

ANALYSIS OF TREND AND ATTRIBUTES OF SEA PIRATE ATTACKS IN NIGERIA

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DOI: 10.29816/sjss.9.1.4

ABSTRACT

Nigeria's maritime domain has been identified as one of the new global hotspots for sea pirate activities ranking 2nd among countries with the highest incidence of attacks globally. Nigeria and two other nations jointly accounted for about 67% of the global reports in the year 2017. Increasing incidence of attacks is thought to pose serious challenge to international shipping as well as other political, economic and safety challenges to the development of the nation. This study investigated the trend and characteristics of sea pirate attacks in Nigeria using data from the International Maritime Bureau (IMB) between 1995-2017. The data was analyzed using The Regression Model using the Ordinary Least Square and Binary Logistics methods. Findings of the study show an increasing trend of attacks while Nigeria's national election cycle appear to influence annual spikes in attacks. Other findings show pirates operating in Nigeria exhibiting a greater likelihood to attack vessel while steaming rather than at anchorage or berth. Tanker vessels are the most important targets of pirates while night attacks are equally the most prevalent, container vessels are 9 times more likely to be attacked at anchorage than tankers. The study made several useful suggestions aimed at guiding policy for mitigating attacks in the country.

Keywords: Attributes Sea Pirate attack Nigeria

1.0 Introduction

The contribution of maritime transportation to global economic exchange remains significant. About eighty per cent (80%) of the world's international trade exchange is thought to be carried via global sea and ocean by more than 112,000 ships manned by more than 1.5 million seafarers (Joubert 2013). The sheer value flowing through the maritime

environment as well as its security vulnerability has not escaped the attention of sea criminals globally. Since the year 1999, resurgence in piracy at sea has continued to attract considerable global concern. The scale and sophistication of these attacks now poses a considerable threat to global exchange (Shane et al 2015). Between year 2009 and

2017 there have been a total of 2,717 reported attacks on shipping vessels across the globe with an annual average of 302 incidents.

Three broad categories of motive for sea piracy have been identified; these include those looking for easy profit; those working with or belonging to organized crime syndicates and those working with terrorist/secessionist groups with political motivations. Piracy acts on shipping vessels are thought to be rampant in recent time due to one or more of these reasons. First is the use of skeletal crews on ships, second is the limited resources by states for securing territorial waters and thirdly the shoddy coastal and port-side security, fourthly corruption that easily compromises judicial structures of states fifth is the poverty and political anarchy within coastal states and above all the sixth is the willingness of ship owners to quickly pay ransom (Chalk 2009). The recent global concern has been irked by the increasing scale and sophistication of attacks on large ocean-going vessels. Pirates exhibited proven capacity to operate as far as 500 nautical miles from shore with insatiable appetite for hostage-takings that has a weakening effect on States (Murphy 2007; Bowden 2010; Salopek 2013; US National Security Council 2014).

The global response against sea piracy is changing the face of international maritime security. Firstly, Admiralty laws have been amended with more flexibility for Naval patrols of nationals to arrest and trial offenders. Secondly, telecommunication technology has further aided safety/security at sea as vessels of 500 gross tonnage or more are now required to have a security alert systems on board which allows Naval patrol vessels to respond to a distress signal. Lastly, multiple global agencies have launched a database system to provide updated

information on characteristics of attacks and their eventual outcomes globally.

The contribution of Africa and Nigeria in particular to the current resurgence in sea piracy is also worthy of note. Nigeria's coastal water is currently designated as one of the global hotspot for piracy by the International Maritime Bureau (IMB). As at 2013, Nigeria was ranked 3rd among nations with the worst record of attacks with 22 attacks in that year alone. IMB's annual report for 2017 placed Nigeria 2nd among four countries that contributed about 67% of the 180 piracy acts for the year. The concentration of sea piracy in Africa which was once greatest around the Gulf of Aden as at 2008 has now been overtaken by Nigeria/Gulf of Guinea. Incidentally, Nigeria alone is noted to have contributed about 53% of piracy attacks within the Gulf of Guinea (Nnadi et. al. 2016).

