

# Estimation of Audit Delay Determinants: Do Outliers and Asymptotic Properties Matter?

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## ABSTRACT

The overriding objective of the study is to empirically examine if outliers and asymptotic properties of estimators matter in the estimation of audit delay determinants. The study employed the ex-post causal research design and focuses on a sample of ten (10) listed oil and gas firms in Nigeria. Secondary data from the content analysis of annual reports spanning the period 2010-2019 was used for the study. The study investigates if outliers and asymptotic properties matter in estimation outcomes comparing the following estimators; the standard OLS, Bootstrapped OLS and Robust estimators. The outcome of the study revealed that the robust estimator yields results that are significantly different from those of both the OLS and Bootstrapped OLS estimations. This suggests that the failure to address outliers in standard OLS estimations can significantly bias the estimation outcome and may be responsible for the myriad of inconclusive outcomes observed in the extant academic literature. Hence, the study confirms that in the estimation of determinants of audit delay, the considerations of outliers indeed constitute a significant statistical consideration for researchers and even more germane than asymptotic concerns.

**Keywords:** Audit Delay, Robust Estimators, Outliers, Asymptotic Properties, Firm Size.

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## I. INTRODUCTION

Timeliness of audited financial reports is one of the identified pillars of financial reporting quality (Lilik & Ani, 2020) as information should be provided to the users in time for it to be useful and even value relevant. With the emergence of information technology, there is even now a shift to 'real-time' reporting of accounting information. The effective functioning of financial markets demands timely financial reporting as this aids investor decision making as oftentimes the difference between a good and bad investment decision can simply be about the timing. In Nigeria, the recognition of the importance of timely financial reporting has necessitated regulatory agencies such as the National Insurance Commission of Nigeria (NAICOM) and the Financial Reporting Council of Nigeria (FRCN) amongst others to provide guidelines stipulating the expected periods for financial reports to be released for listed companies. Despite this, evidence (Ibadin *et al.*, 2012; Ilaboya & Christian 2014; Oladipupo, 2011) show that several listed companies still do not comply with these timelines for reporting.

In diverse contexts, multiplicity of empirical studies had been conducted on the determinants of timeliness of financial reporting. However, researchers such as Ibadin *et al.* (2012) examined the association between selected corporate governance attributes, company attributes and timeliness of financial reporting in Nigeria. Ohiokha and Idialu (2017) explored the determinants of audit delay by taking into

account comparative analysis of both Nigerian and Malaysian listed firms. Sari and Supadumi (2014) examined gender audit committee on audit delay by using regression analysis listed in the Indonesia Stock Exchange. Alexander and Fatimoh (2015) ascertained the determinants of audit delay in the Banking Sector in Nigeria. Rusdiyanto *et al.* (2020) investigated audit delay determinants in Indonesian Companies. Lailah and Indra (2020) accounted for the interplay of firm size, profitability and leverage as determinants of the timeliness of financial reports. Lilik and Ani (2020) studied the relationship between audit report lag and its determinants in Indonesian Mining companies from 2013 to 2017. Al-Muzaiqer *et al.* (2018) presented an empirical examination on timeliness of financial reporting and audit committee effectiveness in the United Arab Emirates. Sigit and Erza (2019) investigated the determinants of audit report lag of financial statements in the banking sector listed in the Indonesia Stock Exchange. Sumadi and Pratiwi (2018) documented the moderation effect of firm size and audit complexity on the influence of internal auditor on audit delay on public companies listed in the Indonesia Stock Exchange. However, the focus of this study is not necessarily to estimate determinants of audit delay as this has been done extensively by several studies such as Ohiokha and Idialu (2017), Sari and Sapadumi (2014), Alexander and Fatimoh (2015). This study is however interested in what has been left unexamined by prior studies especially in attempting to explore the supremacy of estimators and the implications of statistical and econometric issues overlooked by accounting

researchers studying determinants of audit delay. Particularly, the study looks at the twin issues of asymptotic properties and outliers in regression estimations for determinants of audit delay. Despite the computational simplicity of the ordinary least squares (OLS) estimator and Panel estimations which a good number of studies estimating audit delay determinants employ, the techniques fall short in preferred robustness mainly because of their sensitivity to outliers.

