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Binary Logistic Regression Analysis on the Effect of Tax Audit on Improving the Taxpayers' Compliance Behavior: A Case of Ethiopian Ministry of Revenue, South Gondar Zone Branch-Ethiopia

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Abstract

The study has attempted to examine the effect of tax audit on tax compliance in Ethiopia, with special referenceto Ethiopian ministry of revenue, branch of south Gondar zone. To examine the effect of probability of being audited on the tax compliance, the study is conducted by using primary data collected from category “A” and “B” taxpayers. The response obtained from 233 respondents (approximate 91.4% response rate) is used for both descriptive and inferential analysis. Binary logit model is estimated in order to examine the effect of tax audit and the control variables (taxpayers awareness, penalty rate and compliance cost) on compliance behavior, The study found that tax audit (probability of being audited), tax payer’s awareness and penalty rate imposed on fraud and evasion are

found to have statistically significant positive effect on the tax compliance behavior of category “A” and “B” taxpayers in Ethiopian ministry of revenue, south Gondar zone branch. On the other hand, compliance cost is found to have statistically insignificant effects on compliance behavior of category “A” and “B” taxpayers in the study area.

Key words:- 1. Tax audit 2. Effect of Tax audit 3. Taxpayers’ Compliance Behavior 4. Tax Compliance 5. Binary Logistic Regression Analysis 6. Ethiopian Ministry of Revenue.

1. Introduction

In over the entire world for the provision of basic facilities and social services, government of the nation undertake huge amount of public expenditure. The development of any nation in the world also depends on the amount of revenue generated and applied by the government on public expenditure for the benefit of the societies at large (Alamirew, 2016). According to McKerchar and Evans (2009), Tax revenues are the fundamental components of any attempt to build any nations, and this is particularly the primary case in the developing or/and transitional nations in the world.

In other word among the various sources from which government can generate remarkable income, taxes are the most important and contributing much more than any other sources of revenue. However, most governments in the world faced major problem inhabiting effective and efficient tax administration; mainly in emerging economy is tax evasion (Agegneu, 2020). As a solution to tackle this serious problem various countries in the world have introduced tax audit into their tax system. Because tax audit involves in the examination of an individual or organizations tax report by the relevant tax authorities in order to ascertain compliance with applicable tax laws and regulations of state (Kircher ,2008 as cited by Agegneu, 2020).

In the tax revenue collection system tax audit is important because it helps the government in collecting appropriate tax revenue necessary for budget, maintain economic and financial order and stability, to ensure that satisfactory returns are submitted by the tax payers, to organize the degree of tax avoidance and evasion, to ensure strict compliance with tax law by tax payers to improve the degree of voluntary tax payers,and to ensure that the amount due is collected and remitted to government (Agegneu, 2020).

In many developing countries including Ethiopia, taxation is a challenging issue and it has attracted increasing attention to the researchers, because in many developing countries in fact it is observed that there is low capacity of tax administration to monitor compliance behavior among taxpayers and the potential amount of tax revenue has not been collected

in an efficient level (Kircher, 2008 as cited by Agegneu, 2020). Tax audit therefore, provide the governments tax administration strategy with important and implementable power across the community rather than simply impacting on the tax payers selected for different audit and collecting the tax that should have been paid in the first place. Therefore, as it is a center of many scholars attention, it is very important to study determinant factors that affect taxpayers voluntary compliance of both the developed and developing countries in the world in order to increase governments revenue and to assure economic stability. The main objective of this study is to examine the effect of tax audit on improving the taxpayers' compliance behavior: a Case of Ethiopian Ministry of Revenue, South Gondar Zone Branch.

