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ESTIMATING CONSUMERS' WILLINGNESS TO PAY FOR SAFETY OF STREET FOODS IN SOUTH-WEST NIGERIA

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Abstract

Street foods have the potential to improve both food security and nutrition but they have the possibility of causing food poisoning outbreaks because they are mostly produced in dirty environments along dusty roads and other sources of contamination. In order to reduce the incidence of food borne diseases there is need for improved safety practices especially by the street food vendors which may increase costs. Parts of these costs will be transferred to consumers in form of higher prices. There is therefore an urgent need to assess consumers' Willingness to Pay (WTP) for safer street foods. Data were collected from 126 respondents who were selected from consumers patronizing street food stalls in Abeokuta, South-west Nigeria. The data were analyzed using descriptive statistics and the Logit regression model. WTP was estimated from the Dichotomous Choice Contingency Valuation Method (DCCVM). Average age of consumers was 35years with income of ₦29, 903.00. The Logit regression estimation showed that income and education have significant and positive effects on consumers' WTP. Estimated WTP value of ₦12.70 per ₦100 worth of street food was obtained from the DCCVM. It is recommended that safer street stalls should be located in areas populated by high income and educated people due to their readiness to pay for the improved quality. Public enlightenments should also focus on food safety education in order to stimulate food safety awareness among consumers especially in areas populated by low income and lowly educated people.

Key words: Street food, Safety, WTP, Consumer.

Introduction

Street foods are "ready-to-eat" foods and beverages prepared and sold by vendors and hawkers, especially in the street and other similar public places. The varieties and forms of foods sold depend largely on local eating habits and the socio-economic environment (FAO, 1997). Tinker (1997) defined street foods as any minimally processed food sold on the street for immediate consumption. They are foods obtainable from a makeshift or portable stall. According to FAO (1997), 2.5billion people eat street food everyday around the world. In many developing countries, street foods are common and important features of urban centres and are important because they provide a source of employment and income for men and women and street foods are also ready source of relatively cheap and nutritious food convenient for busy urban dwellers (Canet and N'Diaye 1996). The sector plays an important role in the urbanization process because it shows the survival and coping strategies adopted in most African cities. The movement of people from rural areas to urban centers has added to the need for feeding large numbers of working people on a daily basis away from their residence. The distances between the homes and places of work;

and the long hours of commuting leave very little time to cook, which contributes to the huge demand for inexpensive and convenient foods near schools and work places. Although, street foods have been a common feature of Nigeria urban scene for a very long time, their importance in the informal economy started growing considerably in the eighties (Akinyele, 1992).

Despite the tremendous potential to improve both nutrition and food security among urban population, street foods can sometimes cause concern because of their potential to cause serious food poisoning outbreaks due to microbiological contamination, improper use of additives and the presence of other adulterants and environmental contaminants (FAO, 1995). In some places, some of the street food stalls were dirty and are located in dirty environments with hordes of flies taking over available spaces. Others are located near sources of contamination such as sawmills and carpentry sites; refuse dumps, and along dusty roads (Dipeolu, *et al.* 2007). The street food vendors, who are frequently unlicensed and untrained in food hygiene or sanitation, work in unsanitary conditions and these are predisposing factors for food poisoning and serious health problems (Johnson and Yawson, 2000)

Laboratory analyses of some common street foods in Abeokuta in South-west Nigeria by Sanni *et. al* (1999) revealed that most the street foods have heavy microbial load: cooked *fufu* had a load of 1.0×10^4 cfu/g to 1.0×10^5 cfu/g; vegetable soup had a load in the range of 1.0×10^4 cfu/ml to 1.6×10^4 cfu/ml; stew had a load range of 1.3×10^3 to 1.8×10^3 cfu/ml; cooked beans had a load of 8.5×10^2 cfu/g to 9.7×10^2 cfu/g. Rice had the least count which range from 1.2×10^2 cfu/g to 1.5×10^2 cfu/g. Akinbode (2005) and Akinbode *et al.* (2011) found that majority of street food consumers were aware that diseases can occur from consumption of water and foods.

