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Abstract. Niger delta region is severely polluted due to oil pipeline vandalism. This has resulted to severe economic loses, land and water pollution which impacted negatively on the environment and the socioeconomic lives of the Niger Delta people. In an effort to bring an end to the problem, government signed an amnesty programme with the militants and embarked on formal training and integrating of ex-militants in to the formal system. Thus the cost of the compensation package provided under the amnesty programme is an estimate for vandalism related pollution. However, there are concerns that the current amnesty compensation package may not have been properly designed and thus many of the militants could not benefit from the programme. The study is the first to use choice experiment models to evaluate relationship between pipeline vandalism and militancy in the Niger delta region of Nigeria. Three hundred (300) respondents were employed, data were collected through the use of questionnaire method and analysed using choice experiment (CE) models. The findings from the study includes: respondents willingness to accept lower compensation in addition to institutional reform and better environmental management; reduction in land and water pollution levels; also improvements in government spending to provide better infrastructure.

Keywords: Environment, Militancy, Amnesty, Niger-Delta region.

1. Introduction

The Niger delta region is of Nigeria has been facing a series of environmental degradation for years, but which becomes very severe in recent years due to frequent pipeline vandalism by the militant groups in the region. This has led to the government signing of an amnesty programme in 2009 with the hope that the militant groups will embrace peace and in return be provided with educational training and subsequent employment opportunities. However, a year after the peace initiative the militants continued oil pipeline vandalism.

It is on this note the researchers feel the need to review the package and proposed a better compensation package that will have a holistic approach to the problem of pipeline vandalism in the region. The study adopted the choice models (CM) approach designing a new improved package for the militants, which was developed from their own perspectives.

The region is said to be one of the world most oil impacted region in the world due to poor environmental regulations and oil pipeline vandalism. This has resulted into serious economic cost and environmental degradation with significant negative socioeconomic impact on the lives of the communities in the Niger delta region. Oil spillage has caused significant land and water pollution rising oil companies' activities resulting to agitators vandalizing crude oil pipelines in protest to environmental neglect and under-development of the Niger delta region. This has not only affected the health of indigenous but also their means of survival, such as farming, fishing and access to clean sources of drinkable water. To abate sufferings from this havoc, the Federal Government of Nigeria in response to the militancy struggle in the region has pardoned and created an amnesty program intended to bring to an to militancy and crude oil pipeline vandalism in the region. However, there are concerns that the current amnesty compensation package may not have been properly designed and thus many of the militants could not benefit from the program, while some of the reformed militants have after passing through the program, return to militancy activities. Although the government made some concerted efforts to develop the region through its various economic and programs and policies also to deal with issues relating to pipeline vandalism but little achievements were recorded over the years. This is partly due to inconsistency in government

policies, poor implementation, corruption and lack effective accountability. It is against this background that the researchers feel the need to undertake this research work with a view to finding a lasting solution to crude oil pipeline vandalism. This study proposes a compensation package that is assumed to be compatible with the agitations of the militants, which when implemented will significantly reduce the crude oil pipeline vandalism. The package is modelled through choice experiments (CE) models, whereby respondents were asked to make a choice between the alternative provided in the choice sets.

Objectives of this study include:

- The study hypothesized to achieve the following objectives:
- To propose a new compensation package for the Niger Delta militants
- To find out whether the new proposed compensation package is acceptable for the militant.

2. Methodology

The design of the survey instruments was selected through various approaches of review of related literature, pilot study and interaction with the stakeholders in the region. However, these attributes were not adopted from any previous study, it was designed, solidly designed by the researcher after intense research as specified. Despite identifying various attributes after the interaction, the researchers selected the most important attributes in line with the needs of the militants in the Niger delta region. The attributes are as presented in table 1 below. The estimation of an improvement of an environmental quality through non market approach is an aspect of environmental economics.

