



RESEARCH ARTICLE

The Impact of Inflation on the Taxation of Capital Gain: ARDL Approach

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ABSTRACT

This study investigated the long-run relationship and dynamic interactions between inflation and capital gain tax in Nigeria for the period 2000-2020. Secondary data were collected from the Central Bank of Nigeria Statistical Bulletin and World Bank Development Indicators. The Autoregressive Distributed Lag (ARDL) bound test as proposed by Pesaran and Pesaran (1997), and Pesaran et. al. (2001) was employed to empirically analyze the impact of inflation on the taxation of capital gain. From the results, it is evident that there is the existence of a long-run relationship between inflation and capital gain tax. The short-run dynamic model also uncovers that the speed of convergence to equilibrium is moderate suggesting that there is a short-run relationship between inflation and capital gain tax. The significant positive relationship between inflation and capital gain tax reveals that when the inflation rate is high, capital gain taxes therefore will be excessive

Keywords: *Inflation, Taxation, Capital gain, ARDL*

1. Introduction

Taxation is a compulsory levy imposed by the government on the incomes, goods, services, and properties of individuals, companies, partnerships, trustees, and organizations in a geographical territory to defray the expenses of governance (Ocheni, 2015). It is a means of revenue generation for the government of any country. To meet set economic objectives, the government of Nigeria is responsible for reviewing the tax position considering the distortions in the allocation of resources as a result of rising inflation rates. The different types of tax include personal income tax, company's income tax, petroleum profit tax, value-added tax, and capital gains tax. Taxes on capital gain is the tax levied on the returns to capital; it is usually incurred by individuals and corporations. The most common capital gains are realized from the sale of stocks, bonds, precious metals, and property (Von Glahn, 1996). The tax is charged only when the gains are realized and is also a function of the time duration that the was held and the circumstances upon which the gain is realized. In most counties, there are different

rates of taxation for corporations and individuals.

Inflation is a great and complex economic and social problem in Nigeria. Inflation is a continuous rise in the general price level of goods and services in an economy over a period of time. Inflation has a disquieting effect on the economy, political system, and society as a whole. Inflation affects tax liabilities in three ways. First, it may alter real factor incomes. Second, it affects the measurement of taxable income. Third, it changes the real value of tax provisions legally fixed in nominal terms (Aaron, 1976). Inflation contorts all facets of the taxation of personal income but it is explicitly severe on the taxation of capital gains. When capital assets are disposed of, current tax law requires that a capital gains tax be paid on the profit realized from the transaction. The major problem is that the nominal gain only offsets a continuous general rise in the prices of consumer goods and services in the economy. This way, there is a substantial increase in the effective tax rate on real price-adjusted capital gains. This occurs because only the nominal gains are taxed. Many individuals and corporations pay considerable taxes on profits gotten from the disposal or exchange of certain kinds of assets, even though when adjustment is made for the change in the price level, they receive less from their sale than they had paid to acquire the asset (Cross, 1980).

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Regarding capital gains, national and state enactment frequently encompasses a huge cluster of fiscal obligations that must be regarded. Taxes are charged by the state over the exchanges, profits, and capital gain on the stock market. Be that as it may, these monetary commitments may shift from vary from jurisdiction to jurisdiction. Despite that, tax collection on capital gains is taxed on the benefit gotten from a transfer or trade of certain sorts of assets. In Nigeria, tax collection on capital pick up is 10% of the benefits from the deal of the qualifying assets. It is recognized in law under the Capital gain Act. For the most part, Tax may be a financial issue and its installment may be a gracious obligation. It is the imposition of a budgetary burden for the government on individual firms and companies. In general, the word tax implies any contribution imposed by the government upon individuals and companies for the use of the government to supply facilities or administrations as rendered by the state. It is not a deliberate payment or donation but an implemented commitment made on the order of administrative authorities (Stiglitz, 1983). The taxation of capital income is more severely distorted in the presence of inflation than the taxation of wages and salaries. (Feldstein & Slemrod, 1978)

