THE IMPACT OF REJECTED VOTES ON 2019 NIGERIAN PRESIDENTIAL ELECTION: AN APPLICATION OF ORDINARY LEAST SQUARE

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Abstract

This paper investigates the impact of rejected votes on 2019 Presidential election in Nigeria. The subsequent increase in rejected votes in Nigeria general elections has posed a serious challenge and concern to the electorates, to local and international observers, and the election umpire, that is, the Independent National Electoral Commission (INEC). The issue of rejected votes makes mockery and embarrassment of the entire election process in Nigeria. One of the reasons adduced for the high level of rejected votes by political scientists is there is a low level of political education in Nigeria. The specific objective of this study is to determine the extent to which rejected votes are affected by three variables. These variables are; number of registered voters, the number of accredited voters and total vote cast. Secondary data of 2019 Presidential Election Result obtained from the website of the Independent National Electoral Commission (INEC) was used for the analysis. Based on the analysis, we can conclude that the number of rejected votes of the 2019 Nigerian Presidential election is not influenced by the number of registered voters, but it is influenced number of accredited voters, total voting cast and total valid votes.

Keywords: Rejected Votes, INEC, Nigerian Presidential Election, Multiple Regression, and Ordinary Least Square Estimation.

1. INTRODUCTION

The 2019 Nigerian Presidential Election was scheduled for 16 February 2019, Presidential and National Assembly elections were later rescheduled to 23 February 2019. Nigeria has conducted several general elections since the return of civil democracy in 1999 and the 2019 Nigerian Presidential election was the 9th national election. The 2019 general election was regarded as one of the biggest in the country because it accommodated 91 political parties of various sizes and capacities. The Independent National Electoral Commission (INEC) arranged for the election of 73 presidential candidates, 109 Senators, and 360 members of the House of Representatives. It also organized the election of 36 State Governors and 36 State House of Assembly representatives. INEC provided for 84,004,084 registered voters to perform their civic responsibilities. It was an enormous task for the Independent Electoral Commission (INEC) (Dung, 2019).

The election once again recorded a high percentage of rejected votes compared to previous elections. The high rate of rejected votes in Nigeria elections has become alarming in all election process; from the figures released by INEC for just concluded 2019 Presidential results, the numbers of rejected votes are higher than that of 2015 election. 2019 Nigeria presidential election recorded 1,289,607 rejected votes nationwide, while that of 2015 was 844,519, according to the results announced by the Independent National Electoral Commission (INEC) (Ukah, 2019).

Subsequent increase in rejected votes in Nigeria general elections has posed a serious challenge and concern to the electorates, both local and international observers, the election umpire, that is, the Independent National Electoral Commission (INEC). The problem of rejected votes makes ridicule and embarrassment of the entire election process in Nigeria. One of the causes adduced for high level of rejected votes by political scientists is there is a low level of political education in Nigeria. A News Agency of Nigeria (NAN) analysis of rejected votes of 2019 figures reveals that it constitutes 4. 5% of 28,614,190 total votes cast in the election. NAN observation also reveals that voided votes are more than total valid votes cast in each of the thirty-four states and Federal Capital Territory. However, it was only in Kaduna, Katsina and Kano state that valid votes exceeded rejected votes across the country. The three states recorded valid votes of 1,663,603, 1,555,473 and 1,891,134 respectively (Premium Times, 2019).

The 2019 rejected votes figure is 445,088 or 52.7 percent higher than 844,519 rejected votes declared nationwide in 2015 presidential election. Ratio of rejected votes to total votes cast is also higher in 2019 elections compared with the 3.1 percent recorded in 2011, representing an increase in 1.4 percent. On the state basis, Kano recorded the highest voided votes in 2019 polls, accounting for 73,617 or 5.7 percent of the national total. This trend indicates that Nigerian voters are getting less educated in the balloting system, hence the need for more voter education in the country. (Adegboyega, Premium Times, 2019).

Ayanda and Odunayo (2015) paper compared the 2011 and 2015 presidential elections in Nigeria with a specific focus on the Fourth Republic. They proposed that for voting to be free and fair, it is essential for government to place priority on education through free and compulsory education, shun provocative speech-making, openly condemn violence, guarantee to respect rules, specifically the Code of Conduct for Political Parties, and track criticism through legal paths.