Onuoha (2009) observed that sea pirates' activities have political, economic, security implication for the growth and development of any nation and should be a source for serious concern. Essien and Toakodi (2015) noted that sea piracy could induce direct and indirect cost on an economy. Such direct cost could emanate from theft onboard ships, loss of sailing time, delays, cost of ransom and loss of life. The indirect cost noted include cost of security mitigation plans, increase in marine insurance premiums that ultimately increases the cost of exchange among nations.

Shane et. al. (2015) observed that sea piracy varies by region in terms of frequency, scale of violence, distance from the shore, time of day and the ship's position. Ocean Beyond Pirates an online news letter notes that the Gulf of Guinea is mostly characterized by Armed Robbery. Other studies such as Chalk (2009); Hansen (2012) and Onuoha (2009) suggested the primary motivation behind piracy to be money with

poor economic condition of coastal communities being a main contributing factor.

The literature reviewed so far suggest studies on sea pirate attacks in Nigeria are scarce with little knowledge on the behavior and characteristics of attacks. This study therefore will fill the existing gap in literature by investigating attributes and characteristics of these attacks within Nigeria's coast as well as factors influencing their occurrence. The following research questions will therefore guide this study. What is the trend of pirate attacks on shipping vessels in Nigeria's maritime environment? What is the distribution and concentration of these attacks? What are the factors that influence attacks on sea vessels in the study area.

2.0 Methodology

Data used for this study were retrieved from the IMB annual Global Sea Piracy Report for the period 1995 to 2017. The data for incidence reported within Nigeria is contained in the "Rest of Africa (excluding Gulf of Eaden)" section. Both "successful" and "attempted" categories of the report for Nigeria for each year were extracted for the analysis. Those incidences that are not related to sea vessels such as attacks on oil platforms and passenger boats used for public transportation were excluded from this study. Data captured from each incidence reported by IMB include Time of incidence, Status of vessel (Steaming or Otherwise), Vessel type (Oil tanker, Service vessel, Service ships, Tug boats etc), Container ships, Other cargo ships (bulk carrier). Other information captured included the success/failure of the incidence, outcome of the incidence (Robbery, Kidnapping, Hostage or failed attempts). The Grid location of the vessel under attack as at the time of incidence was also recorded for analysis as well as the number of attackers

as captured in the incidence record for each attack that has taken place across the globe.

The aforementioned attributes of the piracy incidence which emanated from the report credited to the Nigerian territory was coded and inputted to the Statistical Package for Social Science (SPSS) the 15.0 version of the computer program. Each attribute of attack that was recorded include, number of occurrence within each month, time of attack (Twilight = 0 , Daylight =1), type of vessel attacked were taken as categorical variables with Tanker as the Referenced category (Other types of vessels include Service vessels, Container vessels, Cargo vessels), Grid location of the attack, Status of vessel during attack (Steaming =0, others= 1), boarded (No=0, Yes=1) Nature of the crime (Robbery=0, others 1), Kidnapping=0, others=1).

The Arc-View GIS computer software programme was used to map the distribution of Sea pirate attacks using the spatial auto-correlation technique. The grid location of each attack was imputed into the computer software and the output plotted on a digital map of Nigeria coast. The Model employs the spatial auto correlations of GIS information or data to measure the degree to which one object in space is similar to other similar nearby objects. This in other words can be used to determine if objects in space occur independently of each other or otherwise. Three categories of classification of the outcomes of objects observed in space will then be possible with the use of the Moran I index, these are positive, negative and no spatial auto-correlation.

The simple regression analysis (OLS method) was also used in estimating the trend of annual sea-pirate attacks in Nigeria's territorial waters. The annual incidence was plotted on the Y axis while year period was on the X axis. The relationship between the

variables was modeled using the regression equation

$$Y = a + bx + e \dots \dots \dots (\text{eq 1})$$

Where;

a = constant which is the value of the intercept of the regression line on the Y axis.

b = the criterion of the simple regression equation.

