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Influence of E-tax System on Tax Revenue Collection in Tanzania Large Taxpayers: A Prior and Posterior Analysis

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Abstract

Purpose: This paper intended to examine the influence of the e-tax system on tax revenue collection in Tanzania.

Design/Methodology/Approach: The study made use of secondary data gathered in two groups, data from 2006-2011 (prior e-tax system) and 2012-2017 (post e-tax system) was used. An ex-post-facto research design with paired sample t-test compared the mean values of the pre and post-e-tax system to confirm if the observation between the two sets of mean is zero or significantly different from zero.

Findings: The results depict that the use of the e-tax system has positive significant impact on tax revenue generation. Correspondingly, increase in number of registered large taxpayers has a positive effect on tax revenue.

Originality/Value: This study contributes on the awareness to both large taxpayers and the government, that is, the use of the e-tax system had an impact on lessening tax compliance cost and assists the government to collect taxes in cost efficient ways.

1.0 Introduction

Taxation is an important source of revenue and a tool for fiscal and macro-economic development for all developed and developing countries (Eugene & Chineze, 2015). Revenue from taxes has considerably contributed towards the growth and prosperity of the economy in different countries (Coccia, 2018; OECD, 2012).

Most of African countries including Tanzania have undergone transformation to expand their tax bases and collect more tax revenue to finance public expenditures (Moyi & Ronge, 2006; OECD, 2012). Tax to GDP ratios in African countries has been tremendously growing reaching to the benchmark set by OECD of 24% to some African countries (Kirti & Agrawal, 2014). Countries like Cameroon, Equatorial Guinea, Ivory Coast, South Africa, Senegal and Morocco their tax revenue to GDP ratios have increased from 16.1% to 31.3% from 2014 to 2016 (AfDB, 2018; Coulibaly & Gandhi, 2018) .

In Tanzania the government has been implementing tax reforms since the 1960s to increase tax revenue. Tax reforms of the 1990s to 2000s have been important in improving tax revenue collection (Coulibaly & Gandhi, 2018; Osoro, 1995). Reforms included the introduction of value-added tax, programs to improve taxpayer services and the roll-out of e-tax system (Moreno, Murtin, Martins, & Branch, 2016). With the application of e-tax system in Tanzania it was estimated that there would be a substantial expansion of tax revenue with a visible increase in tax income as the proportion to GDP (Kochanova, Hasnain, & Larson, 2018; Ofurum, Amaeful, Okonya, & Amaeful, 2018).

Despite the introduction of the e-tax system in Tanzania, tax revenue to GDP ratio has remained in the average of 12.7 percent which lies expressively below the average of OECD standard for African countries which is 24% (BOT, 2018; Coulibaly & Gandhi, 2018; Kochanova et al., 2018; Tabares et al., 2013) However since its inception of e-tax system for in 2006 there is no empirical evidence whether the system has achieved its objectives of maximizing tax revenue through tax compliance

and the link between e-tax system and tax revenue not clearly substantiated (Fjeldstad, 2019; Muturi, 2015; Chatama, 2013; Oreku, Mtenzi, & Ali, 2013). It has also remained uncertain and imprecise whether the efforts of registering new large taxpayers in a tax brackets each year has an association with tax revenue in Tanzania (A. Yakovlev & Davies, 2014; Wang, 1991). Therefore the motive of this study is to assess the effects of e-tax system on tax revenue generation in Tanzania large taxpayers.

2.0 Review of related literature

Concept of e-tax system

This is a digital method whereby a taxpayer is capable of accessing all the services related to taxes through internet offered by a financial and tax authorities such as the registration for a personal identification number, filing of tax returns and other related documents (Wasao, 2014). It is the platform in which taxpayers are can access all the services online without physical contact with the service providers. In taxation, this is the link between the authorities responsible for collecting taxes on behalf of the government and the taxpayers or users of the digital tax services (Ofurum *et al.,* 2018).