Consequently, this study addresses these gaps, by investigating if outliers and asymptotic properties matter in estimation outcomes by comparing the following estimators; the standard OLS, Bootstrapped OLS, and Robust estimators. The main reason to use robust regression is clearly to obtain results that are valid even if there are outliers as robust estimators can detect and control for outliers (Rousseau & Leroy, 2005; Hodge & Austin, 2004; Mielke, 2016; Delliotte, 2019). Therefore, comparing the outcomes of the standard OLS against the Bootstrapped OLS and Robust estimators can provide insight into the extent to which outliers and asymptotic properties account for differences in empirical outcomes. The vast contribution of this research to knowledge stems from the above illuminated and insightful perspectives. The sophisticated data analytical technique used advances the field of this phenomenon. The paper is streamlined into several sections. The introduction which embodies the contributions to knowledge is presented in section I, the review of literature which depicts the conceptual framework and numerous arguments is presented in section II and then the implemented methodology is presented in section III. Furthermore, the results are presented and discussed elaborately in section IV, and finally, the conclusion is in section V.

### A. Outliers

Outliers are datum at the extreme ends of a data set. A variation of outliers represents true values from natural variation in the population. They give useful insights into data that is being studied, and they can have a substantial effect on statistical results. Their usefulness encompasses discovering inconsistencies and any errors in the statistical processes.

In addition, outliers can be identified in a data set based on the following criterion.

$$\text{Outlier} < Q1 - 1.5 (\text{IQR})$$

$$\text{Outlier} > Q3 + 1.5 (\text{IQR})$$

There are certain rules relating to low outliers and high outliers. Low outliers are a data point in a data set, which is less than  $Q1 - 1.5 \times \text{IQR}$ , while, high outliers at a data point in a data set are more than  $Q3 + 1.5 \times \text{IQR}$ .

### B. Asymptotic properties

Asymptotic properties could be used interchangeably to denote properties that are true which occurs when the sample size becomes large or reflects, how an estimator behaves as the sample size gets bigger. Here, we state these properties without proofs. Asymptotic Properties of MLEs. Let  $X_1, X_2, X_3, \dots, X_n$  be a random sample from a distribution with a parameter  $\theta$ . Let  $\hat{\theta}_{ML}$  denote the maximum likelihood estimator (MLE) of  $\theta$ .

In retrospect, estimators that are considered to be asymptotically normal will have an approximately normal distribution as the sample size infinitely expands.

## II. LITERATURE REVIEW

### A. Audit Delay

Audit delay takes into cognizance the period of time from a company's financial year-end and the date on which the annual financial statements are published by the capital market (Aston *et al.*, 1987).

According to Harjoto (2015), Audit Report delay is a proxy to assess the timeliness of the audit report, as well as to evaluate the timeliness of corporate earnings report stated further that Audit delay can also be conceptualized as the time between accounting year end and the date of the published audit report. They argued that audit delay can influence, when the audit work is started and how long it will take to complete the audit work.

In addition, as opined by Ohiokha and Idialu (2017), audit delay is the period between the ending date of the financial year to the conclusion date of the external auditors' report. Audit delay is the time needed to finish the entire audit until the audited statements are published which is calculated from the date of publication of the annual financial statements of the company (Sari & Supadumi, 2014). According to Alexander and Fatimoh (2015), in order to ensure the timely publication of financial reports, adequate and reliable corporate governance is inevitable. Effective corporate governance must imperatively put management under check. In recent times, the great value of importance has been attached to the timeliness of financial reporting, different national regulatory authorities have deemed it fit to set an ultimatum for all the firms and give them maximum time financial reports should be made available to the shareholders (Sagin & Nikhil 2019).

Further, Durand (2019) defines audit delay as the period of time that encompasses between the submission of the financial statements, measured from the closing of the financial reporting year to the completion of audited financial statements by an independent auditor.

### B. Determinants of Audit Delay

#### 1) Firm size and Audit delay

Firm size is a commonality used to determine the level of audit delay. Extensive empirical studies have shown a link between firm size and audit delays (Rusdiyanto *et al.*, 2020; Yousef, 2016). Audit timeliness is enhanced by large companies due to their ability to take advantage of effective and efficient internal control systems, which tends to alleviate the extent of audit tests allotted to audit engagement. Large firms have the magnitude to exert pressure on auditors to accelerate the conclusion of the audit (Carlsaw & Kaplan, 1991) and normally have efficient internal control (Hassan, 2016). Furthermore, more recent evidence from Indonesia is seen in the study of Rusdiyanto *et al.* (2020) which examined the determinants of audit delay for manufacturing firms listed in the Indonesian stock exchange. Regression analysis results showed that firm size is a significant determinant of audit delay. Similarly, Yousef (2016) examined the factors affecting audit delay for listed firms in Palestine. The study used a sample of 46 companies and secondary data covering the period 2011. The OLS technique was used for the estimation and the results support the existence of a significant positive effect of firm size on audit delay.