According to Hassan and Itodo (Premium times, 2015), in 2019 presidential election, the margin of victory was about three million nine hundred thousand votes and better than the amount of invalid votes. It is on this basis that INEC didn't incorporate a rerun. However, during a strong contest, the invalid votes would be enough to see the end result. Hassan and Itodo (Premium times, 2015) attributed the high incidence of voided, or invalid votes to inadequate voter education in Nigeria. They urged the government, the electoral commission and political parties to do more enlightenment campaigns for voters on the voting process. They also wish for the size of the ballot papers to be enlarged to enable voter's thumbprint correctly in their preferred party's box. To increase the size of the ballot papers, Itodo (Premium times, 2015) suggested a review of the number of parties that get on the ballot papers. Bassey et al. (2011) paper on the 2011 presidential election reveals that rejected votes differed significantly across the geopolitical zones in Nigeria.

Umar (2016) found out that rejected votes of the 2015 Nigerian Presidential election is influenced by the number of registered voters, the number of accredited voters and total votes cast. From the figures released by INEC for just concluded 2019 Presidential results the numbers of rejected votes are higher than that of the 2015 election. This paper is a further study to determine the extent to which rejected votes can be affected by some variables such as the number of registered and accredited voters and total vote cast by the voting public in Nigeria.

2. MATERIALS AND METHODS

Secondary data of 2019 Presidential Election Result is obtained from the website of the Independent National Electoral Commission (INEC). The data consists of rejected votes, registered voters, accredited voters and total votes cast of the Nigerian Presidential election results of the thirty-six states and Federal Capital Territory (FCT). The data obtained in this study will be processed using Multiple Linear Regression Model via the SPSS statistical package.

2.1 MULTIPLE LINEAR REGRESSION MODEL

Regression analysis is a statistical method that is used to model the relationship that exists between two or more variables. In some research studies, the main objective is to determine the relationship between variables.

A regression in which two or more independent X variables, and a dependent Y variable are present is known as multiple regression, as in simple linear regression, the potential problems, diagnostic methods, assumptions and estimations of the regression coefficients using ordinary least square.

A regression model with any number of variables can be expressed by the simple matrix equation below:

$$Y = X\beta + \varepsilon$$

Where **y** is an n×1 vector of responses,

X is an n×p matrix of the regressor variables,

β is a p × 1 vector of unknown constants,

ε is an n×1 vector of random errors, with $\varepsilon_i \sim IID(0, \sigma^2)$.

It will be convenient to assume that the regressor variables are standardized. Consequently, $\mathbf{X'X}$ is a p × p matrix of correlations between the regressors and **X`y** is a p × 1 vector of correlation between the regressors and the response.

Let the jth column of **X** matrix be denoted by X_j , so that X = $[X_1, X_2, \dots \dots . X_P]$. Thus X_j contains the n levels of the regressor variable.

A regression with n cases and k-1 with X variables can be stated in the following matrices form:

Y (n x 1), a column vector of Y observed values:

$$Y = \begin{bmatrix} Y_1 \\ Y_2 \\ Y_3 \\ . \\ . \\ . \\ Y_n \end{bmatrix}$$

$\hat{Y}$ (n x 1), a column vector of Y predicted values :

$$\hat{Y} = \begin{bmatrix} \hat{Y}_1 \\ \hat{Y}_2 \\ \hat{Y}_3 \\ . \\ . \\ . \\ \hat{Y}_n \end{bmatrix}$$

(k x 1) matrix column vector of the estimated regression coefficients:

$$\beta = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \\ . \\ . \\ . \\ b_{k-1} \end{bmatrix}$$

(n x 1) column vector of ε sample residuals for the respective n cases is given below :

$$\varepsilon = \begin{bmatrix} e_1 \\ e_2 \\ e_3 \\ . \\ . \\ . \\ e_n \end{bmatrix}$$

