

THE EFFECT OF TAX COMPLIANCE STRATEGIES EXPENDITURE ON GOVERNMENT TAX REVENUE IN KENYA

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Abstract

This study endeavored to establish the effects of tax compliance strategies expenditure on government tax revenue. The specific objectives of the study were to: establish the effect of tax payer education expenditure on tax revenue, determine the effect of improved tax payer services expenditure on tax revenue, and assess the effect of law enforcement expenditure on tax revenue as well as determine the effect of technology adoption expenditure on tax revenue. The study was pegged on three theories namely; the economic deterrence theory, fiscal exchange theory and the regulatory compliance theory. Revenue data between 1980 and 2015 was used in the study. Ordinary Least Squares technique (OLS) was employed to establish the long run relationship between expenditure on taxpayer education, tax payer services, expenditure on law enforcement and adoption of technology on government tax revenues. Breusch-pagan test was used to test for heteroscedasticity and multi-collinearity, Variance Inflation Factor method was used. Further, the relationship between variables was established through correlation analysis. The results of the study show that the expenditures by the tax authority on the use of technology, law enforcement and the tax payer education were statistically significant in explaining the variations in tax revenue. Contrary to these findings is the fact that the expenditure of the tax authority on improved tax payer services is not significant in explaining the variations in tax revenue.

Keywords: *compliance, strategies, tax revenue, correlation, deterrence, regulatory, enforcement, significant*

1. Introduction

Marina *et al.*, (2002) asserts that the sole and realistic way of mobilizing resources to meet public expenditure on goods and services required by the citizenry is taxation. But this is not entirely the case since some third world countries have alternative sources of revenue besides taxation like user fees and licenses levied on services provided by government ministries, departments and state agencies, including proceeds from the disposal of public assets and denationalization of 'ailing' state corporations. Furthermore, a number of emerging economies rely heavily on external funding as an alternative source of income (Barnett and Grown, 2004).

Generating revenue locally is given precedence by many nations in sub-Saharan Africa (Drummond *et al.*, 2012). Raising revenue enables many governments in developing countries achieve financial superiority, avail

basic state amenities to its people, lower dependency on external support which in most cases has strings attached and diversify sources of revenue. On the contrary, tax avoidance and evasion in the local scene has hampered the growth of domestic tax base (IMF 2011). Even with the increasing and persistent world-wide challenge of tax non-compliance (McKerchar and Evans 2009), it is evident that most developing economies especially in the sub-Saharan Africa are the worst affected (Cobham 2005; Fuest and Riedel 2009). Masinde and Makau, (2010) assert that taxes are crucial in budgetary projections of an economy and one of the major reasons why taxes are levied is to raise revenue for economic management and allocation of resources for economic stabilization. Numerous interventions in the form of administrative initiatives have been put in place in the past by the Kenyan Government to enhance revenue generation. Among the interventions implemented to boost tax revenue was self-assessment systems (SAS) in the year 1992. The aim of the strategy was to enhance voluntary compliance, ease the complexity involved in evaluating tax returns and make the process of raising tax revenue more effective (cut down the cost of collecting tax revenue) (Masinde *et al.*, 2010). Even with the various tax management changes, the degree of adherence to revenue collection regulations has remained minimal. A study carried out by KRA, KIPPRRA and the ministry of finance, based on 1999/2000 statistics showed that the amount of Value added tax remitted was minimal at 55% and the compliance on self-assessment tax returns through lodgment was 65% (Makau *et al.*, 2010).

Handling the perennial challenge of tax nonpayment demands for the tax authorities to clearly identify the elements that contribute to an individual's tendency to fulfill or fail to honor his or her tax obligations. Unfortunately, not much is understood concerning the dynamics of tax compliance in third world economies (Andreoni *et al.*, 1998; D'Arcy 2011; Fjeldstad and Semboja 2001). The tax compliance challenge has two main approaches the first is derived from economic rationality that is based on economic analysis and the second approach concerns with issues of behavior and borrows heavily from ideas and research findings in other fields like psychology and sociology (OECD, 2004). These two approaches are often perceived to provide alternative explanations on tax compliance (Valeria, 2004).