Large taxpayers

Taxpayers engaged in extensive, multifaceted and regularly international dealings. This is because of being characterized by; manifold operating entities and diverse business interests; a substantial volume of business; a large number of employees (Chatama, 2013). It deals with complicated issues involving complex tax laws and tax planning arrangements. Moreover LTs present major tax compliance risks, tactics of minimizing tax liabilities, a large portion of tax assessments and significant role in income generation (Coulibaly & Gandhi, 2018).They are fully-fledged on the use of the e-tax system and their turnover per annum exceeds the threshold being the condition of using the e-tax system, and the law requires them to adopt and use the system

2.1 Theoretical perspective

2.1.1 Diffusion of Innovation Theory

The study in hand assessed the influence of e-tax system on tax revenue collection. Since the e-tax system is an innovation newly presented in an already prevailing system, hence the Diffusion Innovation Theory. This theory was proposed by Everett Rogers in 1995 and later modified in 2003. The theory explains how, when and to what extent the new idea, technology or system propagates. Rogers (2003) asserts that diffusion is the process by which innovation is transferred over time among the users of the system. Innovation theory dictates the ways innovation can be spread through several stages, including understanding, persuasion, decision, implementation, and confirmation that led to the development (Rogers, 1995).

In understanding; person (taxpayer) grasp of doing things in different ways unlike others' do and comprehend how to go about. In coaxing, the user depends on the environment, whether favourable or unfavourable in accepting the innovation. However, whenever a person uses innovation evaluates the results which might be derived from the innovation. For that case; the results of an innovation are determined by testing whether the e-tax system has contributed towards tax revenue collection. The most prominent feature of the theory of innovation diffusion is that, to some people, the decision of doing things differently (innovation) depends greatly on the innovation-decisions of the other followers who benefited from the system (taxpayers).

2.2 Empirical Review

The study by Olaoye & Atilola (2018) on the effects of e-taxation on revenue improvement where the study made use of secondary data gathered from 2012 to 2018. Data were analysed using trend analysis where descriptive statistics on mean and standard deviation, paired sample t-test were used to compare the significances between the period before and after electronic taxation. The results attested that there were no significant difference between the period before the inception of e-taxation and the period after e-taxation. Hence it was concluded that e-taxation has

not improved tax revenue in the selected areas. Monica *et al, (*2017) investigated the effects of the e-tax system on tax collection proficiency in Domestic Tax Revenue Department with sample sizes of 130 respondents. The study employed taxpayers' knowledge, electronic tax filing, employees' competence and electronic tax payment as explanatory latent variables. The analysis used both descriptive and inferential statistics. The results revealed that both electronic filing and electronic payment shown significant influence on tax collection efficiency.

The implementation of electronic tax filing and payments in 2004 made an increase of tax revenue collection in Malaysia (Nasr,2014). The study aimed at revealing the benefits of maintaining a good electronic tax system as disparate to a manual system. The study used purely secondary data from Malaysian Inland Revenue report from 2004 to 2011. It used trend analysis to uncover the substantial increase in tax returns since the introduction of an e-tax system. The findings confirmed that for the first two years, the number of taxpayers using the electronic filing system was below anticipation at about 5%, and the tax authorities were still in the position to resolve the challenges posed by the new system such as the timely and costly adaptation of the system, improbability and security problems. In 2006 to 2011, the e-tax system brought about an increase in the users of the system from the disappointing 4% to an encouraging 34% and 37% in 2012,over the same period tax returns increased from 14.5% of GDP to 15.3%. Allahverdi, Alagö, & Ortakarpuz (2017), surveyed the effect of electronic taxation system on tax revenue collection and cost in Turkey, the study employed secondary data and were obtained from Turkish revenue authority, the data were studied in two groups which are pre e-tax system with a tax period of 1993-2004 and post e-tax system with tax period of 2005-2016. The study used the Mann-Whitney U Test to analyze the data. The findings indicate that e-tax system positively affected the tax revenues and reduced the cost per tax. However the study did not show whether the effect was statistically significant or not and how the idea of introduction of the e-tax system has been propagated. This study however, has

indicated the way e-tax system has been understood by large taxpayers through the tax revenue collected on the sampled years.