The general matrix format for a regression model with any number of variables is given below:

$$\begin{bmatrix} Y_1 \\ Y_2 \\ Y_3 \\ . \\ . \\ . \\ Y_n \end{bmatrix} = \begin{bmatrix} 1 & X_{11} & X_{12} & X_{13} \ldots\ldots & X_{1K-1} \\ 1 & X_{21} & X_{22} & X_{23} \ldots\ldots & X_{2K-1} \\ 1 & X_{31} & X_{32} & X_{33} \ldots\ldots & X_{3K-1} \\ . & . & . & . & . \\ . & . & . & . & . \\ . & . & . & . & . \\ 1 & X_{n1} & X_{n2} & X_{n3} \ldots\ldots & X_{nK-1} \end{bmatrix} \begin{bmatrix} b_1 \\ b_2 \\ b_3 \\ . \\ . \\ . \\ b_{k-1} \end{bmatrix} + \begin{bmatrix} e_1 \\ e_2 \\ e_3 \\ . \\ . \\ . \\ e_n \end{bmatrix} \qquad 2.11$$

(n x 1) (n x k) (k x 1) (n x 1)

2.2. LEAST SQUARE ESTIMATION OF THE PARAMETERS

The regression coefficients can be estimated by solving:

$$\beta = (X'X)^{-1}X'Y. \qquad 2.21$$

The ordinary least square can be used to solve for the coefficients

The sum of squared residual is given by

$$\sum_{i=1}^{n} e_i^2 = \varepsilon'\varepsilon = (Y - X\beta)'(Y - X\beta)$$

Expanding the RHS of the equation we get Y'Y $-2\beta'X'Y + \beta'X'X\beta$

Applying partial differentiation concerning β and equating to zero we get

$\frac{\delta \sum_i^n e_i^2}{\delta\beta}$= -2X'Y + 2X'X$\hat{\beta}$=0

$2X'X\hat{\beta} = 2X'Y$

By simplification, we get $\hat{\beta} = (X'X)^{-1}X'Y$

By solving the above equation, gives the estimates of the regression coefficients. We now obtain the expectation and the variance of $\hat{\beta}$.

$$\hat{\beta} = (X'X)^{-1}X'Y$$

The matrix model, $Y=X\beta + \varepsilon$ is substituted in $\hat{\beta}$

$\hat{\beta} = (X'X)^{-1}X'Y = (X'X)^{-1}X'(X\beta + \varepsilon) = (X'X)^{-1}X'X\beta + (X'X)^{-1}X'\varepsilon$

$= \frac{1}{X'X} X'X\beta + (X'X)^{-1}X'\varepsilon = \beta + (X'X)^{-1}X'\varepsilon$ 2.22

The expectation becomes,

$E(\hat{\beta}) = E\{\beta + (X'X)^{-1}X'\varepsilon\} = E(\beta) + (X'X)^{-1}X'E(\varepsilon) = \beta$

From equation 2.22

$\hat{\beta} - \beta = (X'X)^{-1}X'\varepsilon$ 2.23

The variance of $\hat{\beta}$ becomes

$Var(\hat{\beta}) = E[(\hat{\beta} - \beta)(\hat{\beta} - \beta)'] = E[(X'X)^{-1}X'\varepsilon\ (X'X)^{-1}X\ \varepsilon']$

$= (X'X)^{-1}X'(X'X)^{-1}X\ E(\varepsilon\ \varepsilon')$

$= (X'X)^{-1}X'\sigma^2 I_n (X'X)^{-1}X = \sigma^2\ (X'X)^{-1}$ 2.24

$= \sigma^2\ (X'X)^{-1}$ which is the variance-covariance matrix of $\hat{\beta}$

Test of Hypothesis for Regression Slope

This test is carried out to determine whether there is a significant linear relationship between an independent variable X and a dependent variable Y.

This test focuses on the slope of the regression line. If it is discovered that the slope of the regression line significantly differs from zero, we will conclude that there is a significant relationship between the independent variable and the dependent variables.

To determine how good the model fit the given data we utilized the analysis of variance (ANOVA) method to test the hypothesis.