Table: 1 Attributes and Levels

Attributes	**Levels**
Training allowance	N65, 000; N585, 000; & N52, 000
Programme access	Low & high access
Duration of Benefits	Ends after training; continue until job offer
CSC Unit	No; Yes
Land & Water pollution intensity	High ; Low
Infrastructural provision	Inadequate; adequate

*csc: civil service commission

The first attributes represent the price, which is the training allowance government is paying ex-militants for accepting peace and undergoing training. It has three levels; the status-quo ₦65, 000 and two levels of ₦585, 000 and ₦52, 000. The second attribute presents program access by the militants, because it was identified that one of the shortcomings of the program is limited access to training. The third attribute represents the duration of benefits that is paid to the ex-militants, while the existing program, allowances payment terminates immediately after training. The study proposes a threshold of six months after training. This study proposes two option; ends after training or continue until job offer. The fourth attribute is the civil service commission (CSC) unit, where after training, ex-militants can submit their results for employment. Fifth attribute is the land and water pollution intensity, it measures the level environmental pollution, which includes; water sources, forest destruction, fauna and flora, fisheries, etc. the attributes has two levels of high (high intensity of pollution and low intensity of pollution). It offers the militants to accept lower training allowance in exchange for an improvement in the levels of pollution. Finally, the sixth attributes represent the provision of infrastructural facilities, because it was considered to be among the most important attribute observed during interaction with the militants and stakeholders. The model suggests an improvement in infrastructural facilities such as water supply, schools, hospitals, electricity, and road network among others in exchange for a lower compensation.

Model Specification

Choice experiment (CE) relies heavily on the Lancaster (1966) value theory and random utility theory (Thurstone 1927 and Manski 1977). The Lancaster theory assumes that the value of a good comprises of attributes that characterize the good and its levels (Hanley et al., 1998). Therefore, it's justified to assess consumer utility function using CE methods. Equally, the random utility theory (RUT) serves as an alternative theory of choice which relates utility directly to the probability of choosing an alternative from a set of options. The RUT assists in selecting the best estimator of an unknown utility function by segmenting the function into

deterministic and error parts. This is presented in the following conditional logit model specification:

$V = \beta_{PAV}*PAV_i + \beta_{DOB}*DOB_i + \beta_{CSC}*CSC_i + \beta_{LWP}*LWP_i + \beta_{IPC}*IPC_i + \beta_{IPC}*IPC_{i+} \beta_{TAL}*TAL + E_i$

Where: V = Utility; β = Constant; PAV = Program access by victims; DOB = Duration of benefits; CSC = Est. of special civil service commission unit; LWP = Envisaged land and water pollution; IPC = Infrastructure provision in affected communities; TAL = Training allowance and E_i =error term.

3. Literature Review

The conditional logic model (CLM) is a multinomial model extended by McFadden (1974) which is consistent with the random utility (RUT) model. Therefore, CLM is used for multiple choices to estimate consumer preferences in the choice experiment multiple sets. Different choices between different bundles of environmental goods can be chosen by respondents which are presented in form of attributes and levels with one of the attributes as the price, this study the training allowance is used as the price.

When a respondent is asked to make a choice of an improvement in an environment polluted by the oil spill improvement, the utility of the respondent will depend on choices of set *"**C**"* of alternatives presented in the form of attributes and socioeconomic factors that may influence the Choice. This could be expressed in the following utility function (Hanley, Wright, and Adamowicz, 1998):

$$U_{in}=(Z_{in},S_n)$$

Where, U_{in} represent an unobserved (latent) utility for an individual n, given to a level of derivable utility with any alternative of an improvement in a polluted environment labelled as *i*. Under normal situation, alternative "*I"* will be selected by the respondent over option "*j"* if *Ui* > *Uj*. The amount of Utility derived from any available option is a function of the attributes *Z*, of that option U the perceptions of the respondents on each attribute may be very different depending on the influence of their socioeconomic characteristics *S which* will affect their utility. By dividing the utility function into two different segments, one deterministic and in principle observable, and one random and unobservable. Then Equation (1) can be re-written as:

$$U_{in}=V(Z_{in},Sn)+\varepsilon(Z_{in},S_n)$$

The probability of choosing option *i* by individual *n* over option *j* can be given as:

$$\mathbf{Prob}(i|C)=\mathbf{Prob}\{V_{in}+\varepsilon_{in}>V_{jn}+\varepsilon_{jn}, \mathbf{all} j\in C\}$$

Where *C* is considered to be a complete choice set, equation (3) expresses the probability that an individual will prefer option "*i*" over option "*j*" provided the random utility, available in option "*i*" is greater than the one available in option "*j*".