Lailah and Indra (2020) examined the factors that influence Audit delay for listed manufacturing firms in Indonesia. The study used a sample of 91 firms and secondary data from 2015-2016. The panel regression results revealed that firm size is a significant determinant of audit delay. The authors adduced these findings to the fact that large companies are able to put pressure on auditors to present audit financial statements faster, thus shortening audit delay.

Against the backdrop of the foregoing gaps, we therefore hypothesize:

H<sub>1</sub>: Firm size has an inverse relationship with audit delay.

## 2) Firm complexity and Audit delay

Firm complexity is a firm-related construct that is presumed to be frequently relevant but could be difficult to the proxy. The complexity of company operations relates to the diverse company units that are synchronized to achieve firm goals. The number of subsidiaries is a proxy used to determine complexities associated with company operations. The intricacy of firm complexity will result in audit lag (Habib & Uddin, 2018).

Further, the vast amount of subsidiaries owned by a company is reflective of the company's operating units, so that it takes enormous time to audit the financial statements. High accounting complexity is associated with audit complexity and risk, which implies that it will take the auditors a longer process to execute the audit engagement.

Sigit and Erza (2019) analysed determinants of audit delay for banks listed on the Indonesian Stock exchange. Secondary data covering the period from 2013-2015 was used for the study. Based on the analytical results using panel regression, the findings showed that firm complexity had a positive significant effect on audit delay. This means that the higher the complexity of the company, the longer the time of the audit delay. Introducing a moderating effect, Sumadi and Pratiwi (2018) examine the moderating role of complexity in the relationship between the internal auditor and audit delay. The findings of the study showed that the moderating effect of firm complexity on the overall tends to significantly increase audit delay.

Ayemere and Elijah (2015) examine the effect of firm attributes on audit delay in Nigeria. The study used a sample of 54 listed firms and secondary data used in the study spanned the period 2010-2016. Panel regression technique was used for the data estimation and the findings revealed amongst others, that firm complexity is a significant determinant of audit delay. The findings of Pratama and Ciptani (2018) carried out using listed firms in Indonesia are also in tandem with that of Ayemere and Elijah (2015). The study aimed at also identifying the impact that corporate attributes have on audit delay using a sample of 69 firms covering the period from 2012-2014. The result from the study showed that firm complexity is one of the significant firm attributes affecting audit delay. The study done by Maggy and Patricia (2018) still for listed Indonesian firms further confirms the findings of Pratama and Ciptani (2018) as complexity is significantly linked with audit delay.

Following consistencies as depicted above, we hypothesize;

H<sub>2</sub>: Firm complexity has a positive relationship with audit delay.

## 3) Audit firm type and Audit delay

Audit firm type has been substantiated differently by renowned scholars and eminent scientists. While some scholars perceive it from the perspective of the Big 4 accounting firms, which are synonymous with quality differentiated audits (Ezat, 2015; Geiger & Rama, 2006; Basioudis & Francis, 2007). Arguments from prior studies reveal that signaling theory ascribes that firms that are audited by the big 4 provide strong signal to the market about their higher quality audit -reporting decisions. Big 4 audit firms have the pedigree to perform exceptional audit assessments in an effective and efficient manner due to their plethora of highly skilled staff and resources (Chan *et al.*, 1993; Caneghem, 2004; Chung *et al.*, 2005). They are driven by the incentives to deliver higher quality audit to sustain their firm's reputation and track record of performances.

Extant academic literature cutting across diverse domains in the public and private listed entities has established the linear relationship on audit firm type (both the non -big 4 as well as the big 4 group) and audit delay lag. Big firms are expected to be timebound in performing their audit engagement due to the magnitude of resources at their beck and call, in order to keep their reputation in the market (Hossain & Taylor, 1998; Afify, 2009; Cohen & Leventis, 2013).

