

DISCLOSURE QUALITY AND INVESTMENT EFFICIENCY OF LISTED DEPOSIT MONEY BANKS IN NIGERIA: DIRECT AND MEDIATED EFFECTS VIA INFORMATION ASYMMETRY AND COST OF CAPITAL

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Abstract

This paper assessed direct and mediated effects of investment information disclosure quality (DQ) on investment efficiency (IE) of listed Deposit Money Banks (DMBs) in Nigeria using MacKinnon's (2015) approach to serial mediation. Secondary data generated from Thomson Reuters data stream and annual reports and accounts of listed DMBs for a period of 10 years (2008 - 2017) was utilized. Regression analysis and bootstrapping procedure were employed for analysis of the data generated. The results found showed that DQ exerts both direct and mediated effects on IE in underinvesting banks. The indirect is insignificant and transmitted through information asymmetry (IA) and cost of capital (COC). For overinvesting banks, only direct effect was statistically established. The practical implication of this result is that the level of underinvestment in the Nigerian banking industry can be reduced if the listed DMBs adopt a practice of disclosing quality investment related information to financiers for their informed lending decision. Hence, the study recommended that the listed DMBs should be disclosing comprehensive and relevant investment information to the finance providers so that the level of IA and COC will reduce, to enable the banks undertake viable investment projects. This paper will contribute to the extant literature on DQ and IE of corporate firms, especially in developing economies where there is paucity of relevant studies. It will contribute to financial reporting practice by influencing the decision and the way in which the banks report investment related information to capital providers. The paper will also contribute to policy and practice of regulating the content of annual reports and accounts by regulatory bodies like Financial Reporting Council, Central Bank of Nigeria and Securities and Exchange Commission.

Keywords: Disclosure Quality, Information Asymmetry, Cost of Capital, Overinvestment, Underinvestment

1. Introduction

The quest for empirical evidence regarding influence of investment information disclosure quality (DQ) on investment efficiency (IE) in an environment characterized with asymmetric information dates from Myers and Majluf's (1984) Issue-Invest Decision model. In the model,

Myers and Majluf (1984) proposed that until a firm is in possession of ample financial slacks, it would decide to forego profitable investments rather than issuing stocks at a price lower than their actual market value. Since then, studies, mostly from developed economies have been making attempts using different

methodologies in order to assess the effect of DQ on IE in different corporate organizations.

IE can be defined as undertaking all and only investment projects that have positive net present value (Biddle et al., 2009). Thus, inefficiencies in corporate investments (that is, Underinvestment or overinvestment) arise when a firm resolves to forgo investment projects that yield positive NPV or when it decides to undertake capital projects that produce negative NPV. One major factor that compels a corporate firm to pass up profitable investment projects is an increase in cost of capital (Myers & Majluf, 1984). A rise in Cost of capital (COC) affects ultimate profitability of investment projects and limits the ability of a firm to raise the required fund for financing viable investment proposals. Hence, a firm experiencing a rise in the overall COC may be left with no option than forgoing profitable capital investment projects.

Consistent with the first proposition of Pecking Order theory, a rise in COC can be attributed to a rise in information asymmetric risks (that is, adverse selection and moral hazard). Because, as the theory proposed, financiers who are imperfectly informed could compensate themselves for these risks through charging high risk premium which raises the COC. Thus, an increase in the level of information asymmetry (IA) between corporate firms and providers of fund means high level of adverse selection and moral hazard risks and hence, increase in COC. IA in this context means a scenario in which financiers are less informed (that is, when compared to corporate managers) about

corporate firms and viability of their investment proposals.

As proposed by Signaling theory, IA between parties to a transaction can be reduced by way of disclosing, sending or reporting a signal (that is, relevant information) about the transaction to the other party. Also, research studies such as Al-Bahedili et al. (2019), Suharsono et al. (2020), Mehr (2020), Emawati and Budiasih (2020) and Septriani (2022) have confirmed that commitment to quality reporting or disclosure reduces asymmetric information in the capital markets. Furthermore, Biddel et al. (2009), Zhu et al. (2014) and Wang et al. (2015) have argued that due to its effect on IA and COC, commitment to quality reporting or disclosure could have implications on the level of corporate IE. Thus, based on the forgoing propositions and arguments, this paper expects that the effect of DQ on corporate IE can be mediated or passed through changes in the level of IA and COC.

Relevant studies conducted in this area (for instance, Poorzamani & Keivanfar, 2015; Micky, 2015; Wang et al., 2015; Naseri & Habibi, 2014; Lenger et al., 2015; Ren, 2016; Rad, Embong et al., 2016; Asma, 2017) have focused mostly on the direct relationship between financial reporting quality (FRQ) and IE in developed economies. Few studies that have been carried out on the mediated effect of FRQ (for instance, Vander Bauwhede et al., 2015; Cuadrado-Ballesteros et al., 2016; Firth et al., 2016; Chen et al., 2017) have paid attention to assessing the simple mediated relationship between FRQ and IE

or FRQ and COC using earnings management mostly as a measure of FRQ.

