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Amponsah, Stephen and Adu, Kofi Osei

University of Cape Coast

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**FACTORS INFLUENCING TAX STAMP PURCHASES IN GHANA: A CASE OF  
TWIFO-ATTI MORKWA SUB-TAX DISTRICT.**

**STEPHEN AMPONSAH<sup>1</sup> and KOFI OSEI ADU<sup>2</sup>**

<sup>1</sup>School of business,  
University of Cape Coast,  
Cape Coast- Ghana.

<sup>2</sup>Department of Economics  
University of Cape Coast  
Cape Coast- Ghana.

**Abstract**

This study examined the factors that influence number of tax stamp purchased in Twifo-Atti Morkwa sub-tax district in Ghana. Data were collected from taxpayers in the study area who qualify for tax stamps and interview schedule was used for the collection of the data from the respondents. In total, 305 taxpayers were interviewed. The study employed negative binomial regression model to examine the factors that influence number of tax stamp purchased.

The study found that levels of education, perception towards the importance of payment of tax, application of sanctions, guilt feeling, rate of tax audit and distance to tax office are key predictors of tax stamp purchases. This study strongly recommends that Tax auditors should go round at least at the beginning of every quarter to inspect the number of tax stamps that taxpayers have bought. The study also recommends that Ghana Revenue Authority should apply sanctions promptly when tax auditors catch some tax stamp defaulters.

**Keywords: tax stamp, taxpayers and negative binomial model.**

## **INTRODUCTION**

Tax plays a major role in the development of a country. It is a major source of government revenue in developing countries of which Ghana is no exception. Tax revenue is used for financing government expenditure. Tax revenues are collected from both the formal sector and the informal sector. The informal sector provides about 86 percent of the total employment in Ghana (GSS, 2013). This shows that the informal sector has the potential to raise a larger amount of tax revenue than the formal sector if attention could be shifted to that sector. However, it is predicted that out of about 1.5 million Ghanaian tax population paying direct taxes, the informal sector contribution represents only 5 percent of the number (Terpker, 2013).

As an effort to improve income tax collections in the informal sector, the Tax Stamp system was introduced by the Internal Revenue (Amendment) Regulations, 2004. It was envisaged to enhance easy recognition of small scale self-employed persons in the informal sector. For instance, persons operating in kiosks, on table tops, identifiable groups such as hairdressers, dressmakers and tailors, butchers, market traders, chop bar and cooked food sellers, artisans such as masons, carpenters, welders, mechanics, among others.

Under this method, taxable persons in the informal sector are grouped into two: by business type and by volume of business operation. This method also imposes an obligation on taxpayers to buy the tax stamp in advance (i.e. 15<sup>th</sup> January, 15<sup>th</sup> April, 15<sup>th</sup> July and 15<sup>th</sup> October) and to conspicuously display the tax stamp on their business premises. Like any system for tax collection, punitive measures are put in place to help enforce compliance by the IRS at the various districts (Ghana Revenue Authority [GRA], 2006). It must be noted that unlike the other types of tax which are paid based on profit or the income earned by taxpayers, assessment of tax stamp is based on the size and volume of a taxpayer's business activities. Even though, the

introduction of tax stamp in Ghana had impacted positively on self employed tax collections, it is found to be characterized with high level of tax evasion (Amamoo, n.d).

According to Amponsah (2015), studies on tax evasion in the Ghanaian informal sector have focused mainly on taxpayers who are assessed based on their profit or taxpayers who file tax returns leaving those taxpayers who are assessed on the basis of their business sizes (tax stamp cases). Hence, Amponsah (2015) conducted a study that focused only on tax stamp cases- “Determinants of Tax Stamp Evasion at Twifo Atti-Morkwa Sub-Tax District”. Using a binary logit as the analytical tool, Amponsah (2015), however, was unable to explain the intensity of tax stamp purchased in his study area. Thus, by using logit, that study failed to explain factors influencing number of tax stamp purchased (1, 2, 3 or 4) by taxpayers. That is to look at factors that will let taxpayers increase the number of tax stamp purchased from zero to say one, two, three or four. This study sought to analyse factors that influence the number of tax stamp purchased by taxpayers in Twifo Atti-Morkwa Sub-Tax District.