Ilaboya and Christian (2014) investigated the effect of corporate governance on audit delay in listed firms in Nigeria. A sample of 40 firms with data covering the period from 2007-2011 was used for the study. Data were analysed using descriptive statistics, correlation and Ordinary Least Square, (OLS) regression. They found that audit firm type amongst other variables had a significant effect on audit delay. They argued that audit firms with global reputations such as the BIG 4 tend to mitigate audit delay due to their financial strength to get the needed human and material resources to complete the audit within a specific time compared to when the audit is carried out with their local counterparts.

Comparing Malaysia and Nigeria, Ohiokha and Idialu (2017) examined the factors affecting audit delay from 2008-2014. The empirical estimations revealed that in the Nigerian case, audit firm type has a positive and significant effect on audit delay. They argued that clients put a lot of pressure which overstretches their capacity with fewer people attending to too much volume of work and hence the delay. But in the Malaysian case, audit firm type has a negative and significant effect on audit delay.

H<sub>3</sub>: Audit firm type has an inverse relationship with audit delay.

## 4) Audit fee and Audit delay

Studies on audit fee and audit delay have spurred a lot of news and brought attention to scholarly repositories on the multiple variants of findings, which have been dissected below.

Abbas and Zadeh (2017) in their study investigated the extent to which the audit fee affects risk and audit delay both used as proxies for reporting quality. The study employed 39 listed firms in the Tehran Stock Exchange as the sample and the time period was from 2012-2017. A multivariate regression technique was used, and the results support the presence of a significant effect of audit fees on audit delay

with a negative coefficient which is in line with a priori expectation.

On the contrary, Oladipupo (2011) also investigated the extent to which audit fees impact audit delay in Nigeria. The study used a sample of 40 listed firms on the Nigerian Stock Exchange and employed a combination of multivariate techniques in the data estimation. Overall, the findings do not support the presence of a significant effect of audit fees on audit delay. In Pakistan, Monirul and Peter (1998), conducted a study that focused on identifying the effect of corporate attributes on audit delay in Pakistan. The results for the sample of 103 listed Pakistani companies further showed that audit delay was not significantly related to the audit fees.

H4: Audit fee has an inverse relationship with audit delay.

#### 5) *Audit committee independence and Audit delay*

Raweh *et al.* (2019) examined the impact of audit committee characteristics on audit delay. The study used a large sample consisting of 255 firms and a time frame from 2013-2017. The panel regression results reveal that no significant effects from audit committee independence to audit delay are observed. Similarly, Chukwu and Nwabochi (2019) conducted a study to examine the extent to which audit delay is occasioned by characteristics of the audit committee in Nigeria. The study focused on the insurance industry and used a sample of 15 listed insurance firms for the period 2012 to 2015. The OLS results showed that audit committee independence has no significant impact on audit delay.

But in the case of Nigerian banks, which was the focus of Akhor and Oseghale (2017) study in investigating the relationship between audit committee attributes and audit delay, the findings reveal the presence of a significant relationship. The study employed a quantitative and longitudinal research design in which secondary data were retrieved from the annual reports of the quoted banks for 2011-2015. The results were obtained from the data estimation process using the OLS technique. In addition, Ismail *et al.* (2008) investigated the relationship between audit committee independence and audit delay.

The findings of the study result, however, reveal that the independence of the audit committee would not influence the quality of financial reporting of the companies. Retrospectively, this is as a result of the company fulfilling mandatory requirements.

H5: Audit committee independence has an inverse relationship with audit delay.

#### 6) *Audit committee diligence and Audit delay*

Chai *et al.* (2017) investigated the effect of corporate governance on the audit delay of 250 public listed companies in Malaysia by using secondary sources of data from Bursa Malaysia in 2015. The methods of analysis applied in this study Pearson correlation coefficient and multiple regression analysis. The results of the research revealed that, there is an inextricable relationship between audit committee diligence and audit delay. In a similar vein, Khaldoun *et al.* (2015) examined the link between board characteristics and audit delay using a sample of 112 firms quoted on the Amman Stock Exchange covering the period 2011-2012. Based on the regression analytics, the finding showed supports the significant effects of audit committee diligence on audit delay.

Ahmed and Neila (2018) studied the effect of audit committee features on reporting timeliness and its direct implications on the management of firms. Tunisian-listed companies were used as the focal point for the survey and pertinent data on audit committee parameters were gathered by the use of the structured questionnaire. Therefore, the aggregate sample size was 54 companies. Balanced panel data was used as the method of analysis for 162 firm-year observations spanning a three-year period (2011-2013). Findings revealed that audit committee meeting frequency does not appear to have a significant effect on audit delay. Razman and Iskander (2004) explored the extent of Malaysian companies' compliance with an efficient and effective reporting system. It was deduced that during meetings, monitoring of management activities was evident. Logically, this will reduce the time taken on the audit process by the auditors and therefore reduce the reporting lag. As a result of the findings which have been inferred from the analysis, we, therefore, reach a consensus view.

