International Research Journal of Multidisciplinary Scope (IRJMS), 2024; 5(4): 57-68 IRJMS

Original Article | ISSN (O): 2582-631X DOI: 10.47857/irjms.2024.v05i04.01132

Taxation and Economic Growth in the United Kingdom (UK)

Abdulgaffar Muhammad[1]*, Okwuise UY[2], Ogbohoro Vincent[2], Bokumo Esther Chidi[2], Edeme Nelson C[2], Anthony Kolade Adesugba[1]

[1]Department of Business Administration, Ahmadu Bello University, Zaria, Nigeria, [2]Department of Business Administration, Delta State University, Nigeria. *Corresponding Author's Email: muhammadabdulgaffar306@gmail.com

Abstract

Taxation is the method used by the government to levy money from people, businesses, companies, and other sources of income. The aim of this study is to investigate any possible relationship between taxation and economic progress in the United Kingdom. In this study, gross domestic product is the dependent variable since it serves as a gauge of economic growth while the value of tax receipts and the tax burden are the main independent variables, while unemployment and inflation act as control factors. The secondary data from the World Bank development indicators for the years 2000–2022 were subjected to analysis. Quantitative research methods, such as correlation analysis, OLS regression modelling, and descriptive statistics, were used to evaluate the secondary data that were obtained for the study. The analysis's findings, which made use of a regression model, show a strong linear relationship between taxation and economic growth in the UK. More proof that tax revenues have a major and favorable impact on the UK's economic growth comes from the regression model. The Pearson correlation analysis's findings show a substantial and favorable link between tax collections and the growth of the British economy. Thus, in order to ensure long-term economic stability, the UK government needs to adopt a financially responsible plan that increases tax collection significantly.

Keywords: Economic Growth, Pearson Correlation, Regression Model, Taxation.

Introduction

As a tool for governments to raise money and promote economic growth, taxes are a crucial component of fiscal policy (1). It is standard practice to use tax allocation to pay for various government services. These duties include the provision of public goods and services, the upholding of law and order, the defence against external threats, and the control of trade and commercial activity in order to preserve social and economic stability. According to the United Nations (2), an economy can lessen its reliance on erratic foreign funding by efficiently collecting taxes.

Value-added tax (VAT), personal income tax, and corporate income tax revenue have all been wisely applied to control economic growth and prosperity in the United Kingdom (3). The United Kingdom will have freshly acquired and distinct fiscal liberties once it leaves the European Union (4). To give one example, the UK is currently considering lowering its regular 20% value-added tax (VAT) rate to a level below the 15% threshold outlined in Article 97 of the Principal VAT Directive (5). Of all the tax revenue streams in the United Kingdom, VAT is the third largest, earning £134 billion in revenue in 2019 (6). Therefore, even though it is theoretically feasible, entirely abolishing VAT is highly unlikely.

Taxation is one way that governments can exercise control and oversight over their development plans. This encourages countries to improve their internal economic performance in order to draw in large amounts of foreign direct investment. Moreover, it fosters a stronger sense of accountability and transparency in the relationship between governmental bodies and their citizens (2). Throughout the global economic and financial crisis of 2008–2009, countries gained a great deal of insight on the necessity of reducing their reliance on incoming capital inflows and export revenue. But the authors also acknowledged the importance of prioritizing efforts to mobilize domestic resources, like increasing tax revenues (7).

(Received 18th May 2024; Accepted 23rd October 2024; Published 30th October 2024)

The main goals of tax systems are to minimize distortions, promote economic growth, and maximize revenue generation. It is imperative to recognize that tax systems have significant heterogeneity among different countries (8). Many different countries have rather different ideas and methods when it comes to taxation. It is important to highlight that different countries manage their finances differently, which has a different effect on economic growth (8). Government spending and tax revenue collection have a significant impact on the trajectory of economic development (9). Tax policy has little impact on long-term rates of economic growth, regardless of whatever distortions it may create and regardless of the slow decline in overall economic production (10). Hence, there is little effect of tax policy on long-term economic development (10). The distinct effects on economic growth are produced by the different ways in which total government spending is implemented (10).