According to Jamel and Michael (2001) the economic approach gives economic variables that influence the behavior of tax compliance such as financial constraints that points to the relationship between tax liability and compliance behavior of the tax payer. If the tax liability is within the tax payer's ability, there is a high likelihood of voluntary compliance (Alligahm and Sandmo, 2004). Tax is the main form of raising government revenue by the Kenyan government which it requires to provide public amenities to its population. From the 1990s, Kenya achieved a significant growth in tax collection in nominal terms constituting about 24% of its GDP (Kenya Economic Report, 2013) making it possible for the state to cater for 60% of its budget (Kenya Economic Report, 2013). Machogu and Amayi (2013) noted that the debates around tax policies and public participation in decision making were a crucial public concern, to individual business enterprises and to the whole economy because of the varied effects on each of the entities. Consequently, tax related inequalities emanate from differences in the structure and performance of the tax system and therefore it is the responsibility of the state to institute a just and fair tax regime for balanced distribution of income and welfare services to its citizens. Additionally, the other significant indicators of a just and fair tax regime are simplicity, adequacy and neutrality. The promulgation of the new constitution in Kenya in 2010 has brought about a two tier system of governance; the national and 47 county governments (GOK, 2010).

The new constitution accords the central government the responsibility of levying both direct taxes (Income and corporate taxes) as well as indirect taxes (VAT, excise and customs duty). Income tax forms about 40% of the total tax revenue raised by the national government over last 10 years, followed by Value Added Tax at

28%. Approximately 20% of the economically active work force bears the burden of paying the income taxes such as PAYE which has raised fairness related issues besides the fact it is regarded as the most progressive tax arrangement (Karingi *et al.*, 2005). Alternatively the county governments are mandated to levy property rates, entertainment levies and any other taxes by an Act of parliament (Parliament Budget Office, 2010). Both the central and devolved units of government may levy service charges.

According to Okello (2001) the government should consider widening the tax bracket in its tax reforms agenda instead of relying on tax credits and deductions like tax reliefs as a means to achieving fairness in tax administration. This can be achieved by instituting high tax rates for upper income tax brackets alongside the adjustment of tax bands to limit salary increments that are responsive to inflationary pressures without necessarily pushing the citizen's income to higher tax bands

Achieving improved tax compliance requires sustained and long range reform efforts based on very strong organizations and prudently managed Kenya Revenue Authority as well as having in place a collection system that is robust (e.g., payment and withholding systems) with regard to establishing a tax administration system that has the capacity to enforce registration, filing, payment, debt collection, audit, provide relevant and necessary services to tax payers, and processing of appeals) (Marina and Kilis, 2002). To ensure that the penalties are imposed as required, disputes resolved amicably and sufficient powers are vested on the tax agencies, the legal framework and the judiciary should play a major role. This coupled with increased use of information and communications technology plays an important role in tax compliance management by facilitating collection of information relating to third parties on their business activities, the use of electronic invoices to achieve monitoring and verification of transactions on a real time basis and analysis business risks (KNBS, 2011). Different countries and regions have adopted different strategies to achieve improved tax compliance. The differences are justified by the different stages of development, diverse administrative capacities and different non-compliance scopes. Therefore no single solution to tax compliance problem exists for all countries. The reforms implemented should be structured to fit the different circumstances of each country. The third world countries have however shown greater potential of achieving tax revenue growth by implementing tax compliance reform initiatives (GOK, 2010).

1.1 Tax Compliance Strategies

Tax compliance is a major problem for many tax authorities and it is not easy task to persuade taxpayers to comply with tax requirements even though tax laws are not always precise" (James and Alley 2004).The definition of tax compliance in its most simple form is usually cast in terms of the degree to which taxpayers comply with the tax law (James 1999).However, like many such concepts, compliance is seen as a continuum of definitions. One suggestion is that the degree of non-compliance may be measured in terms of the "tax gap". This represents the difference between the actual revenue collected and the amount that would be collected if there was 100% compliance (James, 1999).