H6: Audit committee diligence has a negative relationship with audit delay.

### III. METHODOLOGY

This study employed the ex-post-facto design. The choice of the design is because the nature of the variables especially the data for the study involves repeated observations of the same variables over periods. Additionally, the data that was collected is based on past performance and also, allows for testing the expected relationships between and among variables. The population of the study comprises oil and gas companies quoted on the floor of the Nigerian Stock Exchange as of December 2019, there are about 11 such companies quoted on the stock exchange (NSE, 2019) and the study uses ten (10) with available data covering the period as the sample for the study. Retrospectively, the research data are primarily from oil and gas companies listed on the Nigeria Stock Exchange between 2010-2019. Secondary data was used for this study. The data was retrieved from corporate annual reports of the sampled firms for the period 2010-2019 financial years. The time span between 2010- 2019 was selected to capture the determinants of audit delay. With a firm year observation of 100 covering a period of ten (10) years, it can be deduced, that the time is long enough for the effect of the explanatory variables to manifest on the dependent variable . Furthermore, the dependent variable of audit report lag was used as a proxy for Audit delay . Audit report delay is a proxy used to assess the timeliness of financial reports (Hajorito,2015).

The researchers utilized corporate annual reports retrieved from the website, because they are readily available, accessible and also provide a greater potential for comparability of results. With An avalanche of econometric methods, the standard OLS, Bootstrapped OLS and Robust estimators were used in the study.

The classical OLS using minimization of the sum of the squared errors is used as the baseline estimator. Then to test for the sensitivity of the estimations to outliers, we used robust regression to obtain results that are valid even if there

are outliers, or if the distances of the data to the regression curve are not normally distributed. Given that the robust algorithm not only yields the regression curve but also the weights assigned to the data points, it can as well be used for outlier detection (Rousseau & Leroy, 2005; Hodge & Austin, 2004; Mielke, 2016; Delliotte, 2019). In the light of addressing asymptotic concerns, the Bootstrapped OLS is employed, and they are always then useful if we do not trust the distributional assumptions underlying standard test procedures or if the sample size is small to allow an asymptotic argument (Efron, 1979).

A. Model Specification

The baseline model specification to be used to examine if outliers and asymptotic properties matter in the estimation of determinants of audit delay is presented below;

Specifying the functional model, we have

$$ARL_{it} = f (AUDFE, ACDIL, ACIND, FSIZE, AUDT, COMP) \text{------(i)}$$

The econometric specification is presented below;

$$ARL_{it} = \lambda_{it} + \lambda_1AUDFE_{it} + \lambda_2ACDIL_{it} + \lambda_3ACIND + \lambda_4FSIZE_{it} + \lambda_5AUDT + \lambda_5COMP + \epsilon_{it} \text{--- (ii)}$$

Where;

ARL = Audit delay measured as period between accounting year end and AGM

AUDFE= Audit fee measured as log of audit fee

ACIND = Audit committee Independence measured as a percentage of independent directors in the audit committee

FSIZE= Firm size measured as log of total assets

AUDT= Audit firm type measured as dummy variable “1” if the firm is audited by big 4 and 0 if otherwise

COMP= Complexity measured as the number of subsidiaries

ACDIL = Audit committee diligence measured as a number of audit committee meetings.

IV. PRESENTATION OF RESULTS

Table I revealed that ARL has a mean of 130 days with the largest and smallest values of 154 days and 96 days respectively. The audit delay for each of the companies revealed that it takes a minimum of 96 days and a maximum of 154 days for Oil and gas companies to publish their annual reports. This exceeds the statutory time limit of 3 months' requirements with regard to CAMA (1990). This finding is in tandem with the studies of Modugu *et al.* (2012) and Ibadin *et al.* (2012) which revealed that the vast majority of companies present their reports beyond the 3 months statutory period. Log of audit fee (AUDFE) has a mean of 7.215 with largest and smallest values of 9.413 and 5.975 respectively. The standard deviation of audit fees is 0.795 and is considered to be low, indicating that there is insignificant variation in the payment to independent auditors among the companies sampled. The mean for ACDIL is approximately 7 with largest and smallest values of 9 and 4 respectively. The results depicts that almost all audit committee in the listed oil and gas companies discharge their duties appropriately in which on average 7 meetings were being held. For ACIND, the mean stood at 60.3% with largest and smallest values 91% and 0% respectively. This means that the average