One might make a similar argument about the approaches used in the tax collection process. Singapore's remarkably low individual and corporate tax rates support the nation's thriving economy. The inherent inequalities exist in the tax systems of wealthy and poor countries (11). Based on research findings, developed nations mostly rely on indirect taxes as their main source of tax revenue. On the other hand, wealthy countries like the United Kingdom heavily depend on direct taxes to increase their total tax collection. Nonetheless, a proposal has been made to possibly modify the tax structure in order to promote economic expansion. The ongoing crisis in Ukraine and Russia and the ensuing UN economic sanctions have resulted in a major reduction in trade volume between the United Kingdom and Russia (12). Thus, the aim of this study is to investigate whether the crisis between Russia and Ukraine caused a significant shift in the long-term relationship between taxation and economic expansion in the United Kingdom.

The tax-to-GDP ratio has risen dramatically during the last 50 years in a number of industrialized economies, including the UK, the G7 nations, and the EU's fourteen members (13). As was already indicated in the literature review, more research has been done on the connection between taxes and economic growth. To the best of my knowledge, no recent study has looked at how tax collections—rather than actual taxes—affect the UK's economic expansion. Furthermore, the United Nations against Russia (12) has not investigated the possibility of structural cracks arising from the ongoing Russia-Ukraine conflict, particularly concerning the notable decrease in trade between the United Kingdom and Russia following the imposition of economic sanctions. As such, the purpose of this research project is to add to the body of knowledge by investigating the precise relationship - complication factors being unemployment and inflation - between the size of tax receipts and the growth of the UK economy. This research will evaluate the impact of taxation changes on economic growth during the Russia-Ukraine war era, using a graphical approach to uncover structural fractures.

Investigating the interwar years in the United Kingdom, spanning from 1918 to 1939, Cloyne *et al.,* (14) aimed to gain a deeper understanding of the influence that taxes had on the country's economic development within the given period. During this time, excise taxes, tobacco goods, intoxicating beverages, and vehicle taxes made up the majority of the British tax system. In addition, there was little taxation on individual income and business earnings. In the twenty-first century, tax reforms have frequently placed greater emphasis on goals like promoting productivity growth, budgetary stability, and reducing inequality rather than primarily addressing economic cycles. The absence of Keynesian macroeconomic theory in this period could serve as the theoretical basis for this strategy. In a year, the GDP increased by 0.5 -- 1% first, then by 2% after the authors calculated that a 1% reduction in taxes as a percentage of GDP would have the same effect. Despite the notable distinctions between the British economy of the previous century and that of modern nations, Cloyne *et al.,* (14) offers strong empirical data about the effect of taxes on economic growth in contexts marked by large levels of debt and low interest rates.

In theoretical paradigm, Jaimovich and Rebelo (15) posits that there is a non-linear association between taxes and economic development and indicates that a little rise in tax rates has no appreciable effect on economic growth, especially when tax rates are already moderate or low. However, the significance of the outcome becomes more and more apparent. Similarly, Mertens and

Olea (16) carried out a thorough investigation on the effects of marginal tax rates on personal income by evaluating time series data from 1946 to 2012. Based on empirical evidence, real GDP growth has already benefited from lower marginal rates, and unemployment rates have also dropped concurrently and after a 1% tax rate cut, real gross domestic product (GDP) grew by 0.78% by the third year. Furthermore, Mertens and Olea (16) examine the effects of marginal tax rate modifications on post-reform income adjustments, independent of changes in average tax rates and contend that changes in incentives are more likely to be the cause of the observed GDP growth than an unexpected spike in aggregate demand brought on by increased expenditure. From a supply standpoint, lower-income groups' salaries may steadily rise when the highest marginal tax rates are lowered. Therefore, the tax rate cut that was meant for the wealthiest 1% of people also benefits other income levels. They contend that tax reductions aimed primarily at the wealthiest 1% of taxpayers unintentionally worsen income disparity.

In studying the connection between labour force participation, economic growth, and federal tax laws, Zidar (17) covers a wide range of geographical areas and social strata and runs from 1950 to 2011. After two years of policy changes, it is clearly clear that tax cuts do promote economic growth. It is important to note that tax cuts that primarily assist the wealthiest taxpayers have a more positive and moderate impact on economic growth than tax cuts that specifically target lower- and middle-class taxpayers. According to the data, a 1% decrease in state GDP taxes led to a 6.6% gain in state GDP and mostly impacted 90% of the lower income group. The thorough study provided by the author emphasizes the significance of staff availability. The study found that a one percent decrease in the state's GDP tax causes a two percent rise in the overall number of hours worked. Moreover, it raises the labour force participation rate by 3.5 percentage points for those in the lowest 90% income category. The study's conclusions show that there is no statistically significant relationship between the amount of hours worked, GDP growth rate, or labour force participation rates for the top 10% of income and a tax adjustment of the same size. The present discovery runs counter to the study of Mertens and Olea (16), which concentrated mostly on the wealthiest people.