All revenue authorities are generally required to achieve as good a compliance outcome as possible (i.e., to maximize the overall level of compliance with the tax laws). Jackson (2013) argues that improving tax compliance requires long-term reform efforts, beginning with strengthening the organization and management of the revenue agency, implementing robust collection systems (e.g., payment and withholding systems) and building capacity in core tax administration functions (registration, filing and payment enforcement, debt collection, audit, taxpayer services, and processing of appeals). Keen *et al.*, (2013) argue that reform of the legal framework and judiciary is also often required to ensure that the necessary powers, penalty regimes, and

dispute resolution processes are in place. Increasingly, information and communications technology is playing a critical role in compliance management (e.g., through automatic gathering of third-party information as a by-product of natural business processes; use of electronic invoices to facilitate real-time transaction monitoring and verification; and analysis of revenue risks).

1.2 Tax compliance and tax revenue

According to ITEP (2011), a great proportion of revenue authorities have digressed from the traditional tax management assessment regimes where all or to a larger extent tax reports are scrutinized or examined as a precondition for before being issued to the taxpayers. The regime of choice of late is the self-evaluation and adjustment mechanism that bases its confidence on the taxpayer's own initiative to adhere to their tax obligations to subscribe to the tax register, maintain up to date records, submit accurate tax returns and honour their tax liabilities with minimum or without the intervention of a tax body. Article 209 of the Constitution of Kenya 2010 prescribes the right to levy taxes or accumulate revenue for both the central government and the devolved units of governance (GOK, 2011). The distribution of the tax collection authority between the two levels of government is meant to respect and enhance the spirit of devolution, whose structure makes it possible for the central government to have greater mandate over a bigger portion of taxes with substantial revenue base. Specifically, the central government is particularly in charge of imposing income tax, excise duties, VAT, and customs (GOK, 2010).

About 20% Kenya's tax income-to-GDP ratio from the year of 2010 has been the best in standards by regional comparisons; this is far above the tax-to-GDP ratios in Tanzania (17.4% in the fiscal year 2013/14) and Uganda (13% in fiscal year 2013/14). The economic short fall (including foreign aid) was approximately 5% of the gross domestic product running over the financial periods of 2011/12 and 2012/13, growing up to 5.6% from 4.0%, respectively. This development remained constant besides the adoption of new and advanced systems and structures to operationalize the 2010 supreme law in Kenya (the constitution), both at the central government level as well as among the 47 devolved units of government, that has made it necessary for the state to expand its expenditure; and increased demands by government employees to have their basic pay and other employment allowances (Odero, Reeves & Kipyego, 2015: 12).

Adherence to tax obligations has gradually developed and grown into a major field of focus for studies in social and financial psychology. This concept has been looked at and tackled from a variety of standpoints leading to the understanding of the varied aspects of behavioral attitudes by the tax payers. Attitudes of a tax payer have been determined, current cultural practices defined and the lay philosophies held by people with regard to fulfilling their yearly tax liabilities and declarations examined (Kirchler, 2007). Experimental findings point to the fact that adherence to taxation requirements has resulted in higher and rising levels of government revenue and verification reports and a generally encouraging decline in the overall tax rates based on yearly tax returns. Tax liability payment will also be highly efficient when the tax payer anticipate improvement in provision of welfare amenities paid for by the tax revenue with any change in percentage penalties appearing to cause minimal impact on tax liability payment tendency (Almet *et al.*, 1992). To conclude, there seems to be a range of alternative tax regulation elements superior to the normal routine of implementation activities that the state can put in place to realize and even exceed the expected or projected level of adherence with the tax collection and administration conditions. Essentially, a number of these fundamental strategies (increased fines) may to a greater extent fail to trigger any increase in the levels of compliance to tax requirements.

