Financial Indicators of Corporate Social Responsibility in Nigeria: A Binary Choice Analysis

Pat Obi, Ph.D. (corresponding author)†
Professor of Finance
Purdue University Northwest
cpobi@purdue.edu
219-801-6228

Pat Obi is the White Lodging Endowed Professor of Finance at Purdue University Northwest. He received his Ph.D. in Finance and Econometrics from the University of Mississippi. At Purdue Northwest, he teaches courses in corporate finance, applied statistics, and derivatives. With professional engagements in four continents, he is the author of several scholarly publications including two financial books. His latest book, *We Must Change the Way We Live*, provides a thoughtful and compelling narrative on financial prudence. His areas of expertise include corporate financial analysis, valuation, statistical modelling, derivatives and risk management.

Inalegwu Ode-Ichakpa, Ph.D.
Senior Lecturer of Accounting, Finance & Banking
Manchester Metropolitan University
i.ode-ichakpa@mmu.ac.uk

Inalegwu Ode-Ichakpa received his Ph.D. in business from Manchester Metropolitan University in the UK. He is currently Senior Lecturer of Accounting, Finance and Banking in the same university. His research interest is in corporate governance, corporate social responsibility, financial reporting, and corporate finance.

Financial Indicators of Corporate Social Responsibility in Nigeria: A Binary Choice Analysis

Abstract

Using multivariate binary choice models, this study investigates the effect of financial indicators on the practice of corporate social responsibility (CSR) in Nigeria. The indicators include return on equity, asset size, and revenue growth. Results of both linear probability and logistic models show that return on equity and asset size increase the likelihood of CSR practice. Sales growth has a negative effect. Compared to other metrics, firms with a large asset investment exhibit the highest likelihood of investing in CSR. Nonparametric tests confirm the positive linkage between CSR and asset size. These findings suggest that large firms, irrespective of their financial conditions, are more likely than other firms to invest in social initiatives. An implication for civil society might be to employ moral suasion to encourage financially strong firms, irrespective of size, to embrace CSR as an important means to boost their public image and long run performance.

Keywords: CSR, Financial performance, Binary choice, Logistic model, Nonparametric tests

1 Introduction

Increasingly, consumers are prioritizing corporate social responsibility (CSR) by holding firms responsible for promoting practices that enhance quality of life in the community in which they do business. Examples of such practices include maintaining a healthy and ethical work environment, practicing equity and energy efficiency in the workplace, and contributing in the educational, social and economic development of the community (The Hauser Institute, 2015). In each of these cases, the expectation is for the firm to proactively drive social change without the push of government or civil society (Rajeev and Kalagnanam, 2017). This voluntary form of corporate engagement carries an obvious cost which many firms may not be so quick to embrace. Yet, the evidence in studies such as Forcadell and Aracil (2017) and Palmer (2012) shows that the social cost of CSR notwithstanding, there are enduring financial benefits to firms that chose to be good corporate citizens.

As is typical with most social constructs, there is hardly a consensus view in the literature on the definition of CSR. In this study, we base our research motivation on the definition proposed by Carroll et al (1979) in which social responsibility is defined to encompass the economic, legal, ethical, and discretionary expectations that society has of organizations. This definition also aligns with the triple bottom line CSR approach which emphasizes the importance of economic, social and environmental dimensions in the conduct of business (Global Reporting Index, 2015). The core supporters of this point of view, as Norman (2004) explains, insist, if only in passing, that firms have social and environmental bottom lines in much the same way as they have a financial or economic threshold. As a corollary, Nakashima and Ota (2016) define CSR to include a firm's moral duty to engage in activities that benefit the community and its business

environment. In all of this, the critical research question is whether investing in CSR is financially beneficial to the firm.

A number of theories have been advanced to examine the linkages between CSR and corporate performance. They include agency, stewardship, stakeholder, resource-based, and slack resource. When viewed as an agency cost, CSR is considered a diversion of corporate resources toward social causes that only serve the interest of managers (Friedman, 1970; McWilliams, Siegel, and Wright, 2006). This involvement constitutes a conflict of interest between managers and stockholders and is therefore a direct cost to those who own the business.

The stewardship theory, on the other hand, argues that ethical and professional considerations drive managers to engage only in those social projects that contribute in maximizing the value of the firm for its owners (Donaldson and Davis, 1991, 1994). Such prudence in the exercise of CSR works to minimize principal-agent conflict. Stakeholder theory takes a broader view and stresses the importance of the needs of all interested parties, not just the shareholders (Donaldson and Preston, 1995; Freeman, 1984). In this respect, the beneficiaries of good corporate citizenship include not only the owners but also employees, customers, suppliers, and members of the community in which the firm conducts business.

In an examination of the resource-based view of CSR, Russo and Fouts (1997) show that environmental and economic performance are positively related and that this relationship strengthens with industry growth. They tested their hypothesis using data from 243 firms over a two-year period. In a similar study, McWilliams and Siegel (2001) determine that managers settle for an ideal level of CSR by conducting a cost-benefit analysis on how much resources are committed to social programs. Quite remarkably, they found a neutral relationship between CSR and financial performance.

The slack resource theory argues that firms engage in CSR only when there are financial benefits to the firm. And in such a case, the firm has sufficient discretionary funds to invest in social projects. By this approach, financial success is the key driver of CSR. If the slack resource theory were to be represented empirically, CSR would be defined as a linear function of a set of corporate performance metrics. The theory would then be upheld if a positive relationship is found to exist. This framework has been used in several studies seeking to determine the effectiveness of financial performance on CSR. Perhaps the first rigorous empirical study in support of this theory is by Waddock and Graves (1997). They find that corporate social performance is positively related to a firm's future and prior financial performance.

In all of this, questions remain as to the reliability of previous empirical results. For example, research by Surroca et al (2010) shows that the empirical findings of a positive relationship may be spurious. Using financial data of 599 firms in 28 countries, they find that when the firms' intangible resources were taken into account, there was no longer a direct linkage between social investments and financial performance. Additional inconsistencies, blamed primarily on researcher subjectivity, have also been documented by Galant and Cadez (2017).

This study offers a novel methodological approach pursuant to the slack resource theory. It examines the impact of financial indicators on the practice of CSR using financial data from Nigeria. The indicators used in this study include measures of profitability, revenue, and asset size. While this research adds to extant literature on the CSR-performance nexus, it charts a unique path by investigating, instead, the *likelihood* that a firm engages in CSR given its unique set of financial characteristics. By examining the odds of CSR engagement instead of utilizing a linear model that infers on a direct causality, it avoids the empirical problems of researcher subjectivity and measurement bias cited by Galant and Cadez (2017) and Surroca et al (2010).