Ofurum *et al.*(2018) conducted a study on impact of e-taxation on Nigeria's revenue and economic growth. The study aimed at assessing how the implementation of e-taxation has affected tax revenue generation to GDP ratio in Nigeria. The study made use of secondary data and was grouped into two parts that are pre e-tax period, and post e-tax period, the two data were compared using paired sample t-test. In this study, data were sourced from quarterly economic reports, Central Bank of Nigeria and Federal Inland Revenue Service. The findings of the study revealed that tax revenue collected to GDP ratio significantly decreased after e-taxation implementation. Another study by D(2019) examined the effects of e-taxation on tax productivity was conducted in Nigeria. Data were analyzed using analysis of variance (ANOVA), the results revealed that the e-tax system has improved tax productivity in Nigeria. The contracting results from the previous empirical findings motivated the researcher to develop the underneath propositions:

H_o: *The adoption and use of e-tax has not improved tax revenue collection in Tanzania*

H_a: *The inception and use of e-tax system has improved tax revenue generation in Tanzania*

3.0 Data and Methods

This study used central government tax revenue secondary data of large taxpayers accessed from Tanzania Revenue Authority website. The sources of data thought to be reliable and relevant because they were obtained from reputable authorities (Masiya & Chafuwa, 2016). Data for the number of firms for the studied years that is 2006-2017, the first six years (2006-2011) is for the pre-electronic tax system and the last six years (2012-2017) is for the period after the implementation of the e-tax system. A dummy variable (0, 1) that is 0 representing an independent variable before e-tax system and 1 for an independent variable after the e-tax system used to indicate whether the e-tax system has caused significant change on tax revenue

generation from large taxpayers. An ex-post-facto research design (quasi-experimental research approach) was used to validate the effects of the e-tax system on revenue generation in Tanzania.

This approach was preferred basing on the type of data used in this study. Quasi-experimental research approach (QERA) involves the analysis of data or events that have happened without the involvement of the researcher (Ndunguru, 2007). Hence QERA entails the pre-post design, with-without or before-after that's variations in time. The study involved the test of the hypothesis that the population mean assessed by given two samples (t-test) are equal or differ significantly or insignificantly. This technique best fits this study as the period was divided into two parts; the before e-tax system and the after the e-tax system, which explains how the variations of tax revenue have resulted from e-tax system.

The model specification was: $TR\_LTP_{POST\_ETS} = \beta_0 + \beta_1 Pre\text{-}Post + \beta_2 no.firms + \varepsilon$

Where by: β_0 = slope of the model, $\beta_1, \beta_2 .... \beta_n$ = coefficient of parameters, Pre = is before the e-tax system, Post = is after acceptance of e-tax system, ETS- Electronic tax system, ε - Error term, TR- Tax Revenue and LTP- Large Taxpayers

4.0 Presentation of the findings and discussion

4.1 Presentation of the findings

Before analysis, the data were checked to confirm if the assumptions of linear regression were met. All the required tests were conducted to ensure the results did not violate these assumptions. Adhering to these assumptions' tests increased the likelihood of providing results which were unbiased, increase the predictive power of the studied sample regression model and the population model. These assumptions are:

Firstly, linearity assumption: the assumption dictates that the standard linear regression model is required to be linear in parameters so that it can be validated using the matrix method. Secondly, the variance of error terms of each antecedent variable should be constant throughout the observations (homoscedasticity).Thirdly,

all independent variables are required to be either metric or non-metric and the response variable must be metric, focusing on discrete or continuous. The metric data must be measured at the interval level or ratio scale. Fourthly, ensure there is no linear association between exogenous variables (no multicollinearity). Fifthly, autocorrelation; the study also tested the error terms using the Durbin-Watson test to ensure that there is no correlation between error terms (no autocorrelations).

The test for autocorrelation ranges from 0 to 4 with a value of 2, indicating the residuals are uncorrelated. Value >2 indicates a negative association between residuals and value < 2 depicts a positive correlation. Sixthly, normal distributed errors; it is expected that the residuals in the model are random, usually scattered variables with a mean of zero (0).

Table 1: Assumptions of Linear Regression model

S/N	Assumption	Definition	Statistical Test
1	Linearity	The mean values of the outcome variable for each increment of the predictor(s) lie along a straight line	The scatterplot matrix was used to test the linearity. Linearity was achieved (Appendix 2.4).
2	Homoscedasticity	Variance of error terms of dependent variable be constant at each level of the exogenous variable(s)	Scatterplot matrix used to test for homoscedasticity (Appendix 2.1 and Appendix 2.4)
3	Multicollinearity	Constant correlation between independent variables	Used variance inflation factor (VIF >3). The test indicated no multicollinearity VIF=2.685 (Appendix 2.5).
4	Autocorrelation	Correlations between error terms	The test was applied using Durbin-Watson test. The results indicated lack of autocorrelation of error terms (DWT= 2.35).
5	Normality of error term	The error terms are assumed to be normally distributed and are random with a mean zero.	Histogram and normal probability plot used to check for normality of error term (appendix 2.3).

