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**EFFECTS OF INFLATION ON TAX REVENUE PERFORMANCE IN  
KENYA**

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**Abstract**

For any government to effectively carry out its primary function and other subsidiary functions, it requires adequate funding. Taxation generates public funds to governments through structured approaches. Tax is a compulsory payment imposed by the government on the incomes and profits of individuals and corporate bodies. The amount of tax revenue realized or expected by any state is determined and influenced by various economic factors ranging from micro to macro-economic. In Kenya, tax revenues have, for quite some time, remained low relative to the effort and tax policies in place. This study examined the effects of macroeconomic variables on tax revenue performance in Kenya using annual time series data of ten years for the period 2008 to 2018, to estimate a linear model of tax revenue performance and the selected macro-economic factors. The period is extensive enough to give accurate results. The study adopted a correlation research design which is a non-experimental research design technique that helps researchers establish a relationship between two closely connected variables. Secondary data from the Central Bank of Kenya, Kenya National Bureau of Statistics (KNBS), Kenya Revenue Authority (KRA) and World Bank were collected and presented using tables and figures. The study carried out pre-estimation tests so as to validate the results. Unit Root Tests was done to detect for stationarity using Augmented Dickey Fuller (ADF) test, Cointegration was done to test for long run relationship between the dependent variable and the independent or predictor variables. Multicollinearity test was done to find out if the predictor variables are highly correlated using Vector Integrating Factor (VIF), heteroscedasticity test was done to find out if residuals are equally distributed using Breusch-Pagan-Godfrey test. Time series data was collected using documentary analysis and analyzed using Stata and E-views software programs. Time series data rules out the option of collecting biased data from primary sources, it also provides larger and higher-quality databases that would be unfeasible for any individual researcher to collect on their own. The study established that there is a link between the macroeconomic variables and tax revenue performance. It indicated that the coefficient of foreign direct investment (0.311568) units and GDP per capita (0.8128243) from the model exhibited a statistically significant positive relationship with tax revenue performance, whereas the inflation (-0.183015) and unemployment rates (-0.343756) negatively influenced tax revenue performance in Kenya for the period of time under the study. The results also revealed that the model was good in terms of goodness of fit and overall significance with R<sup>2</sup> value of (0.7371) and a probability value of 0.0000. These

means that 73.71% of the variation in tax revenue is explained by the explanatory variables in the model while the other proportion 26.29% is explained by other factors not considered by this study. These findings inform the government and its tax administration on the initiatives and measure to adopt in improving revenue growth and performance. The government should also develop strong mechanism to mobilize more resources for its revenue.

## **1. INTRODUCTION**

### **1.1. Tax performance**

For any given state, one of the key functions is to raise tax revenue. In order to meet its fiscal obligations, government needs to increase revenue. Mashkoo, M et al (2010), confirmed that in as much as governments often use various methods of raising resources, taxation is the key and most important source of government revenue. (OECD, 2012), stressed on strengthening the utilization of domestic revenue for public expenditure financing as well as the core role of taxes in the field of development and redistribution. In order for any state to fulfill its task effectively, it needs to raise funds, e.g. to provide protection to its people, to provide justice or to run the state, and to follow certain growth agendas. Through its key role as a bridge between the ruler and the citizen, tax levying promotes the participation, transparency and state capacity Bräutigam (2002).

Globally, countries with a low-income tax gain or weak tax law compliance experienced tough times. International players such as the Organization for Economic Co-operation and Development (OECD), the World Bank and the G20 called for more concerted steps to tackle tax dodging and evasion. With the world facing the global financial and economic crises, the emphasis on tax havens to improve the openness of their tax regimes and put an end to unequal trade practices has been rising. For example Malaysia, Colombia and Vietnam have seen a downturn in tax performance as a consequence of non-tax revenue rises since 2003-2015. Throughout Western Europe as well as in other previously socialist states in Eastern Europe and the former Soviet Union countries with high tax results predominate. The highest income countries with tax ratios below the trend line are the USA, Japan, Ireland and Switzerland by the European Commission in 2014. Bangladesh, Pakistan, Cambodia, Malaysia, Sri Lanka, India, Indonesia, Nepal and Philippines are among low-performers, as opposed to southern and southeast Asia. Most Latin America and the Caribbean countries are also below the standard, with the low-tax groups of Honduras, Venezuela, Paraguay, Panama, the Dominican Republic and Colombia. Brazil and Guyana are the only high tax payers in this zone (Pearson 2013).

