

Does Corporate Risk Management Increase The Value of a Firm? Evidence from Quoted Nigerian Oil and Gas Companies

Vincent Ivwighrevero Oruwevwiruohwo Odiri

Department of Business Administration,
Faculty of Social Sciences, Delta State University, Abraka, Nigeria; +2348033707931

Emmanuel Ejiroghene Aruoren

Department of Business Administration
Faculty of Social Sciences, Delta State University, Abraka, Nigeria; +23438164054;

Edesiri, Godsdai Okoro

Department of Accounting and Finance
Faculty of Social Sciences, Delta State University, Abraka, Nigeria; +2347033941913; +2348112892035
(Corresponding Author)

Article Info

Volume 84

Page Number: 210 - 225

Publication Issue:

January/April 2021

Abstract

The prime aim of this study is to assess whether certain corporate risk management components affect firm value using three disaggregated corporate risk management and firm value models. By employing panel data analysis technique and fixed and random effect models involving 79 observations of 13 oil and gas companies quoted on the Nigerian Stock Exchange (NSE) from 2010-2019, the study found evidence that inactive corporate risk management leads to decrease firm value. The main outcome of the research demonstrates that corporate risk management does not increase firm value. In addition, we found that CRM components such as risk committee independence and risk committee meetings negatively relate to one firm value metric-TobinQ. For companies to increase firm value via the instrumentality of CRM, there is a need for management to develop a well-structured CRM framework towards increasing firm value; this can be done by increasing the numbers of risk committee meetings, risk committee independence and diversity of risk committee.

Keywords: Firm value; Risk management; Risk committee diversity; Risk committee independence;

Article History

Article Received: 04 October 2020

Revised: 14 November 2020

Accepted: 22 December 2020

Publication: 31 January 2021

1. INTRODUCTION

Over the years, risk management has become a fundamental concern for management, due to the 2008 global financial crisis which steered cessation and ensuing amalgamation of several organizations. One of the prime aims of corporate risk management as observed by Erin and Aribaba, (2021); Horvey and Ankamah (2020); and Faisal and Hassan (2020) is to avert circumstances leading to unfortunate business outcomes like non-sustainability, insolvency, indigent firm value, performance among others. Gonzalez, Santomil and Herrera (2020) posit that corporate risk management (CRM) has been disintegrated in 'silos' since organizations have inclined to systematize their activities into functional parts for better decisions as well as improved value.

Erin and Aribaba (2021); and the Committee of Sponsoring Organizations of the Treadway Commission (2004) see CRM as the identification, assessment and prioritization of business outcomes that possess threats, perils or hazards to firms. Again, the International Standard Organization (ISO 31000); and Abdullah, Janor, Hamid and Yatim (2017) comprehend CRM as the impact improbability may impose on business objectives, matched by coordinated and economical application of resources to lessen, monitor and regulate the likelihood and/or impact of unfortunate business outcomes or to maximize the attainment of opportunities.

In the Nigerian oil and gas sector, the story is similar to those in the banking sector that is characterized with enormous risk, as firms in the oil and gas sector are bent on improving firm value via the instrumentality of CRM. Notably, firms operating in the oil and gas sector are faced with plentiful risks such as workforce and work environment risks; thus the reason for the increase in the number of risk committee meetings, diversity and independence in recent years. Notwithstanding the move by management to drive firm value using the instrumentality of CRM, researchers (see Waitherero, Wanyoike & Muriu, 2019; Anton, 2018; Jesko & Sophie, 2018; and Nwaobia, Ajibade & Kwarbai, 2015) are keen on assessing the connection between CRM and firm value.

In management literature, there is an avalanche of empirical studies on the nexus between CRM and firm value (Faisal & Hassan, 2020; Anton, 2018; Abdullah, *et al*, 2017; Nwaobia, *et al*, 2015); however, there is a dearth of empirical studies on whether CRM increases the value of the firm, particularly for oil and gas firms quoted on Nigerian Stock Exchange (NSE). Thus, this study assessed the link between CRM and firm value. The remaining part of this study is divided into the review of related literature, research method; results and discussions; conclusion and recommendations.

2. REVIEW OF RELATED LITERATURE

2.1 *Corporate Risk Management*

The concept of corporate risk management (CRM) has been broadly defined in management literature. CRM refers to the identification, evaluation and prioritizing of business outcomes that create threats and hazards to the operations of firms (Erin & Aribaba, 2021; Committee of Sponsoring Organizations of the Treadaway Commission, 2004). The effects of CRM on business outcomes according to Horvey and Ankamah (2020); and Faisal and Hassan (2020) are manifest in areas of business sustainability, solvency, firm value and overall, performance.

Practically, there are diverse measurements of CRM, which among others are risk committee diversity, independence, meetings, presence, size, gender diversity, risk strategy, reporting, and compliance. These CRM measurements are similar to those employed in the studies of Gonzalez *et al*, (2020); Husaini and Saiful (2017); and Abdullah, *et al*, (2015). However, this current study employs three (3) CRM measures - risk committee diversity, independence and meetings in its analytical framework.

Notably, CRM provides a basis for plummeting agency cost of risk via monitoring managerial actions (Sekerci & Pagach, 2020); and such managerial actions embraced the initiation of a risk committee. In this study, three (3) monitoring managerial actions relating to the risk committee were employed – risk committee diversity, independence and meetings. *First*, diversity in the risk committee is connected with the

composition of the sexual role of board members in the risk committee.