Table 1.1 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.970a	.941	.927	130982.27290

a. Predictors: (Constant), No. of Firms, Pre and Post ETS

Table 1.1 indicates R, R^2 and the adjusted R square. The findings show that there is a high correlation between the predictor variables (Pre and Post e-tax system and number of firms) on the outcome variable (tax revenue), which is 97%. In addition to that predictor variables explains more than 94 percent of the variations on the dependent variable (Tax Revenue) ($R^2 = 94.15$).

Table 1.2 Analyses of Variances (ANOVA)

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	2442413814293.264	2	1221206907146.632	71.181	.000b
1	Residual	154407202329.623	9	17156355814.403		
	Total	2596821016622.886	11			

a. Dependent Variable: Tax Revenue
b. Predictors: (Constant), No. of Firms, Pre and Post ETS

Table 1.2 Depicts the analysis of variances (ANOVA) and F-statistic; it shows how the regression analysis data forecasts the response variable. The results indicate that the explanatory variables are significantly and best envisage the explained variable (F 71.181; P<0.05).

Table 1.3 Coefficients [a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	-1,283,799.994	521,877.341		-2.460	.036
1	Pre and Post ETS	526,477.709	123,907.942	.566	4.249	.002
	No. of Firms	4,500.426	1308.733	.458	3.439	.007

a. Dependent Variable: Tax Revenue

Table 1.3 shows the unstandardized and standardized coefficients of an association between each antecedent variable on the dependent variable. It shows how each independent variable has explained the variations on the outcome variable. The results indicate that each independent variable has significantly contributed on the

variations of tax revenue. However, the contributions differ for each predictor variable. The contribution of pre and post e-tax system on tax revenue is significantly high (P=0.002) in each year compared to changes in the number of firms registered under large taxpayers' category each year (P = 0.007).

The regression equation $TR\_LTP_{POST\_ETS} = \beta_0 + \beta_1 \, Pre\text{-}Post + \beta_2 no.firms + \varepsilon$

$$TR = -1283799.994 + 526477.709 \; Pre\text{-}Post + 4500.426 \; no.firms$$

Pre e-tax

Moreover, an increase of the use of the e-tax system in one year brings about an increase in the average tax revenue by TZS 526,477.709 million and when more large taxpayers (new firm) is registered in a year cause an average rise of tax revenue by TZS 4,500.426 million. However, the negative intercept (constant) implies that before the inception of the e-tax system the government has been losing an average of TZS1, 283,799.994 million of tax revenue every year. Therefore, an application of the e-tax system and an increase on the number of registered large taxpayers in a year has a significant effect on the change of tax revenue generated in Tanzania (See table 1.3).

Table 1.4 Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	TR Post_ETS	1365378.48	6	117632.55	48023.29
	TR Pre_ETS	501368.85	6	240039.99	97995.92
Pair 2	Post No. of Firms	471.67	6	4.08	1.67
	Pre No. of Firms	396.67	6	44.57	18.20

Table 1.5 Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair 1 TR Post_ETS - TR Pre_ETS	864009.63	239533.74	97789.24	612634.39	1115384.87	8.84	5	.000
Pair 2 Post No. of Firms - Pre No. of Firms	75.00	41.11	16.78	31.86	118.14	4.47	5	.007

The t-test at 5% used to compare the mean values of the pre and post e-tax system to see if there are significances between the two variables. T-test is an appropriate test to indicate if the observation between the two sets of mean is zero or different from zero. Applying the paired t-test is vital because the predictor variables were categorized into two aspects, firstly, the before the adoption of the e-tax system with a code of 0 and secondly, the after the adoption of the e-tax system with a code of 1.