A few research works have been depicted as contentions from a narrow position based on the reality that it supplicates for government policy on tax to encourage lessening in taxation of capital gains because of the inflation in Nigeria well as other countries. High or unusual inflation rates are respected as harmful to an overall economy. They include inefficiencies within the market and make it troublesome for companies to budget long-term. Inflation can act as a drag on productivity as companies are constrained to move resources away from products and services to focus on gains and misfortunes from currency inflation. Vulnerability around the long-run purchasing power of money debilitates investment and saving. Inflation can also force covered-up tax increments, for instance, an increment within the taxation of capital gain. It is subsequently the reason of this study to look at the different impacts of inflation on the taxation of capital gains to proffer recommendations for appropriate policy initiatives.

2. Review of Literature

The effect of inflation on the taxation of capital gain has not been debated extensively over the years. However, a lot more focus has been put into the study of the impact of inflation on income tax and value-added tax since it is seen to have a larger impact on the economy. Gordon (1971) has incorporated personal direct taxes in studies of wage and price inflation in the United States. Temporary increases in the rate of price inflation are attributable to tax increases to the extent that an increase in the effective rate of tax of 5 percentage points would produce a 0.80% rise in the rate of inflation (Auld, 1977).

Concurring to Aaron (1976), Once income has been determined, real tax liabilities are calculated by applying tax rates, exclusions, credits, stipends, and deductions, to arrive at taxable income and liabilities. A considerable lot of these arrangements are communicated in fixed nominal amounts. The genuine worth of those and the magnitude is discounted when costs rise. Through this channel, unambiguous increments in income tax liabilities on both people and corporations due to inflation. In the same vein, the study by (Hasbrouck, 1983) centered on the effect of inflation upon corporate taxation within the united states. This review utilized simulation analysis to portray this process and recognize the positive rate of inflation at which the net tax burden is the same as would get without any inflation. This rate shows up to be around 20 percent (yearly) under pre-ERTA tax rules but is less than 13 percent under the liberalized ERTA/TEFRA rules.

Empirical evidence on the possible inflationary effects on taxes is limited for Nigeria, but some research has been carried out. Olatunji (2013) examined the effect of value-added tax on revenue generation in Nigeria and the view of the resident on value-added tax and inflation. The study applied the descriptive research approach for the study. The study uncovered that value-added tax has not influenced the increment or decrement in the inflation rate. The findings additionally showed that the value-added tax rate ought to be reviewed upward to meet the current needs of the nation.

Hypothesis Development

Literature on the impact of inflation on the tax collection of capital gain for Nigeria is insufficient. When the inflation rate is high, temporarily inflated profits will serve as a tax base, and profit taxes therefore will be excessive (Nowotny, 1980). In inflationary periods, the value of an asset will be lower due to the general increment in the price level. Nominal capital gains hence will exceed real changes in asset value, which even may be actual losses (Feldstein & Slemrod, 1978). Nigeria, where the taxation of capital gains exists, confronts the issue of "inflationary tax distortions" in capital gain tax. In comparative ways, inflation may moreover lead to mismeasurement of interest payments. Thus, we propose to test the following hypothesis:

1. There is no long-run relationship between inflation and taxation between 2000 and 2020
2. There is no significant relationship between inflation and taxation of capital gains between 2000 and 2020

3. Research Methodology and Data Analysis

Data used for this study were sourced from CBN Statistical Bulletin and World Bank. The type of data to be used is secondary and includes data on Capital gain tax as the dependent variable while interest rate (a proxy for the cost of capital and consumer price index (a proxy for inflation) are independent variables.