Regionally, many developing African countries have problems generating public revenue. In Africa most government budgets have shortages that impede policy expenditures, which are essential to economic growth, in humane and capital projects. Foreign monetary fund's support programs in African sub-Saharan countries have included steps for tax revenue growth and fiscal reform in these countries in recent years. Countries with relative high tax revenues tend to have high tax index.

In Africa, goods and services taxes contributed to the biggest share in 2012 at 5.2 per cent of GDP, while international tax revenue accounted for 5 per cent of GDP and sales and income taxes accounted for 4.6 per cent of GDP (World Bank, 2014). Several sub-Saharan African countries have recently succeeded in reforming their tax system, for example Benin has implemented a substantial tax and administrative reform plan contributing to changes in the framework of the tax system and a rise in the GDP-to-tax ratio. Similarly, countries such as Ghana, Burundi, Liberia, Morocco and Algeria were classified as high-tax countries in the study recently undertaken by the World Bank in Africa (World Bank, 2014), whilst central African countries (e.g. Sudan, Central African Republic, Nigeria) are rated as low-tax performers who have been associated with higher death tolls in armed conflict and violence (OECD, 2013).

Taxation is the primary source of government spending funds in Kenya, like most developing nations. Report by the Institute of Economic Affairs reveals that tax revenue accounted for 80.4 per cent of total government taxes and grants between 1995 and 2004. They also argued that taxation was implemented to achieve two goals; to collect adequate tax revenue to fund public expenditure with far less borrowing; and, second, to leverage revenue in a manner that is rational and minimizes its disincentive impact on economic activities (Moyi et al 2006).

Kenya has shifted over time from being a low tax burden country to a high tax burden country, yet the country faces the apparent need for more tax revenue to maintain public services. Notwithstanding improvements, tax authorities face significant obstacles in their main revenue collecting function. Nyaga; J. N. et al (2016), in their study noted that although the tax reforms experiences seemed encouraging, there still existed gaps that needed further improvement.

### **1.2 Inflation and Tax Revenue Performance**

Inflation is the sustained increase in the general prices of goods and services in an economy over a period of time. When the prices of goods rise, each unit of currency buys less and hence inflation is an indication of a reduction in the purchasing power per unit of money. Inflation is measured in units known as inflation rate, the annualized percentage change in the general prices of goods and services. It is mostly constituted by the consumer price index over time.

Global economy has suffered immensely since the global financial crisis 2008 and that caused global inflation to increase. The highest recorded global inflation of the past decade in comparison with the previous year's took place in 2008, when it increased by more than 6.4% (IMF, 2005). The global regions that have experienced the highest year-on-year inflation rate in past years are Middle East and North Africa, as well as Sub-Sahara African. Some countries that have experienced some of the highest inflation rates include Ukraine, Venezuela and Zimbabwe. In 2015 the inflation rate of industrialized countries was just about 0.35%; meanwhile the inflation rate in the Middle East and North Africa amounted to more than 6.2% (World Bank, 2005).

In East Africa inflation remained an important indicator of macroeconomic stability, it remained in the double digits in 2018, increasing by 0.5 percentage point from 14.0 percent in 2017. But if South Sudan's exceptionally high 104.1 percent is excluded, the region's average inflation rate drops to an estimated 12.8 percent in 2018, and is projected to decrease slightly to 10.9 percent

in 2019 and 10.2 percent in 2020 (World Bank, 2018). Inflation also remained high in Burundi and Ethiopia and extremely high (43.4 percent in 2018) in Sudan. Burundi's expansionary monetary policy, which began with the 2015 sociopolitical crisis and aimed to facilitate the refinancing of commercial banks in order to support productive investments in 2016 and 2017, continues to place pressure on inflation. Inflation was estimated at 12.7 percent at the end of 2018 and is projected to sharply increase by 22.1 percent in 2019 and 23.1 percent 2020.

In Kenya inflation rate rose slightly to 5.70% year-on-year in June 2019 from 5.49% in the previous month, but missing market expectations of 6.40 percent. Main upward pressure came from; food and non-alcoholic beverages (6.98 percent vs. 6.33 percent in May), housing and utilities (4.07percent vs. 4.56 percent), transport (10.96 percent vs. 11.08 percent), clothing and footwear (2.05 percent vs. 2.12 percent), furnishings and household equipment (2.12 percent vs. 2.46 percent), restaurants and hotels (2.68 percent vs. 2.96 percent) and miscellaneous goods and services (2.95 percent vs. 2.92 percent). On a month to month basis, consumer prices dropped 0.69 percent, the largest decline since October last year, following a 0.07 decline in May. Food and non-alcoholic beverages slumped 1.60 percent, while other main components increased (KNBS, 2019).