The results from table 1.4 above show that the mean value for the tax revenue before the inception of the e-tax system is TZS 501,368.8500 million and that of after the adoption of the e-tax system is TZS 1,365,378.48 million and the mean value contribution from the number of firms (large taxpayers) registered before e-tax system was TZS 396.67 million and that of after e-tax was TZS 471.67 million. In table 1.5, pair 1 (TR Post_ETS - TR Pre_ETS) reported the mean value of TZS 864,009.63 million with the standard deviation 239,533.74. Pair 2 (Post No. of Firms – Pre No. of Firms) depicted the mean value of TZS75 million when new large taxpayers are registered or increased in the tax bracket in a year with a standard deviation of 41.11.

The findings indicate that the differences between the tax revenue after the implementation of the e-tax system and before the adoption of the e-tax system yielded TZS 864,009.63 greater than that of pre e-tax system in a year. This implies that the adoption of e-tax system has significant positive influence on tax revenue generation in Tanzania (t= 8.835; P =0.000). Further, the results showed that in subtracting the number of firms or new registered large taxpayers after the adoption of the e-tax system with that before the introduction of the e-tax system in a year provides positive significant influence on tax revenue generation (t = 4.469; P = 0.007). This implies that the number of new large taxpayers added during the inception of e-tax system in one year has brought significant effects on tax revenue collection.

5.0 Discussion of the Findings

From the findings, the results attest that since its inception the e-tax system in Tanzania tax revenue collection has been improving significantly year after year in the average of TZS 1,365,378.48 million (t= 8.835; P =0.000) compared to the tax revenue that generated before the e-tax system which averaged to TZS 501,368.8500 million per annum. Therefore we reject the null hypothesis and accept the alternative hypothesis that the inception and use of the e-tax system has improved tax revenue generation in Tanzania. The study agrees with the findings from Allahverdi, Alagö, & Ortakarpuz (2017) who established that the e-tax system positively affected the tax revenues and reduced the cost per tax in the long run.

Similar results were confirmed by Monica & Makokha (2017) who claimed that the adoption and use of the e-tax system has attested significant effect on tax revenue efficiency. The study presumed that the e-tax system has reduced the operating cost of the business and the time of processing tax document, which in return delivered a positive impact on both taxpayers and tax revenue efficiency. D (2019) concluded that the e-tax system has improved tax productivity in Nigeria and encouraged many taxpayers to engage paying their taxes using the system.

In contrast, a study by Olaoye & Atilola (2018) on the effects of e-tax payment on revenue generation reported insignificant effects on tax revenue generation and has not improved tax efficiency in the short run. The study further claimed that in the long run, the revenue might be improved due to the reduction of taxpayers' cost of compliance. Negative effects also were reported by Ofurum *et al.*(2018), who proved that tax revenue collected to GDP ratio significantly decreased after e-taxation implementation. Furthermore, this study found a significant effect of the number of firms or large taxpayers registered each year in the tax brackets during the implementation of the e-tax system with tax revenue generation in Tanzania (t = 4.469; P = 0.007). On the contrary a study by A. Yakovlev & Davies (2014) claims that registered firms decrease when the government increases the tax rate. That is there

is an indirect relationship between tax rates and the number of firms added or opt to register in a tax bracket.

6.0 Conclusions and further studies

This study assessed the influence of e-tax system on tax revenue collection in Tanzania. The general results confirmed that the adoption and use of e-tax system brought a significant positive impact on tax revenue generation. That means the application of the e-tax system influences tax revenue collection. The results also concluded that as the number of firms increase or as the registered large taxpayers increase in the tax brackets brings a positive influence on tax revenue generation. Basing on the findings, the study has the following recommendations:

- The government should strengthen the capacity of taxpayers to use the e-tax system. The same encompasses the provision of awareness on the benefits of the e-tax system to taxpayers and the government. For instance, during the global pandemic (Covid-19) where the physical movement were utterly prohibited the use of the e-tax system enabled taxpayers using e-tax system to relentlessly pay taxes to the government electronically. This assisted the government to continue providing the necessary services to its people.

- As noted in the findings of this study, the improvement of tax revenue depends on the number of firms registered in the tax bracket; the government should come up with sustainable strategies of transforming many taxpayers into the e-tax system. In Tanzania there are three groups of taxpayers that is; presumptive taxpayers, medium and large taxpayers. Many presumptive taxpayers use manual system to pay and process their tax documents. This increases the cost of compliance and minimizes the tax paid to the government. Hence the government should focus on this group to register all taxpayers in e-tax system.