Statement of problem

In every countries in the world, the goal of tax administration is to develop the voluntary tax compliance, although tax noncompliance is still an issue in both developed and developing countries and it becomes a growing global problem and it create a center of attention for scholars (McKerchar & Evans, (2009). Moreover, tax noncompliance is a problem that affect governments in tax administration and in tax revenue collection performance, many of the available literatures and reports printed by the local and foreign bodies indications suggested, in Ethiopia the total tax revenue as a percentage of GDP has continued to decline and has accounted for 12.5 percent in 2014/15 to 12.5 percent in 2015/16 and 11.8 percent in 2016/17 (International monetary fund, 2018). This is an evidence that noncompliance of tax is become a serious tax administration problem in developing countries, particularly Sub-Saharan Africa countries including Ethiopia. As a result reducing the loss of tax revenue resulting from non-compliance behavior of taxpayers with the tax administration laws in Ethiopia is critical problem to achieve fiscal objectives. Therefore as a solution to tackle this tax administration problem, identifying the primary sources of noncompliance behavior of taxpayers is important, to design and implementing an effective and targeted remediation for the country in the long run.

In the study area, in Ethiopia only limited number of empirical studies has been conducted on the tax compliance and its determinants, for instance, Ahmed (2015) studied Tax compliance and its determinant the case of Jimma zone, Ethiopia with quantitative research approach in category "A" taxpayers, Gebeyehu (2008), studied tax audit and its role in increasing government revenue in Ethiopia, Engida (2014), have studied factors influencing tax payers compliance with the tax system in Mekelle city, Ethiopia and Mihret (2011), have also studied tax audit practice in Ethiopia in the case of federal government.

In line with this, as far as the researchers knowledge is concerned and literatures indicates, the effect of tax audit on improving taxpayers compliance behavior is not so far widely studied in Ethiopia in general and south Gondar administrative zone in particular. Giving

this gap of knowledge, together with the fact that improving taxpayer's compliance is one of the most important issues in the tax administration system, and it is a center of empirical study. Therefore, the intent of this study is to find out the effect of tax audit over the tax compliance, to assess the degree of compliance by the taxpayers over the relevant tax administration laws and to examine whether tax audit limits the degree of non-tax compliance behavior of taxpayers with the incorporated of compliance cost, penalty rate and taxpayers awareness as a controlling variables in the study.

2. Review of Relevant Literature

Tax audit and tax compliance

According to Kircher (2008), tax audit is defined as an examination of an individual or organizations tax report by the relevant tax authorities in order to ascertain compliance with applicable tax laws and regulation of the state. In the tax administration systems of the country tax audit is one of the important components and it is established to stimulate/improve tax compliance behavior on the tax payer's side and to increase tax revenue collection performance on the side of the state. Since tax audit is an independent examination of accounts, tax returns, tax payments and other relevant records of taxpayer to confirm compliance with tax laws, rules and regulations, accuracy and correctness of tax paid adhering to the relevant generally accepted accounting principles and standards (Okonkwo, 2014). As of many theoretical literatures indication, the concept of tax audit in the tax administration system have been variously discussed in relation to tax compliance, some studies claimed that tax audits have a positive impact on the detection of taxpayers noncompliance behavior (Palil & Mustapha, 2011). In their empirical findings Palil and Mustapha (2011) argued audit rates and carefulness of tax audits being conducted could encourage taxpayers to be more prudent in completing their tax return, report all income and claim the correct deductions to ascertain their tax liability. In addition to Palil and Mustapha (2011), Butler (1993) has also found that tax audits availability can change taxpayer's compliance behavior from negative to positive. Various researchers in the world have listed many factors that influenced tax compliance behavior of taxpayers, such as demographic, level of income, compliance cost, level of education, ethics, and complexity of the tax law, perceived fairness of the tax system, possibility of being audited, and tax rate (Mohani, 2001). But in this study the primary objective of the researcher is examining the effect of tax audit on the tax compliance. Allingham Michael and Sandmo (1972), in their empirical investigation they argued that tax payers will always declare their income correctly if the probability of detection is high, since probability of detection which is called tax audit plays a significant role in reporting behavior as taxpayers will declare everything if they perceived that they will be one of the auditees in the particular fiscal year. Therefore, from the previous theoretical and empirical literatures perspective, it is

observed that tax audit play an important role in increasing voluntary compliance and it could potentially encourage taxpayers to be more prudent in completing their tax returns.