Ayagi and Kurawa (2019) have made an attempt to examine the sequential mediating effects of IA and COC on the relationship between FRQ and IE of listed Deposit Money Banks in Nigeria. However, the work measured FRQ indirectly using Chang et al. (2008) Discretionary Loan Loss provisions model. And one of the criticisms against accrual models is the complexity in distinguishing between discretionary and non-discretionary accruals. For that, Healy and Wahlen (1999) in Beest et al. (2009) argued that conclusions drawn regarding FRQ based on accrual models might not provide direct and comprehensive evidence on the quality of financial reports and its dimensions of decision usefulness. This paper therefore aimed at filling this methodological gap by employing a different and direct measure of FRQ (that is, investment information disclosure quality index) in order to assess its serial mediated effect (through IA and COC) on IE of listed DMBs in Nigeria, over 10 year period (2008 -2017). Thus, based on the theoretical arguments and the methodological gap identified, this paper formulated the following hypotheses:

H0₁: DQ does not significantly affect IA of listed DMBs in Nigeria.

H0₂: IA does not significantly mediate the relationship between DQ and COC of listed DMBs in Nigeria.

H0₃: IA and COC do not significantly mediate the relationship between DQ and IE of listed DMBs in Nigeria.

2.0 Literature Review

2.1 Investment Information Disclosure Quality

The term Disclosure can be defined as the financial or non-financial, qualitative or quantitative, mandatory or voluntary information provided by a firm via formal or informal mediums (Gibbins et al. 1990 in Takhtae et al. 2014). Thus, disclosure quality (DQ) is the precision, timeliness, and quantity of information provided (Brown & Hillegeist, 2003). As reported by Scaltrito (2015), the term DQ has been used in accounting literature to refer to the level of information disclosed by firms. Hence, consistent with these definitions, this paper defined investment information disclosure quality (DQ) as the precision, timeliness, quantity and level of financial or non-financial, mandatory or voluntary investment related information provided by corporate firms.

DQ as pointed out by Scaltrito (2015) can be assessed using either subjective or objective measures. The Subjective measures are survey, questionnaire, external rating and analyst opinion. While the objective measures include content analysis, disclosure index and event frequencies. Also, in line with Beest et al. (2009), DQ measures can be considered and classified under methods of measuring FRQ that focus on specific elements in the financial reports. This is because of the fact that they center on specific information which measures the quality of specific elements in the annual reports. This specific information includes investment information, risk disclosure information, auditor's report, corporate governance mechanisms and quality of internal control.

The models have some advantages over accruals and value relevance models. For, they focus on FRQ and measure it directly.

2.2 Investment Efficiency (IE)

IE means accepting and undertaking only capital investment projects that produce positive net present value. Imelda et al. (2022) regard IE as appropriate, proper or optimal allocation and committing of investible funds to capital projects. Hence, investment inefficiency can be seen inappropriate, improper or suboptimal allocation or commitment of fund to capital projects. Investment inefficiency is a deviation from optimal investment and can either be overinvestment or underinvestment (Gaio et al., 2023). Overinvestment means accepting projects with negative net present value; while underinvestment denotes rejecting or passing up projects with a positive net present value. Various methods of measuring IE have been used in relevant literature. They include Fazzari et al. (1988) Investment-Cash Flow Sensitivity Model as reported in Daniel et al. (2016), Richardson (2006) Investment Expectation Model, Bidet et al. (2009) model of Investment Efficiency, Chen et al. (2010) Parsimonious Model of Expected Investment and Zhu et al. (2014) model of Investment Efficiency.

2.3 Empirical Evidence

Studies have assessed the unmediated effect of FRQ on IE in various corporate firms. For example, Biddel et al. (2009) came up with a model for measuring corporate IE and used four models of computing FRQ that include Dechow- Dichev (2002) model,

Wysocki's (2008) Modified Dechow-Dichev (2002) model, Li's (2008) FOG index and FRQ Index. The findings thereof, suggest that improvement in FRQ would result in less over-and under-investment problems in the selected firms. Jamhuri(2009) employed Biddel's et al. (2009) IE model in the study of 34 firms listed on the Nairobi Stock Exchange and the result found upheld the Biddel's et al. (2009) stand on the positive association between FRQ and IE.

Similar research studies conducted (for instance, Baik et al., 2010; Kangarlouei et al., 2011; Abdul Jalil, 2014; Zhu et al. 2014; Du, 2014; Micky, 2015; Wang et al., 2015; Ren, 2016, Rad et al. 2016) strengthened the position of Biddel et al. (2009). Conversely, studies carried out by Gilaninia et al. (2012), Moradzadehfard et al. (2013), Naseri and Habibi (2014), Poorzamani and Keivanfar (2015) and Lenger et al. (2015) confirmed a negative association between FRQ and IE. Furthermore, the findings of Gilaninia et al. (2012) and Asma (2017) found no evidence to suggest that FRQ explains IE of the sampled firms.