1.3 Statement of the Problem

Efficient self-assessment structures are reinforced by a controlling approach that identifies that voluntary compliance will be optimized through an appropriate balance of taxpayer education and assistance, simple laws and procedures, and risk-based verification programs. Article 209 of the Constitution of Kenya (2010) outlines powers to impose taxes or raise revenue by the national government (GOK, 2011). In particular, the national government is solely responsible for imposing income tax, value added tax, customs duties and excise taxes. The justification for this is that the central government needs to retain the ability to redistribute national resources and stabilize the economy which is the key objectives of tax systems.

The relatively wider tax gaps and lower revenue productivity of developing and emerging economies that contribute to galloping budget gaps can be reduced if implemented tax reforms incorporate effective tax compliance strategies to help raise more tax revenue (Odero, Reeves and Kipyego, 2015). However, the link between these tax compliance strategies and the level of tax revenue has not been established in Kenya. This is the knowledge gap that this study attempts to fill.

2. Literature Review

The review of literature was divided into two sections: theoretical literature review and empirical literature. The theoretical literature was based on the Economic deterrence, fiscal exchange and the regulatory compliance theories. The empirical literature focused on the relation between expenditure on tax compliance strategies and government tax revenue.

3. Study design

The study adopted a non-experimental correlational research design. Data was collected for different expenditures on tax compliance strategies from 1980 to 2015 in Kenya. The variables of interest were expenditures on taxpayer education, taxpayer services, law enforcement, and technology and government tax revenue. The data sources included the CRA and KRA publications. Least squares estimators are used to estimate the empirical model.

3.1 Theoretical Framework

The study adopted the economic deterrence theory which points out that tax compliance depends on tax rate which determines the benefit of evasion, the probability of detection and the penalties that applied to fraud. According to this theory tax compliance (Tr) is a function of expenditure on credible law enforcement in (CLE), information on penalties and tax evasion benefits (TE) as shown in equations 1. Therefore, the theoretical model is given by;

$$\text{Tax compliance (Tr)} = f(\text{CLE, TE}) \dots \dots \dots (1)$$

Where:

Tr is tax revenue; while CLE is credible law enforcement and, TE is tax payer education.

In equation (1), tax compliance can be measured using government tax revenue.

3.2 Empirical Model

The empirical model adopted by the study was derived from equation (1). From the literature review, other factors that affect tax compliance include services offered to tax payers (TS) and use of technology for tax administration (T). Inserting these factors in equation 1 yields the empirical model to be estimated.

$$TR = f(CLE, TE, TS, T) \dots\dots\dots (2)$$

Where TR is government tax revenue, CLE is expenditure in law enforcement, TE is expenditure on taxpayer education, TS is the expenditure on services offered to taxpayers, and T is expenditure in technology used in tax administration.

To determine the effect of each factor on tax revenue, equation (2) is be modified, to include an error term that captures other factors that are not included in the model. The econometric model estimated to answer the research questions is given by;

$$TR_t = \beta_0 + \beta_1 CLE_t + \beta_2 TE_t + \beta_3 TS_t + \beta_4 T_t + \varepsilon_t \dots\dots\dots (3)$$

Where ε_t is error term. The coefficient of expenditure on law enforcement, taxpayer education, and services offered, and use of technology in tax administration is expected to be positive. Equation (3) is estimated using OLS and it gives the long run relationship between government tax revenue and expenditure on law enforcement, taxpayer education, services offered, and tax administration.

Several diagnostic tests were done to ensure estimated coefficients are consistent. Breusch-pagan test was used to test for heteroscedasticity and multicollinearity, Variance Inflation Factor method is used. When the error term in equation (3) is found to be heteroscedastic, robust standard errors is used. Since data is in form of time series, the study tested for serial autocorrelation. The Jarque-Bera test was also conducted to test normality for the error term.

3.2.1 Testing for Stationarity (Unit root Test)

Most time series data exhibit non-stationary. It occurs when the mean and the variance of the time series data is not constant over time and hence it is impossible to interpret the results of OLS. Therefore, unit roots test was done to avoid the problem of the non-stationarity, as it leads to spurious results. The study used Augmented Dickey-Fuller (ADF) test to test for stationarity.