composition of independent director members of the audit committee of all the sampled companies is 60.3%. This implies that the smallest proportion of non -independent directors in the audit committee is 0 % and the largest proportion is 17.5 %. The average FSIZE stood at 7.621 with the largest and smallest values of 9.02 and 6.050 respectively. This is indicative that the firms employed in this study are homogenous. The standard deviation of firm size is 0.639, which depicts evidence of substantial clustering of firm size around the mean. For AUDT (Audit firm type) has a mean value of 0.582 which suggests that about 58.2% of the firms are audited by the big 4, The standard deviation is 0.496 and is indicative of the fact that most companies engage the services of the big 4. The Jacque bera statistics of 13.20 alongside its p-value (0.001) indicates that the data satisfies the criterion for normality. The average COMP stood at approximately 3 with the largest and smallest values of 5 and 1 respectively. The standard deviation of 1.3698 is low and implies that some level of difference is apparent in the number of subsidiaries in the sample.

The Pearson correlation results reveals that ARL exerts positively correlation with AUDFE (r=0.0805) though not significant at 5% [p=0.4808] but positively but does not connote causal-effect relationship with ACDIL (r=0.025, p=0.8282). ARL also exerts positive correlation with COMP (r=0.108) though not significant at 5% [p=0.345] but exerts negative, but not significantly correlation with ACIND (r=-0.020, p=0.8601). ARL exerts negative correlation with FSIZE (r=-0.158) though not statistically significant at 5% [p=0.1651] and also exerts negatively but not significantly correlated with AUDT (r=-0.0164, p=0.8860). However, correlations do not necessarily imply functional dependence and causality in a strict sense, and regression analysis and more suitable for that purpose. From Table II, we can infer that all the correlation coefficients among the independent variables are below 0.80. This points to the absence of possible multicollinearity though the variance inflation factor (VIF) and tolerance value (TV) test are still required to confirm the assumption.

Prior to running the multivariate analysis, the test of multicollinearity was used to ascertain the possibility of variance inflation factor in the model. It can be inferred that the VIF's are below the benchmark of 10 and are not indicative of the threat of multi-collinearity (Naser *et al.*, 2006).

TABLE I: DESCRIPTIVE STATISTICS

	Mean	Max	Min	Std. Dev.	Jarque-Bera	Prob	Obs
ARL	130.94	154.0	96.00	18.39	5.372	0.068	80
AUDFE	7.215	9.413	5.975	0.795	17.93	0.0001	80
ACDIL	6.645	9.00	4.00	1.617	4.600	0.1002	80
ACIND	0.603	0.910	0.0	0.175	4.082	0.129	80
FSIZE	7.621	9.02	6.050	0.639	3.393	0.183	80
AUDT	0.582	1.00	0.00	0.496	13.20	0.001	80
COMP	3.367	5.00	1.00	1.3698	5.774	0.055	80

TABLE II: THE PEARSON CORRELATION RESULTS

	ARL	AUDFE	ACDIL	ACIND	FIRMSIZE	AUDTY	COMP
ARL	1	-	-	-	-	-	-
AUDFE	0.0805	1	-	-	-	-	-
p-value	0.4808	-	-	-	-	-	-
ACDIL	0.025	-0.161	1	-	-	-	-
p-value	0.8282	0.1561	-	-	-	-	-
ACIND	-0.020	-0.211	0.2312	1	-	-	-
p-value	0.8601	0.0620	0.0404	-	-	-	-
FSIZE	-0.158	-0.176	0.177	0.0039	1	-	-
p-value	0.1651	0.1212	0.1193	0.9729	-	-	-
AUDT	-0.0164	0.318	0.085	0.2259	0.391451	1	-
p-value	0.8860	0.0043	0.4580	0.0453	0.0004	-	-
COMP	0.108	-0.0523	-0.224	-0.094	-0.005	0.266	1
p-value	0.345	0.6472	0.0471	0.4104	0.9675	0.0177	-

TABLE III: MULTICOLLINEARITY TEST

	Coefficient Variance	VIF
AUDFE	0.027447	2.43
ACDIL	0.007124	1.245
ACIND	0.008895	1.208
FSIZE	0.019637	1.106
AUDTY	0.002616	1.095
COMP	0.000605	1.150

Source: Researcher's compilation (2020).