In a study of over 250 cases of state business tax changes between 1970 and 2010, Ljungqvist and Smolyansky (18) looked at the effect of several tax adjustments on employment levels and productivity-related outcomes as examined by the researchers. This helps the writers separate the effects of changes to corporate taxes from other factors that could affect economic growth. It has been demonstrated that there is a clear association between a 1% decrease in the obligatory company tax rate and the ensuing 0.2% increase in employment and 0.3% rise in wages.

In a study where economic development and value added tax (VAT) are analyzed using a sample of 51 nations which span from 1970 to 2014, Gunter *et al.,* (19) demonstrated that taxes have a significant non-linear impact on the rate of economic growth. When one takes into account the small rate changes and low tax rates, the effects become insignificant. However, as the initial tax rate rises and then falls, the negative economic effects become more noticeable. Evidence from the empirical literature indicates that industrialized European countries with higher value-added tax (VAT) rates are more likely than those with lower rates to face major GDP consequences from VAT hikes. These nonlinearities indicate significant effects of the Laffer curve. Federal tax receipts will decrease with increases that exceed the designated level, especially for some tax categories. The authors predict that the tax multiplier for wealthy European countries is -3.6. According to data, within the first two years of implementation, tax cuts in these nations had a significant and favorable impact on economic activity.

In the examination of the effects of individual, business, and consumer income taxes on the United Kingdom between 1973 and 2009, Nguyen *et al.,* (20) found that decreases in income tax rates, which affect both individual and corporate income, have a significant effect on investment, private spending, and the GDP. Based on empirical study, there is a positive correlation between a decrease in the average income tax rate and a subsequent growth in GDP (20). Based on current statistical evidence, there is a favorable impact on economic development when shifting from an income-based tax system to a consumption-based tax system. It is important to remember, too, that the consumption

tax decrease has a small and statistically insignificant impact. Consumption taxes have very little effect on the labour and investment incentives, both of which are essential for fostering long-term economic growth. Because of this, people usually think that consumption taxes cause less distortion than other types of taxes.

Similarly, in the examination of the effect of taxes on the economic growth of Organization for Economic Co-operation and Development (OECD) nations in a thorough meta-analysis by Alinaghi and Reed (21), they used a total of 49 research publications were the source of 979 estimates that were used in the study. Policy changes are categorized into three groups: fiscal policies with unfavorable tax implications, fiscal policies with favorable tax results, and fiscal policies with ambiguous tax implications (21). According to Alinaghi and Reed (21), unfavorable tax outcomes can arise from fiscal strategies that use tax hikes to finance inefficient investments as well as from policies that raise distortionary taxes while lowering non-distortionary taxes. Fiscal strategies that are tax-positive include a range of methods intended to achieve budgetary objectives through the implementation of tax laws. Increasing fees that do not have discriminatory effects while lowering taxes that cause market inefficiencies, enacting higher tax rates to fund important projects, or changing taxes to cut spending are some potential approaches to deal with budget shortfalls. Tax-ambiguous fiscal policies are essentially defined by a lack of clarity surrounding their macroeconomic implications. Based on the defined categories, the authors conclude that the introduction of a tax-negative fiscal programme (which includes a 10% tax cut) causes the rate of GDP growth to slightly increase by 0.2%. Fiscal policies that lower taxes by a certain percentage cause the GDP to grow by 0.2 percent less. These policies are referred to as tax-positive policies.

Using a dynamic panel data model was carried out using data from twenty-one OECD nations between 1971 and 2004, Arnold *et al.,* (22) used a Pooled Mean Group estimator in their research. An increase in corporate taxes had a more noticeable negative impact on economic growth than an increase in personal taxes (22). Furthermore, corporate income taxes and economic advancement have a favorable but erratic relationship, particularly when accounting for the corporations' portion of the overall tax structure (23). In a statistical examination of panel data models utilizing a sample of 23 OECD countries spanning the years 1970–2000, Angelopoulos (24) yielded results that are in line with previous investigations of a relationship between tax and economic growth.