Studies that assessed the mediated effect of FRQ have mostly focused on simple mediated effect through IA or COC. For example, using path analysis, Bhattacharya et al. (2010) examined the simple mediating effect of IA on the link between earnings quality and COE capital of large and stable American firms. The result found confirmed an evidence of direct link between earnings quality and COE, and then indirect link which is passed via IA. Similarly, Shan-cun and Wei-ning (2012), Barth et al. (2013), Nuryaman (2014),

Vander Bauwhede et al. (2015) and Cuadrado-Ballesteros et al. (2016) have specifically assessed the mediating effect of IA on the relationship between FRQ and COC in various corporate organizations. Furthermore, Daman and Mehr (2012) and Nurcholisah (2016) have also assessed the mediating effect of IA and hence, ignoring that of COC on the association between FRQ and IE. Moreover, Nurcholisah (2016) used causal associative method which failed to clearly show the direct and mediated (indirect) effect of FRQ.

In a similar way, Ascioğlu et al. (2008), Xie (2013), Firth et al. (2016) and Chen et al. (2017) have specifically examined the simple mediating effect of COC on the relationship between IA and IE. Worthy of note is fact that Firth et al. (2016) did not employ COC as intervening variable on the relationship between IA and IE. It just supported the idea that IA affects IE through influence on COC. Furthermore, findings from studies that assessed the simple mediating effect of IA or COC on the relationship between FRQ and IE (for instance, Daman & Mehr, 2012; Shan-cun & Wei-ning, 2012; Barth et al. 2013; Nuryaman, 2014; Vander Bauwhede et al. 2015; Cuadrado-Ballesteros et al. 2016; Nurcholisah, 2016) have been varied and hence, imply the need for more research efforts using different approach to mediation that would possibly produce wide ranging findings on the mediated relationship between FRQ and corporate IE.

In response to the need for bridging the identified research gap, Ayagi and Kurawa (2019) examined the mediating effects of IA and COC on the association between

FRQ and IE of listed Deposit Money Banks (DMBs) in Nigeria using sequential mediation model steps. The results found confirmed that the indirect effect of FRQ on IE is insignificant and can be transmitted by IA and COC in both Underinvesting and Overinvesting banks. However, in terms of the direct effects, the results were mixed and varied, suggesting that commitment to FRQ (measured using Discretionary Loan Loss Provision Model) might worsen overinvestment problems in the Overinvesting banks. Thus, this paper is an attempt to further examine this relationship in the same industry using DQ index as an alternative measure of FRQ.

2.4 Theoretical Framework

The underpinning theories adopted by this paper are Asymmetric Information, Pecking Order, Issue-Invest Decision and Signaling theories. They were jointly used to explain the relationship between DQ and IE via influence on IA and COC. Asymmetric Information theory proposed that the existence of IA between parties to a transaction (for example, corporate firms and capital providers in this context) gives rise to adverse selection and moral hazard risks. These risks according to the first proposition of Pecking Order theory would cause the firms' COC to rise, since the capital providers would compensate themselves for the risks by raising the risk premiums on stocks or bond issued by the company, in order to fund capital investments proposals. The rise in the COC as premised by Issue-Invest Decision model would pose financing constraint on the firms and affect the ultimate profitability of the projects, thereby compelling them to forgo the investment proposals. As a

remedy to asymmetric information problem which if addressed, the firms would be able to invest efficiently. Signaling theory proposed that the borrowers (in this context the corporate firm) should send or disclose to the lenders (capital providers) some relevant and comprehensive information about themselves and their investment proposals. This according to the theory would minimise the level of IA in the capital market and hence lower the COC.

3. Methodology

The current study used ex-post facto research design. The population of the study covered fourteen (14) listed DMBs in

Nigeria that remained listed from 31st December, 2008 to 31st December, 2017 (see Appendix 1). Due to the availability of relevant data for the study, census sampling technique was applied so that the entire fourteen banks were covered. Secondary sources of data which comprised the published annual reports and accounts of the listed DMBs and Thomson Reuters Data stream were utilized. The variables of the study are in two sets, that is, dependent and explanatory variables. The dependent variable is IE of the listed DMBs in Nigeria, and it was computed using Zhu et al. (2014) expected investment model. The model is as follows:

$$\text{Investment}_{i,t} = \alpha_0 + \alpha_1 \text{Growth}_{i,t-1} + \alpha_2 \text{Leverage}_{i,t-1} + \alpha_3 \text{Cash}_{i,t-1} + \alpha_4 \text{Size}_{i,t-1} + \alpha_5 \text{Return}_{i,t-1} + \alpha_6 \text{Age}_{i,t-1} + \alpha_7 \text{Investment}_{i,t-1} + \varepsilon_{i,t}$$