### **Objectives of the Study**

The general objective of the study was to analyse tax stamp purchases at Twifo-Atti Morkwa Sub-Tax District. The specific objectives of the study were to:

1. examine the socio-economic factors that influence the number of tax stamp purchased:
2. determine the effect of guilt feeling on the number of tax stamp purchased:
3. determine the effect of distance between taxpayers place of business and tax office on the number of tax stamp purchased.

## **Research Hypotheses**

In achieving the above specific objectives, the following hypotheses were formulated.

1. H<sub>0</sub>: Socio-economic factors do not affect the number of tax stamp purchased.

H<sub>1</sub>: Socio-economic factors affect the number of tax stamp purchased.

2. H<sub>0</sub>: Guilt feeling has no effect on the number of tax stamp purchased.

H<sub>1</sub>: Guilt feeling has effect on the number of tax stamp purchased.

3. H<sub>0</sub>: Distance between taxpayer's place of business and tax office has no effect on the number of tax stamp purchased.

H<sub>1</sub>: Distance between taxpayer's place of business and tax office has effect on the number of tax stamp purchased.

## **METHODOLOGY**

### **Study Area**

The demographics of the study area relevant to this study are as follows. The 2010 population and housing census report shows that the age distribution of age group 0-4 years exhibits the highest proportion of 14.9 percent and the age group of 85+ years constitutes the lowest proportion of 0.5 percent. With regards to sex ratio, usually expressed as the number of males for every 100 females, the sex ratio of the district is 97.4 which implies that there are 97.4 males to every 100 females in the district. The sex ratio of the district is higher than the regional ratio of 91.2. The sex ratio of the district indicates that females are more than males. At the active working stage (55-59 years) the sex ratio is 113.2 (GSS, 2014).

About 73.0 percent of the total population (aged 15 years and older) is economically active while 27.0 percent are economically not active. Of the economically active population, 97.2 percent are employed while 2.8 percent are unemployed. The peak of employment status is between ages 40-44 years for both sexes. The employed population of 15 years and older has 67.5 percent as self-employed without employees (32395) and 2.8 percent are self-employed with employees. Casual workers are 1.9 percent. Majority of the people are engaged in petty trading activities, especially females who represent about 69.5% of the employed without employees. The private informal sector is the largest employer in the district, employing 89.7 percent of the population followed by the public sector with 6.3 percent (GSS, 2014).

Of the population 11 years and above, 73.9 percent are literate in English and Ghanaian language and 26.1 percent are illiterates. Those who had attended school in the past constitute about 38278 made up of females 17893 and males 20385.

### **Target Population**

The target population comprised taxpayers in the study area who qualify for tax stamps. Those taxpayers included persons operating in kiosks, identifiable groups such as hairdressers, dressmakers and tailors, butchers, market traders, chop bar and cooked food sellers, artisans such as masons, carpenters, welders, mechanics, among others. This category of taxpayers forms part of the self-employed in the informal sector.

### **Determination of Sample Size**

The target population for this study (tax stamp cases) represents a portion of the population of self-employed in the study area. The 2010 Population and Housing Census pegs self-employed in the study area at 33741. Hence, with a given level of confidence as well as error of margin, the minimum sample size was determined proportionately as:

$$n = \frac{\rho q z^2}{E^2}$$

Where:

$p$  is the percentage belonging to the specified category and it is based on assumed population proportion, existing information or pilot studies,  $q$  is  $1 - p$ , the percentage not belonging to the specified category,  $z$  is the z-value corresponding to the level of the confidence required, and  $E$  is the margin of error required. For unknown population size,  $p = 0.5$  produces largest possible sample size ( Cochran, 1977; Saunders et al., 2012).

Since the sampling frame for tax stamp cases is unknown in the study area,  $p$  is considered to be 0.5. Taken 95% as the level of confidence, 5% margin of error and a z-value of 1.96, the minimum sample size was calculated as:

$$n = \frac{0.5(0.5)(1.96)(1.96)}{0.05(0.05)} = 384 \text{ taxpayers}$$

### **Sample and Sampling Technique**

This study was designed to obtain data from taxpayers that qualify for tax stamps in the Twifo Atti-Morkwa Sub Tax District. This study area consists of four paramountcies (Twifo, Atti-Morkwa, Hemang and Lower Denkyira). Considering the nature of the study area, three sampling techniques were used. Stratified sampling was first used to divide the study area into four strata with each stratum representing paramountcy. Simple random sampling technique was used to select a community from each of the stratum. In all, four communities were selected. The communities are Praso, Agona, Hemang and Jukwa.