According to Crutchfied *et al*. (2000) economics has a role to play in the issue of food safety by measuring how large the cost of reducing food safety risk can be and determine who bears the cost. The costs are then compared to the benefits of improving food safety. If the WTP for safe street food can be estimated it can be compared with the cost of improving safety. The willingness to pay of consumers for the improvement in the safety of street foods is not known even if they are aware of the hidden hazards despite the importance of street foods in the diet of an average Nigerian. This study is therefore expected to be one of the pioneer attempts to assess the consumers' Willingness to pay (WTP) for safety of street foods.

Specifically, the study described the socio-economic characteristics of street food consumers; estimated consumers WTP for safe street foods and determined factors affecting WTP for safety of street foods.

Theoretical Background

Willingness to Pay (WTP) is the amount of money a person would be willing to pay for higher level of environmental or commodity quality (Hartwick and Olewiler, 1998). WTP corresponds to equivalent variation or surplus which measures the amount of money a person is willing to give up to hold utility constant after there has been an increase in the price of a good that person consumes. Consumer surplus is defined as the difference between the amount of money that a consumer actually pays to buy a certain quantity of a commodity and the amount that he would be willing to pay for this quantity rather than do without it (Kontsoyianis, 1982). According to Hirsholeifer (1984), consumer surplus is the difference between aggregate WTP and aggregate actual payment. Consumer surplus can be estimated using the area under the demand curve. It is the area under the demand curve but above the prevailing market price.

Equivalent variation evaluates environmental change due to the benefit level after the change ("How much would the consumer pay at maximum to avoid a worsening of the environmental situation?"). In

economic theory, equivalent variation (EV) is a measure of how much more money a consumer would pay before a price increase to avert the price increase (Mas-Collel *et al.,* 1995). Because the meaning of "equivalent' may be unclear, it is also called extortionary variation. John Hicks (1939) is attributed with introducing the concept of compensating and equivalent variation. It is a useful tool when the present prices are the best place to make comparison.

On the other hand, compensating variation (CV) is a measure of utility change introduced by John Hicks (1939). Compensating variation refers to the amount of additional money an agent would need to reach his initial utility after a change in prices, or a change in product quality, or the introduction of new products. Compensating variation can be used to find the effect of a price change on an agent's net welfare. CV reflects new price and the old utility level.

Contingent Valuation Method (CVM): This is a method of estimating the value that a person places on a good. The approach asks respondents to directly report their WTP to obtain a specified good or willingness to accept (WTA) to give up a good, rather than inferring them from observed behaviour in regular market places. Loomis (1996) stated that CVM is used to directly value the use and the non-use value of a natural resource. It is a standardized survey method for estimating maximum willingness to pay (WTP) or willingness to accept compensation (WTA) for use, existence and bequest values for resources. Because contingent valuation creates a hypothetical market place in which no actual transactions are made, it has been successfully used for commodities that are not exchanged in regular markets (in this case safety of street foods) or when it is difficult to observe market transaction under desired conditions.

Two of the CVM techniques that have been widely used to determine the maximum WTP and WTA compensation for changes in the availability of non-market goods are the Open-Ended Approach and the Dichotomous Choice approach. In the Open-Ended Approach, the respondent is simply asked to state his maximum WTP or WTA. Although, Jabarin and Damhoureyeh (2006) posited that the easiness notwithstanding, it has a low incentive. Despite this criticism, the approach has been used in a number of high profile studies involving government programmes and policies in countries around the world. Dichotomous Choice (DC) approach asks the respondent a question if he would pay "X" amount of money to obtain a hypothetically defined good. There are only two possible responses to a dichotomous choice question which are "yes" and "no". The amount presented is varied across respondents and is usually termed the "bid values". The DC approach mimics behaviour in regular markets especially in western countries where people usually purchase or decline to purchase a good at the posted prices. It should be noted that DC does not observe the WTP directly, but allows us to infer that the respondent's WTP amount is greater than the bid value if the respondents answers "yes" to the bid value or is less than the bid amount if he answers "no". The bid values form a broad intervals around all the respondents' WTP amounts. The mean WTP can be estimated by fitting special statistical models of the responses. In this case, a Logit estimation was adopted as used by Okojie (2007). The DC is appealing at least for reducing respondent's dilemma vis-à-vis what he may consider as the appropriate WTP value to be stated as the highest amount of money he can forego for the non-market good (in this case safety of street foods).