3.2.2 Variance Decomposition

The variance decomposition show what percentage of the variation in a series is due to its own shocks and other variables in the model at the present and future periods (Enders, 2004). The study used variance decompositions to study the importance of shock or innovation in tax compliance strategy in relation to tax revenue.

4. Results and Discussions

4 4.1 Descriptive Statistics for the Variables

In time series analysis, descriptive analysis of data enables us to determine the variability of data so as to determine if the time series are susceptible for further statistical analysis. Table 4.1 shows the descriptive statistics (in millions).

Table 1: Descriptive Statistics

	Observations	Mean	Std. Deviation	Minimum	Maximum
Taxpayer Education	36	37.22	9.57	20.00	49.00
Taxpayer Services	36	29.06	7.44	16.00	38.00
Credible Law Enforcement	36	62.50	16.11	34.00	82.00
Adoption of Technology	36	76.33	19.65	42.00	101.00
Tax Revenue	36	304,007.70	277,272.80	66,260.00	1,008,671.00

(Source: Author, 2018)

From Table 1 it can be seen that the mean of government expenditure on taxpayer education was KES 37.22million with a standard deviation of KES 9.57million. The largest expenditure on taxpayer education was KES 49.00 million and the lowest was KES 20.00 million. The mean expenditure on taxpayer services was KES 29.06 million with a standard deviation of KES 7.44 million. The largest and the smallest expenditure on taxpayer services were KES 38.00 million and KES 16.00 million respectively. On the other hand, the expenditure on law enforcement by the tax authority was KES 62.50 million with a standard deviation of KES 16.11 million. The respective largest and smallest values were KES 82.00 million and KES 34.00 million.

The expenditure on the adoption of technology had a mean of KES 76.33 million with a standard deviation of KES 19.65million. The largest and the smallest expenditure on adoption of technology were KES 101.00 million and KES 42.00 million respectively. Lastly, the mean of tax revenue collection by the tax authority was KES 304,007.70 million with a standard deviation of KES 277,272.80 million. The largest and the smallest tax revenue were KES 1,008,671.00 million and KES 66,260.00 million respectively. From the descriptive analysis of the time series above, it is evident that the time series are variable and can be subjected to further statistical analysis.

4.2 Pre-Estimation Tests

Before conducting the analysis, several pre-estimation tests were conducted. These included unit root test and correlation analysis.

4.2.1 Stationarity Test

To test for Stationarity, Augmented Dickey-Fuller (ADF) test was used. To conduct the ADF test, equation (4) was used.

$$\Delta Y_t = \alpha + \beta_t + \rho Y_{t-1} + \sum_{i=1}^k \delta_i \Delta Y_{t-1} + \mu_t \dots \dots \dots 4$$

The null and alternative hypotheses of the ADF test were;

H₀: ρ = 0 (Non-stationary)

H₁: ρ < 0. (Stationary)

If the computed t-statistics is greater than the asymptotic critical values in absolute term, the null hypothesis is rejected and the study concludes that the series is stationary (Gujarati, 2004).

Table 2: ADF Unit Root Test Results

		Tax revenues	Credible law enforcement	Taxpayer education	Taxpayer services	Adoption of Technology
Constant	t-Statistic	4.1876	-1.7167	-1.7167	-1.7167	-1.7167
	Prob.	1	0.4143	0.4143	0.4143	0.4143
	Conclusion	Non-stationary	Non-stationary	Stationary	Non-stationary	Stationary
Constant & Trend	t-Statistic	0.6667	-6.4338**	-6.4338**	-6.4338**	-6.4338**
	Prob.	0.9994	0.0000	0.0000	0.0000	0.0000
	Conclusion	Non-Stationary	Stationary	Stationary	Stationary	Stationary

*** Indicates stationary at 5% level of significance*

From the ADF test at level, credible law enforcement, taxpayer education, taxpayer services and adoption of technology are stationary at 5 percent level of significance. Therefore, using the ADF test the null hypothesis for the presence of a unit root was rejected at 5 per cent level of significance. However, the presence of a unit root was not rejected at 5 per cent level of significance for tax revenue, and hence was non-stationary. For tax revenue, ADF test was done at first difference. Table 3 shows the ADF test results for all variables differenced once. The table shows that at first difference, all variables are stationary.