In specific, risk committee diversity is considered as the percentage of female risk committee members to total risk committee members. *Second*, risk committee independence refers to the percentage of non-executive directors and shareholders representatives in the risk committee to total risk committee members size. *Third*, risk committee meetings entail the number of meetings held by risk committees in a fiscal period.

Remarkably, recent attempts to link CRM with firm value have been done predominantly in other nations and have produced mixed results (see Faisal & Hassan, 2020; Gonzalez, *et al*, 2019; Danisman & Demirel, 2019; Anton, 2018; Şenol, *et al*, 2017; Husaini & Saiful, 2017; Augustina & Baroroh, 2016; Abdullah, *et al*, 2015); however, this has not been established in Nigeria

2.2 *Firm Value*

In literature, several measures have been employed to measure the value of a firm; it has been a conventional practice by academics to measure firm value using market-based indicators such as Tobin Q. Most strategic management studies use the construct of business performance in an attempt to measure the value of a firm (Okoro & Ihenyen, 2020; Al-Matari, Al-Swidi & Fadzil, 2014). Broadly speaking, firm value relates a firm's market value to its replacement costs in a fiscal period; however, in this study, three (3) ratios were employed in measuring firm value

namely Tobin Q, price to cash flows and price to revenue.

First, Tobin Q is assessed based on additions of market capitalization and totals minus cash flows, divided by total assets; *second*, price to cash flows is computed as yearly average monthly closing share price divided by cash flow from operations per shares (in numbers); and *third*, price to revenue is computed as yearly average monthly closing share price divided by revenue per shares (in numbers)

Prior studies have shown mixed findings in the relationship between CRM and firm value (see Faisal & Hassan, 2020; Danisman & Demirel, 2019; Anton, 2018; Husaini & Saiful, 2017; Augustina & Baroroh, 2016; Abdullah, *et al.*, 2015; Francisco & Hayong, 2013). The mixed results may be connected with the monitoring of managerial actions taken by risk committees of diverse firms. While some firms may engage in a more efficient managerial action on risk management concerns, there are some whose risk management actions may be inefficient. In specifics, this study argued that with the monitoring managerial actions of the risk committee, firm value can be increased. Consequent to this contention, we hypothesized as follows:

H₀1: Corporate Risk Management does not increase the value (Tobin Q) of quoted oil and gas firms.

H₀2: Corporate Risk Management does not increase the value (Price to Revenue) of quoted oil and gas firms.

H₀3: Corporate Risk Management does not increase the value (Price to Cash Flows) of quoted oil and gas firms.

2.3 Theoretical Underpinning

In management literature, several theories can be employed in describing the relationship between CRM and firm value. Nevertheless, this study's theoretical underpinning is on Risk Management Agency Theory (RMAT), which explicates the conceivable conflicts of interests between owners of wealth (shareholders - principal) and management (agents). The RMAT argues that conflict surfaces owing to asymmetries in earnings allocation between shareholders and management and that the conflict can lead the firm to engage on extremely ample risks (Jensen, 1986).

The RMAT demonstrates that to a large extent attitude of management in risk-taking behaviour and hedging impacts the value of a firm (Smith & Stulz, 1985; Mayers & Smith, 1987). Consequently, RMAT provides evidence for CRM as a response to incongruence between shareholders and management interest (Horvey & Ankamah, 2020). Smith and Stulz (1985) contended that owners of wealth and management have dissimilar interests to the firm and their CRM objective diverges.

Horvey and Ankamah (2020) opined that while wealth owners may require greater risk to greater return on investment, management may crave for small risk and return on investment. The relevance of RMAT to this study is that CRM should

link the interest of owners of wealth and management to increase firm value and that CRM should be considered as a tool for monitoring managerial actions and decisions, thus reducing the agency cost of CRM.

2.4 Some Extant Studies

In Nigeria, there is a paucity of empirical evidence on whether corporate risk management (CRM) increases firm value, particularly of oil and gas companies; studies in this area abound most in other countries. For instance, Faisal and Hassan (2020) investigated the effect of enterprise risk management on firm value using panel data of manufacturing companies listed on the Indonesia Stock Exchange from 2013-2017. Findings established that the implementation of the effectiveness of ERM has a positive and significant effect on firm value.

Horvey and Ankamah (2020) examined the linear and non-linear link between ERM and firm performance of 30 financial and non-financial listed firms in Ghana during the period 2010 – 2016. Firm performance was measured using Tobin Q, return on assets and equity) and fixed and random effect estimation techniques were employed. The study found a non-linear inverted U-shape for return on equity while a non-linear direct U-shape was found for return on assets and Tobin Q. Overall, the study established a non-linear relationship between ERM and performance.

Gonzalez, Santomil and Herrera (2019) evaluated the impact of enterprise risk management on firm performance and financial stability of non-financial Spanish

quoted companies from 2012–2015. Results showed that the adoption of enterprise risk management is not linked with a change in performance (measured via return on equity, assets and Tobin's Q) nor does it decrease the likelihood of bankruptcy.

Danisman and Demirel(2019) examined the relationship between corporate risk management practices and firm value using a mixed-methods approach. Using primary data (questionnaire) and regression analysis, the study found evidence that corporate risk management practices do not matter for the value of firms.