X = Independent variable of time (Year)

e = the error term of the model.

Whereas the Binomial Logistic Regression was used to examine the influence of independent variables on binary dependent variables which is the outcome of attacks success/failure of attacks and status of the ship as at the time of attack. This was given by the equation;

$$P(NR) = \frac{1}{1 + e^{-(b_0 + b_1 x_1 + b_2 x_2 + \dots + b_n x_n + e)}} \dots \dots \dots (\text{eq 2})$$

where;

P(NR) = probability for success/failure or Status of Ship

b₀..... is the constant in the equation

b₁..b_n..... is the criterion of the logistic regression

x₁..x_n..... are the independent variables or predictors

e..... is the error term of the logistic equation.

The statistical Package for Social Science (SPSS) 20.0 computer software was used in processing the analysis to be made for this inquest. The summary objectives and methods of analysis for this study are provided in the table below.

Table 1: Showing a summary of technique of analysis.

		Type of Data	Source of Data	Model
To examine the trend of sea pirate attacks within Nigeria's coastal area.	Objective 1	Secondary	IMB ANNUAL REPORT	Regression Analysis (OLS)
Analyse the distribution of offshore attacks in Nigeria	Objective 2	Secondary	IMB ANNUAL REPORT	Arc-View GIS (Spatial Autocorelation)
Examine the nature and types of sea pirate attacks in Nigeria.	Objective 3	Secondary	IMB ANNUAL REPORT	Bi-nomial Logistic Regression