In order to obtain the sample size computed, a quota was assigned to each of the selected community. The assignment of quota was based on the premise that a sample will represent the population as the variability in a sample for various quota variables is the same as those in the population (Saunders, *et al.*, 2012). The calculation of quotas is based on relevant data and is usually relative to proportions in which they occur in the population. Nevertheless, such criteria vary as a range of factors including the nature and type of research play a major role (Sarantakos, 1997). Hence, quotas were assigned to the communities based on population density of the community. After the quota was assigned to each of the community, a simple random technique was used to actually select the samples. In every community where sample was drawn, one out of every two tax stamp cases met was selected. The process was repeated until the suitable sample was drawn. This approach was adopted to give each and every taxpayer in the community an equal opportunity to be selected as part of the quota. Additionally, this sampling technique was adopted to ensure the possibility of making generalization about the population.

## **ESTIMATION TECHNIQUE**

The generalized model for estimating a count variable (in this case tax stamp purchases) is a Poisson regression. Poisson regression treats the number of tax stamp purchases as a Poisson random variable with an intensity hypothesized to depend on posited explanatory variables. In Poisson regression, there is an assumption of equality of the conditional mean and variance functions. This assumption is typically taken to be the major drawback of the Poisson regression model. In order to overcome this shortcoming in this study, the negative binomial regression, which arises from a natural formulation of cross-section heterogeneity is used. The negative binomial model is more general than Poisson since it caters for overdispersion (Cameron & Trivedi, 2010).

A random variable  $X$  is negative binomial distributed if its probability distribution function is given by

$$\Pr(Y = y | \mu, \alpha) = \frac{\Gamma(\alpha^{-1} + y)}{\Gamma(\alpha^{-1})\Gamma(y+1)} \left\{ \frac{\alpha^{-1}}{\alpha^{-1} + \mu} \right\}^{\alpha^{-1}} \left\{ \frac{\mu}{\mu + \alpha^{-1}} \right\}^y \dots\dots\dots(1)$$

Where  $\Gamma(\cdot)$  denotes the gamma integral that specializes to a factorial for an integer argument.

Assuming a given sample data, then, the corresponding log-likelihood function is the logarithm of the product of the marginal probabilities.

$$\sum_{i=1}^N \frac{y_i - \mu_i}{1 + \alpha\mu_i} X_i = 0$$

$$\sum_{i=1}^N \left[ \frac{1}{\alpha^2} \{ \ln(1 + \alpha\mu_i) - \sum_{j=0}^{y_i-1} \frac{1}{j + \alpha^{-1}} \} + \frac{y_i - \mu_i}{\alpha(1 + \alpha\mu_i)} \right] = 0 \dots\dots\dots(2)$$

The negative binomial maximum likelihood estimator is that value which maximizes this loglikelihood function.

**Empirical Model**

$$\Pr(Y = y | \mu, \alpha) = \beta_0 + \beta_1 gender + \beta_2 age + \beta_3 educ + \beta_4 taxaud + \beta_5 san + \beta_6 import + \beta_7 amtax + \beta_8 guilt + \beta_9 dist + \beta_{10} assoc + \beta_{11} inc + \varepsilon_i \quad (1)$$

Where:

*gender* = gender of the taxpayer, *age*= age of the taxpayer, *educ* = level of education of the taxpayer, *taxaud*= frequency of tax audit, *San* = application of sanctions, *import*=taxpayers perception about the importance of payment of tax, *amtax* = perception of the taxpayer about the amount of tax, *guilt*= guilt feeling, *dist* = distance to the tax office, *assoc*= belonging to micro business association, *inc*=level of income earned by the taxpayer and  $\varepsilon$ =stochastic error term

The stochastic error term was included in the empirical model to introduce all the changes in  $Y_i$  that cannot be predicted by the included predictor variables. That is to say that it is a symbol which takes care of inability to model all the movements of the dependent variable ( $Y_i$ ). This is so as there may be errors in specification of the model, omitted variable biases and errors in data measurement. Therefore, the stochastic error term caters for all those errors. The independent variables used in the model were selected based on the theoretical and empirical review.