This model specification is assumed that error term ε_{jn}, is identically and independently distributed (IID), i.e. errors are Gumbel-distributed and independently and identically distributed (McFadden 1974).

Based on the above, probability of choosing "*i*" is given as:

$$\text{Prob}(i) = \frac{\exp^{\mu v_i}}{\sum_{j\in C} \exp^{\mu v_j}}$$

From the above equation the scale parameter "μ" is assumed usually to be 1(constant error).

The model becomes deterministic as "μ*"* heads towards infinity (Hanley, et al., 1998). Equations of this nature are estimated using CLM, where the interpretations of the coefficients are carried out with reference to the study at hand. The reference study here is the status-quo option of improvement in crude oil spillage through vandalism. It's assumed that individual choices are consistent over a period of time and independence from irrelevant alternatives (IIA). This shows that the ratios of choice probabilities of any two alternatives are completely independent of the utilities of other alternatives (Ben-Akiva and Lerman, 1985).

On the other hand, the IID is restrictive in nature and does not put into account the possibility that unobserved information could be significant enough to induce correlation within and across choice alternative situations. If CE data sets are tested and found to violate the IIA property, then the standard random utility model should not be used (Hanley, et al., 1998; Alpízar, Carlsson, and Martinsson (2001).

A model that relaxes hemoskedasticity assumption of the MNL model is the nested MNL model. The model can accommodate alternative has been placed in subgroups, and allow variance between groups and assume same within subgroups. It allows alternative specification assumes that error terms are independently, but not identically distributed type I extreme values, this would provide room for variations cross elasticities among different pairs of alternatives available, ie relaxing the IIA restrictions. In addition, it will enable us also to model heterogeneity in the covariance among nested alternatives (Alpizar, et al., 2001).

Furthermore, the second problem arises as a result of variations in taste among respondents due to either observed heterogeneity, unobserved heterogeneity or both. Observed heterogeneity can be incorporated into the systematic part of the model by allowing for interaction between socioeconomic characteristics and attributes of the alternatives or constant terms. However, the MNL model can also be generalized to a so-call mixed MNL model in order to further

account for unobserved heterogeneity (Alpizar, et al., 2001).

Alternatively, two approaches can be applied to relax the IIA assumptions of the MNL model that is the nested MNL model and the classical test procedures such as the Wald test likelihood ratio (LR) test or long-range multiplier (LM) test. However, due to its technicalities nested MNL and Wald test are preferred to test IIA assumptions in MNL models (Hausman and McFadden, 1984). However, since the Wald test requires more sophisticated computer application nest MNL models are preferred. Marginal willingness to accept (MWTA) is a measure of the rate of substitution. Different CE studies estimate TEV by either including or excluding the ASC (Hanley et al., 1998; Dehlavi et al., 2010:144 and Bennett and Birol, 2010). This has been a source of concern to many researchers as authors do not provide clear justification on why they have included or excluded the ASC term in computing TEV using CE models, which is also adopted by this study.

In determining economic value using indirect methods, values are estimated based on the implicit value (price) of the good's attributes (Callan and Thomas, 2012). Where the attribute that is sacrificed is the compensation amount, trade-off calculated is described as "indirect price", in this case, marginal willingness to accept compensation. This stand for the amount of money respondents are willing to accept for doing away with vandalism.

Both marginal willingness to accept (MWTA) or in other words, marginal consumer surplus and total willingness to accept (TWA) that is associated with policy modification can be computed from changes in compensation plans, to status-quo position of no change. In this study, we expect the MWA to be negative because it represents the amount of compensation each the militant is willing to sacrifice for an improved environment attribute, adopting the approached used in Hensher, et al., (2005) also Bennett & Birol, (2010). While the ASC parameter is expected to have a positive sign since it would reflect the minimum amount needed as an inducement to sign up to a program that sets other attributes to their 'less desirable' levels. Finally, total compensation surplus or net WTA for signing a different program profiles is given as follows:

$$TWTA = -((V^0 - V^1)/\beta_{price})$$

The above provides an estimate of the minimum bid that a respondent would be willing to accept in order to sign up a particular program, in this case to sign up for amnesty that yields utility V^1 as opposed to that obtained from the status-quo V^0 (Bennett and Birol, 2010).

