1997	Dec. 28, 1990	Guinness Nig Plc.	GUINNESS	04	Jan. 2, 1965	Apr. 29, 1950
Cadbury Nigeria Plc.	CADBURY	04	-	Jan. 9, 1965	Honeywell Flour Mill Plc.	HONYFLOUR	04	Oct. 20, 2009	Jul. 9, 1985
Cap Plc.	CAP	08	May 24, 1978	Sep. 21, 1965	Ikeja Hotel Plc.	IKEJAHOTEL	11	Sep. 6, 2007	Nov. 18, 1972
Capital Hotel Plc.	CAPHOTEL	11	Aug. 15, 1990	Jan. 16, 1981	Industrial & Medical Gases Nigeria Plc.	IMG	09	-	Dec. 11, 1959
Capital Oil Plc.	CAPOIL	10	-	Aug. 29, 1985	Infinity Trust Mortgage Bank Plc.	INFINITY	05	Dec. 11, 2013	Nov. 28, 2002
Caverton Offshore Support GRP Plc.	CAVERTON	11	Feb. 6, 2014	Jun. 2, 2008	Interlinked Technologies Plc.	INTERLINK	11		-
Champion Brew. Plc.	CHAMPION	04	Sep. 1, 1983	Jul. 31, 1974	International Breweries Plc.	INTBREW	04	-	Dec. 22, 1971
Chams Plc.	CHAMS	07	-	Sep. 10, 1985	International Energy Insurance Plc.	INTENEGINS	05	Jul. 13, 2007	Mar. 26, 1969
Chellarams Plc.	CHELLARAM	02	Apr. 1, 1977	Aug. 13, 1947	Jaiz Bank Plc.	JAIZBANK	05	-	Apr. 1, 2003

Company	Ticker	Sector	Listed	Incorporated	Company	Ticker	Sector	Listed	Incorporated
Conoil Plc.	CONOIL	10	-	Jun. 30, 1970	Japaul Gold & Ventures Plc.	JAPAULGOLD	10	Aug. 10, 2005	Jun. 29, 1994
Consolidated Hallmark Insurance Plc.	CHIPLC.	05	Feb. 22, 2008	Aug. 2, 1991	John Holt Plc.	JOHNHOLT	02	-	Aug. 28, 1961
Cornerstone Insurance Plc.	CORNERST	05	-	Jul. 26, 1991	Juli Plc.	JULI	11	Jul. 11, 1986	Sep. 14, 1972
Coronation Insurance Plc.	WAPIC	05	Aug. 31, 1990	Mar. 14, 1958	Julius Berger Nig. Plc.	JBERGER	03	-	Feb. 18, 1970
Courteville Business Solutions Plc.	COURTVILLE	07	-	Jan. 4, 2005	Lafarge Africa Plc.	WAPCO	08	Feb. 17, 1979	Feb. 24, 1959
Custodian Investment Plc.	CUSTODIAN	05	-	Aug. 22, 1991	Lasaco Assurance Plc.	LASACO	05	-	Dec. 20, 1979
Cutix Plc.	CUTIX	08	-	-	Learn Africa Plc.	LEARNAFRCA	11	-	Oct. 8, 1961
CWG Plc.	CWG	07	-	Sep. 26, 1991	Linkage Assurance Plc.	LINKASSURE	05	Nov. 18, 2003	Mar. 26, 1991
Daar Communications Plc.	DAARCOMM	11	-	Aug. 18, 1988	Livestock Feeds Plc.	LIVESTOCK	01	Apr. 1, 1978	Mar. 20, 1963
Dangote Cement Plc.	DANGCEM	08	Oct. 26, 2010	Nov. 4, 1992	Livingtrust Mortgage Bank Plc.	LIVINGTRUST	05	-	Mar. 9, 1999
Dangote Sugar Refinery Plc.	DANGSUGAR	04	Mar. 8, 2007	Jan. 4, 2005	May & Baker Nigeria Plc.	MAYBAKER	06	Nov. 10, 1994	Apr. 9, 1944

Note: 01 = Agriculture, 02 = Conglomerates, 03 = Construction/real Estate, 04 = Consumer Goods, 05 = Financial Services, 06 = Healthcare, 07 = ICT, 08 = Industrial Goods, 09 = Natural Resources, 10 = Oil & Gas, 11 = Services **Source:** Nigerian Stock Exchange (2021).

Table A. …continued.