Source: Author Research, 2018

3.0 Result and Discussion

3.1 Result

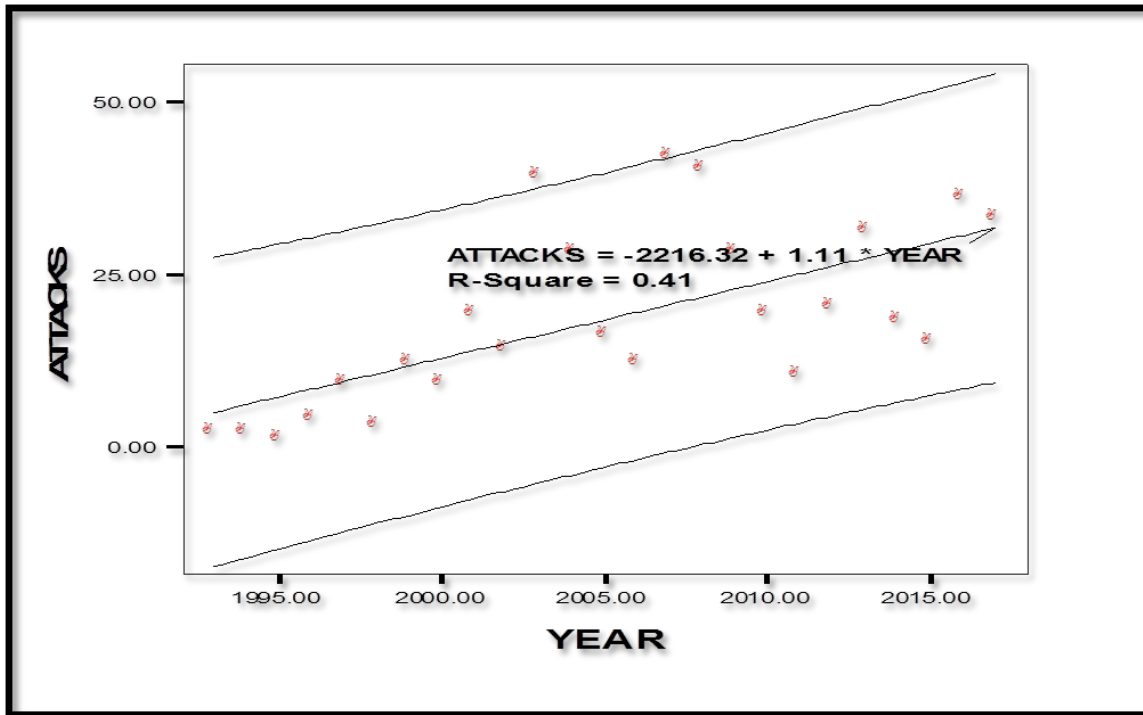


Fig. 1: Showing Scattered plot of annual attacks in Nigeria 1993-2017

The 25 year annual incidence in Nigeria as recorded in the IMB reports is provided in the scattered plot in figure 1 above. A casual look at the plot shows that within the first six years of the series annual attacks remained in single digit. This resulted in the gentle rise of the plot between 1993-1998; peak annual incidence in this period was 9 incidences in 1997 with 2 incidences as the lowest recorded in 1993 and 1994. However, from year 1999 and above, the number of attacks rose consistently as well as maintaining a double digit figure till the end of the series in year 2017. Between 1999 to 2003, a sharp rise in the annual incidence plot is visible resulting in the first major peak of the series in year 2003 with a total of 39 incidences recorded. This was followed by a sharp decent of the series between 2004-2006 falling to 12 incidence. This was followed by another sharp rise in the series, the highest of

the peaks was recorded, the series rose from 12 incidences in the previous year to 42 in year 2007.

The next 3 years saw the number of attacks dropped from the 42 peak incidences to 28 in 2009, 19 in 2010 and 10 attacks in 2011. By year 2013, the number incidence rose to another peak with 31 attacks. In the period between year 2014 and 2015, the number of attacks dropped from the 31 incidences in year 2013 to 18 and 15 attacks respectively. The last two years of the series in 2016 and 2017 saw another sharp rise in attacks to 36 in 2016 and 33 incidences in 2017. The scatered plot of the series is presented in figure 1 shows the trend line of attacks. From the plot, the regression line intercepts at -2216.3 while the slope of the regression line is 1.11. This suggests the number of attacks increased by one each passing year within the period under consideration.

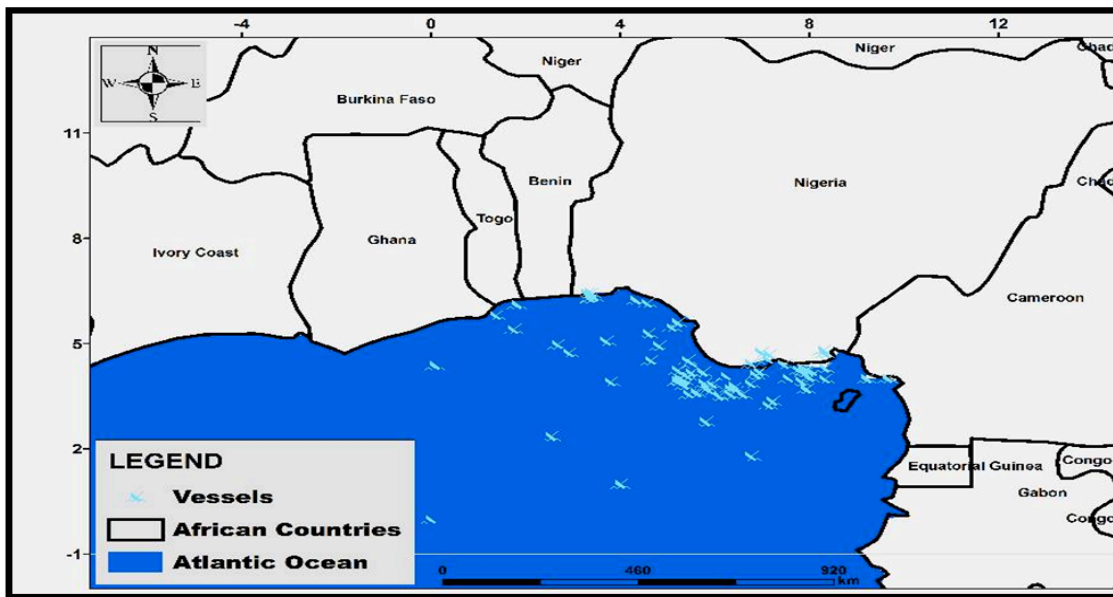


Figure 2: Map of Nigeria showing location of sea pirate attack on Nigeria's coast
Source, Author field work, 2018