While considering changes to corporate tax, it is imperative to consider the interplay between government spending and other tax components because of fiscal restrictions. If the regression analysis takes the whole tax income into account, then it is expected that a decrease in corporate taxes will be balanced by an increase in VAT in other sectors (22). There is no evidence of a detectable impact of lower business taxes on government expenditure patterns in their analysis of spending patterns (22). Raising corporate taxes may potentially spur economic development in technologically proficient industrialized nations (25). This can be accomplished by providing funding for sensible government programmes and promoting private sector innovation. A reduction in tax wedges may result in a more pronounced negative link between corporation tax rates and economic development in developing nations that predominantly rely on technological imitation (25). Utilizing the differences in data between states within a single country, it is feasible to examine corporate taxation's effects on economic growth independent of institutional and geographic factors.

Examining the relationship between company taxation at the state level and economic growth from 1959 to 1997, Kate and Milionis (26) used information from a sample of 48 US states that were representative of the country for their analysis. The idea that corporate taxes have a major impact on state economies' growth is supported by a wealth of factual data. Also, Prillaman and Meier (27) look at the relationships between a range of political power, tax, and spending variables in all fifty states in the US. Panel data covering the 28-year period (1977-2005) is used which indicates no change in the states' economic development. One such model is the Solow model, which is based on the neoclassical paradigm and asserts that labour and capital accumulation are necessary for economic growth. The creation of a tax system helps to maintain the balance between capital and labour, while outside

technical advancements also help to raise GDP per capita (28).

In addition, there is little effect of taxes on economic growth, even when considering the degree of possible tax system misallocations (29, 30). Capital income taxes may be detrimental to economic growth and per capita income if they are implemented during a time of stable equilibrium. Moving from one stable equilibrium state to another can be a lengthy process that takes years or even decades. The idea of endogenous growth has created a causal relationship between the general trajectory of economic development and specific economic decisions, such as spending on Research and Development and education. Aghion and Howitt (31) have recognized the importance of financial regulation in influencing these kinds of choices. From 1980 to 1997, Lee and Gordon (32) conducted a comprehensive study that included a representative sample of seventy countries. The researchers' findings indicate a strong association between slower rates of economic progress and company taxation. Empirical data indicates that a 10% decrease in the officially mandated company tax rate results in an increase in yearly GDP growth per capita that ranges from 0.7% to 1.1%.

In the study to examine the relationship between taxes and economic development in twenty-one member countries of the OECD as compared to property and consumer taxes, it indicates a positive correlation between income taxes and slower rates of economic growth (32). Similarly, there exist an inverse association between GDP and income tax rates (33). This suggests that raising income tax rates could reduce the motivation for people and businesses to engage in financially beneficial activities like working, saving, and investing.

Looking into the negative impacts that direct and indirect taxes have on the economic growth of emerging nations Abd Hakim *et al.,* (34) found a direct association in developed economies. In contrast, Dackehag and Hansson (35) investigated the relationship between the rates of corporate and personal income taxation and the state of the economies of the richest countries in the OECD and found a negative relationship between the previously indicated tax rates and economic advancement. In the assessment of the economic performance of seventeen member states of the OECD between 1970 and 2004, Gemmell *et al.,* (36) show that direct taxes, which are levied on both individual and business incomes, have a stronger negative impact on economic growth. In the investigation of the effects of changes in the marginal tax rate on the gross domestic product per capita in the United States from 1912 to 2016, Barro and Redlick (37) shows a clear relationship between a 1% decrease in the marginal tax rate and a roughly 0.5% rise in the gross domestic product per person. Moreover, the study of Poulson and Kaplan (38) showed that increases in marginal tax rates have a detrimental effect on the rate of economic growth. There is broad consensus among academic researchers that taxes can have a favorable impact on economic development (39-41). Taxation has a major impact on how governments use their financial resources because it makes it possible to finance infrastructure and public goods. Consequently, this process plays a major role in boosting competitiveness, encouraging innovation, and optimizing efficiency. Effectively addressing economic inequality and fostering social cohesion through the use of tax policies can help to reduce community unhappiness and advance the development of a more secure and prosperous economy.