Inflation is directly related to tax performance as economist Milton Friedman said that, under certain circumstances, inflation can become an effective form of tax. If the government increases the rate of excise duty (tax on petrol/alcoholic drinks) as we have seen in the past years in Kenya, the prices of goods tend to go higher. This has often caused a temporary rise in the rate of inflation as was seen in the financial budget of 2016/2017 where the government increased excise tax of bottled water, beer and other beverages which made the inflation rise to 10 percent (Kenya, 2016). Hence inflation has always caused taxes to increase since people tend to pay more for goods and services more than they should.

## **2. Objective of the study**

To determine the relationship between inflation and tax revenue performance in Kenya.

## **Research Hypothesis**

H<sub>0</sub><sub>1</sub>: There is no statistically significant relationship between inflation and tax revenue performance in Kenya.

## **3. Scope of the Study**

The study has covered a period of ten years, starting from 2008 to 2018, with the variables measured at a national level. The period covered was extensive and therefore more likely to give accurate results.

## **4. Review of Literature**

Immervoll, H. (2000), Samimi, A.J. and Jamshidbaygi, S. (2011), Samimi, et al. (2012), Tafti, F.C. (2012) used CPI values as a measure of inflation. There are certainly some indices used to measure inflation; CPI, WPI, SPI, and the GDP deflator. The more commonly adopted measure is Consumer Price Index (CPI) which covers major portion of the items with their retail prices while estimating the cost of living in the urban areas.

Victor, T. (1996) and Gerald, A. & Carroll, R. (1999) stated three effects that inflation may have on real tax liability and requires understanding for adjustments; erosion of amounts expressed in national currency, erosion of the value of tax obligations and other effects on the measurement of the tax base. The techniques for compensating for each of these effects are different. All, some, or none of these may apply to a particular tax. An ad valorem excise tax is said to be an example which implies no consideration for or not affected from above three effects because of immediate collection. Therefore, it requires no adjustment for inflation. On contrary, income tax is noticeably complicated for the effects of inflation in terms of the presence of all three effects.

Personal income tax is highly elastic, subject to its progressiveness. The corporation tax response is based on the growth of corporate sector in relation to other sectors of the economy for which collection lag extends to 18 months in many developing countries. The rapidity of indirect tax adjustment to inflation will be influenced significantly by the nature of taxes (ad valorem or specific) and the accounting system in manufacturing and wholesale developments.

Inflation can alter the characteristics of tax and contribution systems in numerous ways; Immervoll, H. in 2000, showed in his research that if the tax values are computed in a nominal fractional change, inflation will lead to increasing effective tax rates. Capital gains tax is an important example of this. A tax base is not affected by inflation if the tax is a fraction of a transaction's value at the time of the transaction (ad valorem taxes, vat). For changing general price levels, the tax changes in line with the nominal value of the underlying transaction. Thus, the real value of the tax liability remains unchanged.

Tanzi (1992) found out that inflation has a negative influence on tax revenue, the so called Olivera-Tanzi effect. Reduction in tax revenue value by inflation tends to explain this inverse relationship, since it exists for some tax categories time-lag from imposition period to the effective collection of these taxes. Therefore, by maintaining lower levels of inflation and increasing value of tax revenue theoretically, inflation targeting may reduce a state's tax collection.

Erkin et al (1988) found evidence that there is a negative link between inflation and economic Growth in terms of tax revenue performance. They argued that inflation results to more public expenditures for lesser goods. They also found out that when inflation is high, the level of investment is low as many people spend money to purchase only basic commodities especially food. However, they found out that inflation usually remains stable for a long period of time unless affected by other macroeconomic situations affecting a particular country.

## **5. Research methodology**

### **Model Specification**

To establish if there is a relationship between macro-economic factors (FDI, GDP per capita income inflation and unemployment) and tax revenue performance in Kenya. The researcher conducted a multiple regression analysis using the following model;

$$T = \alpha + \beta_1.X_1 + \beta_2.X_2 + \beta_3.X_3 + \beta_4.X_4 + \varepsilon$$

Where; T = tax revenue performance was measured using tax revenue figures from the year 2009-2018 available on KRA website.

$\alpha$  = Constants.

$\beta_1 \dots \beta_4$  = the slope which represents the degree with which tax revenue performance changes as the independent variable change by one unit variable.

$X_1$  = Foreign Direct Investment (independent variable). Annual figures for the year 2009-2018 retrieved from KNBS website.

$X_2$  = GDP per capita Income (independent variable). Annual figures from the year 2009-2018 retrieved from World Bank website.