## **Result and Discussions**

### **Socio-Economic Characteristics of Taxpayer**

In carrying out the research, a survey method was used with questionnaire being the data collection instrument. In order to accomplish the purpose of this study, micro business owners who are obliged to buy tax stamps were interviewed. Information on those taxpayers' characteristics which included gender, age, marital status, educational level, religion, among others are discussed. In all, Three hundred and five (305) taxpayers were sampled for this study.

Gender distribution of those taxpayers is depicted in Table 1. From the Table 1, 227 (74.43%) taxpayers in the informal sector were female and 78 (25.57%) were male summing up to 305 tax payers. Thus, majority of the taxpayers in the area of study are female. According to Baba (2010), no premium is placed on women education in Ghana so generally, women do not acquire higher level of education. Therefore, women tend to become unskilled and the only option available to them is to engage in the informal sector so that they can earn a living to supplement their husband. This sex distribution is also in line with the current studies on taxation

and women in the informal sector by Carroll (2011). He notes that about 80% of the informal operators are women in Ghana.

**Table 1: Distribution of Taxpayers in the Informal Sector by Gender**

Gender	Frequency	Percentage
Female	227	74.43
Male	78	25.57
Total	305	100.00

Source: Field Survey, 2015

Concerning the age variable, the maximum age was 64 years while the minimum age was 19 years. The mean age of the taxpayers was approximately 34 years with the associated standard deviation being 9.1664. For the age categories of the taxpayers as shown in Table 4.2, 63 taxpayers were between 19 – 26 years all inclusive representing about 20.66% percent of the total sample. Between the ages of 27 and 34 years all inclusive, there were 113 taxpayers representing about 37.05 percent. Between the ages of 35 and 42 years all inclusive, there were 80 taxpayers representing about 26.23 percent. Thirty (30) taxpayers representing about 9.84% were between 43 – 50 years all inclusive. Those within the age of 51 and above years were 19 representing about 6.23 percent. Generally, as revealed by prior studies on taxation in Ghana (Asante & Baba, 2011; Amoah, 2012; Armah-Atto & Awal, 2013), majority of taxpayers fall within the young adult age and economically active categories (thus 19- 42 years) having a cumulative percentage of 83.94 percent. The remaining 16.06 percent fall in the old age category.

**Table 2: Age distribution of the respondents.**

Age categories of taxpayers	Frequency	Percentage
19 – 26	63	20.66
27 – 34	113	37.05
35 – 42	80	26.23
43 – 50	30	9.84
51 and above	19	6.23
Total	305	100.00

Source: Author's Construct, 2015

The level of education is very important in assessing the demographic characteristics of the taxpayer. Out of the 305 taxpayers who were interviewed, 16 (5.24%) had no form of formal education, 203 (66.56%) had attended Basic School, 67 (21.97%) had attended Senior Secondary/Vocational/Technical whilst 19 (6.23%) had attended Tertiary School (Training College, Polytechnic and University).

Out of the sixteen (16) taxpayers who had no form of formal education, 12 (3.93%) were female while 4 (1.31%) were male. Similarly, 138 (45.25%) out of the 203 taxpayers who had attended Basic School were female while 65 (21.31%) were male. With regards to the 67 taxpayers who had attended Senior Secondary/Vocational/Technical School, 39 (12.79%) were female while 28 (9.18%) were male and for the Tertiary School, 9 (2.95%) were female while 10 (3.28%) were male.

**Table 3: Distribution of the level of education by respondents.**

<i>Education:</i>	<i>Frequency</i>	<i>Percentage</i>
No formal Educ.	16	5.24
Basic School	203	66.56
SSS/Voc. Sch.	67	21.97
Tertiary School	19	6.23
Total	305	100

Source: Author's Construct, 2015

On issue of religion, 287 taxpayers representing 94.10% of the total taxpayers who were interviewed were Christians, 17 representing 5.57% were Muslims while only 1 representing 0.33% was Traditionalist. Thus, majority of the taxpayers in the study area are Christians. This may be due to the fact that the Ghanaian population is dominated by the Christian religion (2010 Population and Housing Census Report) or to the fact that Christianity was first established in the southern part of Ghana. Among the 287 taxpayers who were Christians, 219 (71.80%) were female while 68 (22.30%) were male. Concerning the 17 Muslims, 7 (2.30%) were female while 10 (3.27%) were male. The 1 (0.33%) Traditionalist was female. Table 4 depicts the above analysis.