The main indicator of the measure of utility in CBA is the willingness to pay (WTP) by individuals or the community for desirable increases in wellbeing or for the avoidance of undesirable losses. Theory has provided room for willingness to accept (WTA) compensation to indicate a decrease in wellbeing. However, both approaches have their shortcomings, of being biased in evaluating environmental damages. The measures may be subject to various kinds of bias, such as an inflated claim for compensation, which may lead to inappropriate estimates of the welfare lose involved (James, and Francisco, 2015).

Despite the above shortcomings, there is dominance of cost benefit analysis (CBA) as a tool of analysis when taking an environmental decision. Therefore, policy makers have to have long term or perspective thinking and policy formulation and projections to understand the implication of the policy they have designed to counter such problems. When people have little or no adequate information about the negative effects of environmental degradation on health, recreation, etc. their WTP will certainly fall short of what it should be therefore achieving an efficient allocation will still be difficult, hence third party which is the government must intervene. The government uses its policies to force market participants to internalize the external cost or benefit.

Johansson (1993) pointed out that in applying the Pareto criterion, there is need to understand the benefits derivable by households, whether they are better or worse off as a result of a policy change. However, most real-world project results in producing both gainers and losers, and, as observed above, the Pareto criterion cannot handle such mixed outcomes.

In such circumstances, the KALDOR criteria, compensation principle which was suggested by Johansson (1993) can be applied as a decision criterion. The Kaldor criterion, maintained that a project is desirable if, it is hypothetically possible to redistribute income from the project to the society so that everyone becomes better off than without the project. That is to say, gainers should be able to compensate losers. Johansson (1993) further suggested that The Hicks criterion is applicable to a project, to move from state *A* to state *B*, if, in state *A*, it is impossible to redistribute income from the gainers to the losers rather than abandoned the project.

The compensation principle unlike the Pareto principle does not require the actual compensation payment. The principle is stated in terms of potential

compensation rather than actual compensation. However, if the compensation were required there would be no significant difference between the compensation principle and the Pareto principle.

However, due to difficulty in measuring cardinal utility, a number of such measure were carried out under an ordinal measure of utility which help consumers in making choices or measure of their preferences over time. To obtain a cardinal measure of utility change we need to use money to understand what the individual is willing to pay (WTP) to acquire more of something desirable, or less of something undesirable; and "the least that someone is willing to accept (WTA) in compensation for giving up something desirable, or tolerating something undesirable" (Hanley, et al., 2009: 17).

Hanemann (1991) pointed out that the literature from environmental economist is widely viewed to imply that there is no much difference between WTP and WTA for variations in environmental amenities except if it's influenced by income effects as an argument by Bergstrom, Stoll, and Randall (1990). However, a number of current empirical studies proved that there exist large disparities not only income but also substitution effects. Holding income constant, a public commodity that has no close substitute is expected to have greater disparity between WTP and WTA. But if there is a private good that can substitute a public good, then there will be little differences on an individual WTP and WTA for a change in public, although there are arguments about the disparity between WTP and WTA Hanemann (1991) is the view that despite the theoretical prediction that the difference between WTP and WTA tends to be small, empirical evidences from CVM proves that there exist large differences. Brown, and Gregory (1999) pointed out that the disparity is as a result of both economic and psychological explanations. Economic reasons include, among others income effects, transaction costs, implied value, and motive for profit maximization. While, Psychological reasons can be looked at the following: the endowment effect, legitimacy, ambiguity, and responsibility. Horowitz, and McConnell (2002) maintained that, even when the ratio between WTP and WTA becomes smaller, WTA cannot be reliable for environmental valuation. They also observed that disparity between WTP and WTA may be considered to be a sign of the CVM survey method. This is because of the limitation of the respondent's preferences in answering CVM questions. Another weaker version can be interpreted that WTP questions, measure preferences, but WTA questions do not. This may be considered to be the basis of the interpretation given by the NOAA panel, which recommends that researchers not to use WTA questions (Horowitz, and et al., 2002).

Biel, Johansson-Stenman, and Nilsson (2011) observed that Plott and Zeiler (2005) discovered that disparity in consuming standard goods disappears when an incentive-compatible design controls for misconceptions is used. Equally Biel, et al. (2011) also supported the view and observed that, there are no significant remaining discrepancies existing between the WTA and the WTP framings. They conclude that, it is likely to be true that emotional experiences, and possibly moral perceptions, may well in addition to other factors explain why the observed WTA and WTP differences tend to be larger for the public than for private goods.