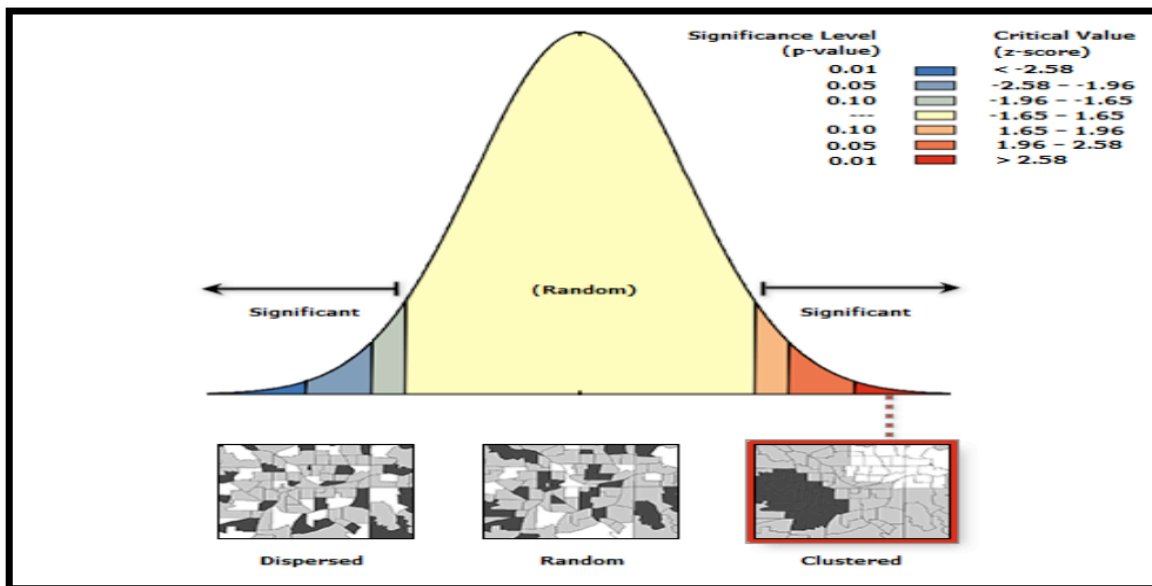


Fig.3: Showing critical value area for Z-score computation
Source, Author field work, 2018

Table 4.2: Showing Moran's I Summary for Pirate attacks in Nigeria

Moran's Index	Expected Index	Variance:	z-score	p-value:
: 0.912043	: -0.006494	0.000113	: 86.507535	0.000000

Source: Author field work, 2018

Result of the analysis of the distribution of attacks in Nigeria is presented in Figure 2 and 3 above. A casual look at the map suggests most of the attacks appear to be concentrated around the Niger Delta area between Warri and Calabar. Majority of the attacks appear to have occurred within 200km from the shoreline area of Nigeria's Southern Coastline. The attacks around Lagos appear relatively scanty when compared to those within the Niger Delta Region. A number of attacks appear to have occurred within some of the river channels connecting the coast. The first hypothesis to be tested in this study is to determine if the locations of attack are independent of each other.

Hypothesis 1:

H0: The locations of pirate attacks within Nigeria's coastal area not independent.