**Table 4: Religious Distribution of Taxpayers**

Kind of Religion	Female		Male	
	Frequency	Percentage	Frequency	Percentage
Christianity	219	71.80	68	22.30
Islamic	7	2.30	10	3.27
Traditional	1	0.33	0	-
Total	227	74.43	78	25.57

Source: Field Survey, 2015

**Table 5: Negative Binomial regression analysis on number of tax stamp purchased**

Variable	Coef.	Std. Err.	z	P>z	95% Conf.	Interval
Gender	.0681269	.2204034	0.31	0.757	-.3638559	.5001096
Age	-.0172481	.0108212	-1.59	0.111	-.0384573	.003961
Education:						
Basic	-.3461408	.3338288	-1.04	0.300	-1.000433	.3081516
Secondary	-.1768927	.4180935	-0.42	0.672	-.9963409	.6425556
Tertiary	.669909	.3843089	1.74	0.081	-.0833226	1.423141 *

Importance	.6564535	.2049983	3.20	0.001	.2546643	1.058243***
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Amount of tax:

Moderate	-.8578295	.7602766	-1.13	0.259	-2.347944	.6322852
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High	-1.130752	.7311713	-1.55	0.122	-2.563821	.3023177
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Distance	-.0151467	.0064644	-2.34	0.019	-.0278166	-.0024767**
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Income:

GHS50-145	.845508	.2285607	3.70	0.000	.3975372	1.293479***
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>GHS 145	.846277	.2681941	3.16	0.002	.3206263	1.371928***
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Tax audit	.3948572	.0926494	4.26	0.000	.2132676	.5764467***
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Sanction	.8477766	.266329	3.18	0.001	.3257814	1.369772***
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Association	-.0436939	.2125051	-0.21	0.837	-.4601964	.3728085
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Guilt feeling	.3733166	.2120675	1.76	0.078	-.042328	.7889612**
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_cons	.8422374	.8834094	0.95	0.340	-.8892132	2.573688
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/lnalpha	.621819	.1903889			.2486637	.9949743
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alpha	1.862312	.3545635			1.282311	2.704655
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Number of observation = 305    Pseudo R2 = 0.0738

Dispersion = mean Wald chi2(15) = 101.34

Log pseudolikelihood = -388.1686 Prob > chi2 = 0.0000

Likelihood-ratio test of alpha=0: chibar2(01) = 109.66 Prob>=chibar2 = 0.000

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\*P>Z=0.1 \*\*P>Z=0.05 \*\*\*P>Z=0.01

It can be seen from the Table 5 above that the Wald chi-square is significant at 0.01 percent level of significance (P -value = 0.000) indicating that the combined independent variables significantly explain the dependent variable (number of tax stamp purchased). Also, the table shows the log-transformed over-dispersion parameter ( $\ln\alpha$ ) and its corresponding estimated untransformed value. A Poisson model is one in which this alpha value is constrained to zero. Stata finds the maximum likelihood estimate of the log of alpha and then calculates alpha from this. This means that alpha is *always* greater than zero and that negative binomial *only* allows for overdispersion (variance greater than the mean). The likelihood ratio test in Table 5 compares the negative binomial model to a Poisson model and the associated chi-squared value is 109.66 with one degree of freedom. This means that alpha is non-zero and the negative binomial model is more appropriate than the Poisson model. Therefore the study went ahead to explain the negative binomial regression results.

Table 5 also shows that level of education (educ), perception towards the importance of payment of tax (import), distance to the tax office (dist), income of the taxpayer (inc), rate of tax audit (taxaud), application of sanctions (san) and guilt feeling (guilt) are the significant factors that explain the expected log count of number of tax stamp purchased.

Level of education was captured by three indicator variables by setting no formal education as the reference category. Only tertiary education was significant at 10%. The expected log count for a taxpayer with tertiary education is 0.669 higher than the expected log count for a taxpayer with no formal education. This means that a taxpayer with tertiary education is more likely to buy more tax stamp as compared to taxpayer who has no formal education. This can be attributed to the fact that a taxpayer with tertiary education knows the role tax plays in the development of a country and therefore sees paying of tax as an obligation. The result of the tertiary education variable also confirms the findings of Mcgee and Ross (2014) that showed that the strongest opposition to tax evasion in India and the USA came from the most educated group.