Methodology

The study Area:
The study was carried out in Abeokuta, the capital city of Ogun State, south-west Nigeria. The state was created in 1976 by the then Federal Military Government and it is located within latitudes $3^0$30'N - $4^0$30'N and longitudes $6^0$30'E-$7^0$30^{1}E (Ogun State Annual Report, 2000). The state covers a land area of 16,762 square kilometers with a population of 3,728,098 (2006 population census). The state is bounded in the West by the Republic of Benin, in the south by Lagos state and the Atlantic Ocean, in the east by Ondo state and in the North by Oyo state. The state is almost the fastest growing state in the country in terms of

physical development, urbanization and the number of people immigrating to settle down therein as a result of decongestion of the neighboring Lagos state which is the commercial capital of the country but the smallest in terms of land area (about 3,577 sq. km), yet creeks, lagoons and estuaries constitute nearly 500sqkm (14% of the total land area) but with the highest population of about 10million. Due to the fact that the study area is the capital city of the state (Ogun), it is mostly populated by civil servants, students, artisans and traders who are potential consumers of street foods.

Sampling Technique:

A total of 150 respondents were randomly selected from food stalls (*bukas*) across different areas of the city (low income areas such as Ago-oko, Ita-morin, Ijemo, Ake and Ijaiye; middle income areas such as Idi-aba, Olomore, Obantoko, Onikolobo and Adigbe; and high income areas such as Ibara Estate, Elega Estate, Asero Estate Kenta Idi-Aba Estate and Oke-Ata Estate). Various predetermined bid values were evenly presented to respondents. However, only 126 of the questionnaires were used for the analysis as twenty-four were discarded due to incomplete information.

Method of Data Collection and Sources:

Primary data used in this study were collected by personal interview and recording with the aid of structured questionnaires. Data were collected on socio-economic characteristics of respondents and WTP for safety of street foods. The WTP questions were asked in dichotomous choice format. In order to determine the bids posted to respondents in the dichotomous choice question, a small size pre-survey was carried out where respondents were asked to state their WTP figure in an open-ended format. From the responses collated outliers were excluded and a range of more representative values were obtained. The data generated were used to develop the bid vectors, (b_1, b_2 .....b_m). The Bargland *et al* (1987) approach which was also adopted by Okojie (2007) was used in selecting the unique bid amounts (b_1, b_2 .....b_m) to be used in eliciting willingness to pay in the dichotomous choice contingent valuation survey. It involves the choice of unique bids based on equal-linear increments between the upper and lower bound bids of the pre-test open-ended contingent survey data. This resulted in the choice of 10 unique bid amounts which were used in the actual Dichotomous –Choice Contingent Valuation Method (DC- CVM) survey. This agrees with the 10 – 15 bid amounts that have always been used in such studies according to Cooper (1993). The various bids were then posted randomly to respondents sampled for the study.

Method of Data Analysis:

Descriptive Statistics: Frequency tables and percentages were used to describe the socio-economic characteristics of respondents.

Dichotomous-Choice Contingent Valuation (DC–CVM)

The Maximum Likelihood Estimation of the Logit regression coefficient was used to determine the mean WTP in the DC- CVM. It was also be used to determine the relationship between the socio-economic variables of respondents and their acceptance probability to bids elicited and by implication Willingness To Pay (WTP).

From the DC- CVM, an indirect WTP was quantified and its mean calculated. Haneman (1984) noted that this means can be expressed as:

$$E(WTP)=\int_0^{\infty}(1-F(b))db \quad \text{.....(ii)}$$

Where F (b) = Cumulative density function that represents the probability of "no" responses.
b = Various bids elicited for "no" response

Alternatively, equation (ii) can be presented as:

$$E(WTP)=\int_0^{\infty}(1-F(b)db) \quad \ldots\ldots(iii)$$

Where F (bi) = Cumulative density function that represent the probability of a "yes" response
bi = Various bids elicited for "yes" responses.