2 Nigeria's Economic Significance

A former British colony, Nigeria is Africa's largest economy and the most populous country in the continent, with an estimated population of 191 million in 2017 (World Bank). With a nominal GDP of over $1 trillion in 2017, the country's economy is larger than the combined economies of the other 14 countries in the Economic Community of West African States (ECOWAS) of which Nigeria is a member. According to the International Energy Agency, Nigeria's average daily crude oil production in 2018 was about 2.5 million barrels, making it by far, the largest crude oil producer and exporter in the continent and the sixth largest in the world. Perhaps on the basis of its economic significance and size, Nigeria is arguably a good test case for examining the nature and impact of social investments in Africa by the private sector.

Yet for two other reasons, CSR studies are of particular relevance in developing economies like Nigeria. First, due to lax environmental regulations and the enormous amount of energy needed to operate, there is a profound negative impact that firms located in such economies have on the environment (Onoja and Agu, 2012). Parry et al (1998) explain, moreover, that in such countries where industrial pollutions are largely unregulated, firms tend to resort to unethical practices in pursuit of short-term financial gains. Second, for reasons of limited government services in the communities, the private sector is often looked upon to fill the gap. Such needed services include education, healthcare, environmental protection, and poverty reduction; all of which have been variously documented in CSR studies focusing on Nigeria (Nwoke, 2016; Nwagbara and Kamara, 2015; Achike and Onoja, 2014; and Amaeshi et al, 2006).

Most notable studies on CSR have investigated its economic impact in the advanced economies. The dearth of such inquiry in the developing world, especially in sub-Saharan Africa, inspires not only a needed expansion of the literature but also one that uses a novel approach to address the underlying empirical question. In this paper, we focus on the likelihood that a firm will invest in CSR given the firm's financial characteristics. Moreover, because results of previous studies have proved largely inconclusive, this lends further value to the purpose of this study.

The rest of this paper is organized as follows: Section 3 discusses recent literature, especially as they pertain to the Nigerian CSR environment. In Section 4, we describe the data and present the estimation models. Results of the empirical analyses are presented in Section 5, followed by a discussion of the findings in Section 6. The study conclusions are presented in Section 7 while Section 8 contains some limitations and policy recommendations.

3 Literature

The literature on corporate social responsibility (CSR) is replete with studies attempting to prove the existence of a relationship between corporate social engagements and financial performance. In a broad sense, these studies seek to identify the economic impact on a firm of its social investment activities. This CSR-performance dynamic is driven by the notion that business and society are inextricably linked and therefore are able to successfully leverage each other's resources.

Recent studies that have attempted to highlight the reputational or economic benefits of CSR include Arevalo and Aravind (2017), Bocquet et al (2017), Palmer (2012), and Carter et al (2003). As mentioned earlier, there is a lack of consensus on the CSR-financial performance linkage. For example, McWilliams and Siegel (2001) and more recently, Cavaco and Crifo (2014) show mixed results that include no relationship, negative relationship, and positive relationship. Galant and Cadez (2017) argue that these contradictory results are due primarily to measurement bias, researcher subjectivity, and sample selection bias.

Su et al (2014) show that firms adopting CSR practices send a positive signal to investors that their firms have superior capabilities. Using data from ten Asian emerging economies, they find a positive linkage between CSR and financial performance. Rodriguez-Fernandez (2016) presents evidence of a bidirectional positive relationship in that social projects benefit from corporate participation and at the same time, the firm's financial performance is enhanced by its investments in these social projects. Palmer (2012) also shows that a positive relationship exists in both directions, pointing out that increased CSR engagement leads to rising revenues and gross margins in that customers are willing to pay a premium for the products and services of companies with a CSR focus.

The quest to unravel the relationship between CSR and financial performance in Nigeria has taken different forms. Many studies utilize data from the financial services industry. Others have examined the effect in nonfinancial firms especially those in the manufacturing sector. These studies have included samples from privately held SMEs as well as listed firms. Amole *et al* (2012) conducted a study on the impact of CSR on the profitability of Nigerian banks using the regression approach. The financial variables used in their study were net income and CSR expenditure. Their empirical results show a statistically significant positive relationship. In a case study on First Bank of Nigeria, Bolanle (2012) also finds a significant relationship between CSR expenditure and net profit. Bolanle's study determined, in particular, that for every unit increase in CSR expenditure, net profit rose by 95 percent. The sample period of the study was 2001-2010.

Luper (2013) argues on the need for Nigerian banks to rethink CSR in all the key sectors of the economy including education, power, healthcare, agriculture, and SMEs. The study examines the size of commercial loans made to SMEs in the period, 2001-2010. In a pre-post statistical test, the study shows that bank consolidation in Nigeria reduced the size of SME loans to less than one percent of the banks' total loan portfolio. Because the results showed no improvement in the

size of SME loans before and after bank consolidation, the author recommends that bank CSR policy include capacity building for entrepreneurs to qualify them for bank credit. The study however does not show proof that such CSR policy can add value to either the bank or the SME.

Similar to banks, the oil industry plays a pivotal role in the Nigerian economy since this industry accounts for over one-half of fiscal revenues. As a result, the oil industry's involvement in CSR has equally come into strong focus. An important study to this effect was conducted by Friday (2015), which examines the CSR contributions of five Nigerian oil firms. The study finds a positive relationship between financial performance and CSR activities. The latter included employee welfare and social investments in the host community. The regression model was however not statistically significant.

Other CSR studies on Nigeria have extended their sample of firms to include those listed on the Nigerian Stock Exchange. For example, Uadiale & Fagbemi (2012) examine the audited financial data of 40 listed firms for their CSR disclosures. Two profitability measures used in their regression model are return on equity and return on assets. A similar analysis, which also uses the regression approach, was conducted by Okedge and Egbunike (2016) with data from 30 listed Nigerian firms. Both of these studies found that CSR disclosures appear to be positively linked to profitability ratios. Using data of 41 listed firms in 2008, Uwuigbe and Egbide (2012) investigate the additional impact of financial leverage on CSR disclosures. Similar to other studies, they find that profitability and in their specific case, also firm size, have a positive effect on CSR disclosures. Importantly, they also determined that heavily levered firms are less likely to engage in CSR.

Studies that have found contradictory evidence include Khanifar *et al* (2012) and Babalola (2012). Khanifar *et al* (2012) analyzed a sample that included hotels, restaurants, and airlines, but found mixed evidence of positive and negative effects. With sample data consisting of ten Nigerian firms from the period, 1999-2008, Babalola (2012) was unable to find a conclusive evidence that CSR and corporate performance have a positive relationship.

The multiple regression approach is the common thread in the method of analysis in all of these studies that focus on Nigeria. The specification challenges of such an approach are those that have been clearly documented by Galant and Cadez (2017). Our study offers a methodological improvement by not only using a much more extended sample period but also a binary choice econometric model that avoids the measurement errors pointed out by Surroca et al (2010).