7.0 Theoretical contribution and Implication of the study

The study used Diffusion of Innovation Theory (DIT) which underscores on innovation propagation with five well-known adopters. This study contributes to the theory in two parts: Firstly, in the category of users of e-tax system, the study tested the relevance of the theory if it has understood by the users through manifestation on the tax revenue. The study revealed that there is a group of large taxpayers who were adopted the system (innovators) and used at the early stages that is why there was a slight revenue improvement. However as the early adopters of the system received the information on the viability of the system from innovators, the information passed to other groups (early majority, late majority and to the laggards) that is why we saw some significant effect on the tax revenue generated. Secondly, grounding in the theoretical contribution, the study indicates that more awareness and persuasion to register more taxpayers to adopt and use the system and make this idea sustainable (continued decision).

This study has two implications; firstly, the adoption of electronic tax system has a positive effect on tax revenue collection in the context of Tanzania. However there had been minimal number of large taxpayers added in the tax bracket each year. Secondly, large taxpayers are emphasized to use the e-tax system in their daily tax issues, this had an impact not only on minimization of tax compliance cost but also assist the government to collect taxes in cost efficient ways.

8.0 Limitation and Future Studies

This study investigated the influence of e-tax system on tax revenue collection by using secondary data gathered from the TRA revenue reports and from the website ,which were grouped into before and the after e-tax system focusing on large taxpayers. The collection of data from secondary source only presents a limited comprehension on the problem under investigation which lacks the insight perceptions from taxpayers' description on the application of the e-tax system. Future studies can collect both quantitative and qualitative data to have a real picture

on the contribution of e-tax system on tax generation and the ways taxpayers perceive the system. Furthermore future studies can establish the comparison on how e-tax system has contributed on the revenue in different departments like Domestic Department, Custom and Excise Department and Large Taxpayers Department.

9.0 Acknowledgement

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Appendices

Appendix 1: Data from electronic tax system, number of firms and tax revenue (Pre and Post ETS)

Years (Pre ETS)	Pre e-tax system	Number of Firms (Pre-ETS)	Tax Revenue (Pre-ETS) (Million)
2006	0	350	310,969.1
2007	0	360	358,548.8
2008	0	370	391,319.6
2009	0	400	435,653.2
2010	0	450	549,119.5
2011	0	450	962,602.9
Years (Post-ETS)	Post e-tax system	Number of Firms (Post-ETS)	Tax Revenue (Post-ETS) (Million)
2012	1	465	1,349,470.4
2013	1	470	1,152,871.8
2014	1	470	1,390,549.0
2015	1	475	1,512,169.9
2016	1	475	1,393,916.7
2017	1	475	1,393,293.1

Appendix 2: Assumptions of Linear Regression

Appendix 2.1 Residuals Statistics [a]

|	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	291349.0000	1380379.8750	933373.6667	471208.67934	12
Residual	-205005.96875	221211.34375	.00000	118477.92366	12
Std. Predicted Value	-1.363	.949	.000	1.000	12
Std. Residual	-1.565	1.689	.000	.905	12

a. Dependent Variable: Tax Revenue

Appendix 2.2 Test for autocorrelations Model Summary [b]

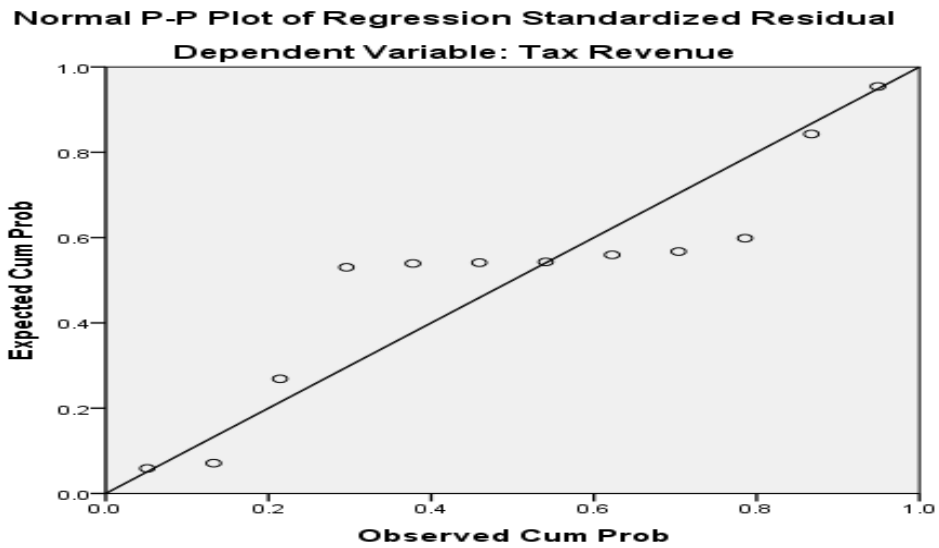| Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.970[a]	.941	.927	130982.27290	.941	71.181	2	9	.000	2.351