$H_0: \beta_1 = \beta_2 = \beta_3 \ldots\ldots = \beta_k = 0$

$H_1: \beta_1 \neq \beta_2 \neq \beta_3 \ldots\ldots \neq \beta_k \neq 0$

Decision Rule: We reject the null hypothesis if the probability value is less than the level of significance, otherwise we accept.
The null hypothesis is equivalent that there is a relationship between the response variable and the predictive or explanatory variables.
The following formulas are needed in ANOVA:

$SS_T = Y^T\text{Y} - \text{n}\bar{Y}^2$ → Sum of squares totals
$SS_R = \beta^T X^T Y - \text{n}\bar{Y}^2$ → Sum of square regression
$SS_E = Y^T\text{Y} - \beta^T X^T Y$ → Sum of square error
The goodness of fit test is conducted by computing the ratio

$$F_c = \frac{MS_R}{MS_E} = \frac{R_{SS}/1}{E_{SS}/n-2}$$

The null hypothesis (H_0) is rejected if the F_c (test statistic value) is greater than the critical values, that is, $F_c > f_{\alpha,1,n-2}$. The F test is used to test for the overall goodness of fit of the regression model.

However, when the ANOVA test reveals that some parameters are significantly different from zero, and then the t-test is used to perform hypothesis test on the individual parameters to determine which among them are or is different from zero. The test statistic is given by:

$$t = \frac{\beta_i}{S_e\ (\beta_i)} \qquad 2.25$$

Where;

$$Se(\beta_i) = \delta \left(\frac{1}{\sum_i^n (X_i - \bar{X})^2} \right)^{1/2} \text{ and } \delta^2 = \frac{Y^T\text{Y} - \beta^T X^T Y}{n-k-1}$$

$100(1-\alpha)\%$ confidence interval is then constructed for the parameters that significantly differ from zero. The confidence interval can compute with:

$$\beta_i \pm t_{\alpha/2, n-2} \,.\, SE(\beta_i)$$

2.3 COEFFICIENT OF MULTIPLE DETERMINATION

Measure of the direction and strength of the linear association between two or more variables, that is in case of multiple linear regression, it measures the proportion of variation in Y "explained" by the regression on X's explanatory variables.

$$r^2 = \frac{\text{explained variation}}{\text{total variation}} = \frac{SSR}{SST} \qquad 0 \le r^2 \le 1$$

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According to Adjekukor and Awariefe (2019), if the regression sum of squares (Explained Variation) is greater than the Error sum of squares (Unexplained Variation), then R^2 will be closer to 1 and more precision will be obtained from the fitted model. This indicates the importance of the regression equation as a predictor when the coefficient of determination (R^2) is closer to 1, then the fitted regression model is adequate or good to the (X, Y) data, R^2 can also be obtained from the square of the coefficient of correlation (r).
The coefficient of multiple determination can be obtained by

$$R^2 = 1- \frac{SS_E}{Y^T\text{Y} - \text{n}\bar{Y}^2} = \frac{\beta^T X^T Y - \text{n}\bar{Y}^2}{Y^T\text{Y} - \text{n}\bar{Y}^2} \quad \text{.. 2.32}$$

3. DATA ANALYSIS

Table 3.1 **Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.945[a]	.893	.880	5139.939	.893	66.720	4	32	.000

a. Predictors: (Constant), Tota valid Votes (X4), Registered Voters (X1), Accredited Voters (X2), Total Votes Cast (X3)

b. Dependent Variable: Rejected Votes (Y)

From table 3.1 the coefficient of multiple determination (R^2) computed is 0.893, that is, 89.3% of total variation of rejected votes (response variable) is accounted for or explained by the number of accredited voters, total vote cast and total valid votes while the remaining 10.7% of total variation of number of rejected votes is explained by other variables not considered by this research. The 89.3% coefficient of multiple determinations implies that the explained sum of squares is greater than the unexplained sum of squares; this implies that the regression model is adequate for the data.

Table 3.2 ANOVAa

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	7050655541.577	4	1762663885.394	66.720	.000[b]
	Residual	845407005.667	32	26418968.927		
	Total	7896062547.243	36			

a. Dependent Variable: Rejected Votes (Y)
b. Predictors: (Constant), Tota lValid Votes (X4), Registered Voters (X1), Accredited Voters (X2), Total Votes Cast (X3)

To determine how good the model fit the given data we utilized the analysis of variance (ANOVA) method to test the hypothesis.