Ultimately, the research goal in all of these studies is to determine if in fact a positive linkage exists between CSR expenditure and corporate performance. This study departs from this approach by seeking, instead, to ascertain the *likelihood* that a firm would engage in CSR given its financial characteristics. Although this approach is an imputation on the slack resource theory, it does not, *ex ante*, consider a profit measure an essential or necessary condition for determining if a firm would invest its resources in CSR. Accordingly, the following empirical questions drive the statement of hypothesis in this study:

- After accounting for asset size and revenue growth, what is the effect of profitability on a firm's decision to engage in CSR?
- After accounting for revenue growth and profitability, what is the effect of asset size on a firm's decision to engage in CSR?

4 Data and Methodology

Numerous methods have been employed to analyze the effect of CSR on business performance. There is however no common or universally accepted measure of CSR impact in corporate or research practice. In this study, we undertake a strategic departure in both design and approach with a conjecture that the allocation of slack resources toward CSR is likely to produce a financial gain to the firm. But more directly, we hypothesize that the nature of a firm's financial conditions influences the odds of the firm's involvement in CSR. In some ways, this notion points to the sources of competitive advantages that a firm may possess as it seeks to extend its financial commitments for the benefit of society (Barney, 1991 referenced in McWilliams & Siegel, 2011, p. 1484).

This study adopts the triple bottom dimensions of CSR identified in Global Reporting Initiative (GRI). Through a content analysis of the annual reports of the firms, we measured the economic, social, and environmental CSR disclosures using self-constructed indices based on the GRI guidelines (Appendix 1). These dimensions of CSR have also been used as compliance proxies in studies such as Uwuigbe and Egbide (2012), Orlitzky *et al* (2003), Margolis and Walsh (2003), Milne and Adler (1999), and Krippendorf (1980). Weber (1990) explains that content analysis is a helpful method for codifying text into different groups using pre-selected criteria. Milne and Adler (1999) add that content analysis is particularly useful in a study where the objective is to assess the social and environmental disclosures of firms.

The Global Reporting (GRI) approach is a more traditional variant of the Global Corporate Social Responsibility Rate (GCSRR) proposed by Focacci (2011). While the GCSRR is primarily prescriptive and not as definitive in application, its potentially greater value is in the utilization of CSR factors that not only include financial data but also a much more comprehensive set of environmental and social indicators.

In this study, the themes in the GRI index were used in ranking CSR compliance as identified in the annual reports of the sampled firms. If the annual report discloses CSR activity in accordance with the contents of the GRI Index, then a score of 1 is assigned; otherwise a score of 0 applies. We use a threshold of 30 percent overall CSR compliance based on the identified disclosures for each firm. Using this protocol, if the overall compliance is at least 30 percent, a binary score of 1 is assigned; and disclosures deemed less than 30 percent receive a score of zero. Such a compliance indicator approach has been adopted in other types of studies using categorical data, including Bebbington and Larrinaga (2007) and Campbell *et al* (2006).

Of the 169 listed firms on the Nigerian Stock Exchange in 2017 with total market capitalization of $31 billion, the audited annual reports of 30 firms were obtained from their websites over the

nine year period, 2005 to 2014. This sample includes all firms with full reporting data for the purpose of this analysis. As it turns out, these were by far the most dominant firms on the exchange, with a total market capitalization of $26 billion. In local currency terms (Nigerian naira), this represents about 85 percent of the total market value of all listed firms (Appendix 2).

In contrast to previous studies, we utilize binary outcome models to calculate the odds that a firm, given its financial characteristics, engages in social responsibility. For each of the firms in the sample and for each year in which data were available, we calculated the following financial metrics: net profit margin (NPM), return on equity (ROE), Tobin's Q (Q), asset size (Size), leverage ratio (LVRG), and sales growth (SG). Ultimately, only ROE, asset size, and sales growth were found pertinent in our final working sample of 195 observations. Compared to previous CSR studies in the Nigerian context, this is arguably the most robust dataset featuring all the relevant financial variables.

Binary choice models share the common feature of investigating the nature of a categorical response variable. Unlike multinomial models, binary models follow the *Bernoulli* process of true or false and as a result, offer a unique opportunity to draw an inference on the likelihood of the occurrence of an event based only on the two possible outcomes. For this study, the general linear model, defined over the relevant variables, is as follows:

$$Y = \beta_0 + \beta_1 ROE + \beta_2 Size + \beta_3 SG + \varepsilon \qquad\qquad (1)$$

where

$Y = 1$ if firm engages in CSR (score $\geq$ 30%), 0 otherwise. The explanatory variables are as previously defined. The linear probability model is the most basic form of probability choice and is so called because the dependent variable, Y, is expressed as a linear function of the explanatory variables. In the model, it takes the form of a discrete variable assuming the values of 1 and 0. With this construct, the expected value of Y becomes $E(Y) = 0(P_1) + 1(P_2) = P_2$, where P_2 is the probability that Y takes the value of 1 when the true criterion has been met. Since $E(Y) = P_2$, it follows that

$$P_2 = \beta_1 ROE + \beta_2 Size + \beta_3 SG \qquad\qquad (2)$$

This linear model can also be expressed as $Y = P_2 + \varepsilon$, where $P_2 = P(Y=1)$ is a *linear probability function* defined over the independent variables.

Unfortunately, the linear probability model can sometimes lead to estimated probabilities that are less than 0 or greater than 1. Further, the model forces a linear relationship, which is unlikely to support real life behavior. More robust probability choice models such as logit and probit models are able to overcome these weaknesses by constraining the likelihood of outcomes to the closed interval [0, 1]. Also, these models produce parameter estimates using the method of maximum likelihood instead of least squares. The logistic probability function, based upon which probability estimates were obtained for this study, is defined as:

$$p = \frac{e^{(\beta_0 + \beta_1 ROE) + \beta_2 SIZE + \beta_3 SG)}}{e^{(\beta_0 + \beta_1 ROE) + \beta_2 SIZE + \beta_3 SG)} + 1} \qquad (3)$$

From this function, we derive the following logistic regression model for this study:

$$\ell n\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 ROE + \beta_1 SIZE + \beta_1 SG \qquad (4)$$

The term p/(1-p) is the odds ratio and calculates the probability that Y=1 relative to the probability that Y=0. Since the logit model estimates parameters for the log of odds ratio as defined in Equation 4, we can only interpret the sign but not the magnitude of the coefficients. Ultimately, probabilities are estimated using the logit function in Equation 3.

There are a number of hypotheses that could be examined in the logit model. The specification in Equation 4 corresponds to the log of odds ratio as the response variable and ROE, asset size, and sales growth as the regressors. Accordingly, the null (H_0) and alternative (H_A) hypotheses are as follows:

- H_0: The coefficients of the model are zero
- H_A: At least one of the model coefficients is nonzero.

Before the facts, we expect the null hypothesis to be rejected with each of the three regressors maintaining a statistically significant relationship with the odds ratio. This view is guided by the notion that profitable firms with a vast asset investment are more likely to engage in CSR as a way to give back to their community.