Where:

Investment_{i,t} = sum of capital expenditures, R&D expenditures, and acquisitions minus sales of property, plant, and equipment, scaled by lagged total asset for firm i at the end of year t-1

Growth_{i,t-1} = annual revenue growth rate for firm i at the end of year t-1

Leverage_{i,t-1} = asset-liability ratio of firm i at the end of year t-1

Cash_{i,t-1} = ratio of cash to total asset of firm i at the end of year t-1

Size_{i,t-1} = log of total assets of firm i at the end of year t-1

Return_{i,t-1} = stock returns of firm i at the end of year t-1

Age_{i,t-1} = log of the number of years that a bank has been listed with Nigerian stock exchange

Investment_{i,t-1} = lag of investment.

It should be noted that Investment_{i,t} was modified to cover other investment expenditures that are peculiar to the banking industry so that:

Investment_{i,t} = sum of capital expenditures, R&D expenditures, acquisitions minus sales property, plant, and equipment and other investments peculiar to the listed DMBs scaled by lagged total asset for firm i at the end of year t-1

The study's explanatory variables are independent, mediating and control variables. The independent variable is

investment information disclosure quality (DQ) and was computed using disclosure index developed by this paper based on

some categories of relevant information that the listed DMBs should be disclosing in their published financial statements in order to enable the finance providers assess viability of their investment proposals and investment/lending risks. The disclosure index is made up of sub-indexes (that is, investment proposal index, solvency/stability index and investor index) that cumulatively amount to 17 items/elements of disclosure (see Appendix 2). The steps followed in creating the DQ index are specified by Scaltrito (2015). They are:

- i. Selection of the information source (for instance, the banks' annual reports and accounts);
- ii. selection of elements or items (mandatory or voluntary) on the basis of aspects considered most relevant to the research itself;

- iii. compilation of a check list on the basis of the items selected;
- iv. measurement of elements using scoring methodologies (for instance, Dichotomous, Dichotomous and quantitative, Score range. Note: This paper used Dichotomous, so that a score of 1 is assigned if an item is disclosed and 0 if it is not); and
- v. ascertaining the final and total disclosure index.

The mediating variables are IA and COC. IA was determined using Bid-Ask Spread model developed by Chiang and Vinkatesh (1986) and employed in previous studies like Fu et al. (2012), Fu et al. (2013), Eid, (2015), Nurcholisah (2016), Heydari et al. (2016) and Ayagi and Kurawa (2019). The model is as follows:

$$Spr_{i,t} = \frac{Ap_{i,t} - Bp_{i,t}}{\frac{Ap_{i,t} + Bp_{i,t}}{2}}$$

Where:

- Spr_{i,t} = Bid-ask spread of firm i in the year t
- Ap_{i,t} = Average of the ask price of firm i in the year t
- Bp_{i,t} = Average of the bid price of firm i in the year t

The Bid-ask spread represent the level of IA between the banks and their capital providers and it is expressed in absolute value.

COC was determined using Kazemi and Rahmani (2013) model as follows:

$$COE = \frac{1}{[P/E - (e_0 - d_0)/e_0]}$$

Where:

- COE = the cost of equity capital
- e₀: net profit per share at the beginning of financial period,
- d₀: dividends per share at the beginning of financial period,
- P: final price per share in financial period,
- E: net profit per share at the end of financial period.

$$\text{COD} = \frac{\text{Financial costs based on income statement at the end of each year}}{\text{Aggregated interest-bearing liabilities}} * 1-t$$

Where:

COD = cost of debt

Aggregated interest-bearing liabilities = current financial liabilities, long-term payable notes and

long-term financial liabilities based on current year balance sheet

$$t = \frac{\text{tax expense}}{\text{profit before interest and tax}}$$

WACC was then computed by multiplying book value of liabilities by common stock at their own respective cost rates.

The control variables used are:

- i. Firm size (FSTVE): log of a firm’s market capitalization
- ii. Cash flow from operation (CFO2): Cash flow from operation divide by total assets.
- iii. Dividend payout ratio (DPR1): earning per share divide by dividend per share.
- iv. International Financial Reporting standard (IFRS) adoption: Binary variable which takes the value 1 if a firm applies IFRS and 0 otherwise.

The technique of data analysis used is multiple regressions. Meanwhile, to determine the mediated effects (in models 2 and 3) and their level of significance, the paper employed bootstrapping, using Hayes’s (2018) process procedure for SPSS Version 3.3. Furthermore, as the mediated effect of DQ on IE is expected to be

transmitted sequentially via IA and COC, the paper adopted sequential mediator model as a guide in model specification. The diagram below shows how the effect of conveying relevant information to financiers can be transmitted through IA and COC to corporate IE.