To generate empirical results for the paper, an econometric model is formulated with the assumption that the relationship is in a linear form. It captures capital gain tax as a function of inflation and cost of capital as thus:

$$CGT = F(CPI, RIR)$$

Where

CGT = Capital Gain Tax

CPI = Consumer Price Index (a proxy for inflation) measures the price level

RIR = Interest Rate

To empirically analyze the above functional form, the ARDL model specification is used to show the long-run relationships and dynamic interactions between inflation and capital gain tax using Autoregressive Distributed Lag (ARDL) approach introduced by Pesaran & Smith (1998) and Pesaran et al. (2001). ARDL model is chosen as it has certain advantages, one of them is that it can be applied irrespective of whether the regressors can either I(0), purely I(1), or mutually cointegrated (Pesaran et al., 2001). It is a more statistically significant approach for examining correlation when faced with a small data size as other techniques require large data size for validity to hold. In the ARDL model, the long-run and short-run parameters of the models can be simultaneously estimated (Aregbeyen & Ibrahim, 2012)

The Autoregressive Distributed Lag (ARDL) model specifications of the functional relationship between inflation (CPI) and capital gain tax (CGT) is represented as follows:

$$\Delta \ln CGT_t = \beta_{01} + \sum_{i=0}^n \beta_{11} \Delta \ln CGT_{t-i} + \sum_{i=0}^n \beta_{12} \Delta CPI_{t-i} + \sum_{i=0}^n \beta_{13} \Delta \ln RIR_{t-i} + \delta_{11} \ln CGT_{t-1} + \delta_{12} CPI_{t-1} + \delta_{13} \ln RIR_{t-1} + \varepsilon_{t-1}$$

Where:

CGT = Log of Capital Gain Tax

CPI = consumer price index (proxy for inflation) measures price level

RIR = Interest Rate N = lag length for the Unrestricted Error-Correction Model (UECM)

Δ = first differencing operator

ε = stochastic error term

β_{10} = constant term

$\beta_{11} \dots \beta_{13}$ = represent the short-run coefficients

$\delta_{11} \dots \delta_{13}$ = are the long-run coefficients

The first step in the ARDL approach is to estimate Equation (1) using the ordinary least square (OLS). The next step is to investigate the existence of long-run relationships among model variables using the bounds test. The null hypothesis is that there is no cointegration ($H_0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0$) against the alternative hypothesis of there is cointegration ($H_1: \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq 0$). Appropriately, the computed F-statistic inferred from the Wald test is at that point compared to the non-standard critical bounds values detailed by Pesaran et al. (2001). In case the computed F-statistic surpasses the basic upper bounds value, at that point the null hypothesis of no cointegration is rejected. On the off chance that the computed F-statistic falls underneath the critical lower bounds value, at that point the alternative hypothesis of their cointegration is accepted. In any case, in a circumstance where the computed F-statistic falls between the basic lower and upper bounds values, the order of integration of the variables under consideration is required or else, a significant conclusion cannot be reached about cointegration status. Once the cointegration relationship is set up, the next step is to estimate the long-run coefficients utilizing the ARDL approach and the short-run dynamic parameters utilizing the error correction model. The error correction model helps to capture the speed of adjustment among the variables. The co-integrating long-run relationship was estimated using the specification below:

$$\Delta \ln CGT_t = \delta_{11} \ln CGT_{t-1} + \delta_{12} CPI_{t-1} + \delta_{13} \ln RIR_{t-1} + \varepsilon_{t-1} \dots\dots\dots 2$$

The short-run dynamic model is specified thus:

$$\Delta \ln CGT_t = \beta_{01} + \sum_{i=0}^n \beta_{11} \Delta \ln CGT_{t-i} + \sum_{i=0}^n \beta_{12} \Delta CPI_{t-i} + \sum_{i=0}^n \beta_{13} \Delta \ln RIR_{t-i} + \alpha ECT_{t-1} + \varepsilon_t \dots\dots\dots 3$$

Where:

ECT_{t-1} = the error correction term lagged for one period

α = the coefficient for measuring the speed of adjustment

Diagnostic tests shall be utilized to guarantee goodness of fit for the chosen ARDL model, which includes serial correlation, heteroscedasticity, functional form, and normality tests.