The coefficient of perception towards the importance of payment of tax is 0.656 and it is significant at 0.01 ( $P > z = 0.001$ ). The expected log count for a taxpayer who perceives payment of tax as important is 0.656 higher than the expected log count for a taxpayer who does not perceive payment of tax as important. This means that a taxpayer who perceives payment of tax as important is more likely to buy more tax stamps as compared to a taxpayer who does not perceive tax payment as important. The result of the perception towards the importance of payment of tax corroborates with the prospect theory of tax evasion which suggests that the more a taxpayer perceives payment of tax as a gain, the more that taxpayer pays tax.

The variable distance was significant in determining the number of tax stamps purchased. Distance as a variable has a coefficient of  $-0.0151467$  and is statistically significant at 0.05 level of significance ( $P > Z = 0.019$ ). This means that for one kilometer increase in distance to revenue collection centre, the expected log count of tax stamp purchased decreases by  $.0151467$ . This shows that the nearer the distance of revenue collection center the more likely the taxpayer will increase the number of tax stamps purchased.

Income was also significant factor that determines the number of tax stamps purchased. Income was categorised into three. The researcher used those who earn income below GHS 50 as a reference category. The indicator variable “GHS 50-145” is the expected difference in log count between taxpayers who earn monthly income within category “GHS 50-145” and the reference category (monthly income below GHS 50). The expected log count for “GHS 50-145” of income is 0.845 higher than the expected log count for the reference category. The indicator variable “>GHS 145” is the expected difference in log count between group “>GHS 145” and the base category “monthly income below GHS 50”. The expected log count for” >GHS 145” of income is 0.846 higher than the expected log count for base category. This means that income has positive correlation with number of tax stamp purchased.

Rate of tax audit has a coefficient of 0.3948 and it is statistically significant at 0.01 level of significance ( $P < 0.000$ ). This means that for one-unit increase on rate of tax audit, the expected log count of the number of tax stamp purchased increases by 0.3948. The above result corroborates with the economic theory (expected utility/deterrence) of tax evasion. According to the theory, a higher likelihood of being detected acts as a deterrent to tax evasion.

Application of sanctions was statistically significant at 1 percent level. The coefficient of application of sanctions is 0.8477. The expected log count for a taxpayer whose shop has been locked before is 0.8477 higher than the expected log count for a taxpayer whose shop has not been locked before. This means that a taxpayer whose shop has been locked before is more likely to buy more tax stamps as compared to a taxpayer whose shop has not been locked before. This result is consistent with the economic/deterrent theory of tax evasion (expected utility theory). The theory explains that application of sanction is among the main variables that explain

payment of tax. The more a tax evader is sanctioned, the more he or she is discouraged from tax evasion.

Guilt feeling is another variable that was significant at 0.1 level of significance ( $P > z = 0.078$ ). It has a coefficient of 0.373. The expected log count for a taxpayer who will feel discomfort if caught for not buying tax stamp is 0.373 higher than the expected log count for a taxpayer who will not feel discomfort if caught for not buying tax stamp. The result of guilt feeling variable is consistent with the findings of Akerlof and Kranton (2010) who indicate that a moral individual who does not pay tax incurs a psychic cost (guilt feeling) and becomes happy when he or she fully complies with tax laws since fully compliance is considered as the right thing.

### **Conclusion and Recommendation**

Based on the findings of the study, it can be concluded that the expected log count of the number of tax stamp purchased per year in the study area are explained by the level of education, perception towards the importance of payment of tax, application of sanctions, guilt feeling, rate of tax audit and distance to tax office. The following pragmatic recommendations are therefore made to government and the Ghana Revenue Authority. To begin with Tax auditors should go round at least at the beginning of every quarter to inspect the number of tax stamps that taxpayers have bought. This is because the study found frequency of tax audit to have a positive effect on the expected log count of the number of tax stamp purchased.

The Ghana Revenue Authority is also encouraged to apply sanctions promptly when tax auditors catch some tax stamp defaulters as the study found application of sanctions to have a positive effect on the expected log count of the number of tax stamp purchased per year.

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