Anton (2018)researched the impact of ERM on firm value among listed Romanian firms for the pre and post-financial crisis era (2001-2011). Firm value was measured using Tobin's Q, firm size and leverage and regression analysis were employed. Findings indicated that ERM adoption is linked with greater firm value. Again, the study showed a positive and statistically significant link between firm size and leverage and firm value.

Similarly, Şenol, Karaca and Erdoğan (2017) assessed the effect of financial risk management on firms' value in Istanbul from 2008-2015. By employing panel data and a logistic regression model involving 248 observations of 31 firms listed in the Borsa Istanbul Stock Exchange, the study found evidence that financial risk management has no significant effect on the value of firms.

Husaini and Saiful (2017) evaluated the relationship between enterprise risk management, corporate governance and firmvalue of Indonesian public listedcompanies from 2010-2013. Firm value was measured using Tobin’s Q while corporate governance – board independence, audit committee independence, audit committee financial expertise, audit committee size, audit committee meeting and managerial ownership. The regression result showed that better implementation of ERM and corporate governance increase firm value. However, the study found that managerial ownership negatively affects firm value.

Augustina and Baroroh (2016) analyzed the effect of the mediating role of financial performance in the relationship between enterprise risk management and firm value among 53 companies listed in the Indonesia Stock Exchange from 2011-2013. Using the path analysis method, the study found that ERM has an insignificant effect on firm value while financial profitability has no mediating effect in the relationship between ERM and firm value.

Abdullah, Shukor, Mohamed and Ahmad (2015) examined the effects of voluntary risk management disclosure on firm value (market capitalization, Tobin’s Q and market to book value ofequity ratio) of a sample of 395 firms listed on the Bursa

Malaysia Stock Exchange in 2011. The multivariate regression results showed that voluntary risk management positively and significantly affects firm value.

Li, Wu, Ojiako, Marshall and Chipulu (2014) studied the relationship between ERM and firm value using 135 insurance firms operating in China in 2010. Firm value was measured using firm size, return on equity, sales growth, shares ownership, foreign ownership, life insurer and leverage. The regression result showed a positive and insignificant relationship between ERM and firm value measures.

Francisco and Hayong (2013) evaluated the link between risk management and firm value. Using natural experiments and data from energy firms, the study found that derivatives lead to greater valuations, investments and leverage. Again, the results showed that risk management matter for firm value.

Given the review of literature and hypotheses development, we, therefore, conceptualize three disaggregated empirical models of corporate risk management (risk committee diversity, risk committee independence and risk committee meetings) and firm value (TobinQ, price to cash flows and price to revenues) as shown in figure 1:

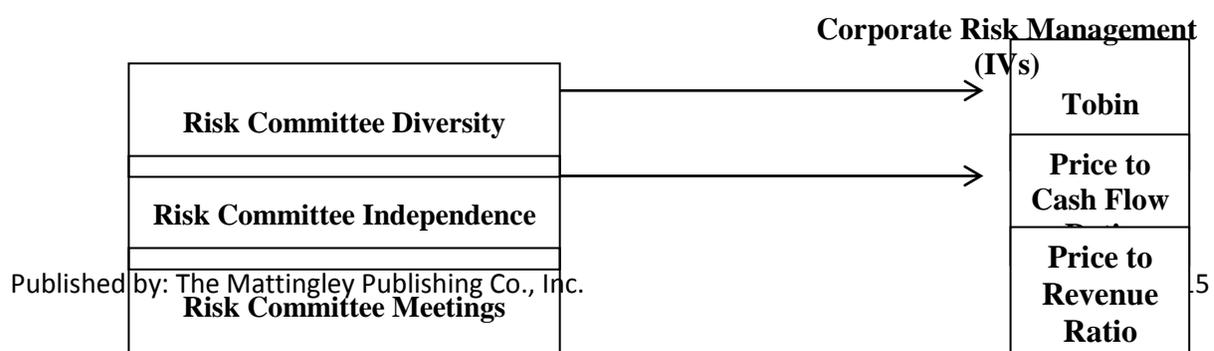




Figure 1: Conceptual Model of the Study

Source: Conceptualized by the Researchers, 2021

3. RESEARCH METHOD

In this study, whether corporate risk management increase firm value was assessed for quoted Nigeria oil and gas firms. *The ex-post facto* research design was adopted and the study population study comprised of all quoted oil and gas companies on the Nigerian Stock Exchange (NSE). As of 31st December 2020, there are thirteen (13) oil and gas companies(Nigerian Stock Exchange, 2020).

A sample of eight (8) oil and gas firms was selected using Krejcie and Morgan (1970) sample size determination formula. Again, the choice of sampled oil and gas firms was also informed on data availability alongside firms with up-to-date records on CRM profile during the study periods. Data of corporate risk committee diversity, independence, and meetings (corporate risk management measures) and firm value (TobinQ, price to revenue and price to cash flow) measures were obtained from the Machameratios during the period 2010-2019.

To analyse the value creation by firms, this study used the firm value measure of TobinQ; as it is a very widespread market-based ratio in firm value measurement (see Erin & Aribaba, 2021; Gonzalez, *et al*, 2020; Horvey & Ankamah, 2020; Faisal &

Hassan, 2020; Chin, Ganesan, Pitchay, Haron & Hendayani, 2019; Husaini & Saiful, 2017; Abdullah, *et al*, 2017; Sayilir & Farhan, 2017; Nwaobia, *et al*, 2015; Abdullah, *et al*, 2015).