Babatunde *et al.,* (42) supported the idea through empirical data that there is a significant and positive association between tax collections and GDP. This finding emphasizes how important tax income is for promoting economic growth in African countries. The OECD member nations' economic development and their adoption of comprehensive and effective fiscal policies have been found to be empirically correlated (43). In a research, Mutaşcu *et al.,* (44) found a statistically significant association between an increase in direct taxes of 1% and a subsequent growth in the GDP of 1.61%. Based on available empirical data, there is a correlation between a 1% rise in direct taxes and a 0.83% decrease in per capita GDP. This suggests that arguing for fiscal harmonization may be a better course of action than encouraging budgetary competitiveness. Similarly, Mertens and Ravn (45) found an inverse relationship between the real GDP per capita and the mean individual income tax rate. Empirical data showed that an initial 1.4% increase in real gross domestic product (GDP) per capita was linked to a one percentage point decrease in the average personal

income tax rate. Moreover, this effect continued and increased to 1.8% after three quarters.

In an empirical research, Akcigit and Kerr (46) shows that both corporation and individual income taxes have a significant negative impact on innovation levels. The number of inventors and volume of patent applications were analyzed in order to quantify these phenomena. In another study, Popov and Zaharia (47) disprove the assertion that the rates of personal income tax and value-added tax had a significant influence on the overall economic growth of 26 member states of the European Union from 2013 to 2019. Scholars have observed, however, that the corporate income tax's introduction has hampered economic progress.

This study, like earlier ones, mainly examines the effects right away, although it's possible that over time, these findings will become more noticeable. This study challenges some people's beliefs by disproving the popular belief that tax cuts mostly benefit the wealthiest segments of society and have a significant positive impact on economic growth. This study focuses only on the immediate effects of tax modifications on GDP, without delving into the wider implications of tax policy for innovation, long-term economic growth, or human resource development. Nevertheless, the study offers strong evidence supporting the tenets of neoclassical economic theory, showing how tax cuts affect the supply side and hence economic expansion.

This study addresses a notable gap in the existing literature by focusing on the UK's post-2016 economic landscape, specifically in the wake of Brexit and the COVID-19 pandemic. Unlike previous studies, which primarily analyzed the pre-Brexit period, this study explores how significant structural shifts—including economic realignment post-Brexit and the recovery from the global pandemic—have influenced the relationship between tax receipts and economic growth. By providing a comprehensive analysis of the period from 2000 to 2022, the study captures both the immediate and long-term impacts of these unprecedented events on the UK economy

From the literature that has been supplied, we will formulate two theories.

H1: Value of tax receipts have a positive impact on the economic growth.

H2: There is a significant linear relationship between taxation and economic growth.

Methodology

Secondary data were acquired from authoritative open sources, including the OECD and the World Bank Development Indicators (13, 48). The data used in this study spans from 2000 to 2022, a period that includes several tax reforms and economic cycles, particularly during and after Brexit and the COVID-19 pandemic. This timeframe allows for a thorough examination of the relationship between tax receipts and economic growth. To guarantee the absence of any missing values, purposive sampling was employed to select the data. The variable measurement and definition of the dataset for the analysis are as presented in Table 1.

Table 1: Variable Measurement and Definition

Variables	Measurement	Definition
GDP	Billions of US $	It functions as an alternative to the growth of the domestic economy. The GDP is a metric that indicates the total value of money spent on products and services produced in a country during a specified time period.
Tax burden	Percentage (%)	This is the proportion of total revenue accumulated during a specified period of time that is applied in calculating the tax liability of an individual, organization, or nation for that time frame.
Value of Tax receipts	Billion GBP	This represents the entire annual gross revenue that the city is entitled to receive from real estate, income, and taxes.
Inflation	Percentage (%)	This phenomenon pertains to the escalation in overall prices of goods and services caused by the circulation of a substantial quantity of currency. Generally, increases in petrol and crude prices occur concurrently with heightened inflationary pressures.
Unemployment	Percentage (%)	This is a situation where competent and skilled individuals are unable to get well-paying jobs.

This study examines the relationship that exists between taxation and economic growth in the UK. This study utilizes the Value of Tax Receipts as a comprehensive measure of the UK's tax revenue, representing the total annual gross revenue from multiple sources such as real estate, income, and general taxes, without focusing on specific types like VAT or income tax. Furthermore, the UK GDP represents the domestic economic growth.