Company	Ticker	Sector	Listed	Incorporated	Company	Ticker	Sector	Listed	Incorporated
Mcnichols Plc.	MCNICHOLS	04	Dec. 18, 2009	Apr. 26, 2004	Secure Electronic Technology Plc.	SETECH	11	-	Jan. 3, 2000
Medview Airline Plc..	MEDVIEWAIR	11	-	Aug. 11, 2004	Seplat Petroleum Development Company Plc.	SEPLAT	10	-	Jun. 17, 2009
Meyer Plc.	MEYER	08	-	May 20, 1960	SFS Real Estate Investment Trust	SFSREIT	03	-	-
Morison Industries Plc.	MORISON	06	-	Jun. 29, 1955	Skyway Aviation Handling Company Plc.	SKYAVN	11	Apr. 26, 2019	Apr. 22, 2009
Mrs Oil Nigeria Plc.	MRS	10	-	Aug. 12, 1969	Smart Products Nigeria Plc.	SMURFIT	03	-	Nov. 1, 1966
MTN Nigeria Communications Plc.	MTNN	07	May 16, 2019	Nov. 8, 2000	Sovereign Trust Insurance Plc.	SOVRENINS	05	Nov. 29, 2006	Feb. 26, 1980
Multi-Trex Integrated Foods Plc.	MULTITREX	04	Nov. 1, 2010	Oct. 30, 1999	STACO Insurance Plc.	STACO	05	-	Jul. 10, 1991
Multiverse Mining And Exploration Plc.	MULTIVERSE	09	Apr. 18, 2008	Jun. 20, 2002	Stanbic IBTC Holdings Plc.	STANBIC	05	Nov. 23, 2012	Mar. 14, 2012
Mutual Benefits Assurance Plc.	MBENEFIT	05	May 28, 2002	Apr. 18, 1995	Standard Alliance Insurance Plc.	STDINSURE	05	Dec. 19, 2003	Jul. 28, 1981
N Nig. Flour Mills Plc.	NNFM	04	-	Oct. 29, 1971	Sterling Bank Plc.	STERLNBANK	05	Aug. 17, 1993	Nov. 25, 1960

NASCON Allied Industries Plc.	NASCON	04	Oct. 20, 1992	Apr. 30, 1973	Studio Press (Nig) Plc.	STUDPRESS	11	Sep. 13, 1979	Jul. 9, 1965
NCR (Nigeria) Plc.	NCR	07	-	Dec. 9, 1949	Sunu Assurances Nigeria Plc.	SUNUASSUR	05	-	Dec. 13, 1984
Neimeth International Pharm. Plc.	NEIMETH	06	Sep. 21, 1979	Aug. 13, 1957	Tantalizers Plc.	TANTALIZER	11	-	May 4, 1997
NEM Insurance Plc.	NEM	05	Sep. 5, 1990	Apr. 2, 1970	The Initiates Plc.	TIP	11	Oct. 25, 2016	Mar. 3, 1995
Nestle Nigeria Plc.	NESTLE	04	Apr. 20, 1979	Sep. 25, 1969	Thomas Wyatt Nig. Plc.	THOMASWY	09	Oct. 26, 1978	Mar. 18, 1948
Niger Insurance Plc.	NIGERINS	05	-	Aug. 29, 1962	Total Energies Marketing Nigeria Plc.	TOTAL	10	-	Jan. 6, 1956
Nigeria Energy Sector Fund	NESF	05	Jun. 18, 1999	Oct. 26, 1998	Tourist Company Of Nigeria Plc.	TOURIST	11	-	Oct. 4, 1964
Nigeria-German Chemicals Plc.	NIG-GERMAN	06		-	Transcorp Hotels Plc.	TRANSCOHOT	11	Jan. 15, 2015	Jul. 12, 1994
Nigerian Aviation Handling Company Plc.	NAHCO	11	Nov. 27, 2006	Apr. 8, 2005	Transnational Corporation Of Nigeria Plc.	TRANSCORP	02	-	Nov. 16, 2004
Nigerian Brew. Plc.	NB	04	Sep. 5, 1973	Nov. 16, 1946	Trans-Nationwide Express Plc.	TRANSEXPR	11	Sep. 7, 1992	Mar. 28, 1984
Nigerian Enamelware Plc.	ENAMELWA	04	-	May 21, 1960	Tripple Gee And Company Plc.	TRIPPLEG	08	-	Apr. 14, 1980
Nigerian Exchange Group	NGXGROUP	05	Oct. 15, 2021	Sep. 15, 1960	UACN Plc.	UACN	02	-	Apr. 22, 1931
Notore Chemical Ind. Plc.	NOTORE	08	Aug. 2, 2018	Nov. 30, 2005	UACN Property Development Company Plc.	UAC-PROP	03	-	-
Npf Microfinance Bank Plc.	NPFMCRFBK	05	Dec. 1, 2010	May 19, 1993	UNIC Diversified Holdings Plc.	UNIC	05	-	-
Oando Plc.	OANDO	10	Feb. 24, 1992	Aug. 25, 1969	Unilever Nigeria Plc.	UNILEVER	04	Apr. 1, 1973	Nov. 4, 1923
Okomu Oil Palm Plc.	OKOMUOIL	01	Sep. 9, 1997	Dec. 3, 1979	Union Bank Nig. Plc.	UBN	05	-	May 30, 1969
Omatek Ventures Plc.	OMATEK	07	-	Jul. 6, 1998	Union Diagnostic & Clinical 11 Plc.	UNIONDAC	06	-	Mar. 16, 1999
PZ Cussons Nigeria Plc.	PZ	04	-	Apr. 12, 1948	Union Dicon Salt Plc.	UNIONDICON	04	Sep. 23, 1993	Nov. 12, 1991
Pharma-Deko Plc.	PHARMDEKO	06	-	Apr. 18, 1969	Union Homes Real	UHOMREIT	03	Feb. 5,	-