The use of market-based measure also has demerits against accounting-based measures, so the results obtained with a measure of a diverse nature cannot be similar. In this vein, diverse accounting-based measures have been used such as price to revenue and price to cash flow as indicators of firm value. The dependent variable is firm value while the independent variable is corporate risk management. Given the above, three (3) disaggregated models (accounting-based and market-based) were employed and estimated as follows:

$$Q_{it} = \alpha_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \mu t \quad eq.1$$

Where α , β , and μ are constants. In order to estimate the disaggregated models of the study, we translated eq.1 to eqs. (2-4) to capture a model of relationship between individual firm value proxies as function of all corporate risk management variables as follows:

$$tobq_{it} = \beta_0 + \beta_1 rcd_{it} + \beta_2 rcid + \beta_3 rctm + \varepsilon_t \quad eq.2$$

$$psal_{it} = \beta_0 + \beta_1 rcd_{it} + \beta_2 rcid + \beta_3 rctm + \varepsilon_t \quad eq.3$$

$$pcas_{it} = \beta_0 + \beta_1 rcd_{it} + \beta_2 rcid + \beta_3 rctm + \varepsilon_t \quad eq.4$$

Table 1: Operationalization of Variables

Variable(s)	Symbols	Operationalization
	<i>Tobq</i>	$\frac{\text{Market capitalization} + \text{Total Liabilities} - \text{Cash flows}}{\text{Total Asset}}$
Firm Value	<i>Psal</i>	Price to revenue(in numbers); this is computed as yearly average monthly closing share price divided by revenue per shares
	<i>Pcas</i>	Price to cash flow(in numbers); this is computed as yearly average monthly closing share price divided by cash flow from operations per shares
Risk Committee Diversity	<i>Rcgd</i>	Percentage of female risk committee members to total risk committee members
Risk Committee Independence	<i>Rcid</i>	Percentage of non-executive directors and shareholders representatives in risk committee to total risk committee members size
Risk Committee Meetings	<i>Rctm</i>	Number of meetings held by risk committees in a fiscal period
$i = 1, 2, 3, \dots, 8$	<i>N/A</i>	Indicating the number of firms employed in the study
$t = 1, 2, \dots, 10$	<i>N/A</i>	Indicating the period used for this study(2010-2019)
β_{1-3}	<i>N/A</i>	Coefficient of independent variables
<i>It</i>	<i>N/A</i>	Error term which accounts for other likely variables that could affect the dependent variable but not captured in the model

Source: Compiled by Researchers, 2021

Data obtained were analysed using descriptive (mean, median, standard deviation, minimum, and maximum values, skewness, kurtosis and correlation) and inferential (variance inflation factor, Breusch Pagan-Cook heteroskedasticity test, regression, fixed and random effects) statistical tools. To ascertain the most

efficient models for assessing the relationship between corporate risk management (CRM) and firm value, the Hausman specification test was performed. The analysis was done via Microsoft Statistical Software - STATA 16.0 version.

4. RESULTS

Table 1: Summary of Descriptive Analysis

	Tobq	Psal	Pcas	Rcid	Rcgd	Rctm
Mean	1.2038	0.4444	27.762	35.2535	6.8160	1.3875
Median	0.9276	0.2423	2.4916	0	0	0
Min. Value	0.5024	0.0205	-127.937	0	0	0
Max. Value	6.2868	5.3644	1853.99	100	60	6
Std. Dev.	0.8692	0.7211	210.193	40.5258	14.2384	1.6420
Kurtosis	18.292	29.762	74.004	1.4307	7.422	2.0705
Skewness	3.5059	4.6628	8.4637	0.4274	2.2373	0.6410
N	79	79	79	80	80	80

Source: Researchers' Computation, 2021 via STATA 16.0

The descriptive analysis reveals that the average firm value proxies of the quoted oil and gas firms in Nigeria are around 1.2 (*Tobq*), 0.4 (*Psal*) and 27.8 (*Pcas*), corporate risk management proxies: 35.3 (*Rcid*), 6.8 (*Rcgd*) and 1.4 (*Rctm*) with the

highest score(maximum value) are 1853.9, (*Pcas*), which was recorded by Arдова Plc. (Forte Oil) in 2013. Moreover, the lowest score is zero; this is anticipated since *rcid*, *rcgd* and *rctm* are expressed in percentages.

The standard deviation values indicated that the sampled oil and gas firms in

Nigeria are not too dispersed from each other and that very probable, the study variables are non-constant over time. Again, the skewness values showed that all the variables are positively skewed with coefficients of 3.5 (*Tobq*), 4.7 (*Psal*), 8.5 (*Pcas*), 0.4 (*Rcid*), 2.2 (*Rcgd*), and 0.6 (*Rctm*); more so, the least kurtosis is 1.4

(*Rcid*) and 74.0 (*Pcas*) the most. The kurtosis values for *Tobq* (18.3), *Psal* (29.7), *Pcas* (74.0), *Rcgd* (7.4), *Rctm* (2.1) and *Rcid* (1.4) are clear signs that the variables are normally distributed because the kurtosis values are far from zero (0).