Table 3: 1st Difference using ADF Stationarity Tests Results

At First Difference		Tax revenues
Constant	t-Statistic	-3.6789**
	Prob.	0.0091
	Conclusion	Stationary
Constant & Trend	t-Statistic	-5.2654**
	Prob.	0.0007
	Conclusion	Stationary

*** stationary at 5% levels of significance.*

The 1st difference of tax revenues is stationary at 5 percent level of significance. Therefore, tax revenues are integrated of order I (1).

4.2.2 Correlation Analysis

In regression analysis, multicollinearity tends to inflate the standard errors which affect the hypothesis testing. To test for multicollinearity between the variables, correlation analysis was done and variables with a correlation coefficient greater than 0.8 are deemed to be collinear. Table 4 shows the results of correlation analysis.

Table 4. Correlation Results

	Taxpayer Education	Technology adoption	Law Enforcement	Taxpayer Services	Tax Revenue
Taxpayer Education	1.0000				
Technology adoption	-0.0929 (0.5955)	1.0000			
Law Enforcement	-0.0805 (0.6457)	-0.0258 (0.8832)	1.0000		
Taxpayer Services	0.1460 (0.4025)	-0.5360 (0.1119)	-0.2567 (0.1366)	1.0000	
Tax Revenue	-0.0213 (0.9035)	-0.1111 (0.5253)	0.2113 (0.223)	-0.0249 (0.887)	1.0000

Significance level in the bracket and Variables in logarithms

(Source: Author, 2018).

Table 4 shows that the variables of the study are not highly correlated. None of the variables have correlation of 0.8 or higher. Tax revenue is positively correlated with law enforcement while it is negatively correlated to taxpayer education, adoption of technology and tax payer services. Taxpayer education is positively correlated to taxpayer services but negatively correlated to adoption of technology, law enforcement and tax revenues. Adoption of technology is negatively correlated to law enforcement, taxpayer services and tax revenues.

4.3 Regression Analysis

The study estimated the effect of the expenditure on law enforcement, log of expenditure on taxpayer education, log of expenditure on taxpayer services, log of expenditure on use of Technology on the log of tax revenue. The regression output is presented in table 5.

Table 5: Regression Output Summary for Tax Revenues on Various Variables

Dependent Variable: Tax Revenue			
Independent Variable	Coefficient	t-Statistic	Prob.
Expenditure on Taxpayer Education	0.021043	0.570446	0.0005**
Expenditure on the Use of Technology	0.246333	3.979523	0.0005**
Expenditure on law Enforcement	0.003128	18.87002	0.0000**
Improved Taxpayer Services	0.182391	-1.432906	0.1638
Adjusted R-squared:	0.681577		
Durbin-Watson statistics:	1.911331		
F-Statistic	12.82431		
Probability (F-statistic)	0.000012		

*(**) indicates that the effect is significant at 5%. The variables are in logs.*

(Source: Author, 2018).

From Table 5, the variations in the independent variables jointly explain about 68.2 per cent of the variations in tax revenue in Kenya. This is shown by the adjusted R-squared of 68.2 per cent. The remaining 31.8 per cent of the variations in tax revenue in Kenya could be attributed to variables that are not captured in the model.

From Table 5, the coefficient of expenditure on the use of technology is 0.246333 and it has p value of 0.0005. This shows that the variable is significant at 5 per cent. The coefficient indicates that when the tax authority increases its expenditure on the use of technology in tax collection by 100 percent, the tax revenue increases by 24 percent. These findings are concurrent with the findings of Machogu & Amayi (2013) which argue that investments in technology by the tax authority increase tax revenues. It is also in agreement with the findings of Okello (2001) which argues that the ability of citizens to access government services anytime, anywhere helps to mitigate the transaction costs inherent in all types of government services and the findings of Palmer (2002) which argues electronic tax filings shortens the time for refunds from an average of 12 weeks to about 3 weeks thus enhancing the efficiency of tax collection.