5 Results

5.1 Linear Probability Model Results
Results of the linear probability model (LPM) are presented in Table 1. The model as a whole is statistically significant with F statistic of 10.73 and a corresponding p-value of 0.00. The explanatory power of the model may not be as compelling, however, given the low coefficient of determination of 14.43 percent.

Table 1. Linear Probability Model Estimates †

	Coefficients	Standard Error	t Stat	P-value
Intercept	-1.8468***	0.4066	-4.5421	0.0000
ROE	0.0023***	0.0008	2.9193	0.0039
SIZE	0.2548***	0.0477	5.3411	0.0000
SALEG	-0.1903**	0.0915	-2.0794	0.0389

F stat	10.7338***
P-value	0.0000
R-square	0.1443

† Linear probability model: $Y = \beta_0 + \beta_1 ROE + \beta_2 SIZE + \beta_3 SG$, where Y = 1 if CSR score $\geq$ 30%, 0 otherwise; ROE = Return on equity; Size = Asset size; SG = Sales growth.
*** *Significant at the 1% level*
** *Significant at the 5% level*

The coefficient for ROE is 0.0023 and suggests that a 1 percent increase in return on equity increases the likelihood the firm would engage in CSR by about 0.23 percent. Results also show that a 1 unit increase in asset size raises the CSR odds by 25 percent. Oddly enough, these results indicate that the likelihood of engaging in CSR is a negative function of sales growth. More specifically, a one percent increase in sales growth appears to reduce the odds by about 19 percent. All the regression coefficients are statistically significant at either the 1% or 5% level.

While the LPM is more intuitive, it is fraught with interpretational challenges as pointed out earlier. This includes the possibility that estimated odds may fall outside the probability bounds of 0 and 1. Also, the assumed linearity of the relationship is questionable since the rate at which probabilities change at low levels of ROE, for example, may differ from the rate at higher levels for the same asset size and sales growth. These limitations necessitate the utilization of the more robust logit model.

5.2 Logit Model Results

In a 1944 article, Berkson (1944) introduced the logit model showing evidence of its superiority over both the LPM and probit models. Later, in a thesis on the 'Analysis of Binary Data,' Cox and Snel (1989) outlined the many benefits of the logit model over linear models. A more recent empirical evidence in this regard is presented by Hellevik (2007). Bearing this in mind, we focus on the results of the logit model to gain a better insight on the CSR-performance dynamic.

Results of the logit model are summarized in Table 2. The likelihood ratio statistic is 33.52, which, as the p-value indicates, is significant at any conventional level. Also, all the coefficient estimates are statistically significant at either the 1% or 5% level.

Table 2. Logit Model Regression Estimates †

| Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-14.2729***	2.7859	-5.1233	0.0000
ROE	0.0173 ***	0.0064	2.7168	0.0066
SIZE	1.5587 ***	0.3165	4.9251	0.0000
SALES	-1.1363 **	0.5793	-1.9616	0.0498
LR statistic	33.5160 ***			
Prob(LR statistic)	0.0000			

Similar to the findings from the LPM, the positive coefficients for ROE and firm size indicate that the likelihood of CSR engagement is a positive function of those two variables. In effect, larger and more profitable firms are more likely than smaller and less profitable firms to engage in CSR. The negative coefficient for sales growth may be initially counterintuitive since one might expect firms with rising fortunes, as it were, to be more disposed to community and social investments. But it could also mean that these firms devote the bulk of their resources to sustaining their growth in order to maintain their competitive edge. This latter interpretation is in line with the view by Barney (1991) on the utilization of slack resources for competitive advantages.

While these results are consistent with those of the LPM, logit probabilities must be estimated with the logistic function shown in Equation 3. Probabilities are calculated and plotted for different values of the explanatory variables. These are summarized in Figures 1 and 2.

Figures 1A and 1B show estimated probabilities for changes in ROE holding sales growth flat in both cases. Asset size is held at the median level in Figure 1A and at a high level in Figure 1B. As Figure 1A shows, even the most profitable firms are not likely to increase their CSR efforts. For example, at ROE of 150%, estimated probability rises to only about 0.02. The ROE range in the dataset is -265 to 304 percent.
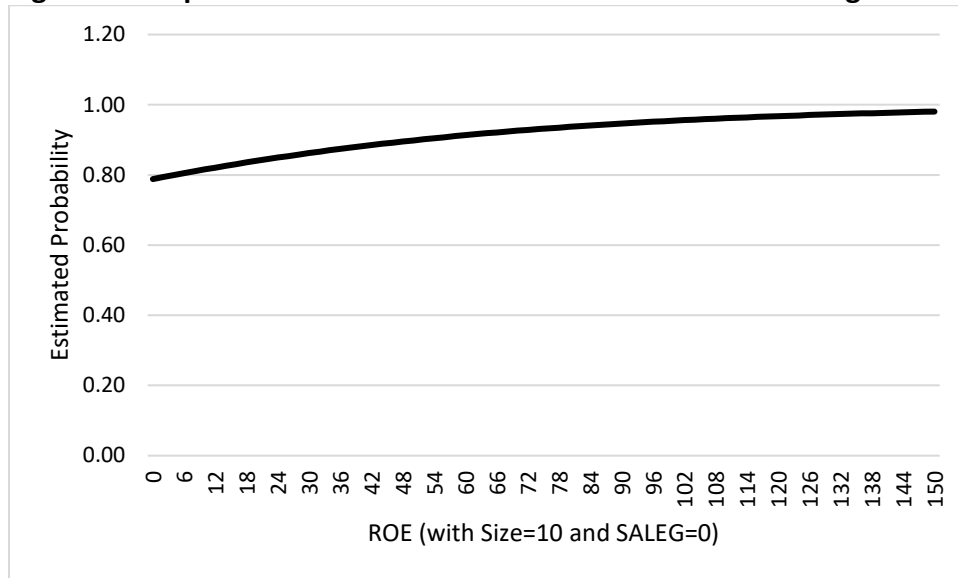
Figure 1A. Impact of ROE on Estimated CSR Probabilities for Small Firms †
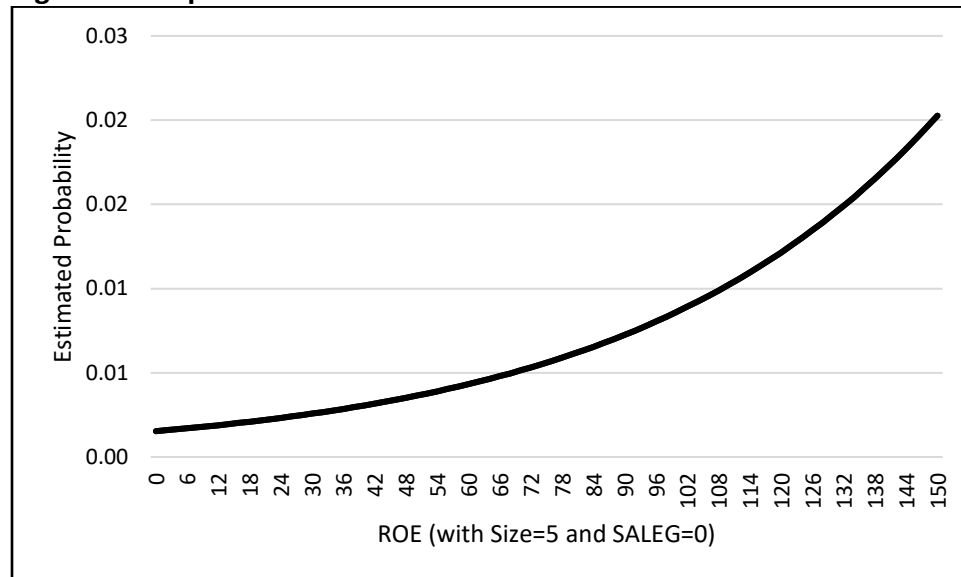
Figure 1B. Impact of ROE on Estimated CSR Probabilities for Large Firms †