Table 2: Correlation Matrix

Variables	<i>Tobq</i>	<i>Psal</i>	<i>Pcas</i>	<i>Rcid</i>	<i>Rcgd</i>	<i>Rctm</i>
<i>Tobq</i>	1.0000					
<i>Psal</i>	0.7335	1.0000				
<i>Pcas</i>	0.1279	0.1468	1.0000			
<i>Rcid</i>	-0.0695	0.0092	0.1510	1.0000		
<i>Rcgd</i>	0.0103	0.0222	0.1197	0.5221	1.0000	
<i>Rctm</i>	-0.0075	0.0726	0.1430	0.7405	0.4833	1.0000

Source: Researchers' Computation, 2021 via STATA 16.0

The correlation matrix of summarized variables of quoted oil and gas firms in Nigeria shows that the reported corporate risk management metrics (*Rcid*) and (*Rctm*) negatively correlate with one of the firm value variable (*Tobq*) while only *Rcgd* was positively correlated. On the other hand, *Rcid*, *Rctm* and *Rcgd* are positively correlated with two of the firm value variable (*Psal* and *Pcas*).

Interestingly, no two pairs of independent variables were wholly correlated since none of the correlation coefficients exceeds 0.9 as recommended by Gujarati, (2003); Okoro and Ihenyen (2020). This suggests the absence of multicollinearity among pairs of independent variables of the study; the viewpoint above is further corroborated by results of post-estimation statistics for regression (Variance Inflation Factor – VIF) as shown in Table 3:

Table 3: Variance Inflation Factors (VIF) Result

Variables	VIEW	1/VIF
<i>Rcid</i>	3.62	0.2761
<i>Rctm</i>	3.44	0.2909
<i>Rcgd</i>	1.39	0.7207
Mean VIF	2.82	

Source: Researchers' Computation, 2021 via STATA 16.0

Table 4 shows the multicollinearity result; Gujarati (2003) asserts that multicollinearity between independent variables may lead to wrong signs or magnitudes in the estimate model and bias

of standard errors of coefficients. The VIF = 2.82, which is less than the accepted VIF value of 10.0, signifying the non-existence of multicollinearity problem in the corporate risk management and firm value model.

Table 4: OLS, Fixed and Random Effects Results (*Tobq*, *Rcgd*, *Rcid* & *Rctm*)

Estimator	OLS (Obs.=79)		FE (Obs.=79)		RE (Obs. =79)	
Variable	Coef.	Prob.	Coef.	Prob.	Coef.	Prob.
Rcid	-0.0051 (-1.09)	0.281	-0.0055 (-1.09)	0.279	-0.0051 (-1.09)	0.278
Rcgd	0.0033 (0.40)	0.690	0.0058 (0.66)	0.510	0.0033 (0.40)	0.689
Rctm	-0.0884 (-0.78)	0.439	-0.1065 (-0.88)	0.380	-0.0884 (-0.78)	0.437
_Cons	1.2380 (9.35)*	0.000	1.2073 (8.74)*	0.000	1.2380 (9.35)*	0.000
R-Squared	0.0158					
R-Sq. Adjusted	-0.0236					
F-ratio	0.4000					
Prob. F.	0.7530					
R-Sq. (within)			0.0207		0.0179	
R-Sq. (between)			0.0409		0.0000	
R-Sq. (overall)			0.0136		0.0158	

Wald Ch2(3) = 1.20; Prob. Ch2 = 0.7526; Hausman Specification Prob.>Chi2 = 0.6104

*significant at 5% level; Items in parentheses are t-ratios; Z-test in parentheses, bold face; Tobq= Tobin's Q; Rcgd = risk committee diversity; Rcid = risk committee independence; Rctm = risk committee meetings;

Source: Researchers' Computation, 2021 via STATA 16.0

The OLS analysis shows that *Rcgd*, *Rcid* and *Rctm* are insignificant at 5% level in explaining *Tobq* indicating that corporate risk management has a small beta coefficient in absolute terms. Using the OLS and RE results, coefficients of *Rcid* are -0.0051 and -0.0051; *Rcgd* are 0.0033 and 0.0033 and *Rctm* are -0.0884 and -0.0884 respectively, signifying that when quoted oil and gas firms in Nigeria engage incorporate risk management (*Rcgd*), it will enhance firm value (*Tobq*) by approximately 0.33%; contrarily, when they engage in *Rcid* and *Rctm*, it will decrease *Tobq* by approximately -0.51% and -8.84% respectively.

Furthermore, the t-test results of corporate risk management proxies are -1.09 (*Rcid*),

0.40 (*Rcgd*) and -0.78 (*Rctm*) respectively. Moreover, t-test results confirm that all the corporate risk management proxies (*Rcid*, *Rcgd* & *Rctm*) are insignificant in explaining the variation in firm value (*Tobq*). Nevertheless, R^2 is 0.0158 for OLS, which is lower than FE and RE; impliedly, corporate risk management explains about 1.58% variation in firm value (*Tobq*). The f-ratio is 0.4000 (p-value=0.7530>0.05) which is insignificant, providing evidence to support the proposition that there is no significant relationship between corporate risk management and firm value (*Tobq*), particularly of quoted oil and gas firms in Nigeria.

Again, the result of the Hausman specification test showed that RE is more efficient than FE; thus, we replied to the results of RE. The results of the Wald statistic is 1.20 with Prob. value of 0.7526, suggesting a rejection of the null hypothesis and acceptance of the alternate hypothesis that corporate risk management

does not increase the value(*Tobq*) of quoted oil and gas firms.