$X_3$ =Inflation (independent variable) was measured using Consumer Price Index (CPI). The annual figures for the year 2009-2018 are available on KNBS website.

$X_4$  = Unemployment

$\varepsilon$  = error term

### **Estimation procedure**

The study builds on existing research studies and methodologies using correlation research design. Several pre diagnostic test were performed which included; summary descriptive, correlation test using pairwise correlation, unit root test using Augmented Dickey Fuller, determination of optimum lags and finally co-integration test using Johansen Co-integration test. Vector Error Correction Model method was used in the model to check for long run and short run causality of the regressors and regressand. Post diagnostic tests of the model under the research study were also performed which included; test for multicollinearity, skewness kurtosis test for data normality, test for model stability and serial correlation among the variables and finally test for heteroscedasticity in the error term. The main advantage of using this design is to enable the researcher to identify the factors and measure their performance. Linear relationships on the explanatory variables were tested using the pairwise correlation matrix. unit root tests was carried out to appraise the effect of shock and to avoid spurious regression related to non-stationary variables by using Augmented Dickey Fuller test (ADF) statistics. The null hypothesis



is  $H_0: \delta = 0$  the alternative hypothesis is  $H_1: < 0$ . If the computed ADF statistics is greater than the ADF critical value at a given significance level, do not reject the null hypothesis because unit root exists. One way to guard against spurious regression is to find out if the time series are co-integrated. Variables are said to be co-integrated if they have a long-term or equilibrium relationship between them. This study used Ordinary Least Squares for regression analysis in STATA version 13. Skewness Kurtosis was used to test for normality and it was established that the probability chi2 value of skewness was above 0.05, This study used Breusch-Godfrey LM test to check for the presence of autocorrelation. To test for the presence of multicollinearity, this study used Variance Inflation Factor (VIF). For VIF values greater than 10, multicollinearity is deemed to be present (Nachtsheim, 2004). This study used the Breusch-Pagan test to check for the presence of heteroscedasticity (Gujarati, 2009).

**6. Results and Findings**

The results presentation starts with the presentation of results of descriptive statistics.

**Table 4.1 Descriptive Statistics**

Variables	Observations	mean	Std. Dev.	Min	Max	skewdness	kurtosis
Tax Revenue	44	9.63e+08	3.59e+08	4.71e+08	1.49e+09	.1107783	1.51884
FDI	44	1111.058	386.6959	131.642	1704.125	-.428901	2.300713
Gdp per Capita	44	1044.443	91.02041	896.6402	1222.825	.2007324	2.024409
Inflation	44	8.247273	3.610454	2.3525	16.94719	.7899919	2.751334
Unemployment	44	11.83199	1.23415	7.99375	15.92646	.2596774	7.265386

Source: Author’s Computation based on STATA 2020

From the above table, it is clear that there is high spread of data among variables. From its nature, it was so anticipated since time series data especially those, which include aggregates follows a random or stochastic process. The tax revenue performance had an average value of 9.63e+08, least value of 4.71e+08, maximum value of 1.49e+09, standard deviation of 3.59e+08, skewness value of 0.1107783 and Kurtosis value of 1.51884. Foreign direct investment had an average value of 1111.058, least value of, 131.642, the maximum value of 1704.125, the standard deviation of 386.6959, skewness -0.428901 value of and Kurtosis value of 2.300713. GDP per capita Income had an average value of 1044.443, least value of 896.6402, maximum value of 1222.825, standard deviation of 91.02041, and skewness value of 0.2007324 and Kurtosis value of 2.024409. Inflation had an average value of 8.247273, least value of 2.3525,

maximum value of 16.94719, the standard deviation of 3.610454, skewness value of 0.7899919 and Kurtosis value of 2.751334. Unemployment had an average value of 11.83199 least value of 7.99375, maximum value of 15.92646 and standard deviation of 1.23415, skewness value of 0.2596774 and Kurtosis value of 7.265386.

From table 4.2, data for inflation had a moderate mean while its data was not widely spread 3.610454 like other variables. This is mainly because of the fluctuations in inflation caused by unfavorable conditions in economy such as high production cost, high cost of imported goods did not significantly come into play in the period under study. GDP per capita Income also had a large mean value because of the economy growth. The range of data, that is the difference between the maximum value and minimum value was a huge gap which demonstrates different economic conditions that the Kenyan economy has been going through within the time period used in the study.