TABLE IV: REGRESSION RESULT

Variable	Expected sign	OLS estimates	Boostrapped OLS estimates	Robust -S estimates
		135.36*	131.179*	267.99*
C	-	(51.742)	(50.7481)	(40.865)
		{0.0108}	{0.0118}	{0.000}
		2.0332	2.2976	-6.1094*
AUDFE	+	(3.3919)	(3.2940)	(2.6789)
		{0.5508}	{0.4877}	{0.0226}
		1.1411	1.1231	6.9509*
ACDIL	-	(1.4146)	(1.3520)	(0.1.1173)
		{0.4225}	{0.4089}	{0.000}
		-0.3684	0.4719	0.6.9509
ACIND	+	(0.0264)	(13.563)	(11.0199)
		{0.9790}	{0.9723}	{0.5282}
		-4.2214	-3.9951	-19.125*
FIRMSIZE	+	(4.0709)	(4.0088)	(3.2152)
		{0.3033}	{0.3223}	{0.000}
		-1.2049	-1.3937	3.4037
AUDT	-	(6.1433)	(5.8790)	(4.8519)
		{0.8451}	{0.8133}	{0.4830}
		1.9111	1.9799	2.6848**
COMP	-	(1.7699)	(1.6606)	(1.3979)
		{0.0.284}	{0.2370}	{0.0548}
R <sup>2</sup>	-	0.435	0.486	0.611
S.E. of regression	-	18.679	18.679	0.118
F-stat (Prob)	-	21.796(0.00)	19.87(0.00)	2.747(0.021)
Durbin Watson	-	1.9	1.9	-
$\chi^2_{Hetero}$	-	0.2738	-	-
$\chi^2_{Serial/Corr}$	-	0.4252	-	-
$\chi^2_{Norm}$	-	0.6431	-	-
Ramsey-Reset	-	0.2318	-	-
Rn-squared statistic	-	-	-	79.86(0.000)
Scale	-	-	-	17.983

Source: Researcher's compilation (2021) Standard error ( ) p-values { } \* Sig @ 5%, \*\* sig @ 10%.

The regression analysis is presented in Table IV and the OLS estimates, OLS bootstrapped estimate, and the robust regression estimate are presented. The OLS estimation has an adjusted R<sup>2</sup> of 43.5% and the F-statistics (21.796). Performance of the variables reveals that the effect of AUDFE is positive and insignificant at 5% (2.0332, p=0.5508), ACDIL has a positive though the not significant effect on audit delay (1.1411, p=0.4225). This means that

audit committee diligence has a positive relationship with audit delays of listed oil and gas companies in Nigeria. For ACIND, a negative effect on Audit delay is observed and this is also not significant at 5% (-0.3684, p=0.9790). The effect of FSIZE is negative and insignificant at 5% (-4.2214, p=0.3033). Furthermore, the effect of AUDT is also negative (-1.2049) while that of COMP is positive (1.911) though both variables do not show statistical significance at 5%.

Diagnostics for the estimation reveal the absence of serial correlation [ $\chi^2_{\text{Serial/Corr}} = 0.4252$ ] and confirm that the errors exhibit homoscedastic properties [ $\chi^2_{\text{Hetero}} = 0.2738$ ]. The residual normality [ $\chi^2_{\text{Norm}} = 0.6431$ ] reveals that the residuals are normally distributed.

The Bootstrapped OLS estimation has an  $R^2$  of 48.6% and the F-statistics (19.87) and p-value (0.000) confirm that the hypothesis of no significant linear relationship between the dependent and independent variables is rejected at 5%. The performance of the variables reveals that the effect of AUDFE is positive and insignificant at 5% (2.2976,  $p=0.4877$ ), and ACDIL has a positive though the not significant effect on audit delay (1.1231,  $p=0.4089$ ). For ACIND, a positive effect on Audit delay is observed and this is also not significant at 5% (0.4719,  $p=0.9723$ ). The effect of FSIZE is negative and insignificant at 5% (-3.9951,  $p=0.3223$ ). Furthermore, the effect of AUDT is also negative (0.0482) while that of COMP is positive (1.9799) though both variables do not show statistical significance at 5%. Though the coefficients and standard errors of bootstrapped estimations have addressed asymptotic concerns, the estimates nevertheless are not significantly different from the OLS estimates and show similarities in the model fit between both estimations.