Table 5: OLS, Fixed and Random Effects Results (*Psal*, *Rcgd*, *Rcid* & *Rctm*)

Estimator	OLS (Obs.=79)		FE (Obs.=79)		RE (Obs. =79)	
Variable	Coef.	Prob.	Coef.	Prob.	Coef.	Prob.
<i>Rcid</i>	0.0033 (0.83)	0.410	0.0044 (1.07)	0.287	0.0033 (0.83)	0.408
<i>Rcgd</i>	0.0005 (0.08)	0.939	0.0044 (0.61)	0.543	0.0005 (0.08)	0.938
<i>Rctm</i>	0.0973 (1.03)	0.305	0.1125 (1.14)	0.259	0.0973 (1.03)	0.302
_Cons	0.42077 (3.83)*	0.000	0.4131 (3.65)*	0.001	0.4208 (3.83)*	0.000
R-Squared	0.0145					
R-Sq. Adjusted	-0.0249					
F-ratio	0.37					
Prob. F.	0.7766					
R-Sq. (within)			0.0263		0.0222	
R-Sq. (between)			0.1555		0.0397	
R-Sq. (overall)			0.0123		0.0145	

Wald Ch2(3) = 1.10; Prob. Ch2 = 0.7764; Hausman Specification Prob.>Chi2 = 0.3744

*significant at 5% level; Items in parentheses are t-ratios; Z-test in parentheses, bold face; *Psal* = Price to revenue; Source: Researchers' Computation, 2021 via STATA 16.0

The OLS analysis shows that *Rcgd*, *Rcid* and *Rctm* arenotsignificant at 5% level in explaining *Psal* demonstrating that corporate risk management has a small beta coefficient in aggregate terms. Using the OLS and RE results, coefficients of *Rcid* are -0.0033and -0.0033; *Rcgd* are 0.0005and 0.0005 and *Rctm* are -0.0973and -0.0973 respectively, indicating that when quoted oil and gas firms in Nigeria engage incorporate risk management (*Rcgd*), it will enhance firm value (*Psal*) by approximately 0.05%; on the contrary, when they engage in *Rcid* and *Rctm*, it will decrease *Psal* by approximately -0.033% and -9.73% respectively.

Besides, the t-test results of corporate risk management proxies are -0.83 (*Rcid*), 0.08 (*Rcgd*) and -1.03 (*Rctm*) respectively. Also, the t-test results substantiate that all the corporate risk management proxies (*Rcid*, *Rcgd* & *Rctm*) are not significant in explaining the variations in firm value (*Psal*). However, R²is 0.0145for OLS, which is lower than FE and RE; impliedly, corporate risk management explains about 14.5% variation in firm value (*Psal*). The f-ratio is 0.37(p-value=0.7766>0.05) which is insignificant, providing evidence to support the assertion that there is no significant relationship between corporate risk management and firm value (*Psal*), particularlyof quoted oil and gas firms in Nigeria.

Again, the result of the Hausman specification test showed that RE is more efficient than FE; thus, we replied to the results of RE. The results of the Wald

statistic is 1.10 with Prob. value of 0.7764, suggesting a rejection of the null hypothesis and acceptance of the alternate

hypothesis that corporate risk management does not increase the value (*Psal*) of quoted oil and gas firms.

Table 6: OLS, Fixed and Random Effects Results (*Pcas*, *Rcgd*, *Rcid* & *Rctm*)

Estimator	OLS (Obs.=79)		FE (Obs.=79)		RE (Obs. =79)	
	Coef.	Prob.	Coef.	Prob.	Coef.	Prob.
Variable						
<i>Rcid</i>	0.4392 (0.39)	0.700	-0.1282 (-0.11)	0.913	0.4392 (0.39)	0.699
<i>Rcgd</i>	0.7829 (0.40)	0.693	1.5499 (0.76)	0.451	0.7829 (0.40)	0.691
<i>Rctm</i>	6.0563 (0.22)	0.825	21.859 (0.78)	0.439	6.0563 (0.22)	0.825
_Cons	-0.9676 (-0.03)	0.976	-8.1294 (-0.25)	0.801	-0.9676 (-0.03)	0.976
R-Squared	0.0257					
R-Sq. Adjusted	-0.0132					
F-ratio	0.66					
Prob. F.	0.5790					
R-Sq. (within)			0.0493		0.0439	
R-Sq. (between)			0.2503		0.1260	
R-Sq. (overall)			0.0229		0.0257	

Wald Ch2(3) = 1.98; Prob. Ch2 = 0.5764; Hausman Specification Prob.>Chi2 = 0.4462

*significant at 5% level; Items in parentheses are t-ratios; Z-test in parentheses, bold face; *Pcas* = Price to cash flow; Source: Researchers' Computation, 2021 via STATA 16.0

The OLS analysis shows that *Rcgd*, *Rcid* and *Rctm* are insignificant at 5% level in explaining *Pcas* indicating that corporate risk management has a small beta coefficient in absolute terms. Using the OLS and RE results, coefficients of *Rcid* are 0.4392 and 0.4392; *Rcgd* are 0.7829 and 0.7829 and *Rctm* are 6.0563 and 6.0563 respectively, indicating that when quoted oil and gas firms in Nigeria engage incorporate risk management (*Rcgd*), it will enhance firm value (*Pcas*) by approximately 43.9%; *Rcid* and *Rctm* will also increase *Pcas* by approximately 78.3% and 605.6% respectively.