Despite the above, a number of studies have found that using incentive compatible elicitation mechanisms yield smaller disparities between WTP and WTA (Sayman, and Öncüler, 2005; Tunçel, and Hammitt, 2014). Equally, Biel, Johansson-Stenman, and Nilsson (2011) observed that, the disparity disappears as in Plott and Zailer. In addition, Tunçel, and Hammitt (2014) observed that, in contrast to Horowitz, and et al. (2002) they find that the disparity between WTP and WTA is significantly smaller in studies using incentive-compatible elicitation mechanisms. They maintained that a number of studies have shown a disparity to still exist and it's not due to a problem of weak experimental design rather it's influenced by study features. We can, therefore, conclude that although there are divergent views and controversies WTA is still a good tool to measure environmental problem that need to be encouraged by economic researchers.

3.1 Area of the Study

Militancy and Vandalism in the Niger delta region

Militancy in the Niger delta region can be traced to agitation by the oil producing communities for improvements in their economic well-being, better environmental conditions, resource allocation and control. The inability to achieve the above, let to the formation of the renowned militias in the region which includes: The Niger Delta People's Volunteer Force (NDPVF) 2007 and the Movement for the Emancipation of the Niger Delta (MEND) 2005, Niger Delta Vigilante (NDV). Given their financial strength, community and international support make them accepts their actions as agitators' for a better Niger delta. However, they employ various means that are outside acceptable norms in an attempt to

achieve their stated political, economic and environmental demands. These include pipeline vandalism, kidnapping of oil workers, killing of military & other security personnel sent to the region (Omotola, 2009; Orogun, 2010).

The militants significantly reduced oil production from the region to 700,000bpd from 2.2mbpd until amnesty was granted in 2009. Under the amnesty program the militants have reached an agreement to lay down their arms struggle and embrace dialogue with a promise of promoting economic development of the region and better environmental. However, due to policy inconsistency, Corruption and lack of delivery of promises lead to more vandalism and economic losses of up to 300,000bpd from 2012 to 2015.

Youth militancy is considered a responsibility and cut across age, education and status among the youth in the region. Youths meeting involved youth in most the communities where a number of decisions, including shutting down oil wells and areas to be vandalized are usually discussed. Most of them believe that violence is the only language, both the government and oil companies understands (Oluwaniyi, 2010).

Vandalism is defined as a deliberate hostile behavior which targets environmental objects with the aim of causing damage to the property (Christensen, Johnson, and Brookes, 1992). It can also be a productive force that resists exploitation of the capitalist system (Zinganel, 2005) or an act of boredom, resentment, and frustration (Winter, 1992). Understanding the mind of the vandal will enable us to his act and the targeted object and the rewards attached to it. Christensen, et al. (1992). Equally, people who perceived of marginalization may resort to vandalism against institutions or organization they accused of marginalizing them.

3.2 Questionnaire Design

The data for the study were collected through a well-designed questionnaire administered to 300 respondents' in the Niger delta region of Nigeria. The socioeconomic background of the respondents is outlined as follows: 236 (78.7%) of the respondents are male, while 64 (31.3%) are female respondents. While 94 (31.3%) of the respondents had formal primary and secondary education, 72 (24%) have NCE/Diploma certificates, 120 (40%) have university education and only 14 (4.7) have no formal education. When asked about the need for an amnesty program in the Niger Delta region, 95.7% agreed that there's a need for an amnesty program for the Niger Delta militants, while 4.3% objected to the program. While 62.7% rate the amnesty program a success, but 37.3% rates the program not successful. About 72.7% of the respondents observed that their family members have not benefited from the program, while 27.3 indicated that their family members have benefited from the amnesty program. On the other hand, when asked about their employment, 46.3% indicated that they're not employed, 18.7% are self-employed, 26% are public servants, 7% are private and 2% are private. Asked whether they consider environmental issues very serious 91.7% said they considered the environment very important, while only 8.3% considers it less important.