Provability of detection/audit and tax compliance

There are a number of factors for the compliance and/or non-compliance behavior of tax payers. Previous studies also revealed that provability of being audited is also one of the important factor in assessing tax compliance behavior (Palil, 2010). Allingham Michael and Sandmo (1972), argued that tax payers will always declare their income correctly if the probability of detection is high. Slemrod, Blumenthal and Christian (1998) also empirically investigated the relationship between the probability of being audited and the taxpayers tax compliance response, they found that taxpayers behavior varied with respect to level of income and the probability of being audited played a significant role in determining taxpayers' evasion behavior. Engida (2014), argued that the probability of being audit positively significant factor that affects compliance of taxpayers according to the study undertaken in Mekelle City.

Hypothesis 1:- probability of being audited has a positive significant effect on the compliance of tax payers

Penalty rate and tax compliance

According to Ethiopian Chamber Of Commerce and Sectoral Associations (2019), any taxpayer who fail to be compliance with tax proclamation regulations and directives is subject to either criminal penalty or administrative based on the misconduct committed by the taxpayer. According to Palil and Mustapha (2011), the higher the penalty and the potential audit probability is the greater the discouragement for potential tax evasion. Since previous studies indicated that penalty rates impact upon tax compliance behavior, the awareness of penalty is presumed to have a significance influence as well.

Hypothesis 2:-penalty rates has a positive significant effect on the compliance of tax payers

Awareness of taxpayers and tax compliance

Citizens of a given country can be informed about the tax system and know their rights and responsibility that assist taxpayers to comply with tax system (Brooks, 2008). Responsibility of government to conduct sensitization programmes which is intended at supporting the business possessors advance their understanding on tax system and its importance for themselves to be compliance willingly (Lethbridge, 2019). The skill and

awareness of tax regulation and legislations of taxpayers enhance to compliance of taxpayers. Skill and awareness of tax laws and regulation by the taxpayer gives an understanding of taxpayer's rights and obligation, and gives an understanding of the importance of paying taxes to government.

Hypothesis 3:- Awareness of taxpayers has positive significant effect on the compliance of tax payers

Compliance cost and tax compliance

To fulfill the tax administration systems of the government or conforming to government requirements such as legislation or regulation, compliance cost is expenditure of many incurred by the taxpayers. Compliance cost include all costs associated with the obeying the law, including planning and administration in addition to the direct time and money spent filing all papers work. Sandford (1981), an excessive compliance costs would make taxpayers to choose evading tax in order to compensate the cost they could incur.

Hypothesis 4:- compliance cost has negative significant effect on the compliance of tax payers

3. Methodology

Research Design and approach

The research design adopted for this research work includes both descriptive and explanatory, since this research is designed to identify the effect of tax audit on the compliance of taxpayers, to this end the researcher is also used qualitative research approach. Because quantitative research approach is best if the problem is identifying factors that influence the outcome, understanding the best predictors of outcome or the dependent variable in the study.

Target population, sampling procedure and sample size

The target population of this study consists with 2570 unincorporated categories "A" and "B" registered taxpayers in south Gondar zone administration. It is impossible to consider the total target population as respondents to this survey, thus in this study only 226 usable questionnaires were distributed, obtained and used for the analysis. This study used stratified random sampling technique. The sample required from each stratum is determined through proportionate to size Method.

Types and sources of data

To achieve the stated objectives of the study, mainly primary data has been collected from primary sources only.

Method of data collection

This study employed primary data, specifically survey method of data collection. Thus the primary data was gathered using questionnaires. In the questionnaire an indirectly phrased questions are used to capture tax compliance behavior of individuals so as to avoid direct implication of “wrong doing” by the respondent.