Besides, the t-test results of corporate risk management proxies are 0.39 (*Rcid*), 0.40 (*Rcgd*) and 0.22 (*Rctm*) respectively. Also, the t-test results validate that all the corporate risk management proxies (*Rcid*, *Rcgd* & *Rctm*) are insignificant in explaining the variations in firm value (*Pcas*). However, R^2 is 0.0257 for OLS, which is higher than FE and RE; impliedly, corporate risk management explains about 2.57% variation in firm value (*Pcas*). The f-ratio is 0.66 (p-value=0.5790>0.05) which is not significant, providing evidence that there is no significant relationship between corporate risk management and firm value (*Pcas*), particularly of quoted oil and gas firms in Nigeria.

Furthermore, the result of the Hausman specification test showed that RE is more

efficient than FE; thus, we replied to the results of RE. The results of the Wald statistic is 1.98 with Prob. value of 0.5790, suggesting a rejection of the null hypothesis and acceptance of the alternate hypothesis that corporate risk management does not increase the value (*Pcas*) of quoted oil and gas firms in Nigeria.

5. DISCUSSIONS

Risk management practice has made considerable numbers of firms sustainable and a going concern. As management engages incorporate risk management (CRM), business outcomes like decreased performance and firm value, non-sustainability and insolvency are averted (Erin & Aribaba, 2021; Horvey & Ankamah, 2020; Faisal & Hassan, 2020). CRM aims to systematize firms' activities into functional parts for improved decisions as well as the impact of implausibility may impose on business objectives.

The debate in literature has been whether CRM will enhance the value of a firm. Quite several studies (Faisal & Hassan, 2020; Anton, 2018; Abdullah, *et al*, 2017; Nwaobia, *et al*, 2015) have shown that CRM significantly influences firm value; however, whether this is the case for oil and gas companies in Nigeria, has not yet been established in management literature. A disintegrated CRM and firm value models were developed to resolve this gap in the literature in the Nigerian context.

*First, the finding showed that the reported corporate risk management metrics (*Rcid*)*

and (*Rctm*) negatively relate with *Tobq* while only *Rcgd* was positively correlated. On the other hand, *Rcid*, *Rctm* and *Rcgd* are positively related to *Psal* and *Pcas*. Again, t-test resultsshowed that *Rcgd*, *Rcid* and *Rctm* are insignificant at 5% level in explaining *Tobq*, *Psal* and *Pcas*. Second, the results of the Hausman specification test revealed that Random Effect (RE) is more efficient than Fixed Effect (FE); thus, we replied on the results of RE.

The results of the Wald statistic suggest a rejection of the null hypotheses and acceptance of alternate hypotheses that CRM (*Rcid*, *Rctm* and *RCGD*) do not increase firm value (*Tobq*, *Psal* and *Pcas*). The finding agrees with the results of Şenol, *et al*, (2017); and Danisman and Demirel(2019). The inability of CRM to increase firm value may be connected to inactive CRM practices adopted by oil and gas companies in Nigeria.

6. CONCLUSION AND RECOMMENDATIONS

This study seeks to (1) apply certain Corporate Risk Management (CRM) components in advancing disaggregated firm value models; and (2) ascertain whether CRM components (risk committee diversity, independence and meetings) increase firm value metrics (TobinQ, price to cash flow, and price to revenue). A total of thirteen(13) quoted oil and gas companies were sampled in Nigeria during the period 2010-2019. Findings showed that all CRM components do not significantly affect the value of the firm. Moreover, we found CRM components such as risk committee independence and

meetings negatively correlate with the firm value metric of Tobin Q.

Impliedly, CRM does not significantly increase the firm value of quoted oil and gas companies in Nigeria. For companies to increase firm value via the instrumentality of CRM, there is the need for management to develop a well-structured CRM framework towards increasing firm value; this can be achieved by increasing the numbers of risk committee meetings, risk committee independence and risk committee diversity. Again, future studies are needed to assess the link between CRM and firm value of other quoted companies in Nigeria and extend data till 2020.

7. CONTRIBUTION TO KNOWLEDGE AND LIMITATIONS OF STUDY

Remarkably, this study contributes to corporate risk management and firm value literature by reaffirming the position of prior studies. Again, this study established that even though corporate risk management significantly increases the value of a firm, it was found to hurt the value of oil and gas firms, particularly in the Nigerian context. Furthermore, the study only employed certain components of corporate risk management in assessing whether they increase the value of oil and gas firms quoted on the Nigerian Stock Exchange (NSE).

Moreover, the study did not assess other components of corporate risk management and firm value and was delimited in scope to only firms in the oil and gas sector.

Consequently, there is the need for future researchers to validate the model of this study by employing other corporate risk management and firm value measures from other sectors in Nigeria and other regions of the world.