4. Results

The study presents two different *CLM* results in tables 2 and 3 which includes Basic Model and the Extended Model results. The *CLM* results from the basic model shows that the respondents' choices are determined by the main effect only. While the *CLM* results in table 3 from the extended model represent respondents' choices which are influenced by main effects and their socioeconomic characteristics. In both results compensations are found to be positive and significant. This signifies that better compensation package will increase the likelihood of militant's willingness to stop vandalization of oil pipelines and engaged in amnesty programme and training designed for the ex-militants. Equally the positive sign of compensation is an indication that, ceteris paribus, respondents prefer improved compensation packages that offers better compensation than the status-quo option.

Table 2: CLM Basic Model

Attributes levels	Coefficient	Std. Error	t-ratio	p-value
ASC	2.18488778***	0.2221489	9.835	0
PAM1	.50563273***	0.0776161	6.515	0
DOB1	.30961774***	0.1007131	3.074	0.0021

CSC1	-.65212902***	0.1777056	-3.67	0.0002
LWP1	1.04210777***	0.0688237	15.142	0
IPC1	1.26480914***	0.1049135	12.056	0
TAL1000	.03610948**	0.0141549	2.551	0.0107

*** 1%; **5%; *10%

Table 3: CLM Extended Model				
Attributes levels	Coefficient	Std. Error	t-ratio	p-value
ASC	.98029804*	0.4126567	2.376	0.0175
PAM1	.53893428***	0.0818313	6.586	0
DOB1	.28872359***	0.102643	2.813	0.0049
CSC1	-.60007017***	0.1827574	-3.283	0.001
LWP1	1.04299317***	0.0692635	15.058	0
IPC1	1.74199110***	0.3109906	5.601	0
TAL1000	.02955945*	0.0151704	1.948	0.0514
SECCIP	-0.50181024	0.3026157	-1.658	0.0973
ADTP2	.24905307*	0.1282211	1.942	0.0521
HINCP2	-.26343423***	0.0980085	-2.688	0.0072
MAL_ASC	.62192238*	0.3304239	1.882	0.0598
HHASC	.32328222**	0.1327595	2.435	0.0149
TAL1000	0.02955945	0.0151704	1.948	0.0514

While most attributes maintain their positive sign with the exception of *CSC*, which has a negative sign, is an indication that ex-militants would rather look for employment opportunities elsewhere than submit their credentials to a special *CSC* for employment. Furthermore, ASC also has a positive sign, an indication that respondents' will prefer better improved environmental and training options packages than the status-quo. This is expected because of long agitations for a better environment and infrastructural improvements in the Niger delta region.

Table 4: Heterogeneity around the mean (integrated with ASC/TAL)				
SECCIP	-0.50181024	0.3026157	-1.658	0.0973
ADTP2	.24905307*	0.1282211	1.942	0.0521
HINCP2	-.26343423***	0.0980085	-2.688	0.0072
MAL_ASC	.62192238*	0.3304239	1.882	0.0598
HHASC	.32328222**	0.1327595	2.435	0.0149

***** 1%; **5%; *10%**

The results also shows that all socioeconomic variables are significant with the exception of SECIP which is not significant. However, while *ADTP*, *MAL* and *HH* have significant and positive signs, an indication that age, male and household size are among variables that support an improvement in environmental protection in the Niger delta region (see table 4). However, household income *HINC* indicates significant, but with a negative sign. This revealed that as income fall, households support environmental improvement, while improvements in their income shows less concern with the improvement in the environment. However, this study adopted the Hicksian demand function in measuring respondents' attitudes towards their individual choices which isolates income in the measure of their utility. Therefore, changes in their levels of income doe not influence their choice from one attribute level to another. Rather, it is the package in an attribute level that influences their choice and keeps them on the same utility.

Table 5: Diagnostics & summary of statistics

Observations		2,400	2,400
Interaction completed		8	8
Loglikelihood	-1415.843	-1851.6819	
Loglikelihood	-1427.794	-1851.6819	
Pseudo – R2		0.22892	0.23537
Adjusted Pseudo- R2		0.22779	0.23346

Traditionally, before achieving any acceptable post estimation analysis, it's usual to assess if the *CLM* model is appropriate for the study or not. The normal approach is to undertake the Hausman and McFadden (1984) IIA property test as observed by (Agimass and Mekonnen, 2011). This is carried out by computing likelihood ratio test on all choices in such a way that excludes different choice alternative in succession. By fulfilling the IIA assumptions at this level, it means the model obtained from the sub-set of alternative choices will be the same from the one's obtainable from the rest of the choices (Karousakis and Birol, 2008).