Figure 1: Serial Mediation Chain

Similarly, considering the limitations of Barron and Kenny’s (1986) approach to mediation as pointed out by Preacher and Hayes (2004), Hayes (2009) and Kenny (2016), the current study adopted *MacKinnon’s* (2015) graphical representation of multiple mediation with two

mediators in a sequence. Hence, the mediated effect of DQ on IE via IA and COC is expressed as:

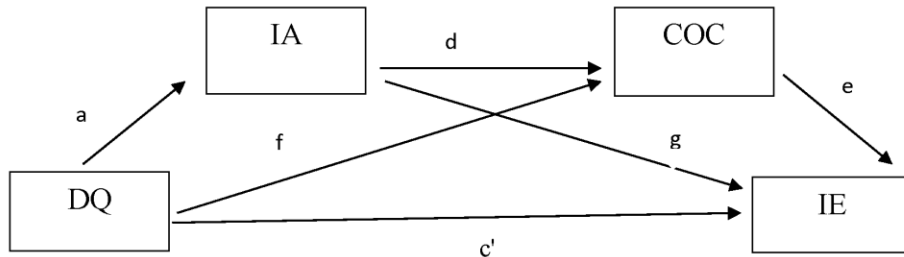


Figure 2: Statistical diagram

From the Figure 2, letter c' represents direct effect of DQ on IE after controlling IA and COC. a is the effect of DQ on the first mediator, that is, IA. Letter d stands for the relationship between the two sequential mediators. The effect COC on IE is represented by letter e. The impact of DQ on COC through IA is given by f. Letter g

is the indirect effect of IA on IE via influence of COC. Finally, the mediated effect of DQ on IE via IA and COC is given by ade. Therefore, consistent with *MacKinnon's* (2015) three causal steps for serial mediation with two mediators in a sequence, the current study models are specified as follows:

$$\begin{aligned}
 \text{IA} &= a_0 + a\text{DQ} + \varepsilon_1 \dots\dots\dots(i) \\
 \text{COC} &= d_0 + d\text{IA} + f\text{DQ} + \varepsilon_2 \dots\dots\dots(ii) \\
 \text{IE} &= e_0 + e\text{COC} + g\text{IA} + c'\text{DQ} + \varepsilon_3 \dots\dots\dots(iii)
 \end{aligned}$$

Note that:

direct effect = c'

indirect/mediated effect of DQ/mediating effects of IA and COC = ade from figure 2

total effect = c'+ ade

Since, corporate IE is determined by measuring the extent of underinvestment (underinv) and overinvestment (Overinv) by a firm, the IE in model iii is splitted into Overinv and underinv. Moreover, since the listed DMBs were sorted and analysed based on their extent of Underinv and Overinv over the study period, models (i) and (ii) were also splitted as follows:

$$\begin{aligned}
 \text{IA}_{(\text{Underinving/Overinving banks})} &= a_0 + a_1\text{DQ} + \varepsilon_1 \dots\dots\dots(i) \\
 \text{COC}_{(\text{Underinving/Overinving banks})} &= d_0 + d\text{IA} + f\text{DQ} + \varepsilon_2 \dots\dots\dots(ii) \\
 \text{Underinv/Overinv} &= e_0 + e\text{COC} + g\text{IA} + c'\text{DQ} + \varepsilon_3 \dots\dots\dots(iii)
 \end{aligned}$$

Taking into consideration the effects of relevant control variables, the models read as follows:

$$IA_{(Underinvesting/Overinvesting\ banks)_t} = a_0 + a_1DQ_{i,t-1} + a_2FS_{i,t-1} + a_3IFRS_{i,t-1} + a_4CFO_{i,t-1} + a_5DPR_{i,t-1} + \epsilon_1 \dots \dots \dots (i)$$

$$IA_{(Underinvesting/Overinvesting\ banks)} = d_0 + d_1IA_{i,t-1} + f_1DQ_{i,t-1} + a_2FS_{i,t-1} + a_3IFRS_{i,t-1} + a_4CFO_{i,t-1} + a_5DPR_{i,t-1} + \epsilon_2 \dots \dots \dots (ii)$$

$$Underinv/Overinv = e_0 + e_1COC_{i,t-1} + g_1IA_{i,t-1} + c_1DQ_{i,t-1} + a_2FS_{i,t-1} + a_3IFRS_{i,t-1} + a_4CFO_{i,t-1} + a_5DPR_{i,t-1} + \epsilon_3 \dots \dots \dots (iii)$$