4. Result and Discussion

The data used for this study were sourced from CBN Statistical Bulletin and World Bank. In addition, the Capital gain tax is in logarithmic form. The data is analyzed below:

Table 4.1 - Descriptive Statistics of the Variables

	LNCGT	CPI	RIR
Mean	0.975911	11.76667	7.032158
Median	0.972841	12.10000	6.055977
Maximum	1.997401	18.90000	18.18000
Minimum	0.423213	5.400000	1.067736
Std. Dev.	0.314381	3.836969	4.440463
Skewness	1.241920	0.060445	0.720591
Kurtosis	6.891281	2.172804	3.074821
Observations	21	21	21

Source: Author's Estimation using Eviews 9.0

The table presents the results of the mean, median, standard deviation, skewness, kurtosis of the variables. The descriptive statistics of the variables has the number of observations as 21. From the table, it can be seen that the variables did not deviate much from their means as shown by the low value of their standard deviations.

The long-run relationship was examined using the ARDL bounds testing procedure. It analyzes if there exists any cointegration among the variables using the ARDL bounds test approach as developed by Pesaran, Shin, and Smith (2001). The result of the bound test for equation (1) is presented in Table 4.2.

Table 4.2 Bounds Test

	n=3 (lag length)
Computed F-Statistic:	6.554503
5% critical bound value	
Lower:	3.79
Upper:	4.85
10% critical bound value	
Lower	3.17
Upper	4.14

Source: Author's estimation using Eviews 9.0

The results suggest that the computed F-statistic of 6.554503 is greater than the upper bound critical value of 4.85 at 5% significance level and 4.14 for the upper bounds critical value at 5% significance level. The study rejects the null hypothesis of no co-integration. This implies that capital gain tax (CGT) and inflation (CPI) are co-integrated. Therefore, equation (2) was estimated to show the long-run relationship between inflation and capital gain tax.

Table 4.3 Results of Long-Run Relationship

Variable	Coefficients	Standard Error	T-Statistics	P-value
C	0.676953	0.159896	4.233719	0.0008*
CPI	0.022238	0.010682	2.081774	0.0462**
RIR	0.007607	0.008361	0.909807	0.0383**

Notes: (*) and (**) indicates 1% and 5% significance level respectively. R-squared: 0.94, Adjusted R-squared: 0.83, Durbin Watson Statistics: 1.98 and Prob (F-Statistic): 0.001.

The result of the long-run relationship between inflation and capital gain tax in table 4.3 reveals that the estimated coefficient of inflation has a positive and significant impact on capital gain tax. A 1% increase in inflation leads to an approximately 2% increase in capital gain tax. The coefficient of the real interest rate is positive and significantly different from zero. This indicates a positive relationship between capital gain tax and real interest rate.

Table 4.4 Results of Error Correction Models

Variable	Coefficient	Std. Error	t-Statistic	P-value
D(LNCGT(-1))	0.445542	0.238966	1.864455	0.0834
D(CPI)	0.046163	0.022633	2.039685	0.0607
D(RIR)	0.015790	0.017201	0.918008	0.3742
ECT	-0.027546	0.405068	-5.124685	0.0002

Note: (*) and (**) indicates 5% and 10% significance level respectively

The above result indicates that the error correction coefficient estimated at -0.027546 (0.0002) is statistically significant, has a negative sign, and suggests a moderate speed of convergence to equilibrium.

The coefficient of the value of inflation is not statistically significant at 5% and 10% level of significance. The result also shows that at both 5% and 10% levels of significance, a change in one period lagged value of the log of capital gain tax (D (LNCGT (-1))) has a positive effect on changes in capital gain tax. This means that the capital gain tax value of a previous year, has a positive influence on the changes noticed in capital gain tax in the current year, but it has a statistically insignificant effect.