The Mean WTP that is based on the cumulative density function of "yes" response – F (bi) was calculated from the Haneman (1984) approach as used by Turcin and Girand (2007) and Okojie (2007). Haneman (1984) utility difference equation states that if cumulative density (F (bi) is logistic, the parameter estimate to calculate F (bi) is:

$$F(bi)=Prob\ (WTP \leq bi)=[1+\exp^{-(a+\beta i)-1}] \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots..(iv)$$

The problem with this model is that the left hand side of the equation is in probability form that is specified between 0 and 1 while the linear predictor on the right hand side can take any real value. Therefore, there is no guarantee that predicted values will be in the correct range unless complex restrictions are imposed on the coefficients. The simple solution was to transform the probability to remove the range restrictions and model the transformation as a linear function of the covariates. This was done by moving the probability F (b) which is also represented as Pi to the odds (i.e. odds ratio):

$$^{Pi}/_{1-pi}=[1+\exp^{-(a+\beta bi)-1}]\ldots\ldots\ldots\ldots\ldots\ldots(v)$$

The results for this are represented as 1:k where k is the number of parameters. This indicates a floor restriction of 1 to any positive value without a ceiling restriction. The floor restriction was removed by taking the log odds that resulted in what is called the logit (Li) as dependent variable:

$$Li=^{1}/(1+\exp^{-(a+\beta bi)} \quad)\ldots\ldots\ldots\ldots\ldots(vi)$$

When socioeconomic variables that affect the acceptance of posted bid values are considered, the equation becomes:

$$Li=^{1}/1+\exp^{-(a+\beta Xi)}\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (vii)$$

Li = Respondents acceptance probability of the bid offered WTP (yes=1, no=0)
X_1 = Bid values i.e. additional ₦ values on ₦100 worth of a plate of street food
X_2= Age in years
X_3= Gender dummy (Male=1, female = 0)
X_4= Income in ₦/month
X_5=Educational level (years spent in school)
X_6 = Marital status dummy (married = 1, single = 0)

Logit in this sense maps probability from the range (0, 1) to the entire real line, that is, from - ∞ as probability approaches 0 to + ∞ (i.e. as probability approaches 1). The model determines the maximum likelihood coefficient estimates.

Li is a proxy for WTP; it represents the dependent variable which is a dummy by the binary choice Logit model adopted for the study following Okojie (2007). It is defined as "1" if respondents accept bids posted and "0" if not. X_1 represents the bids presented to the respondents in the DC-CVM. This is the variable "price of safety" of street foods. The unrestricted mean WTP (P^+) according to Cooper and

Loomis (1992) is calculated from the model coefficients as follows:

$$P^{+} = \frac{a}{|\beta|} \text{ ……..(viii)}$$

As this has the possibility of producing the undesirable negative WTP, the restricted WTP (P^{-}) adopted is given as:

$$P^{-} = \frac{1}{|\beta|} * Ln(1 + \exp^{a}) \text{ ……(ix)}$$

Where: a = intercept
β = coefficient of bid.

Results and Discussions:

Socioeconomic Characteristics
Majority of the respondents (69.8%) were male. Sixty-five (65) percent were married while about 54% did not receive formal education beyond Senior School Certificate (Table 1). The mean age of respondents was 35 years with a standard deviation value of 11.8. About 36 percent of the respondents sampled were civil servants (i.e teachers, Government Ministries, Agencies, Departments and Institution workers). Others respondents included Transport workers (drivers and bus conductors), self employed people, traders and private sector workers. The average monthly income of respondents was ₦29,903.17 and is an improvement over ₦17,025 reported by Akinbode (2005). Akerele *et al.* (2010) reported average monthly income of ₦16,971.98 among *kilishi* (another form of street food) consumers in Sokoto North-West, Nigeria. Respondents spent an average of ₦2,716 on street foods per month which is slightly higher than ₦2,601 reported by Akinbode (2005).

Food Safety Knowledge and Reactions to WTP Questions:
Almost all the respondents (96.8%) indicated that they knew that illnesses can occur as a result of taking unsafe foods. Over 80 percent were of the opinion that cholera, stomach upset and diarrhorea may occur as a consequence of eating such foods (Table 2). Out of 83 percent that have experienced one food borne ailment or the other, stomach upset was the most common (82.5 percent). However, only 16 percent were able to link such food borne ailments to food eaten in a particular food stall. This underscores the need for effective "Trace-back" mechanism if food safety issues are to be tackled head on.

Sixty percent of the respondents rated the foods sold in the food stalls (*buka* or *bukateria*) as fairly safe. This did not however agree with scientific findings of Sanni *et al.* (1999) which revealed that some of these street foods had high bacteria load. Furthermore, Dipeolu *et al.* (2007) reported that most of these street food stalls were dirty and located in dirty environment with hordes of flies taking over some of the available spaces in most cases.