					Estate Investment Trust			2008	
Portland Paints & Products Nigeria Plc.	PORTPAINT	08	-	-	Union Homes Savings And Loans Plc.	UNHOMES	05	Apr. 24, 2006	Nov. 6, 1992
Premier Paints Plc.	PREMPAINTS	08	Mar. 7, 1995	Aug. 24, 1982	United Bank For Africa Plc.	UBA	05	Mar. 31, 1970	Feb. 23, 1961
Presco Plc.	PRESCO	01	Oct. 10, 2002	Sep. 24, 1991	United Capital Plc.	UCAP	05	Jan. 13, 2013	Mar. 14, 2002
Prestige Assurance Plc.	PRESTIGE	05	Dec. 3, 1990	Jan. 6, 1970	Unity Bank Plc.	UNITYBNK	05	-	Apr. 27, 1987
R T Briscoe Plc.	RTBRISCOE	11	Mar. 15, 1974	Mar. 9, 1957	Universal Insurance Plc.	UNIVINSURE	05	Nov. 2, 2009	Mar. 1, 1961
RAK Unity Pet. Comp. Plc.	RAKUNITY	10	-	Dec. 20, 1982	University Press Plc.	UPL	11	Aug. 14, 1978	Aug. 14, 1978
Red Star Express Plc.	REDSTAREX	11	Nov. 14, 2007	Jul. 10, 1992	UPDC Plc.	UPDC	03	-	Oct. 6, 1997
Regency Assurance Plc.	REGALINS	05	-	Jun. 16, 1993	UPDC Real Estate Investment Trust	UPDCREIT	03	Feb. 26, 2008	Mar. 27, 2013
Resort Savings & Loans Plc.	RESORTSAL	05	-	Jun. 17, 1992	Value-Alliance Value Fund	VALUEFUND	05	-	-
Roads Nig Plc.	ROADS	03	-	-	Veritas Capital Assurance Plc.	VERITASKAP	05	-	Aug. 8, 1973
Ronchess Global Resources Plc.	RONCHESS	03	Dec. 17, 2021	Sep. 5, 2008	Vitafoam Nig Plc.	VITAFOAM	04	-	Apr. 8, 1962
Royal Exchange Plc.	ROYALEX	05	Dec. 3, 1990	Feb. 28, 1921	Wema Bank Plc.	WEMABANK	05	-	May 2, 1945
SCOA Nig. Plc.	SCOA	02	-	Jun. 24, 1969	Zenith Bank Plc.	ZENITHBANK	05	Oct. 21, 2004	May 30, 1990

Note: 01 = Agriculture, 02 = Conglomerates, 03 = Construction/Real Estate, 04 = Consumer Goods, 05 = Financial Services, 06 = Healthcare, 07 = ICT, 08 = Industrial Goods, 09 = Natural Resources, 10 = Oil & Gas, 11 = Services.
Source: Nigerian Stock Exchange (2021).