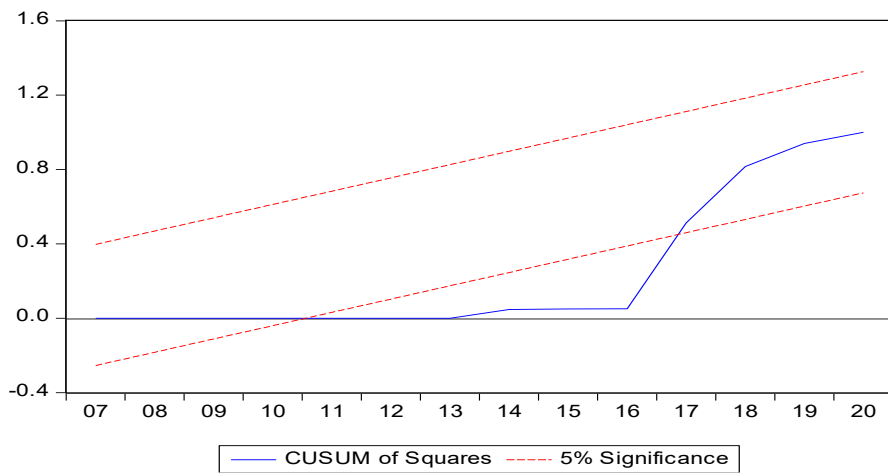
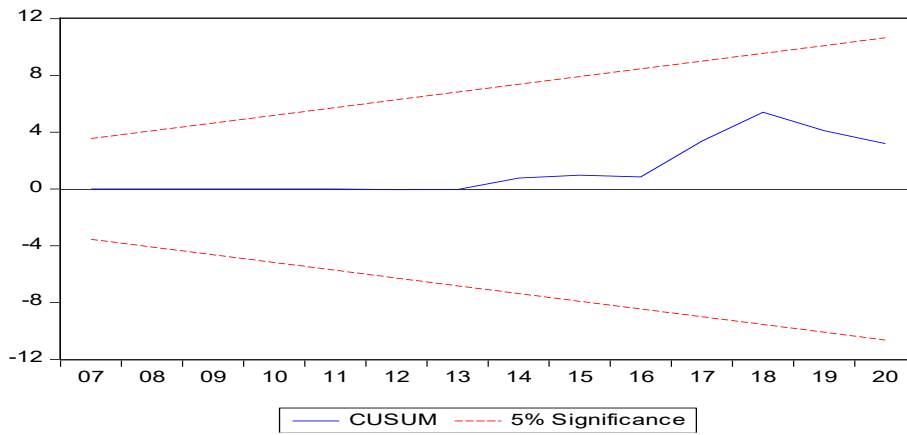
The diagnostic tests examined serial correlation, heteroscedasticity, and normality in the model. The table below shows the results of the diagnostic tests.

Table 4.5 Results of Diagnostic Tests

JARQUE-BERA STATISTIC	5.581533 (0.161374)
Breusch-Godfrey autocorrelation	1.110888 (0.7744)
Heteroskedasticity Test - Breusch-Pagan-Godfrey	5.247568 (0.2628)

The results of the diagnostic tests show no evidence of serial correlation and heteroscedasticity in the Autoregressive Distributed Lag (ARDL-Bounds) model specified. It also reveals that the residual is normally distributed as the p-value of the Jarque-Bera statistic is 0.161374 is greater than 0.05.

It is necessary to check for the stability of the model. This is presented in figures 1 and 2. As can be observed from Figures 1 and 2, the CUSUM and CUSUM Square parameter stability tests indicate that we conclude that all the long-run, as well as short-run coefficients in the error correction model, are quite unstable over the sampled period (2000-2020).



Figures 1 and 2: The CUSUM and CUSUM Square Parameter Stability Tests

6. Conclusion

This study aimed to test the relationship between inflation and capital gain tax in Nigeria. This study adopted the ARDL bounds testing co-integration approach to investigate the long-run and short-run dynamics between inflation and capital gain tax. The results show that there is a long-run relationship between inflation and capital gain tax. The results also indicate that inflation has a positive and significant effect on capital gain tax (CGT). This implies that that inflation is a vital macroeconomic variable that influences the taxation of capital gain and determines the real value of capital gain tax in Nigeria over time. Therefore, this study affirms the proposition of Nowotny (1980) that when the inflation rate is high, temporarily inflated profits will serve as a tax base, and profit taxes therefore will be excessive.

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