Method of data analysis

Both descriptive and inferential statistics were used for the collected data analysis. In which the descriptive statistics is used describe the characteristics of respondents, however the inferential part of the analysis has applied the binary logit model in order to investigate the relationship among the independent variables and the dependent variable which is called tax compliance.

Model specification

This section of the study mainly focuses on the identifications of model to be employed; therefore, in order to examine the factors that affect the probability of being compliant, a binary logit model is estimated. In this study the probability of being compliant is presented as:-

$$\begin{aligned}
 P_i &= E(y=1/x_i) = F(\beta_0 + \beta_1 x_{1i} + \beta_k x_{ki} + u_i) \\
 &= \frac{1}{1 + e^{-(\beta_0 + \beta_1 x_{1i} + \beta_k x_{ki} + u_i)}} \\
 &= \frac{1}{1 + e^{-z_i}}
 \end{aligned}$$

Where $z_i = \beta_0 + \beta_1 x_{1i} + \beta_k x_{ki} + u_i$
 $= \frac{e^{z_i}}{1 + e^{z_i}}$ the cumulative logistic distribution function.

The estimation of the model is, first the probability of being compliant is given by:

$$1 - P_i = \frac{1}{1 + e^{z_i}}$$

As a result

For estimation, logistic function can be written in the odds ratio as

$$L_i = \ln\left(\frac{P_i}{1 - P_i}\right) = z_i = \beta_0 + \beta_1 x_{1i} + \beta_k x_{ki} + u_i$$

Where, L_i , is the log of the odds ratio.

Therefore, the functional form of the model for this study written as;

$$P_i(y=1) = \beta_0 + \beta_1 PBA_i + \beta_2 TPA_i + \beta_3 PR_i + \beta_4 CC_i + u_i$$

Where,

$P_i(y=1)$	=The probability of the i th taxpayer being compliant.
PBA	= Probability being audited
TPA	= Tax payers awareness
PR	= Penalty rate
CC	= Compliance cost
U_i	= disturbance or the error term
i	= stands for the i^{th} cross-sectional unit
β_0	= represents a constant or intercept term, and
β_1, \dots, β_4	= represents slope coefficients

Symbol, Description, Measurement and expected sign of the study variables

	Variables	Description of Variables	Measurement	Expected Sign
Dependent variable	COMP	Tax compliance	Comp=1 if the i th tax payer show compliance behavior and 0 otherwise	
Independent variables	PBA	Probability being audited	PBA =1 high probability of non-compliance detection in tax auditing lead him to compliance behavior and 0 otherwise	+
	TPA	Tax payers awareness	TPA=1 the taxpayer has skill and awareness on the tax issues and 0 otherwise	+
	PR	Penalty rate	PR= 1 high penalty rate make him/her tax compliant and 0 otherwise	+
	CC	Compliance cost	CC= 1 the tax payer reported high cost incurred to pay tax make him/her non-compliant and 0 otherwise	-

4. Data presentation, Analysis and Discussion

This part contains the findings and analysis of the research study based on interpretation of the data collected. The researchers distributed a total of 255 structured questionnaires for

category A and B tax payers by using trained enumerators, but out of 255 questionnaires 233 questionnaires were collected with valid responses. Thus, which represents approximately 91.4% response rate and the overall analysis were made using the data obtained from the 233 respondents.

Descriptive analysis

Table: 4.1 Gender of the respondents					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	female	83	35.6	35.6	35.6
	Male	150	64.4	64.4	100.0
	Total	233	100.0	100.0	

Source: own computation based on filed survey, 2020

Table 4.1 above, shows over 64.4% of the sampled respondents are male. Thus female respondents in the study account only 35.5%. This evidence imply participation of females in category “A” and “B” tax payers is very less and the category is largely represented by male tax payers.