† Estimated logistic probability: $\hat{p} = \dfrac{e^{(b_0 + b_1(ROE) + b_2(SIZE) + b_3(SG)}}{e^{(b_0 + b_1(ROE) + b_2(SIZE) + b_3(SG)} + 1}$,

where ROE = Return on equity; Size = Asset size; SG = Sales growth.

The impact of ROE is only visible for large firms as Figure 1B shows. As already noted, sales growth has a negative although almost negligible effect on the odds. For this reason, sales growth is held at 0% in both cases. More importantly, since the estimated probability is as high as 0.8 at ROE of zero percent, it means that the key driver for CSR in Nigeria is arguably asset size. As Figure 2 shows, asset size has a positive and noticeable impact on estimated probabilities.

Figure 2. Impact of Asset Size on Estimated CSR Probabilities †
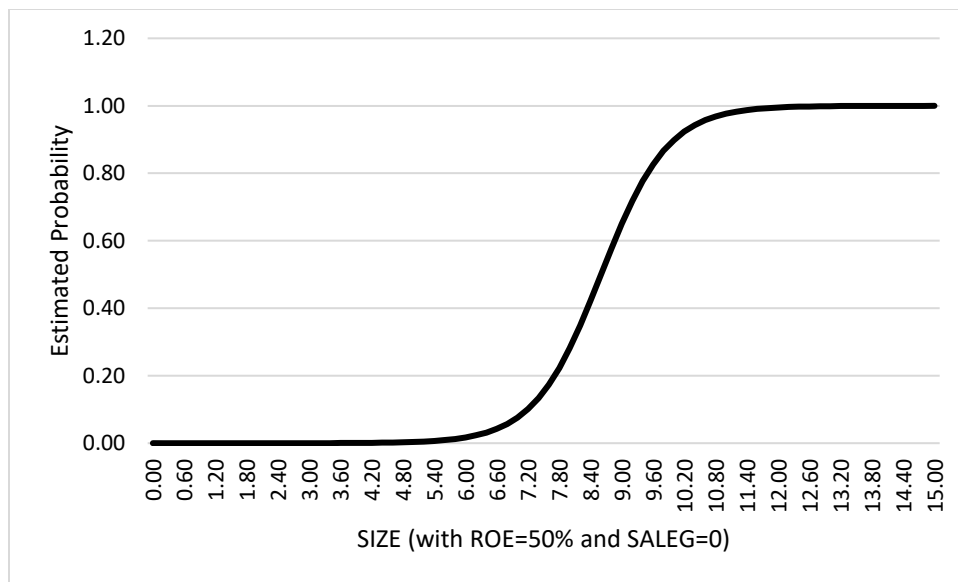
12

† Estimated logistic probability: $\hat{p} = \dfrac{e^{(b_0 + b_1(ROE) + b_2(SIZE) + b_3(SG))}}{e^{(b_0 + b_1(ROE) + b_2(SIZE) + b_3(SG))} + 1}$,

where ROE = Return on equity; Size = Asset size; SG = Sales growth.

Consistent with the logistic probability function, Figure 2 shows there is no significant change in odds for either very small or very large firms. Specifically, change in odds is negligible for firms ranked higher than 12 or lower than 7. Small firms are understandably incapable of mustering the type of resources that can enable them make meaningful civic contributions. For that reason, the odds that a small firm engages in CSR are virtually zero. On the other hand, the odds are virtually assured for very large firms. There is a noticeable evidence of a change in probabilities for moderately sized firms, especially those in the mid-range.

Unlike least squares regressions where the coefficient of determination is the appropriate descriptive measure of goodness of fit, the logit model relies on the percent of correctly predicted values as the basis for determining forecast accuracy. The prediction criteria and results are summarized in Table 4.

Table 4. Logit Model Goodness of Fit (% of Correctly Predicted Values) †

Panel A. Prediction Criteria	Actual y = 1	Actual y = 0
Predicted Y-hat = 1	TRUE	FALSE
Predicted Y-hat = 0	FALSE	TRUE
Panel B: Prediction Result		
Number correctly predicted	93	
Total number of observations	195	
% correctly predicted	48%	

† based on the following estimated logistic probability: $\hat{p} = \dfrac{e^{(b_0 + b_1(ROE) + b_2(SIZE) + b_3(SG)}}{e^{(b_0 + b_1(ROE) + b_2(SIZE) + b_3(SG)} + 1}$,

where ROE = Return on equity; Size = Asset size; SG = Sales growth.

The TRUE criterion is met in two of the four cases shown in Panel A: if the estimated probability is greater than 0.5 where y = 1 and, if the estimated probability is less than 0.5 where y = 0. Since the odds ratio is exactly 1 when the estimated probability is 0.5, the reliability of the prediction model is stronger when the TRUE prediction cutoff rate is sufficiently greater than 0.5. For this study, we set the estimated probability cutoff rate for y = 1 at 0.55.

Goodness of fit analysis is performed only in the case where probabilities are estimated for different asset sizes, since asset size is found to be the most impactful of the three explanatory variables. By comparing the estimated probabilities to the actual y value, we found the percent of correctly predicted values to be 48 percent. These findings are summarized in Panel B of Table 4. One way to interpret this outcome is that our specified model has a 50-50 chance of correctly predicting whether a firm, given its asset size, is likely to engage in CSR.