What is meant by "research design" is the comprehensive approach that is used in an inquiry to achieve its objectives. The purpose of the causal study design is to determine the extent to which one or more factors contribute to or affect another variable (49). In addition, this study highlights the examination of a specific case to better elucidate the correlations between the factors. Often called the explanatory research design, this method is used. Quantitative research methods, such as correlation analysis, OLS regression modelling, and descriptive statistics, were used to evaluate the secondary data that were obtained for the study. The OLS regression model was employed due to its suitability for analyzing time-series data. This method effectively captures the linear relationship between the Value of Tax Receipts and GDP growth. While more complex models like Granger causality or VAR were considered, OLS was preferred due to the focus on linear associations rather than causality.

There will be visual impressions from the data visualization.

Empirically, the functional model can be expressed as follows in Eq [1]. The ordinary least square (OLS) regression model can be specified mathematically below in Eq [2].

$$GDP = f(\text{Tax burden, Tax receipt, Inflation, Unemployment}) \quad [1]$$

$$GDP_t = \beta_0 + \beta_1 \text{Tax burden}_t + \beta_2 \text{Tax receipt} + \beta_3 \text{Inflation}_t + \beta_4 \text{Unemployment}_t + U_t \quad [2]$$

GDP is the dependent variable in this instance since it serves as a gauge of economic growth. The value of tax receipts and the tax burden are the main independent variables, while unemployment and inflation act as control factors. Due to their significance as macroeconomic indicators that reflect current global concerns in both rich and developing nations, unemployment and inflation were selected as control variables [2]. Equation [2] uses OLS regression to investigate the effect of taxes on economic growth. The linear relationship between taxation and economic growth can be analyzed using the regression model, which also accounts for the effects of inflation and unemployment. The intercept, or constant term, is indicated by β_0, while the independent variables' slopes or coefficient estimates are represented by $\beta 1$ through $\beta 4$. In the model, random error is represented by the letter "U_t".

Simultaneously, a study of correlation will be conducted to ascertain the degree and orientation of the association between taxation and economic growth. Because the correlation coefficient, or r, is continuous and can range from -1 to +1, the Pearson correlation approach was used. STATA version 18 was used to analyse the data for this inquiry. In addition, the regression model's P-values and R-squared values were verified by running a multicollinearity test. Furthermore, autocorrelation, heteroscedasticity, and normality OLS assumptions were assessed.

The endogeneity concerns in this study were addressed through various tests. The Shapiro-Wilk W test confirmed the normality of residuals, while the Breusch-Pagan/Cook-Weisberg test (Prob>chi2 = 0.0438) indicated some heteroskedasticity, which was accounted for. The Durbin-Watson statistic (1.579) falls within an acceptable range, indicating that autocorrelation is not a significant issue.

Results and Discussion

Table 2 provides thorough information on a number of economic indices from 2000 to 2022. The Gross Domestic Product (GDP) average is about 2600 billion USD, and the standard deviation is about 432 billion USD. The approximate mean tax burden is approximately 32%, with a standard deviation of 0.6%. An anticipated 490 billion GBP will be collected in taxes on average, with a standard variation of about 125 billion GBP. The mean inflation rate of roughly 2.3% is characterised by a standard deviation of roughly 1.7%. To sum up, the average unemployment rate is roughly 5.4%, with a standard deviation of about 1.4%.

Table 2: Descriptive Statistics

Variables	Observation	Mean	Std. dev.	Min	Max
GDP	23	2599.985	432.3999	1648.658	3131.378
Tax burden	23	32.17565	0.6010281	30.91	33.48
Value of Tax receipt	23	490.2026	125.3673	315.64	786.59
Inflation	23	2.289343	1.690173	0.368	9.1
Unemployment	23	5.448174	1.376619	3.57	8.04

Table 3: Regression Model

GDP Variable	Model	VIF
Tax burden	36.951 (120.553)	1.33
Value of Tax receipt	3.098* (0.629)	1.58
Inflation	-40.748 (44.559)	1.44
Unemployment	93.827 (50.872)	1.24
Constant	-525.739 (3898.494)	NA
Overall model P-value	Prob > F = 0.0011*	
R-squared	0.6201	

asterisk * represent 1% level of significance while standard error is in parenthesis

Regression model estimates, as presented in Table 3, suggest that a 1% rise in taxation is associated with an approximate USD 37 billion gain in the UK's Gross Domestic Product. Similarly, a 1 billion GBP increase in tax receipts in the UK will translate into an equivalent 3 billion USD boost in GDP. Moreover, a 1% increase in the unemployment rate is shown to result in an approximate gain in GDP of 94 billion USD, but a 1% increase in the inflation rate is associated with a drop in GDP of 41 billion USD. Regression model findings show that the estimated coefficient of tax receipts has a positive and statistically significant effect on economic development, supporting hypothesis 1. This suggests that an increase in the amount of tax income that the UK generates will lead to an equal growth in its GDP.