The spatial autocorrelation analysis in ArcGIS soft-ware was used to analyze the distribution of these attacks with a view to confirm if their occurrence is a chance event or otherwise. Analysis shows that the Moran I index is positive 0.912043 close to the optimum value of 1. The z-score obtained in the analysis is 86.507535 which confirm there is less than 1% likelihood that this pattern of cluster could be the result of random chance. This result is highly significant at 99% confidence level. The result of this analysis suggests there is heavy clustering of Sea pirate attacks on sea vessels within Nigeria's coast line. There is 1 in every 99 chance that any attack occurring in the country's coast will not be from the boundaries of this cluster or hotspot. In other words, we fail to reject the

null hypothesis in view of the convincing statistical evidence that the the locations of pirate attacks within Nigeria's coastal area occur in a cluster.

Other results concern factors influencing attacks, the data used for the regression emanated from the records of IMB between the year 2007 and 2017. However, the details of individual attacks for 2011, 2014 and 2015 could not be accessed online are therefore not part of the analysis. The 2014 and 2015 records available are abridged reports that do not contain the details of individual countries for theses years. The record for the period available shows there are 168 cases of sea pirate attacks recorded in Nigeria.

The result of the binomial logistic regression is presented in table 2 below. The classification table from the model shows at step 0 which is the prediction of the outcome of dependent variables without the influence of the dependent variables. The independent variables deemed not to be important addition to model at step 0 are failed attempts to board and attacks and Bulk carrier vessels. The result indicates the model at this stage was able to predict about 58.9% of the occurrence of attacks without the independent variables.

The inclusion of the independent variables in step one greatly improved the predictive power of the model by increasing its accuracy of prediction from 58.9% to 79.2%. The Hosmer and Lemeshow Test confirm the high strength of the model with a probability value 0.956. The contingency table for the Hosmer and Lemeshow Test suggest the high predictive accuracy of the model observed

value of 11 and expected value 10.583. The Nagelkerke R Square which measures the joint influence of all independent variables entered into the model on the variation in the dependent is 0.422. This suggests the

independent variables of the model are able to account for about 42.2% of the variation in the dependent variable. The remaining 57.8% unaccounted are attributed to variables not entered into the model.

Table 2: Showing result of Binary Logistic Regression

Hosmer and Lemeshow Test	Chi-Square 2.602 df 8 Sig 0.957					
Nagelkerke R Square	0.422					
Classification table Step 1(a)	Step 0 58.9 Step 1 79.2					
	B	S.E.	Wald	df	Sig.	Exp(B)
Day/Twilight	1.738	.562	9.549	1	.002	5.685
Tanker	-.097	.487	16.991	3	.001	
Support Vessel (1)	2.254	.713	.040	1	.842	.907
Container Vessel (2)	2.254	.713	9.997	1	.002	9.530
Bulk Carrier (3)	1.310	.710	3.398	1	.065	3.705
Outcomecrew	.471	.546	.742	1	.389	1.601
Boarded	1.158	1.279	.819	1	.366	3.183
Failure/Success	-.305	.597	.261	1	.609	.737
Firearms	1.219	.439	7.691	1	.006	3.383
Constant	-2.702	1.190	5.156	1	.023	.067

A Variable(s) entered on step 1: Insolation, Vessel, Outcomecrew, Boarded, Success, Weapon.

Source: Author's field work, 2018

The result of the binary logistic regression is presented in table 1 above. The influence of the binary dependent variable which is the attacks that took place while vessels were at rest (Anchorage/Berth) =0 and while steaming = 1 make up the binary dependent variable of the model. The independent binary variables include Daylight/Twilight, Outcome (Kidnapping and Others), Vessels boarded or not, if the attack was successful or otherwise and finally if firearms was used in the attack or not.

Hypothesis 2:

H0: Pirates attacks are less likely to occur at day time than at night .