5.3 Chi-Square Tests of Independence

Nonparametric tests are often useful for comparing two qualitative variables using enumerative data. By implementing a chi-square test of independence, we seek to ascertain if, given its significance in the logit model, a firm's asset size influences its CSR policy. Pursuant to this, we sorted the sample of 195 observations by asset size and then split the ranked data into three subsamples, each containing 65 observations. We then counted the number of instances where the CSR dummy variable is satisfied in each of the three asset size classes. The statement of hypothesis is given as:

H_0: Asset size and CSR practice are independent
H_A: The two classifications – asset size and CSR – are not independent

The contingency table cross-classified by CSR and asset size is presented in Panel A of Table 5. Based on the expected frequencies for each cell shown in Panel B, the calculated statistic is chi-square distributed with (r-1)(c-1) degrees of freedom, where r is the number of rows and c the number of columns in the contingency table. Results of the test of significance are presented in Panel C. Since the p-value is less than any conventional level of significance, we conclude that CSR and asset size are not independent. In other words, there is a relationship between the size of a firm, measured by its asset investment, and the firm's decision to practise CSR.

Table 5. Contingency Table for CSR Practice in Nigeria Based on Firm Asset Size

Panel A. Observed Data	Asset Size			
CSR	Small	Medium	Large	Row Total
Yes	15	13	34	**62**
No	50	52	31	**133**

Column Total	**65**	**65**	**65**	**195**
Panel B. Expected Frequencies +				
CSR	**Small**	**Medium**	**Large**	**Row Total**
Yes	20.67	20.67	20.67	**62**
No	44.33	44.33	44.33	**133**
Column Total	**65**	**65**	**65**	**195**
Panel C. Test of Significance				
Degrees of freedom = (r-1)(c-1) = (2-1)(3-1) = 2				
Chi-square statistic: χ^2 = 19.06 ***				
P-value = 0.0001				

*** Significant at 1% level.

+ On the basis of the null hypothesis of 'independence,' we use the multiplication rule for the joint probability of independent events to calculate expected frequencies. Thus, to find the expected frequency of 20.67 for small firms that practice CSR, we first calculate the joint probability for that cell to get 0.106. And then multiply that result by

the total sample size of 195: $P(A_1 \cap B_1) = P(A_1)P(B_1) = \left(\dfrac{62}{195}\right)\left(\dfrac{65}{195}\right) = 0.106$.

Two aspects of the findings in Table 5 are particularly noteworthy. First, more than one half of the firms that practise CSR are large firms (34 out of 62). This reinforces the evidence from the logit model that larger firms are more likely to engage in CSR than any other category of firms. Second, we found that the vast majority of the firms in the large asset category – about 94 percent – are in financial services. Conversely, there is only one financial service firm in the small asset category, more than 70 percent of which are in consumer goods. There is a mix of consumer goods, petroleum, and financial firms in the middle asset class. These subsequent findings lead us to conclude that not only is it the case that firms with large asset investments are more likely to engage in CSR, it is also true that most of these large firms are in financial services, mostly banking.

6 Discussion

The evidence from this study supports our pre-research hypothesis of a positive linkage between CSR and the specified financial indicators. Equally, its supports the findings from the seminal work of Waddock and Graves (1997) on the slack resources theory. Without the consideration of revenue growth, they found that corporate social investment is positively linked to a firm's future and prior financial performance. Notwithstanding, two important distinctions need to be made between the approach in this study and existing studies with a focus on Nigeria.

First, the estimation approach in these other studies utilizes the traditional multiple regression model in which CSR is expressed as a linear function of financial metrics, mainly return on asset and return equity (Okedge and Egbunike, 2016; Uadiale & Fagbemi, 2012; Uwuigbe & Egbide, 2012). Such specification, we believe, may have inadvertently assumed that more profitable firms are those that disclose more of their CSR activities. In our view, these conclusions may be

presumptuous as they bypass the fundamental question. And that is, whether investing in CSR enhances a firm's image in society and as a result, leads to a better financial performance. When this question is presented in the context of a probability choice, as is the case in this study, we find that profitability, when considered exclusively, bears very little impact.

Second, the use of indicator or categorical variables in a traditional multiple regression study, as is the case in some of these studies, may be fraught with estimation problems. On account of this, we believe that our use of binary outcome and nonparametric models are a significant methodological improvement over the existing empirical approaches. By examining the odds of CSR engagement, given the financial characteristics of the firm, this study avoids the empirical problems of researcher subjectivity and measurement bias discussed by Galant and Cadez (2017).

7 Conclusions

This study demonstrates that when compared to other financial indicators, asset size is the most impactful in shaping a firm's policy on corporate social responsibility (CSR). This evidence is based on the financial characteristics of publicly listed firms in Nigeria. Other financial metrics examined are return on equity and sales growth. But these latter variables proved far less impactful.

The approach in this study departs from previous studies in that CSR is measured as a binary response variable, taking on the values of 1 for firms satisfying a pre-determined CSR protocol and 0 otherwise. In that categorical form, CSR is then linked to asset size, profitability, and revenue growth using binary choice and nonparametric models.

Results of both linear probability and logistic models show that CSR is a positive function of both return on equity and asset size. It is a negative function of sales growth. We conjecture that the negative impact of sales growth is because such firms, in their efforts to expand and remain competitive, devote the bulk of their resources to sustaining their growth rather engage in social endeavors. Across the board, asset size had the most pronounced effect on the likelihood that a firm engages in CSR. Estimated probabilities from the logit model reveal that when considered in isolation, profitability has little impact on CSR except for large firms. For smaller firms, the likelihood of engaging in CSR is virtually zero irrespective of how profitable they are. This important finding is contrary to some of the existing studies in the Nigerian context which show that profitability has a direct impact on either CSR disclosures on CSR expenditure. It is arguable that such findings of a positive linkage are spurious.

In a subsequent nonparametric analysis, a chi-square test of independence was used to corroborate the CSR-asset size relationship. We found that not only is CSR dependent on asset size, more than one-half of the firms that are engaged in CSR are large firms, the vast majority of which are in financial services. Most of the small firms are in consumer goods. This finding is consistent with evidence presented by Forcadell (2017) which shows that efforts by banks to build a reputation for CSR does benefit their bottom line especially in strong economic conditions. It also reinforces the hypothesis by McWilliams and Siegel (2001) which identify asset size as a contributing variable in the decision to engage in CSR.

This is the first empirical study that utilizes methods of probability choice in conjunction with nonparametric statistics to examine the linkages between financial performance and CSR in Sub-Saharan Africa. Extant literature shows mixed results. Our study reveals that in the case of Sub-Saharan Africa, the positive impact of profitability on CSR is only realized for large firms, most of which are in the financial services industry.

8. Limitations and Study Implications

The finding that large firms are more likely to contribute to social causes reinforces a widely-held view about such firms in Nigeria and perhaps also, in many other developing economies. And that is, physical size tends to be equated with financial success. This is particularly true of banks, with their big buildings and ubiquitous presence in many African cities. Unfortunately this view does not take into account the financial performance of the firm, which arguably, transcends physical size.

Although Nigeria is an important test case in Sub-Saharan Africa due to its large population and economic strength, the singular focus on that economy may nevertheless be limiting. To the extent that the political and economic landscape of the country may not be easily replicated elsewhere, it would be helpful to extend the inquiry to other Sub-Saharan African countries at least for comparative purposes.