1. Results and Discussion

Table 4.1 below presents the models regression results

Table 4.1: Regression Results

Models	Variables	Underinvesting Banks			Overinvesting Banks		
		Coef.	LLCI	ULCI	Coef.	LLCI	ULCI
Model 1:	DQ	0.115	-0.089	0.32	0.026	-0.084	0.136
	FS	-0.27***	-0.478	-0.064	-0.215	-0.514	0.085
	CFO	-0.18	-1.048	0.689	1.935	0.941	2.930
	DPR	-0.305**	-0.591	-0.018	0.469	0.089	0.848
	IFRS	-0.76***	-1.005	-0.518	-0.86***	-1.153	-0.566
	Obs			80			60
	R ²			0.64			0.75
	F			10.5***			13.5***
Model 2:	IA	0.011	-0.04	0.061	-0.000	-0.068	0.067
	DQ	0.011	-0.033	0.056	-0.000	-0.028	0.027
	FS	0.017	-0.03	0.064	0.042	-0.034	0.118
	CFO	0.054	-0.135	0.243	-0.073	-0.352	0.206
	DPR	-0.003	-0.067	0.061	-0.005	-0.104	0.095
	IFRS	0.032	-0.034	0.097	0.048	-0.046	0.141
	Obs			80			60
	R ²			0.16			0.23
	F			0.33			0.48
	Ind. Effect	0.001	-0.008	0.009	0.000	-0.007	0.005
	Boot Sample			1000			1000

Model 3:								
	COC	0.107	-0.049	0.263		0.055	-0.111	0.222
	IA	-0.027	-0.061	0.006		-0.05**	-0.088	-0.006
	DQ	-0.005	-0.035	0.025		0.123	-0.004	0.029
	FS	-0.017	-0.048	0.015		-0.045	-0.091	0.002
	CFO	-0.102	-0.228	0.025		0.028	-0.141	0.198
	DPR	-0.043**	-0.086	-0.000		0.007	-0.053	0.067
	IFRS	-0.045**	-0.089	-0.001		-0.08***	-0.140	-0.026
	Obs				80			60
	R ²				0.38			0.44
	F				1.73*			1.77*
	T/Ind. Effect	-0.002	-0.011	0.006		-0.001	-0.014	0.007
	Ind. Effect 1	-0.003	-0.012	0.002		-0.001	-0.013	0.006
	Ind. Effect 2	0.001	-0.003	0.007		0.000	-0.004	0.003
	Ind. Effect 3	-0.000	-0.001	0.001		0.000	-0.001	0.001
	Boot Sample				1000			1000

Source: Hayes's Process Procedure for SPSS 3.3 using data extracted (2008 - 2017)

*, ** and *** mean significant at 10% , 5% and 1% respectively

It can be observed from model one result that the effect of DQ on IA (0.115) in underinvesting banks is not significant. This is proved by the lower and upper bound of the 95 percent confidence interval (LLCI=-0.089, ULCI=0.32) which suggests that 0 lies in between the two values. Thus, H₀₁ cannot be rejected. The positive coefficient of 0.115 also suggests that the level of IA between underinvesting banks and their finance providers will increase with more disclosure of relevant information. This contradicts the Signaling theory argument which suggests that disclosure of relevant information to financiers would result in lower asymmetric information in the capital market. The result also disagreed with the position reached in

Nanyondo et al. (2013), *Yaghoobnezhad* et al. (2013), Bahmani (2014), Beshkooch et al. (2015), Ajina et al. (2015), Ali and Abdelfettah (2016) and Abdelghany (2016); they affirmed that FRQ exerts a negative effect on IA.

Similarly, the result obtained is not in agreement with the findings of Purwanti and Kurniawan (2013) that showed no evidence to prove that FRQ could reduce the asymmetric information between firms and their financiers. The current result however agreed with the stance reached in Ajward and Takehara (2010), Cerqueira and Pereira (2013), Nilabhra et al. (2013) and Ayagi and Kurawa (2019) since, their

findings confirmed that FRQ has positive effect on IA.

For overinvesting banks in model one, the positive and insignificant result (coef. =0.026, LLCI=-0.084, ULCI=0.136) obtained with respect to the effect of DQ on IA supported the position of this study on DQ and IA in Underinvesting banks and hence, contradicting Signaling theory and some related studies (for instance, Nanyondo et al. 2013; *Yaghoobnezhad* et al. 2013; Purwanti & Kurniawan, 2013; Bahmani, 2014; Beshkooch et al. 2015; Ajina et al. (2015); Ali & Abdelfettah, 2016; Abdelghany, 2016 and Ayagi & Kurawa, 2019). Thus, H_{01} cannot be rejected either in overinvesting banks.

Model two addressed the mediated effect of DQ on COC through IA. The model result for underinvesting banks shows that IA has positive and insignificant effect on COC. This is confirmed by the positive coefficient (0.011), and lower and upper bound of the 95% confidence interval (LLCI=-0.04, ULCI=0.061) which suggested that 0 is found between the two values. Thus, the positive relationship between IA and COC as established in this study is in line with the first proposition of Pecking Order Theory, which suggests that increase in the level of IA would result in higher COC. The result also supported the findings of Barron et al. (2012), Kazemi and Rahmani (2013), He et al. (2013), Derrien et al. (2014), Levi and Zhang (2014), Eid (2015), Asadbakhti and Malgharni (2016) and Ayagi and Kurawa (2019).