#### **4.2 Vector Error Correction Model**



Source: Author's Computation based on STATA 2020

Dltxr	Coefficients	Std. Err.	Z	P> z	[95% Conf. Interval]
Dlfdi	.311568	.1240745	2.32	0.001	-.1015635 -0.307501
Dinf	-.183015	.12269	-1.49	0.000	-.0128728 -.0077302

D_dltxr					
_ce1 L1	-.218122	.0550395	-0.40	0.0192	-.1296876 .0860632
D_dlfdi					
_ce1 L1	-6.744658	.3294621	-20.47	0.000	-7.390392 -6.098924
D_dinf					
_ce1 L1	.6104296	3.841346	0.16	0.874	-6.91847 8.139329
D_dlgdp					
_ce1 L1	-.1580929	.0167074	-0.95	0.344	-.0485559 .016936
D_ddune					
_ce1 L1	-.3528668	.354401	-1.00	0.319	-1.04748 .3417465

With this model (Vector Error Correction) the study can estimate both the short run and the long run causality. Long run causality is confirmed if the error correction term (ECT) is significant and the sign is negative, from the model the ECT is -.0218122 and it is statistically significant at 5% confidence level of the dependent variable. Therefore the study concluded that there is long run causality which runs from the independent variables.

The results further reveals that lag one of the log of foreign direct investment, is individually significant in influencing tax revenue at 5% percent level of significance in the short run. On the other hand, all the other three lags of inflation, log gross domestic product per capita and unemployment are not individually significant in influencing log tax revenue at 5 percent level of significance in the short run since their p values are not significant.

**Table 4.3 Regression analysis**

DlGdp	.8128243	.3612513	2.25	0.030	-1.544789	-.0808595
ddune	-.343756	.13589	-2.53	0.016	.0068416	.0619096
Cons	.0319441	.0099041	3.225	0.000	.0248441	.0390441
Number of obs = 42 F( 4, 37) = 25.93	Prob > F = 0.0000 R-squared = 0.7371		Adj R- squared= 0.7087		Root MSE = .01313	

Source: Author’s Computation based on STATA 2020

From the table above, the results reveal that the model was good in terms of goodness of fit and overall significance with a (R<sup>2</sup>) of 0.7371 and a joint probability value of 0.0000 showing all variables were jointly significant in explaining the regressand at 5% level of significance. These means that 73.71% of the variation in tax revenue is explained by the explanatory variables in the model while the other proportion 26.29% is explained by other factors not considered by this study.

The key objective of this paper is to establish the level of association between inflation and tax revenue performance. The following is the regression equation obtained;

$$Dltxr = .0319441 + .311568DIFDI_t - .183015DINF_t + .8128243DIGDP \text{ per capita}_t - .343756DUNE_t + e_t \dots \dots \dots \text{(Equation 2)}$$

Where Dltxr = natural log of the first difference of tax revenue

DIFDI = natural log of the first difference of foreign direct investment.

DINF = first difference of inflation rates.

DIGDP = natural log of the first difference of gross domestic product per capita.

DUNE = first difference of unemployment.

e = the error term.

t = time series data

**Interpretation of results**

The coefficient of inflation in the model above was found to have a negative impact on tax revenue performance at 5% level of significance. The coefficient of inflation in the model shows

that a unit increase in inflation would decrease tax revenue by 18.3%. This was explained by Victor, T. (1996) and Gerald, A. & Carroll, R. (1999) stated three effects that inflation may have on tax revenue. Tax revenue of a developing country is highly elastic, to inflationary trends at all segments of tax collections when they are observed for the period of collection. Heller, (1980) tested Aghevli and Khan (1978) hypothesis for a sample of 24 countries and concluded that the net impact of inflation on the budget deficit is not generally predictable as higher the inflation rate is, the higher is the response of expenditure and lagged tax revenue which can widen the gap between revenue and expenditure of the fiscal period.

It is evident from the previous and our own studies that inflationary trends are inversely related to tax revenue performance. As inflation in Kenya has been rising over the years the taxes collected have also been negatively affected at different segments. It is imperative that the government should check through the Central Bank to ensure our inflation should be at recommended levels.

## **5. SUMMARY and CONCLUSION**

Tax revenue is important for any country since it enables the country's government to cater for the welfare of her people. In addition, a country that mobilizes adequate tax revenue reduces her budget deficit which translates into reduced external borrowing. Manageable inflationary trends are good for economic growth since the disposable income of citizens of a country remain high hence triggering a ripple effect on economic activities enabling the government to have more sources of revenue. This in turn will assist the country to expand in development of both infrastructural and human capital aspects. The study investigated the impact of inflation on tax revenue performance in Kenya. The study employed Ordinary Least Squares method in analyzing time series data captured over the period 2008-2018. The empirical results shows that a unit increase in inflation would result to a decrease in tax revenue performance.

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