Results of this study have implications that could moderate society's expectations of the types of firms that contribute to social causes. Public interest and civil society groups can rely on implications of the results of studies such as this to guide them on how to more effectively urge all kinds of financially able firms to play a more active role in promoting the quality of life of people within its business community. For example, firms other than those in financial services, can be encouraged to embrace the value of investing a part of their resources in CSR. This is particularly true of firms in other potentially lucrative business sectors such as petroleum, transportation, and hospitality. As the literature suggests, doing so could have a lasting positive impact on the bottom line of participating firms.

References

1. Achike, A.I. and Onoja, A.O. (2014) 'Greenhouse gas emission determinants in Nigeria : implications for trade', *Climate Change Mitigation and Adaptation Policies*, Vol 4, no. 1, pp.83–94.

2. Amole, B. B., Adebiyi, S. O. and Awolaja, A. M. (2012) 'Corporate social responsibility and profitability of Nigerian banks: A causal relationship', *Research Journal of Finance and Accounting*, Vol. 3, No. 1, pp.6-17.

3. Amaeshi, Kenneth; Adi, Bongo; Ogbechie, Chris; Amao, Olufemi (2006) 'Corporate social responsibility in Nigeria', *Journal of Corporate Citizenship*, Vol. 24, pp. 83-99.

4. Arevalo, Jorge and Aravind, Deepa (2017) 'Strategic outcomes in voluntary CSR: reporting economic and reputational benefits in principles-based initiatives', *Journal of Business Ethics*, Vol. 144, No. 1, pp. 201-217.

5. Barney, J.B. (1991) 'Firm resources and sustained competitive advantage', *Journal of Management*, Vol. 17, pp.99–120.

6. Babalola, Y.A. (2012) 'The impact of corporate social responsibility on firms' profitability in Nigeria', *European Journal of Ekonomics, Finance and Administrative Sciences*, Vol. 21, No. 45, pp.39–50.

7. Berkson, J. (1944) 'Application of the Logistic Function to Bio-Assay', *Journal of the American Statistical Association,* Vol. 39, No. 227, pp.357-365.

8. Bocquet, R., Le Bas, C., Mothe, C., and Poussing, N. (2017) 'CSR, innovation, and firm performance in sluggish growth contexts: A firm-level empirical analysis', *Journal of Business Ethics*, Vol. 146, No. 1, pp.241-254.

9. Carter, D., Simkins, B., and Simpson, W.G. (2003) 'Corporate governance, board diversity, and firm value', *The Financial Review*, Vol. 38, pp.33-53.

10. Cavaco, S. and Crifo, P. (2014) 'CSR and financial performance: complementarity between environmental, social and business behaviours', *Applied Economics*, Vol. 46, No. 27, pp. 3323-3338.

11. Cox, D.R. and Snel, E.J. (1989) Analysis of Binary Data: Monographs on Statistics and Applied Probability, Second Edition, Chapman & Hall/CRC, ISBN 0-412-30620-4

12. Donaldson, L. and Davis, J.H. (1991) 'Stewardship theory or agency theory: CEO governance and shareholder returns', *Australian Journal of Management*, Vol. 16, pp.49-64.

13. Donaldson, L. and Davis, J.H. (1994) 'Boards and company performance-research challenges the conventional wisdom,' *Corporate Governance International Review*, Vol. 2, No. 3, pp.151-160.

14. Donaldson, T., Preston, L.E. and Preston, L. E. (1995) 'Stakeholder theory: concepts, evidence, corporations and its implications,' *Management*, Vol. 20, Vol. 1, pp.65–91.

15. Forcadell, F. J. and Aracil, E. (2017) 'European banks' reputation for corporate social responsibility', *Corporate Social Responsibility & Environmental Management*, Vol. 24, No. 1, pp.1-14.

16. Freeman, R.E. and McVea, J. (2001) Darden Graduate School of Business Administration: A Stakeholder Approach to Strategic Management. *Working Paper*, Vol. 1.

17. Friday, O.B. (2015) 'The role of corporate social responsibility and its relevance in the Nigerian oil industry,' *The International Journal of Business & Management*, Vol. 3, No. 11, pp.222–230.

18. Focacci, A. (2011) 'Corporate social responsibility performance assessment by using a linear combination of key indicators', *International Journal of Business Governance and Ethics,* Vol. 6, No. 2, pp.183-202. DOI: 10.1504/IJBGE.2011.039968

19. Friedman, M. (1970) The Social Responsibility of Business is to Increase its Profits, *NY Times*, 5, p.SM17.

20. Galant, A. and Cadez, S. (2017), 'Corporate social responsibility and financial performance relationship: a review of measurement approaches,' *Economic Research-Ekonomska Istraživanja*, Vol. 30, No. 1, pp. 676-693. https://doi.org/10.1080/1331677X.2017.1313122.

21. Global Reporting Initiative (2015), GRI Standards, www.globalreporting.org/standards (retrieved on Dec 1, 2018)

22. The Hauser Institute for Civil Society (2015) *Corporate Social Responsibility Disclosure Efforts by National Governments and Stock Exchanges*, Harvard Kennedy School, Cambridge, MA, USA.

23. Hellevik, O. (2007) Linear versus logistic regression when the dependent variable is a dichotomy. *Quality & Quantity*, *43*(1), 59–74. http://doi.org/10.1007/s11135-007-9077-3.

24. Khanifar, H. et al. (2012) 'Impacts corporate social responsibility activities on company financial performance,' *Interdisciplinary Journal of Contemporary Research in Business*, Vol. 3, No. 9, pp.583–592.

25. Luper, I. (2013) 'Rethinking banks corporate social responsibility (CSR) in Nigeria,' *International Journal of Finance and Accounting*, Vol. 2, No. 1, pp.30–36.

26. Margolis, J.D. and Walsh, J.P. (2003) 'Misery loves companies: rethinking social initiatives by business,' *Administrative Science Quarterly*, Vol. 48, No. 2, p.268.

27. McWilliams, A., Siegel, D. (2001) 'Corporate social responsibility: A theory of the firm perspective,' *The Academy of Management Review*, Vol. 26, No. 1, pp. 117-127.

28. McWilliams, A., Siegel, D. and Wright, P.M. (2006) 'Corporate social responsibility: strategic implications,' *Journal of Management Studies*, Vol. 43, No. 1, pp.1–18.

29. Milne, M.J. and Adler, R.W. (1999) 'Exploring the reliability of social and environmental disclosures content analysis,' *Accounting, Auditing & Accountability Journal*, Vol. 12, No. 2, pp.237–256.

30. Nakashima, M. and Ota, S. (2016) 'Association between corporate financial performance and corporate social responsibility in a crisis: focusing on the March 11 disaster,' *Asia-Pacific Management Accounting Journal*, 11(2): 147-167.