As for the Expenditure on law Enforcement, the coefficient was found to be positive 0.003128 with a probability value of 0.0000. It was thus concluded that Expenditure on law Enforcement is highly significant at 5 percent. The magnitude implies that when the Expenditure on law Enforcement increase by 100 percent, the tax revenue to the government increases by about 0.3 percent. These findings are in agreement with the findings of Siti, Normala, Sheik & Obid (2007) which argues that paying taxes is a disincentive and must be enforced if sufficient tax revenue has to be raised from the taxpayers.

From regression results, the coefficient of Expenditure on Taxpayer Education is positive 0.021043 and it has a probability value of 0.0005. Therefore, the coefficient is significant at 5 percent. This finding are consistent with the findings of Allingham and Sandmo (1972) and Becker (1968) which found that governments should sensitize the people on matter relating to tax payment and tax compliance to increase the tax revenue From the study findings, we can conclude that Expenditure on Taxpayer Education has a significant effect on the tax revenues in Kenya. The implication of this is that the government should pay close attention to tax education to enhance awareness in order to ensure that higher levels of tax revenue are realized.

However, the spending of the tax authority on Improved Taxpayer Services is found not to be statistically significant in explaining the variations in tax revenue in Kenya. These findings are in contrast with the results of Mikessel (2013) which found out that an effective and efficient program of taxpayer service activities is a critical objective of all revenue bodies. The overall complexity of tax laws coupled with the relatively large populations of taxpayers to be served means that all income agencies must rely substantially on taxpayers' voluntary compliance to achieve the outcomes expected of them. It is axiomatic that to achieve high levels of voluntary compliance, taxpayers and their representatives must have a good standard of services to help them determine their obligations under the laws and to complete the steps required to acquit those obligations.

4.4 Post Estimation Diagnostic Tests

One model was estimated by OLS and the residual were tested for normality, serial correlation and heteroscedasticity. The model dependent variable was tax revenue while independent variables log of expenditure on taxpayer education, log of expenditure on the use of technology, log of expenditure on law enforcement, log of expenditure on improved taxpayer services.

Table 6: Normality test, Heteroscedasticity, and Serial Correlation

Type of test	Test Statistic	Values
Histogram-Normality Test	Jarque-Bera	0.009001
	Probability	0.995510
ARCH LM Test	P-value of the Observed* R-Squared	1.995156
	Probability of Chi-square	0.7366
Breusch-Godfrey LM test for Serial Correlation	F-statistic	1.919537
	Probability	0.3830

(Sources: Author, 2018).

Residual based tests were conducted to test for the normality and presence of heteroskedasticity and autocorrelation. The results of these tests are reported in table 6.

The Jarque-Bera statistic from the histogram-normality test was 36.75279 with a p-value of 0.995510. The probability value was greater than 0.05 and so the null hypothesis of normality of the regression residuals could not be rejected at 5 per cent significance level. Conclusion was thus made that the regression residuals from the estimated equation followed a normal distribution.

The study tested for the presence of autocorrelation for the estimated equation by the use of the Breusch-Godfrey language multiplier test. This method is due to Breusch (1978) and Godfrey (1978) is capable of handling higher order autocorrelation (Gujarati, 2004; Greene 2008). As shown in table 6, the higher probability values for the Observed R-Squared for the Breusch-Godfrey tests showed that the null hypothesis of no serial correlation in the models could not be rejected. This implies that there was no serial correlation in the residual series from the regression.

Autoregressive conditional heteroskedasticity (ARCH) is said to be present in the case where the magnitude of the regression residual is related to that of the recent residuals. If this occurs, there would be an estimation efficiency loss (Greene, 2008). The LM test for no ARCH was conducted and it included up to fifth lagged value of residuals per equation. For both of the equation, the p-value of the Observed* R-Squared was found to be greater than 0.05. The null hypothesis could not be rejected at 5 per cent significance level implying that each of the residuals series exhibited no heteroskedasticity problems.