However, IIA test as reported in table 6 is data specific and may not be applicable to all data. Hence, Hensher et al. (2005) suggested an alternative approach of cross-elasticities assessment of choices be used. If alternative choices have the same cross-elasticity, it means IIA assumptions is violated, however, in this study it's not violated see table 5. Equally, if the results of the basic analysis (without interaction) are violated, then the results with interaction be presented because it's expected to do away with the IIA violation problem. If it is violated, the solution would be to include some of the respondents' characteristics into the model analysis which will solve the IIA problem (Birol et al., 2005; Alpizar et al., 2003 and Agimass and Mekonnen, 2011).

Table 6: IIA – Test:			
Improved option1 cross elasticity			
Improvement Choice=OPT2	-.5841	.3550	
Improvement Choice=OPT3	-.7642	.3623	
Improved option2 cross elasticity			
Improvement Choice=OPT1	-.5996	.4290	
Improvement Choice=OPT3	-.8960	.3022	

The *CLM* with interaction was analysed to meet the requirement for the of IIA test through cross-elasticity base test as reported in table 6 and have satisfied our demand for the *CLM* model in this study. The basic model is extended to include respondents' socioeconomic variables, and has resulted in the formation of the following equation:

$V = \beta_{PAV}*PAV_i + \beta_{DOB}*DOB_i + \beta_{CSC}*CSC_i + \beta_{LWP}*LWPi + \beta_{IPC}*IPC_i + \beta_{IPC}*IPC_{i+} \beta_{TAL}*TAL + \Upsilon (ASC* \text{SECIP}) + \Upsilon (ASC* ADTP2) + \Upsilon (ASC* HINCP2) + \Upsilon (ASC* MAL\_ASC) + \Upsilon (ASC* HHASC) + \varepsilon_i$

Where: *SECIP* = Means secondary educational attainment

ADTP= Measure of age stands for adult; *MAL_ASC*= Male; *HHASC*= Households size.

The variables were interacted with *ASC, TP and IP* to render them variable in accordance with the tradition of estimating MNL model. This is because the three variables are demographic variables that do not change across the different choices. The results obtained from the *CLM* with interaction shows a better model fit than the basic model without interaction. This is because it present a result with the higher McFadden R^2 value and lower log likelihood values as presented in table 5. This analysis has produced an acceptable result, since our cross-elasticity values are not the same, it implies that the IIA problem is solved. Therefore, CLM can be accepted for this study.

In addition, marginal willingness to accept (MWTA) was computed and found to be within acceptable measures. The MWTA measures additional rate of substitution at a given time. The estimation of the marginal willingness to accept shows a minimum MWTA of ₦51.56 (ie ₦51, 560 since the value of TAL is in "000"). This represent the least amount the militants will accept as compensation. This approach is consistent with a number of studies carried out by Hanley et al, (1998); Callan & Thomas, (2012).

5. Discussion of the CLM Basic and Extended Results

The *ASC* results from the basic and the extended models are significant and positive which is in line with the theory (Grosjean et al., 2012; Bennett and Birol, 2010). It shows that the militants would prefer attributes with incentives that promised better environmental management, provision of infrastructure, training programme, engaging in peace and doing away with vandalism of oil pipelines than the status quo. This is also in line with (Omotola, 2009; Oshwofasa, et al., 2012; Anifowose, et al., 2012; Raji and Abejide, 2013) who identified environmental neglect and poor provision of social amenities such as provision of schools, hospitals, water supply and poor environmental management as major drivers of militancy in the Niger delta region. They further suggested that better environmental management and provision of infrastructural facilities would go a long in promoting lasting peace and curbing the menace of oil pipeline vandalism.

Also results on programme accessibility (*PAM*) for the militants training is significant and positive with p = 0.000, from both the basic and the extended models. This is also an indication that, militants would prefer improved access to training than maintaining status quo. Therefore, improving the number of programme beneficiaries at a time is important to the militants which is in line with Asuni (2009) and Oshwofasa (2012) who voiced their support for the amnesty granted to the militants arguing that will promotes lasting peace in the region. Equally it is in the selection of the attributes the militants attached so much significance to program accessibility which they said were high jacked by community leaders and the political class in the region.