31. Nwagbara, U. and Kamara, H.Y. (2015) 'Corporate social responsibility (CSR) leadership and poverty reduction: the case of Nigeria and Sierra Leone,' *Economic Insights-Trends & Challenges*, Vol. 67, No. 2, pp.21-30.

32. Nwoke, U. (2016) 'Two complimentary duties under corporate social responsibility,' *International Journal of Law & Management*, Vol. 58, No. 1, pp. 2-25.

33. Orlitzky, M., Schmidt, F.L. and Rynes, S.L. (2003) 'Corporate social and financial performance: A meta-analysis,' *Organization Studies*, Vol. 24, No. 3, pp.403–441.

34. Okegbe, T.O. and Egbunike, F.C. (2016) 'Corporate social responsibility and financial performance of selected quoted companies in Nigeria', *NG-Journal of Social Development*, Vol 5, No. 4, pp.168-189. DOI: 10.12816/0033096

35. Palmer, H. J. (2012) 'Corporate social responsibility and financial performance: does it pay to be good?' CMC Senior Theses, Paper 529 http://scholarship.claremont.edu/cmc_theses/529 (accessed on January 7, 2019)

36. Rajeev, P.N. and Kalagnanam, S. (2017) 'India's mandatory CSR policy: implications and implementation challenges', *International Journal of Business Governance and Ethics*, Vol. 12, No. 1, pp.90-106

37. Rodriguez-Fernandez, M. (2016) 'Social responsibility and financial performance: the role of good corporate governance," *BRQ Business Research Quarterly*, Vol. 19, No. 2, pp. 137-151. https://doi.org/10.1016/j.brq.2015.08.001

38. Russo, M. V., and Fouts, P. A. (1997) 'A resource based perspective on corporate environmental performance and profitability,' *Academy of Management Journal*, Vol. 40, No. 3, pp. 534-559

39. Surroca, J., Tribo, J.A. and Waddock, S. (2010) 'Corporate responsibility and financial performance: the role of intangible resources,' *Strategic Management Journal*, Vol. 31, pp.463–490.

40. Su, W., Peng, M.W., Tan, W., and Cheung, Y.L. (2014) 'The signaling effect of corporate social responsibility in emerging economies,' *Journal of Business Ethics*, DOI 10.1007/s10551-014-2404-4.

41. Uadiale, O.M. and Fagbemi, T.O. (2012) 'Corporate social responsibility and financial performance in developing economies: The Nigerian experience,' *Journal of Economic and Sustainable Development*, Vol. 3, No. 4, pp.44–55.

42. Uwuigbe, U. and Egbide, B.C. (2012) 'Corporate social responsibility disclosures in Nigeria: A study of listed financial and non-financial firms,' *Journal of Management and Sustainability*, Vol. 2, No. 1, pp.160–169. http://dx.doi.org/10.5539/jms.v2n1p160

43. Waddock, S.A. and Graves, S.B. (1997) 'The corporate social performance-financial performance link,' *Strategic Management*, Vol. 18, No. 4, pp. 303-319. DOI: 10.1002/(SICI)1097-0266(199704)18:4<303::AID-SMJ869>3.0.CO;2-G

44. Weber, R.P. (1990) Basic Content Analysis: *Second edition.*

Appendix 1. Forty Five Testable CSR Disclosure Items in the Study

ECONOMIC	ENVIRONMENTAL	SOCIAL			
		Labour Practices & Decent Work	**Human Rights**	**Society**	**Product Responsibility**
Market Presence	Materials	Employment	Investment	Local Communities	Customer Health & Safety
Indirect Economic Impacts	Energy	Labour\ Management Relations	Non-Discrimination	Anti-Corruption	Product & Service Labelling
Procurement/Sourcing Practices	Water	Occupational Health & Safety	Freedom of Association & Collective Bargaining	Public Policy	Marketing Communications
	Biodiversity	Training & Education	Child Labour	Anti-Competitive Behaviour	Customer Privacy
	Emissions	Diversity & Equal Opportunity	Forced or Compulsory Labour	Compliance	Compliance
	Effluents & Waste	Equal Remuneration for Women & Men	Security Practices	Supplier Assessment for Impacts on Society	
	Products & Services	Supplier Assessment for Labour Practices	Indigenous Rights	Grievance Mechanisms for Impacts on Society	

	Compliance	Labour Practices Grievance Mechanisms	Assessment		
	Transport		Supplier Human Rights Assessment		
	Overall		Human Rights Grievance Mechanisms		
	Supplier Environmental Assessment				
	Environmental Grievance Mechanisms				

Source: Global Reporting Index (2015), www.globalreporting.org/standards/gri-standards-download-center

Appendix 2. List of Firms in the Final Working Sample

COMPANY	SECTOR	MARKET CAPITALIZATION (2018), NIGERIAN NAIRA
7UP	CONSUMER GOODS	N/A
ACCESS	FINANCIAL SERVICES	159,103,843,971
CADBURY	CONSUMER GOODS	18,782,020,400
DANGCEM	INDUSTRIAL GOODS	2,896,886,258,850
DANGSUGAR	CONSUMER GOODS	163,800,000,000
DIAMONDBANK	FINANCIAL SERVICES	43,541,531,260
ETI	FINANCIAL SERVICES	247,718,941,403
FBNH	FINANCIAL SERVICES	253,061,814,184
FCMB	FINANCIAL SERVICES	33,664,608,282
FLOURMILL	CONSUMER GOODS	77,292,155,554
FORTEOIL	OIL AND GAS	34,580,873,285
GUARANTY	FINANCIAL SERVICES	921,195,909,711
GUINNESS	CONSUMER GOODS	153,326,797,330
INTBREW	CONSUMER GOODS	266,471,720,016
JBERGER	CONSTRUCTION/REAL ESTATE	34,122,000,000
MOBIL	OIL AND GAS	66,349,528,208
NB	CONSUMER GOODS	630,955,571,824
NESTLE	CONSUMER GOODS	1,149,351,565,400
OANDO	OIL AND GAS	52,833,503,044
PZ	CONSUMER GOODS	47,645,724,540
STANBIC	FINANCIAL SERVICES	472,601,518,412
STERLINGBANK	FINANCIAL SERVICES	57,005,027,889
TOTAL	OIL AND GAS	67,972,271,767
TRANSCORP	CONGLOMERATES	47,964,628,546
UACN	CONGLOMERATES	25,931,669,220
UBA	FINANCIAL SERVICES	247,945,804,918

UBN	FINANCIAL SERVICES	174,724,516,728
UNILEVER	CONSUMER GOODS	212,565,200,429
WAPCO - Lafarge	CONSTRUCTION/REAL ESTATE	101,479,110,408
ZENITHBANK	FINANCIAL SERVICES	659,326,369,506
Total Market Capitalization		**9,318,200,485,084**

† Average 2018 exchange rate: USD$1 = 364 Nigerian naira. Data source: Nigerian Stock Exchange (www.nse.com.ng/market-data/trading-statistics/equities)