8. REFERENCES

1. Abdullah, H.S.B., Janor, H., Hamid, M.A. & Yatim, P. (2017). The effect of enterprise risk management on firm value: Evidence from Malaysian technology firms. *Jurnal Pengurusan* 49, 3-11. doi.org/10.17576/pengurusan-2017-49-01
2. Abdullah, M.A. Shukor, Z.A. Mohamed, Z.M. & Ahmad, A. (2015). Risk management disclosure: A study on the effect of voluntary risk management disclosure toward firm value. *Journal of Applied Accounting Research*, 16(3), 400-432 doi 10.1108/JAAR-10-2014-0106
3. Al-Matari, E.N, Al-Swidi, A.K. & Fadzil, F.H. (2014). The measurements of firm performance's dimensions. *Asian Journal of Finance and Accounting*, 6(1), 24-49
4. Anton, S.G. (2018). The impact of enterprise risk management on firm value: Empirical evidence from Romanian non-financial firms. *Inzinerine Ekonomika-Engineering Economics*, 29(2), 151-157
5. Augustina, L. & Baroroh, N. (2016). The relationship between enterprise risk management (ERM)

- and firm value mediated through financial performance. *Review of Integrative Business and Economics Research*, 5(1), 128-138
6. Chin, Y.S, Ganesan, Y, Pitchay, A., Haron, H. & Hendayani, R.(2019). Corporate governance and firm value: The moderating effect of board gender diversity. *Journal of Entrepreneurship, Business and Economics*,7(2s), 43-77
 7. Committee of Sponsoring Organizations of the Treadway Commission (COSO) Report (2004) Enterprise risk management-integrated framework, executive summary. COSO, September.
 8. Danisman, G.O. & Demirel, P. (2019). Corporate risk management practices and firm value in an emerging market: A mixed-methods approach. *Risk Management*, 21, 19-47. <https://doi.org/10.1057/s41283-018-0040-5>
 9. Erin, O. & Aribaba, F. (2021). Risk governance and firm value: Exploring the hierarchical regression method. *Afro-Asian Journal Finance and Accounting*, 11(1), 104-130.
 10. Faisal, M. & Hassan, N.N. (2020). Enterprise risk management and firm value: The case in an emerging market. *International Journal of Innovation, Creativity and Change*, 11(6), 272-286
 11. Francisco, P. & Hayong, Y. (2013). Risk management and firm value: Evidence from weather derivatives. *The Journal of the American Finance Association*, 68(5), 2143-2176.
<https://doi.org/10.1111/jofi.12061>
 12. Gonzalez, L.O., Santomil, P.D. & Herrera, A.T. (2020). The effect of enterprise risk management on the risk and the performance of Spanish listed companies. *European Research on Management and Business Economics*, 26, 111-120.
 13. Gujarati, D. N. (2003). *Basic econometrics*. New York, NY: McGraw-Hill Inc.
 14. Horvey, S.S. & Ankamah, J. (2020). Enterprise risk management and firm performance: Empirical evidence from Ghana equity market. *Cogent Economics and Finance*, 8(1), 1-22 doi: 10.1080/23322039.2020.1840102
 15. Husaini, R. & Saiful, H. (2017). Enterprise risk management, corporate governance and firmvalue: Empirical evidence from Indonesian public listed companies. *International Journal of Advances in Management and Economics*, 6(6), 16-23.
 16. Jensen, M.C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *The American Economic Review*, 76(2), 323-329.
 17. Jesko, S. & Sophie, H. (2018). Company risk management in light of the sustainability transition. *Journal of Sustainability*, 10(4), 2-25

18. Li, Q., Wu, Y., Ojiako, U., Marshall, A. & Chipulu, M. (2014). Enterprise risk management and firm value within China's insurance industry. *Acta Commercii*, 14(1), 1-12 <http://dx.doi.org/10.4102/ac.v14i1.198>
19. Mayers, D. & Smith, C.W., Jr. (1987). Corporate insurance and the underinvestment problem. *The Journal of Risk and Insurance*, 54(1), 45-54. <https://doi.org/10.2307/252881>
20. Meriala, G. (2017). Risk management in the context of sustainable development. *Scientific Papers of Bucharest*, 1(1), 1248-1254
21. Nwaobia, N., Ajibade, A. & Kwarbai, J. (2015). Corporate Risk Management and Firms' Value: Empirical evidence from selected Listed Manufacturing Companies in Nigeria. *Program on Policy, Conflict and Strategic Studies International Journal Series*, 2(1), 1-12
22. Okoro, G.E. & Ihenyen, C.J. (2020). Does earnings management exert pressure on firms' return on assets and equity? The case of sub-Saharan Africa. *Economic Horizons*, 22(3), 207-218
23. Sayilir, O. & Farhan, M. (2017). Enterprise risk management and its effect on firm value in Turkey. *Journal of Management Research*, 9(1), 86-99; [doi:10.5296/jmr.v9i1.10124](https://doi.org/10.5296/jmr.v9i1.10124)
24. Sekerci, N. & Pagach, D. (2020). Firm ownership and enterprise risk management implementation: Evidence from the Nordic region. *Journal of Risk and Financial Management* 13, 1-21 [doi:10.3390/jrfm13090210](https://doi.org/10.3390/jrfm13090210)
25. Şenol, Z., Karaca, S.S. & Erdoğan, S., (2017). The effects of financial risk management on firm's value: An empirical evidence from Borsa Istanbul Stock Exchange. *Studio Financiare (Financial Studies), Centre of Financial and Monetary Research "Victor Slavescu"*, 21(4), 27-45.
26. Smith, C.W. & Stulz, R.M. (1985). The determinants of firms' hedging policies. *Journal of Financial and Quantitative Analysis*, 20(4), 391-405. <https://doi.org/10.2307/2330757>
27. Waitherero, F., Wanyoike, M.S. & Muriu, M.S. (2019). Interaction between financial risk management and firm value of the firm among private equity firms in frontier markets: A theoretical perspective. *Journal of Accounting, Finance and Auditing Studies*, 5(3), 30-41