Statistical study shows that taxes and economic growth have a significant link (P = 0.0011), even when unemployment and inflation are taken into account. This finding provides support for hypothesis 2. Furthermore, the R-squared figure demonstrates that factors such as tax burden, tax collections, unemployment, and inflation explain for 62.01% of the variation in GDP, a measure of economic expansion. The fitted regression model is deemed credible as each of the independent variables' variance inflation factors (VIFs) is less than 5. The regression analysis's p-values and R-squared values support the veracity of this assertion.

Table 4 shows a weakly positive link between economic growth and the tax burden, while a large positive correlation between economic growth and the value of tax receipts is noted. This suggests a positive correlation between economic growth and greater taxes, as determined by the tax incidence and value of tax receipts. Stated differently, a rise in taxes is correlated with economic expansion.

Table 4: Correlation Matrix

	GDP	Tax burden	Value of Tax receipt	Inflation	Unemployment
GDP	1.000				
Tax burden	0.2517	1.000			
Value of Tax receipt	0.7343	0.3974	1.000		
Inflation	0.2839	0.3665	0.4956	1.000	
Unemployment	-0.0243	-0.3291	-0.3532	-0.0699	1.000

Table 5: Shapiro–Wilk W test, Heteroscedasticity and Autocorrelation

Variable	Observation	P-value
GDP	23	0.97667
Tax burden	23	0.74843
Value of Tax receipt	23	0.97651
Breusch–Pagan/Cook–Weisberg test for heteroskedasticity	Prob>chi2 = 0.0438	
Durbin–Watson d-statistic (5, 23)	1.5795636	

The OLS assumption of normality findings is shown in Table 5. The predefined significance level of 0.05 was exceeded by the P-values for the dependent and primary independent variables. Because of its constant distribution, this suggests that the data fits the requirements of normalcy. The heteroscedasticity test also shows that the P-value is higher than the pre-established significance level of 0.01. Consequently, it appears that the fitted regression model lacks heteroscedasticity. Furthermore, Breusch–Pagan/Cook–Weisberg test for heteroskedasticity: Prob>chi2 = 0.0438 suggests some heteroskedasticity, but this has been controlled and because the Durbin-Watson statistic is 1.5795636, it indicates that autocorrelation does not affect the model.

While this is happening, the Appendix gives details about the phases of the conflict between Russia and Ukraine when tax rates and economic development trends in the UK experienced significant and notable changes.

Figure 1 shows the gross domestic product (GDP) growth trend for the United Kingdom from 2000 to 2022. According to the data, the gross domestic product (GDP) of the United Kingdom is expected to decline significantly in 2022. The economic sanctions imposed by the United Nations may have contributed to this loss by causing a significant decrease in trade between the United Kingdom and Russia.

In addition, Figure 2 shows that the UK's tax burden falls in 2022, whereas Figure 3, which deals with the conflict between Russia and Ukraine, shows a notable rise in the value of tax revenues in the UK during the same year.