Table: 4.2 Education levels of respondent					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	.4	.4	.4
	the tax payer has less than and equal to primary school education	74	31.8	31.8	32.2
	the tax payer has Secondary school level education	79	33.9	33.9	66.1
	the tax payer has college and above level education	79	33.9	33.9	100.0
	Total	233	100.0	100.0	

Source: own computation based on filed survey, 2020

Table 4.2 above indicates that from the total respondent 33.9% percent of the respondents has Secondary school level education and has college and above level education, but 31.8% of respondents assured they have less than and/or equal to primary school education.

Table: 4.3 Business types of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	the tax payer is involved in service business	87	37.3	37.3	37.3
	the tax payer is involved in manufacturing business	62	26.6	26.6	63.9
	the tax payer is involved in merchandising business	84	36.1	36.1	100.0
	Total	233	100.0	100.0	

Source: own computation based on filed survey, 2020

As of the table 4.3 above, the majority of the respondents are (37%) involved in service rendering type business followed by merchandising and manufacturing type businesses.

Table 4.4 Ages of the respondents

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	the tax payer is in the age group between 18-45	56	24.0	24.0	24.0
	the tax payer is in the age group between 46-65	121	51.9	51.9	76.0
	the tax payer is in the age group above 65	56	24.0	24.0	100.0
	Total	233	100.0	100.0	

Source: own computation based on filed survey,

Demographic Factor 4 presented in table 4.4 above also indicated, the age group of respondents 121 (51.9%) were between the age group of 46-65, whereas 56(24.0%) of the sampled respondents were grouped in between 18-45 and above 65 years of age.

Econometric analysis

Following theoretical and empirical literatures in the area as a bench mark, the researcher tried to investigate the effect of tax audit on improving the tax compliance behaviors of taxpayers in category “A” and “B”. To investigate the actual effect of tax audit on the tax compliance the researcher has choice binary logistic model, due to the binary nature of the dependent variable. Finally, the logistic model result of the study is presented in the following table.

Table 4.5 coefficient value, significance level and odds ratio result of the binary logit model.

COMP	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	Odds Ratio
PBA	.9168274	.285987 4	3.21	0.001**	.3563024 1.477352	2.501342
TPA	.9350297	.311539 4	3.00	0.003**	1.545636 .3244238	.3925742
PR	.6276085	.313555 5	2.00	0.045*	.013051 1.242166	1.873126
CC	.1590857	.285292 5	0.56	0.577	-.4000772 .7182487	1.172438
_cons	-.7235784	.310588 7	-2.33	0.020	-1.332321 .1148357	.4850136
**Statistically significant at 1% level of significance						Number of obs = 233
*Statistically significant at 1% level of significance						LR chi2(4) = 23.59
Prob> chi2 = 0.0001						
Log likelihood = -146.08296						Pseudo R2 = 0.6747

Source: STATA output version 15

In this econometric analysis test, in the first step model fitness test is checked. The Likelihood ratio (LR) value in table above indicates the good fitness of the specified logit model. The LR value, LR chi2 (4) = 23.59 [Prob> chi2 = 0.0001], is also statistical evidence for the presence of good relationship between the dependent variable and the combination of all explanatory variables. The null hypothesis, which states there is no any difference between the model without any independent variables and the model with the list of independent variables is rejected. Therefore, as we have seen in the table above the binary logit model result with the considered independent variables can be used for future interpretation.

Based on the estimated results presented in the table 4.5 above probability of being audited, taxpayers awareness and penalty rate are found statistically significant effect for the tax compliance behavior. However, compliance cost is found to have statistically insignificant effect on the compliance behavior of category “A” and “B” taxpayers in the study area.

Table 4.6 coefficient value, significance level and odds ratio result of the binary logit model.