4.4.1 Model Specification and Stability Tests

Table 7: Ramsey RESET Tests Results for the Model

Dependent Variable	No. of terms	Test statistic		Conclusion
		F-statistic	Prob.(F-stat)	
Tax revenues	1	0.203192	0.6560	No
	2	0.114465	0.8923	misspecification error evidence

(Source: Author, 2018).

Regression Specification Error Test (RESET) was proposed by Ramsey (1969) to determine the departure from the classical linear regression assumptions. The preceding sections entailed a discussion on the individual tests

such as normality tests, heteroskedasticity tests and serial correlation. All the three tests pointed out the models are statistically sound. To detect specification errors in an equation which could have been wrongly specified but nevertheless gives satisfactory conventional tests, Ramsey and Alexander (1984) proposed RESET as a general test for omitted variables alongside correlation between the explanatory variables and the error term and incorrect functional form. The Ramsey RESET test was conducted for the estimated model. The p-values of the F-statistic was greater than 0.05. Therefore, the null hypothesis that the coefficients of the fitted values were all zero at 5 percent level of significance was not rejected. Based on the result it was concluded that there was no specification errors in the model.

5. Conclusions

The results of the study show that expenditure by the tax authority on the use of technology has a positive effect on the tax revenue. On a similar note, expenditure on law enforcement and the expenditure on taxpayer education are also found to be highly significant in explaining variations in tax revenue. The relationship between the three was positive which implies that as the tax authority increases its expenditure on law enforcement, it is expected that its revenues will grow. Contrary to these findings was the fact that the study found that the expenditure of the tax authority on Improved Taxpayer Services is not significant in explaining the variations in tax revenues.

The three variables, spending by the tax administration on the use of technology, the expenditure on law enforcement and the expenditure on tax education had positive and statistically significant coefficients. This means that as Kenya's tax authority increases its expenditure on purchase and acquisition of technology, on law enforcement and sensitization, it is likely to realize more in revenue.

6. Policy Recommendations

This section discusses the implications of the findings of this study for policy. First, the study found a positive relationship between the expenditure on purchase and acquisition of technology and the tax revenue that Kenya's tax authority collected in any given year. The implication of this is that technology enhances the efficacy of tax collection. Thus, the government should spend more on acquiring technology which will help in the administration of the tax system. This is in agreement with the findings of (Machogu & Abayi, 2013) who argue that electronic tax filing systems are particularly favourable for governments because they avoid many of the mistakes taxpayers make in manual filings, and they help to prevent fraud by data matching. The data houses developed using electronic tax filings can allow tax inspectors to analyze declarations more thoroughly, and enable policymakers to develop fairer and more efficient policies.

Secondly, the study found that there is a positive relationship between the expenditure by the tax authority on law enforcement and the tax revenue collected. The implication of this is that the government should continue to up its tax compliance enforcement efforts. This will help it curb tax evasion and underreporting which may lead to low tax revenue realization. Credible law enforcement is an integral part of any compliance strategy as it acts not only to deter tax evasion but also to remind taxpayers that the tax collector is working to maintain the fairness of the tax system by ensuring that all pay their fair share. Administration begins with the law in place. The law represents a component of the context or environment in which a revenue authority operates and it is from this environment that we discern the compliance risks associated with the administration of the law. The challenge for revenue agencies is to administer the law in a manner that sustains community confidence in their administration.

7. Areas of Further Research

The study sought to establish the effects of tax compliance strategies on the level of tax revenue in Kenya. The findings emanating from the study point out to the fact that the use of technology, law enforcement and tax education practices are healthy for the authority of income to realize high tax revenues. The study has recommended that the government should scale up its expenditure on these avenues. However, the study fails to determine a cap on the expenditure. Further studies should seek to determine the optimal expenditure that will ensure that the highest possible tax revenue is realized. For instance, such study should give a tradeoff between tax revenues and the respective expenditures on technology use, education and law enforcement. This is because, from economic theory, there must be a limit beyond which expenditure on these items can turn out to be counterproductive.

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