$H_0: \beta_1 = \beta_2 = \beta_3 \dots \dots . = \beta_k = 0$

$H_1: \beta_1 \neq \beta_2 \neq \beta_3 \dots \dots . \neq \beta_k \neq 0$

From the Table 3.2, we can conclude that the model is fit for the data appropriately since the probability value is 0.000 which is less than the level of significance of 0.05, this implies that the null hypothesis should be rejected. Therefore, we conclude that some parameters of the regression model are significant at 5% level.

Table 3.3 **Coefficients[a]**

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	3652.640	2157.669		1.693	.100
	Registered Voters (X1)	.000	.001	-.014	-.140	.889
	Accredited Voters (X2)	.115	.040	2.931	2.856	.007
	Total Votes Cast (X3)	.574	.079	14.422	7.267	.000
	Tota lValid Votes (X4)	-.680	.086	-16.563	-7.896	.000

a. Dependent Variable: Rejected Votes (Y)

It is seen from Table 3.3 that the probability value (sig) of the explanatory variable of registered voters is greater than the level of significance of 0.05, therefore, it is not significant.

The p-values (sig) of the other explanatory variables of (number of accredited voters, total vote cast, and total valid votes) are less than the level of significance of 0.05; this indicates that it significantly influences the number of rejected votes.

The regression coefficients from Table 3.3 are:
$\beta_0 = 3{,}652.640$, $\beta_1 = 0.000$, $\beta_2 = 0.115$, $\beta_3 = 0.574$ and $\beta_4 = -0.680$
The regression model developed becomes;
$Y_i = 3{,}652.640 + 0.000X_{i1} + 0.115X_{i2} + 0.574X_{i3} - 0.680X_{i4}$ 3.1
The regression model equation (3.1) can be used to predict the number of rejected votes (Y) given any one of the independent variables while holding the remaining others constant.
From the model developed, we can see that the explanatory variable of registered voters does not influence numbers of rejected votes (response variable) while the remaining explanatory variables (number of accredited voters, total voting cast and total valid votes) influences the number of rejected votes (response variable). However, we can infer that without the influence of these explanatory variables the number of rejected votes will be 3,652. From the regression model obtained, the numbers of registered voters have zero effect of numbers of rejected votes. Similarly, it is seen that accredited votes influence rejected votes positively with an average increase of 0.115 rejected votes for each unit increase in the number of accredited voters. The total votes cast also affected rejected votes positively with an average increase of 0.574 rejected votes for each unit increase in a total vote cast, while total valid votes influences rejected votes negatively with mean value of -0.680 rejected votes for each unit decrease in total valid votes cast.

DISCUSSION OF RESULTS

The multiple regression model from the ANOVA test reveals that the model is adequate for the data. The coefficient of multiple determinations of 89.3% indicates that the explained sum of squares is greater than the unexplained sum of squares; this implies that the regression model is a good fit for the data. The t-test for individual explanatory variables reveals that the number of accredited voters, total voting cast and total valid votes significantly influenced the response variable while the number of registered vote is non-significant at a 5% level.

4. CONCLUSION/ RECOMMENDATION

Based on the analysis, we can conclude that the number of rejected votes of 2019 Nigerian Presidential election is not influenced by the number of registered voters, but it is influenced by the number of accredited voters, total vote cast and total valid votes. The numbers of accredited voters and total votes cast influenced the response variable (number of rejected votes) positively, that is, directly, while total valid votes influenced the number of rejected votes inversely. The results obtained from this paper conformed to a research paper on statistical modeling of 2015 Nigerian Presidential election by Umar (2016).

From the result of the research, we recommend the following to reduce the persistent occurrence of rejected votes in future elections:

1. Political education and campaigns by Independent National Electoral Commission (INEC) and other stakeholders in the polity should be vigorously pursued to enlighten the populace to improve the awareness of voting in Nigeria.
2. The electoral act should be amended to incorporate electronic voting in Nigeria.
3. Fewer political parties should be adopted in Nigeria, as too many parties on the ballot paper may contribute to reject votes recorded.
4. Government should increase technical and financial support to relevant civil society organizations to sustain capacity building programs for major institutions involved in the elections, particularly INEC and the police.
5. The civil society organisations and mass media should have interaction with youth leaders particularly in poor urban and rural areas to deepen participatory democracy.
6. Early warning and early response systems should be put in place by INEC and the security forces for timely alerts of potential violence in security prone areas.

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