The result obtained in respect of DQ and COC in model two (underinvesting banks)

suggested that DQ has positive and insignificant impact on COC (see Coef. =0.011, LLCI=-0.033, ULCI=0.056 as presented in Table 4.1). Thus, on the nature of relationship established between DQ and COC, the present result can be said to have contradicted the findings of Saini (2010), Bhattacharya et al. (2010), Fu, Kraft and Zhang (2012), Barth et al. 2013, Ben-Nasr and Al-Dakheel (2015), Oluoch, Namusonge and Onyango (2015), Rezaei and Shabani (2015), Vander Bauwhede et al. (2015), Cuadrado-Ballesteros et al. (2016), Rymar (2016) and Ayagi and Kurawa (2019).

For the indirect/mediated effect of DQ on COC via IA as presented in Table 4.1, the effect (0.001) is not significant, since, 0 lies between the lower and upper bound of the 95% confidence interval (LLCI=-0.008, ULCI=0.0009). Hence, H_{02} cannot be rejected in underinvesting banks. Furthermore, as the direct effect of DQ on COC is not reduced to zero (0.011 \neq 0) after controlling for the level of IA, then, the mediated effect is said to be partial. Hence, on the partial intervening role that IA plays between DQ and IA, the result found strengthened the findings of Saini (2010), Bhattacharya et al. (2010), Fu, Kraft and Zhang (2012), Shan-cun and Wei-ning (2012), Barth et al. 2013, Ben-Nasr and Al-Dakheel (2015), Oluoch et al. (2015), Rezaei and Shabani (2015), Vander Bauwhede (2015), Cuadrado-Ballesteros et al. (2016), Rymar (2016) and Ayagi and Kurawa (2019).

The negative coefficient (-0.0003) found in overinvesting banks regarding DQ and COC in model two implies that disclosure of relevant information to capital providers

will reduce financing cost for the banks. The result presented also showed that IA has negative impact on COC in overinvesting banks and that the effect is not significant (LLCI=-0.028, ULCI=0.027). Moreover, the mediated effect of DQ on COC (-0.007) in overinvesting banks is not significant (LLCI=-0.007, ULCI=0.0005), thus, H_0 cannot be rejected in overinvesting banks. This supported what has been established in Ayagi and Kurawa (2019) and the underinvesting banks of this study. It can further be observed that the mediated effect of DQ on COC in overinvesting banks is partial, since $0.0003 \neq 0$ after controlling for the mediating variable.

The result presented in Table 4.1 in respect of underinvesting banks under model three suggested that the impact of COC on underinvestment is positive. This is in agreement with the argument of Issue-invest decision model, which premised that higher COC could force corporate firms to forgo profitable investment projects. IA was found to have negative and insignificant effect on underinvestment as proved by the negative coefficient and lower and upper bound of 95% confidence interval. DQ also exerts negative and insignificant influence on underinvestment (coef.= -0.005, LLCI=-0.035, ULCI=0.025). Hence, regarding the negative effect of DQ on underinvestment, the finding supported the position of previous studies like Naseri and Habibi (2014), Lai, Liu and Wang (2014), Zhu, et al. (2014), Gomariz and Ballesta (2014), Mohammadi (2014), Amini and Moradi (2014), Du (2014), Poorzamani and Keivanfar (2015), Mricky (2015), Wang et al. (2015), Zhu et al.

(2015), Alizadeh et al. (2015), Kim and Kwon (2015), Rad et al. (2016), Ren (2016), Hayati and Sedaghat (2016) and Ayagi and Kurawa (2019).

Moreover, the model three result (underinvesting banks) presented shows that the T/Ind (total indirect/mediated) effect of DQ on underinvestment is -0.002 and is not significant (LLCI=-0.011, ULCI=0.006). The Ind. Effect 1 (-0.003), is the specific mediating effect of IA on the relationship between FRQ and underinvestment. It is also not significant as confirmed by LLCI=-0.012 and ULCI=0.002. Thus, this result contradicted Daman and Mehr (2012) and Nurcholisah (2016) who found no evidence to prove that IA transmits the effect of FRQ to underinvestment. The specific mediating effect of COC (Ind. Effect 2) is also not significant.

Finally, the lower and upper bound of the 95% confidence interval (LLCI=-0.001, ULCI=0.001) shows that the Ind. Effect 3 (that is, the serial mediating effect of IA and COC on the relationship between DQ and Underinv) is not significant and thus H_0 cannot be rejected. Furthermore, as the direct effect of DQ on underinvestment has not been reduced to zero ($-0.005 \neq 0$) after inserting the two mediators in the model, then, the mediated effect of DQ/mediating effects of IA and COC is said to be partial. Overall, the result found by this paper regarding serial mediation effect can be said to have strengthened (Ayagi & Kurawa, 2019).