Duration of benefits (*DOB*) is also significant and positive with p = 0.0049 ad 0.000 in both the basic and the extended models respectively. It shows that the militants prefer to retain the train training allowances until job is secured. It was observed that in the past some beneficiaries after acquiring training when back to the creeks due to lack of employment. On the other hand, the Civil Service Commission (*CSC*) results show significant but negative with p value of 0.002 and 0.010 in the basic and the extended models respectively. The attribute was designed to create a special *CSC* for ex-militants who are expected to submit their credentials for employment considerations. Despite the significance of the attribute, the results indicate that the militants would prefer to be given some incentives before submitting their credentials for employment through the special *CSC*. This may not be unconnected with the new government policy of regularizing illegal refineries (mostly own and operated by the militants) into authorized modular refineries. Already 56 approval of such modular refineries have been granted by the government.

Land and water pollution intensity (*LWP*) results are also significant and positive in both the basic and the extended models, with p = 0.000 and p = 0.000 respectively. This positive indication signifies that, militants are willing to accept attributes with better incentives that promised improvements in the management of land and water pollution than the status quo position. This is in line with the following researches findings (Odeyemi, and Ogunseitan, 1985; Omotola, 2009; Katsouris, and Sayne, 2013; UNDP, 2006) who observed that the major deriving force pipeline vandalism is environmental pollution and neglect.

Finally, results from basic and extended models shows Infrastructure provision (IPC) significant and positive with p = 0.000 respectively. It shows that the respondents preferred an improved package that will promise better infrastructural provision in the Niger delta region than the status quo. This is in line with findings from (UNEP, 2011; Omofonmwan, and Odia, 2009) who emphasizes the significance of adequate infrastructural provision that is significantly in adequate in the Niger delta (also in other parts of Nigeria) especially electricity, road network, health facilities and schools if government is sincerely committed to solving the problems of oil pipeline vandalism in the Niger delta region. Other studies (Babatunde, 2010; Oshwofasa, et al., 2012) also emphasizes on the level of infrastructural decay in the Niger delta region and the need for improvements to curb oil pipeline vandalism.

Furthermore, on the extended model, the socioeconomic variables interacted in the model SECCIP, not significant, however, *ADTP2* (age), *HINCP2, MAL-ASC* (male), and *HHASC* (household income) all are significant with house hold income significant but negative. This shows that; age, male, family and size has a positive relationship with choices of the respondents in supporting policies that will promotes better environmental management in the in the Niger delta region. While on the other hand, house hold income has a significant with negative relationship towards improving environmental policies in the Niger delta region. This means that, as income of the respondents increase they care less about the environment issues in the

region. While they support better environmental management as their income falls. However, as observed earlier, the study adopted the Hicksian demand function (Hau, 1983; 1987) who pointed out that income only function as a proxy in travel demand models and does not enter the utility function but serves as income per se. Therefore, the choice alternatives have zero income effects, with zero income marginal utility.

6. Conclusion

The findings of the study identified the possibility of proposing a new improved compensation package also assessed the acceptability of the package which has lower compensation but accompanied with better environmental improvement attributes. The study was carried by designing attributes that bring improvement in the amnesty programmer. The selected attributes are six which includes: training allowances, program access by militants, duration of benefits, and the establishment of a special civil service commission, land and water pollution intensity and provision of infrastructural facilities. Both were found to be positive and significant with the exception of CSC, which is significant with a negative sign.

The study found out that, the militants are willing to accept less allowances for training as a compensation to stop pipelines vandalism in the region as long as government is willing to complement compensation with improvements in programmer accessibility for training of militants. The study also discovered that the respondents are willing to accept changes in the duration of payments of training allowance after training and before employment. However, the respondents indicate that they are not willing to accept the establishment of a special CSC commission, rather they prefers to look for employment opportunities from other sources. This may not be unconnected to the current government policies which privatize the downstream oil sector, which makes it easier to secure employment opportunities for private oil companies. The study has also found that respondents are willing to accept less compensation allowance in substitute for improvements in land and water degradation levels in the region. Also the study has found out that the respondents are willing to accept less training allowances with improvements in the provision of infrastructural facilities (such as road networks, hospital, electricity, schools etc.) in the region. These attributes represent one of the most pressing demands of the Niger Delta people for a very long period.

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