Specific WTP bid values were presented to each respondent. Some of them accepted to pay the bids presented to them while some did not. Respondents who were willing to pay gave health concerns (46 percent) and compensation to vendors for their effort aimed at ensuring food safety (16 percent) as reasons for accepting the given bids. Respondents who did not accept to pay the given bid posited that the bids were too high (47.6 percent) and that the foods were already costly (21 percent). Some were of the opinion that it was not their concern to pay for the safety of the foods while some did not seem to think there was any danger in consuming those foods to warrant paying extra for improved safety. The opinion of some respondents that payment for safety was not consumers' issue brings to the fore the position of

Crutchfield *et al.* (2000) that economics has a role to play in the issue of food safety by measuring how large the cost of reducing food safety risk can be and determine who bears the cost.

Dichotomous Choice Contingent Valuation (DC-CVM):
From the Logit Regression result (Table 3), the coefficient of the "Bid variable" (B_1) is -0.1502 and the intercept is 1.687. This is substituted into the equation (ix) as follows:

$$P^{-} = \frac{1}{|\beta|} * \text{In}\,(1 + \exp^{a})$$

Where: a = intercept
β = coefficient of bid.

$$\text{Therefore, Mean WTP} = \frac{1}{|-0.1502|} * \text{In}\,(1 + EXP^{1.687})$$

$= 6.66 * \text{In}\,(1 + EXP^{1.687})$
$= 6.66 * \text{In}\,(1 + 5.403247)$
$= 6.66 * \text{In}\,(6.403247)$
$= 6.66 * 1.856805$
$= ₦12.37$

Furthermore, socioeconomic variables believed to be capable of affecting consumers' likelihood to accept bids were included in the logit model. The result (table 3) showed that variable X_3 (gender) which was a dummy (male =1, 0 if otherwise) was significant and negatively affect the likelihood of accepting the bids presented to consumers at α=0.1. The implication is that female consumers are likely to pay more for safer street foods. Variables X_4(income) and X_5(education) were significant and positively affect the likelihood of accepting the bids presented to the respondents at α =0.05 and α =0.01 levels respectively. These imply that that the higher the income and educational level of respondents, the higher the likelihood to be willing to pay more for safer street foods. These findings corroborate the finding of Henson (1996) in a study of consumers WTP for reduction in the risk of food poisoning in the UK. In the same vein, Akinbode *et al* (2011) reported that age, education and income had significant positive effect on the likelihood of consumers' willingness to pay a premium for safety of street food.

The marginal effect coefficients (table 3) represent the change in the probability of willing to accept a bid offer or to pay a premium for safety. According to the Marshallian theory of demand, there is an inverse relationship between price and demand. In line with this popular theory, a unit rise in the bid amount presented to consumers (which represents price of food safety) caused the probability of willing to pay more for safer street food to decrease by 3.8percent. The marginal coefficient of -0.509 for gender variable implies that the probability that an average male respondent will be willing to pay extra for safety of street food is 50.9percent lower than for an average female respondent. Females have been reported to be willing to more for safety (e.g. Henson, 1996 and Akinbode, 2011). The 3 percent increase in the probability of willing to pay extra as a result of a slight increase in income obtained in this study is close to 2.8 percent reported by Ehirim *et al.* (2007) for fish consumers in Bayelsa state, south-south Nigeria. Meanwhile, 8.5percent obtained here for education (measured in years spent in school) is contrary to -64percent reported in the same study. It can be asserted that probability that consumers will be willing to pay extra for safety of street foods increased with the level of education in line with expectation.

Conclusion and Recommendation

Street food consumption has become an important aspect of the food bundle of an average Nigerian. However, consumers' consciousness of the safety of these foods seemed to be low. Some of the respondents still do not perceive any danger in the consumption of street foods wherever they were prepared or in whatever manner they were handled. To this extent, some of the consumers turned down the bids presented to them while some accepted to pay. Furthermore, the study revealed that gender, income and education were the main important variables affecting consumers WTP for safe street foods. To establish modern safe street food canteens, investors can utilize the WTP figures of ₦12.37 per ₦100 worth of food plate estimated in this study to project their expected sales. It is recommended that safe street food canteens should be located in areas populated by educated and high income consumers as this segment of the buyers in the street food market are ready to pay extra money for safety. Also, consumers should be educated on the importance of consuming safe street foods or danger in consuming unsafe street foods. This is expected to raise food safety consciousness, enhance food borne ailment "trace-back" and improve WTP.