To examine if the presence of outliers biases the OLS and Bootstrapped OLS estimation output, the robust least squares estimator was conducted. As noted earlier, standard regression often yields bad results if outliers are present and given that the robust algorithm not only yields the regression curve but also the weights assigned to the data points, it can as well be used for outlier detection (Rousseau & Leroy, 2005; Hodge & Austin, 2004; Mielke, 2016; Delliote, 2019). The main reason to use robust regression is clearly to obtain results that are valid even if there are outliers, or if the distances of the data to the regression curve are not normally distributed (Delliote, 2019). In the class of robust estimators, the study uses the S-estimator. The S-estimation method is based on the residual scale of the M-estimation method. S-estimators have the same asymptotic properties corresponding to M-estimators and also handle 50% of the outliers appearing in the data (Susanti & Pratiwi 2014). The  $R^2$  of 61.1% is higher than those of both the OLS and bootstrapped OLS estimations.

The F-statistics (2.74) is significant at 5% (0.021). The performance of the variables reveals that the effect of AUDFE is negative and significant at 5% (-6.1094,  $p=0.0226$ ), ACDIL has a positive and significant effect on audit delay (6.9509,  $p=0.000$ ). For ACIND, a positive effect on Audit delay is observed and though not significant at 5% (6.9509,  $p=0.5282$ ). The effect of FSIZE is negative and significant at 5% (-19.125,  $p=0.000$ ). Furthermore, the effect of AUDT is positive (3.4037) though not significant at 5% while that of COMP is also positive (1.9799) but significant at 10% (0.0548). The robust-S estimator yields results that are significantly different from those of both the OLS and Bootstrapped OLS estimations. This suggests that the failure to address outliers in standard OLS estimations can significantly bias the estimation outcome and may be responsible for the myriad of inconclusive outcomes observed in the literature. Hence the study confirms that in the estimation of determinants of audit delay in Nigerian oil

and gas firms, the considerations of outliers indeed constitute a significant statistical consideration for researchers.

## V. CONCLUSION

As indicated earlier, the focus of this research is not necessarily to estimate determinants of audit delay as this has been done extensively by several studies. The presence of mixed and inconclusive findings in the literature are replete even for studies conducted in similar and different climes. This study is however interested in what has been left unexamined by prior studies especially in attempting to explore the implications of statistical and econometric issues overlooked by accounting researchers studying determinants of audit delay. Particularly, the study looks at the twin issues of asymptotic properties and outliers in regression estimations for determinants of audit delay. The study thus asks a direct question which is; does outliers and asymptotic properties matter in the estimation of determinants of audit delay? This concern to the best of the researcher's knowledge has not been looked at or examined by any known study as the emphasis of all studies here is the obsession with identifying relationships and hence the different direction of this research. The outcome of the study reveals that the robust estimator yields results that are significantly different from those of both the OLS and Bootstrapped OLS estimations. This suggests that the failure to address outliers in standard OLS estimations can significantly bias the estimation outcome and perhaps may be responsible for the myriad of inconclusive outcomes observed in the literature. Hence the study confirms that in the estimation of determinants of audit delay in Nigeria, the considerations of outliers indeed constitute a significant statistical consideration for researchers and even more germane than asymptotic concerns.

Based on the empirical results, the study opens up plausible recommendations from the data analysis, as a result of that, the investigators hereby recommend the following.

This goes a long way to ratify the fact that stringent measures of intervention should be taken into account by the regulatory authorities in Nigeria such as the NAICOM and FRCN to expedite actions for reforms in the guidelines stipulating the expected periods for the audit reports to be released for oil and gas firms, in order to reduce audit delay. Firms should get a substantial amount for audit fees to ensure that they meet statutory time limits in order to circumvent audit delays. Furthermore, a broad spectrum of independent variables which have an influence on the timeliness of financial reports have been taken into paramount consideration, however, additional variables such as firm risk, industry effect, accounting year end, and audit committee expertise should be considered going forward.

This research paper has some drawbacks with reference to the small sample of Nigerian listed oil and gas firms as well as the measures that were used to proxy both the exogenous and endogenous variables, which do not necessarily express the most suitable ones.

Finally, as contemporary issues on audit delay advance on the ground, audit delay discourse becomes more complex, and emerging research that delves into deconstructing audit

delay discourses could advance the course of this phenomenon.

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