The second hypothesis examines the influence of the time of day on attacks, that is how daylight or twilight has influenced status of vessels during attacks. The result shows every twilight attack on vessels increases the log odds of attacks on vessels at Anchorage/Berth by 1.738. The odds ratio however shows Twilight attacks on vessels 5.685 times more likely to occur at

Anchorage/Berth than when a vessel is steaming. This outcome is highly significant at 99% confidence level with a probability value of 0.002. We fail to reject the null hypothesis that pirates operating within Nigeria are less likely to attack at day time in view of the highly convincing evidence for the null hypothesis.

The influence of the type of vessel attacked was measured on the status of such during attacks by pirates. The four categories of vessels include Tanker vessels which is the reference category for this class of independent variables. Others include all manner of service/support vessels, Container vessels and Bulk carrier / General cargo vessels grouped together. The result of the analysis shows every attack on service vessels on Nigeria coast by sea pirates reduced the log odds of attacks on vessels at Anchorage/Berth by -0.097. This shows that when compared to Tanker vessels, service vessels are 0.907 times more likely to be attacked at Anchorage/Berth than when steaming. This outcome is not significant with a probability value of 0.842.

The influence of attacks on Container Vessels on status of vessels shows every attack on Container Vessels increases the log odds of attacks on vessels at Anchorage/Berth by 2.254 units. Compared to the reference category Tanker vessels, Container Vessels are 9.530 times more likely to be attacked at Anchorage/Berth than when steaming. This outcome is highly significant with a probability value of 0.002.

The influence of attacks on all other forms of Bulk cargo Vessels on status of vessels during attack shows every attack on Bulk cargo Vessels increases the log odds of attacks on vessels at Anchorage/Berth by 1.310 units. When compared to the referenced category Tanker vessels, the odds of attack on Bulk Cargo Vessels is 3.705 times more likely to occur at Anchorage/Berth than when the

vessel is steaming. This outcome is almost significant with a probability value of 0.065.

The influence of the eventual outcome of attacks was measured against status of vessel during attacks. These "other outcomes" such as robbery/hijacking on one hand and kidnapping on the other. The result indicates pirates' robbery/hijacking a vessels increases the log odds of attacks on vessels at Anchorage/Berth by 0.471. The odds ratio shows robbery/hijacking on a vessel is 1.601 times more likely occur at Anchorage/Berth than when vessels are steaming. This outcome is not significant at 95% confidence level with a probability value of 0.389.

The influence of pirates successfully boarding sea vessels or otherwise was measured against status of the vessels during attack. The result also shows that every failed attempt at boarding vessels by pirates increases the log odds of attacks on vessels at Anchorage/Berth by 1.158. The odds ratio shows failed attempt to board a vessel is 3.183 times more likely occur during attacks at Anchorage/Berth than on vessels that are steaming. This outcome is also not significant at 95% confidence level with a probability value of 0.366.

The association between vessel's status on the failure/success of attacks shows that for every failed attack on vessels by pirates, the log odds estimates of attacks on vessels at Anchorage/Berth reduces by -0.305. In terms of the odds ratio, failed attacks are 0.737 times more likely occur during attacks at Anchorage/Berth than those vessels are steaming. This outcome is not significant at 95% confidence level with a probability value of 0.609.

Finally, the result reveal that the use of firearms and status of the ship shows that the use of firearms increases the log odds of attacks on vessels at Anchorage/Berth by 1.

219. In terms of the odds ratio, firearms are 3.383 time more likely to be involved in attacks at Anchorage/Berth than when vessels are steaming. This is outcome is highly significant 99% confidence level.

3.2 Discussion

The trend of the series indicates there is an annual increase by 1.1 incident of attack through the 25 year period of the series. This observation is at variance with conclusion of the study by Nnadi et. al. (2016) who noted a decreasing trend in the annual attacks within the country. This variance may have been largely influenced by the sudden spikes in attacks in 2016 and 2017. Linear trend fit is extremely sensitive to changes pattern of records could therefore account for such difference in trends.