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Table 1 Socioeconomic characteristics of sampled street food consumers

Gender	**Frequency**	**Percentage**	**Mean**	**Std dev**
Male	88	69.8		
Female	38	30.2		
Marital status				
Married	82	65		
Single	44	35		
Education			12.6	0.48
Primary School	28	22.22		
Junior School	10	7.9		
Senior School	30	23.8		
OND	6	4.7		
NCE	6	4.7		
BSc/HND	36	28.6		
MSc	10	7.9		
Occupation				
Civil Servant	46	36.5		
Private Sector Worker	10	7.9		
Traders	10	14.3		
Transport Worker	18	14.3		
Self Employed	26	20.6		
Others	8	6.3		
Age			34.8	11.8
≥20	10	7.9		
21 – 30	46	36.5		
31 – 40	36	28.6		
41 – 50	14	11.1		
51 – 60	16	13		
Income			29,903.17	18,459.95
≤10,000	16	13		
1,0001 – 20,000	34	27		
20,001 – 30,000	26	20.6		
30,001 – 40,000	14	11.1		
40,001 – 50,000	18	14.3		
>50,000	18	14.3		
Amount Spent on Street Food			2,716..35	1,517. 25
≤ 1,000	14	11.1		
1,001 – 2,000	36	28.6		
2,001 – 3,000	34	27		
3,001 – 4,000	20	15.9		
4,001 – 5,000	10	7.9		
>5000	6	4.8		

Source: Field Survey, 2009

Table 2: Food Safety Knowledge and Reactions to WTP Question

	Frequency	Percent
Do you know illnesses can occur from taking unhygienic foods?		
Yes	122	96.8
No	4	3.2
Consequences of taking unhygienic foods		
Did not know	4	3.2
No effect	2	1.6
Cholera	94	74.6
Stomach upset	120	95.2
Diarrhorea	116	92.1
Dysentery	60	47.6
Others	20	15.9
Experienced food borne ailment before?		
Yes	104	82.5
No	22	17.5
Ailments experienced		
Cholera	4	3.2
Stomach upset	104	82.5
Diarrhorea	84	66.7
Dysentery	8	6.3
Did you link ailment to particular food eaten in a *buka*?		
No	106	84.1
Yes	20	15.9
Have you ever thought about the safety of the foods?		
Yes	108	85.7
No	18	14.3
How would you rate the foods sold in the *bukaterias*?		
Extremely not safe	2	1.6
Not Safe	16	12.7
Fairly safe	76	60.3
Safe	24	19
Extremely Safe	8	6.4
Reasons for accepting bid values		
Personal Health reason	58	46
To compensate vendors	20	15.9
Reasons for not Accepting Bids		
The bids are too high	60	47.6
Foods are already expensive	26	20.6
It is not the duty of consumers to pay for safety	12	9.5
No Danger in consuming those foods	14	11.1
Reasons for not willing to pay at all		
Foods are already expensive	18	14.3
It is not the duty of consumers to pay for safety	18	14.3
No Danger in consuming those foods	16	12.7
Others	2	1.6

Source: Field Survey, 2009

Table 3: Result of the Logit Maximum Likelihood Estimation

Variables	**Variable Symbol**	**Coefficient**	**Marginal Effect**	**Z- value**
Constant		1.687	0.4215	1.52
Bid in Naira	X_1	-0.150203***	-0.038	-3.05
Age in years	X_2	-0.0512323	-0.013	-0.81
Gender (dummy, Male =1)	X_3	-2.035082*	-0.509	-1.83
Income	X_4	0.1185**	0.030	2.46
Education	X_5	0.3413235***	0.085	2.93
Marital Status	X_6	0.126175	0.032	0.09
LR Chi-Square Value		48.94		
Log likelihood		-19.12		
Pseudo R^2		0.5612		

Source: Computed from field survey data, 2009

*** Significant at 1% ($\alpha_{0.01}$), ** Significant at 5% ($\alpha_{0.05}$),* Significant at 10% ($\alpha_{0.1}$)