a. Predictors: (Constant), No. of Firms, Pre and Post ETS

b. Dependent Variable: Tax Revenue

Appendix 2.3 Test for Normality of error terms

Histogram

Dependent Variable: Tax Revenue

Mean = 8.81E-16
Std. Dev. = 0.905
N = 12
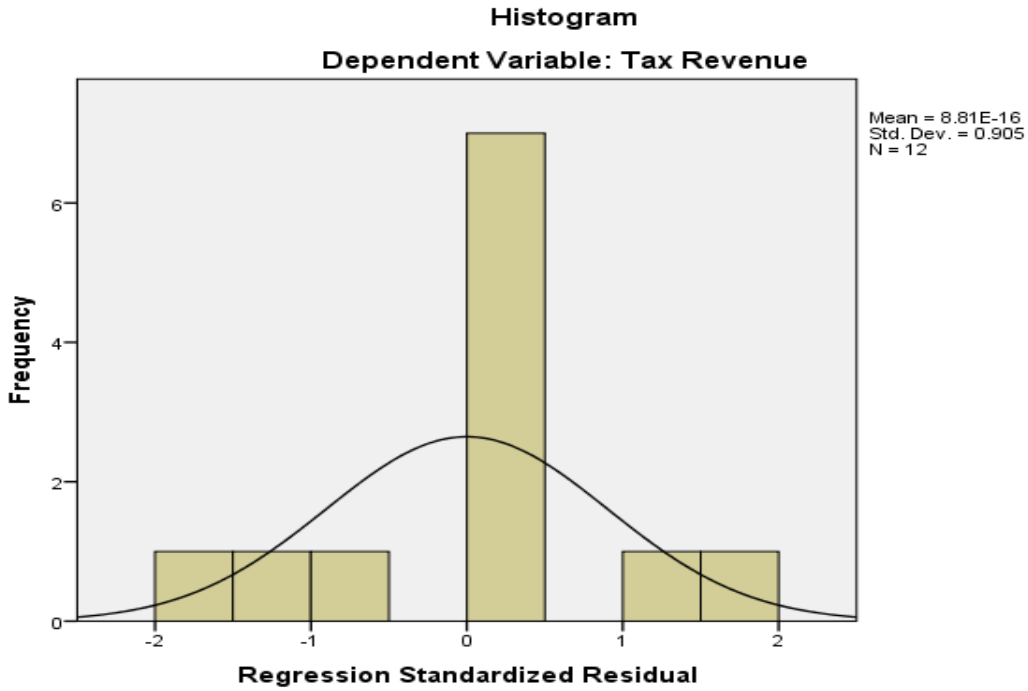
Appendix 2.4 Test for Linearity and homoscedasticity

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: Tax Revenue

Appendix 2.5 Collinearity Diagnostic

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1 (Constant)	-1283799.994	521877.341		-2.460	.036	-2464368.559	-103231.429		
Pre and Post ETS	526477.709	123907.942	.566	4.249	.002	246178.470	806776.948	.372	2.685
No. of Firms	4500.426	1308.733	.458	3.439	.007	1539.867	7460.984	.372	2.685

a. Dependent Variable: Tax Revenue

Appendix 3.1 One-Sample Test (Pre and Post e-tax system)

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
TR Pre_ETS	5.116	5	.004	501368.85000	249462.3273	753275.3727
TR Post_ETS	28.432	5	.000	1365378.48333	1241930.6894	1488826.2773

Appendix 3.2 One-Sample Test (Number of Firms during Pre and Post)

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Pre No. of Firms	21.799	5	.000	396.66667	349.8912	443.4422
Post No. of Firms	283.000	5	.000	471.66667	467.3824	475.9510