Model three result in respect of overinvesting banks as presented in Table 4.1 shows that the effect of COC on

overinvestment is positive and insignificant (coef.= 0.055, LLCI=-0.111, ULCI=0.222). DQ also exerts positive and insignificant influence on overinvestment as suggested by positive coef. (0.123), LLCI (-0.004) and ULCI (0.029). This disagrees with an argument by Wang et al. (2015) that through its negative effect on moral hazard risks, improved FRQ could reduce overinvestment. The first mediator (IA) was however found to have negative and significant effect on overinvestment, as reaffirmed by the lower and upper bound of the 95% confidence interval (LLCI=-0.088, ULCI=-0.006).

As established in the case of underinvesting banks, the T/Ind. Effect, which is the summation of Ind. Effects 1, 2 & 3 is not significant (LLCI=-0.014, ULCI=-0.007). The Ind. Effects 1, 2 & 3 are also statistically insignificant as proved by the respective LLCI and ULCI values; hence, H_0 cannot be rejected. It should however be noted that the Ind. Effect 3, which is the product of Ind. Effects 1 & 2 is 0.000 and hence suggests that IA and COC do not sequentially transmit the effect of DQ to overinvestment in the overinvesting banks. Furthermore, DQ can be said to have partial mediated effect on overinv as suggested by its coef, which is not equals to zero (0.123 \neq 0) after controlling for IA and COC.

Practically, the findings of this paper imply that the level of underinvestment in the Nigerian banking industry can be reduced if the listed DMBs adopt the practice of communicating quality investment related information to financiers for their informed lending decisions. The findings also imply the need for regulatory bodies to make policies that will help in regulating the

content of investment information to be disclosed in annual reports and accounts of the listed DMBs in Nigeria.

Conclusion and Recommendation

Based on the results found from the study models, this paper concluded that the level of IA between listed DMBs in Nigeria and their finance providers can be influenced by disclosure of relevant information on capital investment proposals that the banks intend to undertake in the future. IA mediates the relationship between investment information disclosure and financing cost of listed DMBs in Nigeria. Thus, the banks (especially, the overinvesting) can minimize their financing cost by engaging in quality disclosure of information with the aim of reducing the level of IA in the market. IA and COC transmit the effect of DQ to underinvestment and hence, the banks can alleviate underinvestment problem in the industry by reducing the level of IA and COC through disclosure of investment related information to capital providers.

Based on the conclusions drawn, the paper recommends that the listed DMBs in Nigeria should embrace a practice of disclosing accurate, timely and relevant investment information to their financiers. The information should be comprehensive enough to enable the financiers assess viability of the banks' investment proposals and the risk of lending to the banks. The practice of creating an Investor Relation Function/Unit by FBN Holdings Plc and Zenith Bank Plc can be replicated by other banks operating in the industry, as it helps in reducing the level of IA between the banks and their finance providers.

Regulatory bodies (Securities and Exchange Commission, Central Bank of Nigeria and Financial Reporting Council of Nigeria) should strive to regulate the

content of investment related information being disclosed by listed DMBs in their annual and accounts.

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Appendix 1: Population and Sample of the study

S/N	Bank Name	Year of Listing
1	Access Bank Plc	1998
2	Diamond Bank Plc	2005
3	Fidelity Bank Plc	2005
4	First Bank Nigeria Plc	1971
5	First City Monument Bank Plc	2004
6	Guaranty Trust Bank Plc	1996
7	Skye Bank Plc	2005
8	Stanbic IBTC	2005
9	Sterling Bank Plc	1993
10	Union Bank Plc	1971
11	United Bank For Africa Plc	1970
12	Unity Bank Plc	2005
13	Wema Bank Plc	1990
14	Zenith Bank Plc	2004

Source: NSE fact book 2017

Appendix 2: Items/ Elements of Investment Information Disclosure

- a.** Investment proposals index
 - i. Information that assist in knowing the banks' capital investment proposals
 - ii. Information that assist in knowing the projected life span of the projects
 - iii. Information that assist in knowing the projected cost of the investment
 - iv. Information that assist in knowing the projected periodic cash flows
 - v. Information that assist in knowing the specific risks associated with the proposals
 - vi. Information on sources of finance
 - vii. other relevant information about the investment proposals
 - viii. Alternative sources of information (e.g. investor relation unit/function) as disclosed in the annual reports
- b.** Solvency/stability index
 - ix. Information required in determining long term solvency(capital gearing ratio, fixed interest cover and debt to equity ratio)
- c.** Investors index
 - x. Information required in determining earnings per share
 - xi. Information required in determining price earnings ratio
 - xii. Information required in determining earnings yield
 - xiii. Information required in determining net assets per share
 - xiv. Information required in determining dividend per share
 - xv. Information required in determining dividend payout ratio
 - xvi. Information required in determining dividend yield
 - xvii. Information required in determining dividend cover.