A casual examination of the peaks and trough of the series points out an important observation missed by most researchers. Prior to 1999, the annual number of attacks recorded in Nigeria was within single digit. Since the inception of Nigeria's democratic dispensation however, the annual number of attacks has since maintained a double digit figure. Furthermore, all the sharp and major peaks observed on the plot of the series from 1999 all coincided with the national election year in Nigeria, all except year 2011 and 2015. The irregular behavior of the series at these points may however not be unconnected with the award of coastal security contract to one of the ex-militants in the Niger-Delta area by the Nigerian Government. The revocation of the contract in 2015 has again coincided with the sudden resurgence in the number of attacks recorded in the country. The latest figures have double the record of 2015 up to 36 and 30 attacks in year 2016 and 2017 respectively. The exact role of militant groups in the spikes of attacks especially at election year in Nigeria needs further research.

The identification of hotspot area for pirate attacks within the Niger Delta region of Nigeria disagrees with the position of the work of Nnadi et al (2016) who attributed most of the attacks to the Lagos anchorage and berth area in western Nigeria. A common area of agreement however is that robbery was the most important consequence of most attacks. This position may however not be exactly correct as robbery may be the last resort of the attacks following the escape of crew members to the safe room (citadel) of the ships and raising of alarm bells/distress call to patrol vessels. The work of Rich and Shiverly (2004) in its review of the theory and technique of geographic profiling have suggested serial offences and repeat offenders such as pirates are often resident within or close to the area of their criminal intent. It can therefore suspect attacks occurring in Nigeria are likely attributable to indigenous people around the hotspot area identified in this study.

The result on the characteristics of attacks on vessels within Nigeria revealed sea pirates have a high preference for oil tankers. The low free board, slow speed as well as the high value cargo could be influencing their target with reward for kidnap being the primary motivation. Interestingly, the results shows pirates exhibit a greater likelihood to attack all categories of vessels while steaming than at anchorage or berth. This may not be unconnected with the improved security measures and patrol vessel response to distress signal from ships particularly around berth or anchorage areas. This could also fuel the increasing use of firearms which is also a worrisome occurrence.

Firearms are 3 times more likely to be used at berth or Anchorage than on vessels that are steaming. The reason for this may not be unconnected with the need to quickly restrain their victims hence is easily

showcased than when chasing a steaming ship. Overall, the factors that influence the attacks of vessel at anchorage/berth in order of their importance are Twilight condition, presence of firearms. On the other hand, Container Vessels and bulk Carrier Vessels are the most likely targets of attack at anchorage than Oil tankers.

4.0 Recommendation

Based on the finding of this study the following recommendations become pertinent at guiding any policy drive aimed at mitigating the incidence of sea pirate attacks in Nigeria. There must be increased patrol by security agencies especially during twilight hours when activities of these pirates are most intense. There should be effort to record and gauge the response time to distress signals made by ships for appraisal purpose. Furthermore, reports of failure of patrol vessels to respond to any distress signals should also be thoroughly investigated to determine their immediate and remote causes. The patrol of the hotspot area identified in this study should also be intensified with armed escorts provided for tanker vessels within Nigeria's coastal waters while steaming. The

government in Nigeria should further intensify the effort to equip the Nigerian Navy and other security agencies so as to be able to live up to the responsibility of protecting and securing the coastal area of the country. The penal system in Nigeria should be further strengthened to allow easy prosecution and conviction of sea bandits. There is need to also improve incidence record management for ease of investigation by authorities.

5.0 Conclusion

In conclusion, the trend of sea piracy attacks in Nigeria is likely tied to a system of organized crime tied connected to the political process of the country. Their preference for steaming vessels and increased use of firearms suggest security measures put in place at berth and anchorage areas is a major deterrence. Concrete security measure should however be taken to ensure safe passage of steaming vessels in and out of Nigeria's coastal waters. Finally, intensive patrol of the hotspot areas may be a necessary deterrence for the pirate activities. This will also require major investment in logistics and equipment for security agencies in the country that are involved in the war against sea pirates.

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