Marginal effects after logit						
y = Pr(COMP) (predict)						
= .40173816						
variable	dy/dx	Std. Err.	z	P> z	[95% C.I.]	X
PBA*	.2150719	.06417	3.35	0.001	.089306 .340838	.549356
TPA*	.2241103	.07288	3.07	0.002	.36696 .081261	.583691
PR*	.1505435	.07437	2.02	0.043	.004789 .296298	.454936
CC*	.0381996	.06839	0.56	0.576	-.09585 .172249	.515021

(*) dy/dx is for discrete change of dummy variable from 0 to 1

Source: STATA output version 15

Discussion of results

- Probability of being audited (PBA)**, probability of being audited is found to have statistically significant positive effect on the compliance behavior of category “A” and “B” taxpayers in the study area (Ethiopian Ministry of Revenue, South Gondar Zone Branch). The average positive relationship shows the probability that category “A” and “B” taxpayers increase compliance behavior with high probability of being audited. Thus, probability of being audited is the essential factors increasing tax compliance behavior in the study area and this result is consistent with the theory and most of the empirical findings. The add ratio shows probability of being audited would makes category “A” and “B” taxpayers 2.5 times more likely to have compliance behavior than the compliance in the absence of probability of being audited. In addition, as table 4.6 above indicates the shift from less probability of being audited to high probability of being audited increases the probability of compliance behavior by 21.5%.
- Tax payers awareness (TPA)**, tax payers awareness is also found that it has statistically significant effect (at1% level of significant), positively influence the tax compliance behavior of category “A” and “B” taxpayers in the study area. The tax payer’s awareness about the overall tax issue is approximately 39.2 times more likely to exhibit compliant behavior than the tax payer that doesn’t haveawareness about the overall tax issue. As presented in table 4.6 above, the marginal effect of the shift from having tax issue awareness to pay tax to lack of tax issue awareness is 22.4% improvement to the tax compliance behavior.

- **Penalty rate (PR)**, table 4.6 also shows penalty rate is also found to have statistically significant effect on the compliance behavior of category “A” and “B” taxpayers in the study area (at 5% level of significance). The average positive relationship shows the probability that category “A” and “B” taxpayers increase compliance behavior with high penalty rate imposed on their evasion. Thus, penalty rate imposed on tax evasion is the essential factors increasing tax compliance behavior in the study area and this result is consistent with the theory and most of the empirical findings. The odd ratio shows high penalty rate would makes category “A” and “B” taxpayers approximately 1.9 times more likely to have compliance behavior than the compliance in the absence of penalty on their tax evasion. In addition, as table 4.6 above indicates the shift from less penalty rate to high penalty rate on tax payer’s tax evasion increases the probability of compliance behavior by approximately 15.1%.
- **Compliance cost (CC)**, as indicated table 4.6 above, in this empirical study compliance costis found that it has no statistically significant effect on the compliance behavior of category “A” and “B” taxpayers in the study area (Ethiopian Ministry of Revenue, South Gondar Zone Branch).

5. Conclusion

This study is conducted with the objective of examine the effect tax audit on the compliance behavior of category “A” and “B” taxpayers in Ethiopian Ministry of Revenue, with the special South Gondar Zone Branch. Structured primary data were collected and used for both descriptive and econometric analyses from 233 respondents (with approximate 91.4% response rate).

In order to examine the effect of tax compliance behavior, binary logit model is applied. Thus, the study findings provide direct evidence that the probability of tax audit has a statistically significant effect on the tax compliance behavior of category “A” and “B” taxpayers in the study area. The study also provides preliminary evidence that tax payers awareness on tax issues and penalty rate on the noncompliant tax payers play vital role on improving tax compliance of category “A” and “B” taxpayers in the study area.

6. Recommendations

Based on the empirical findings, this study would like to forward the following recommendations. As a good tax administration system, the capability to detect fraud or evasion is curtail to taxpayers to be compliant more. Therefore, the tax authority (Ethiopian Ministry of Revenue) should increase audit probability, because evidence of increased compliance is detected as the result of the increased probability of an expected audit. Moreover, the tax authority (Ethiopian Ministry of Revenue) should also increase the

taxpayers awareness about all issues in the tax and penalty rate on the taxpayers, who fraud and evade the true tax liability.

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