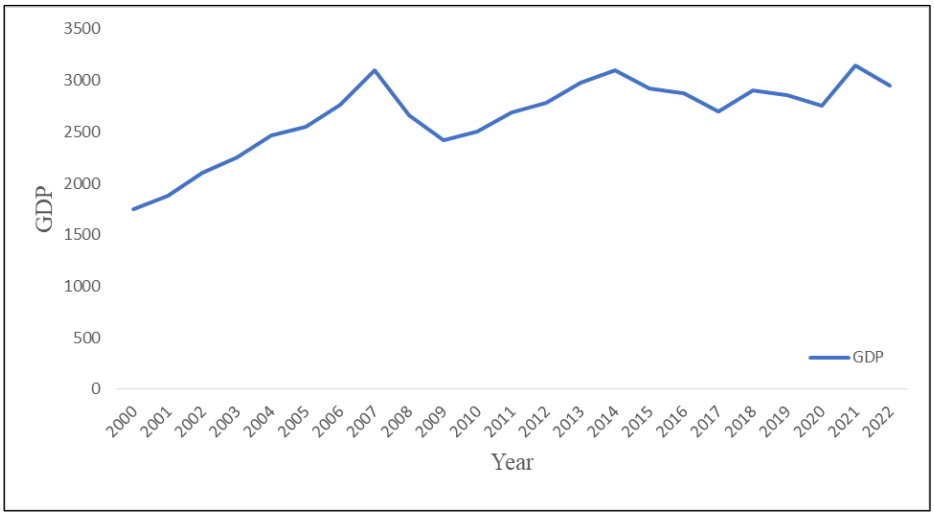

Figure 1: Graph of the UK GDP from 2000 to 2022

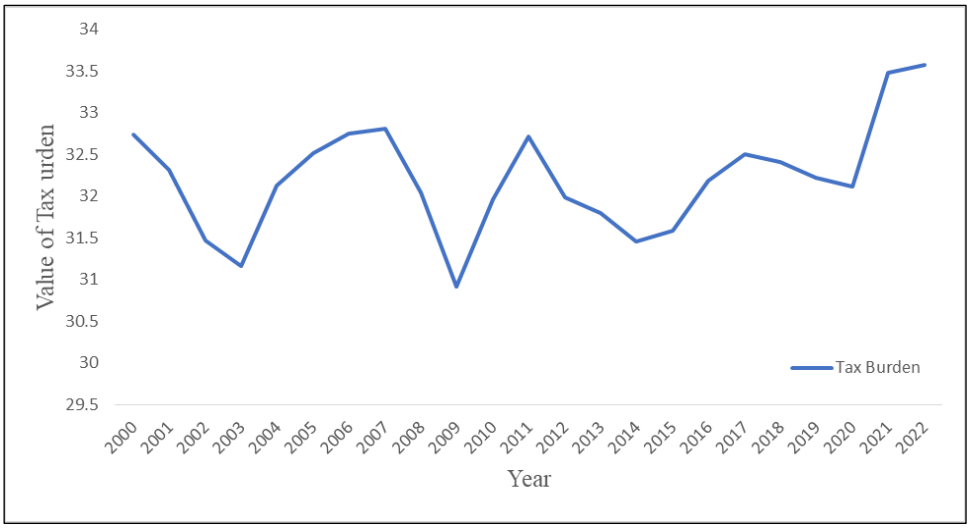

Figure 2: Graph of the UK Tax Burden from 2000 to 2022

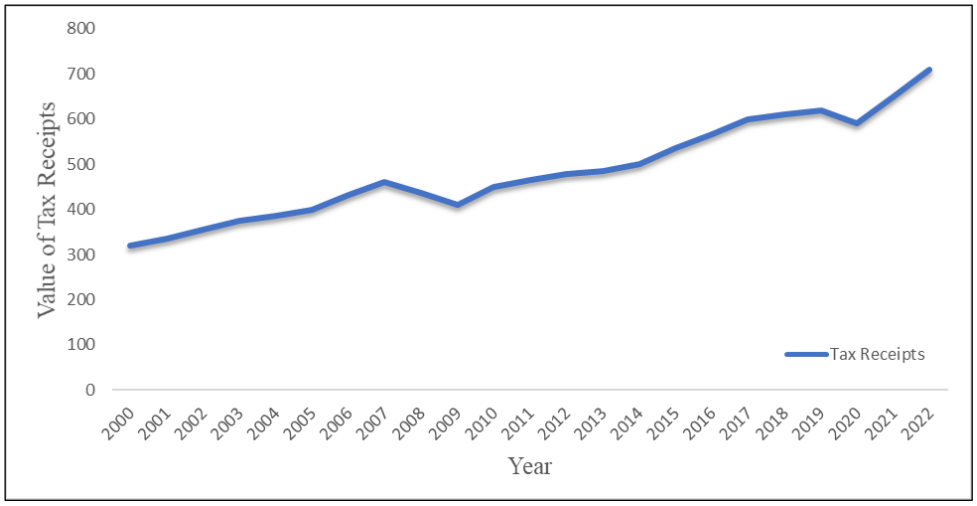

Figure 3: Graph of the UK Value of Tax Receipts from 2000 to 2022

This part contained the important conclusions that were drawn from the data analysis of the study. The research study outlined its objectives and two hypotheses in order to look into the relationship that the UK has between taxation and economic development. The study's goal was to ascertain how tax revenue size affected economic expansion. The study found a positive and substantial association, which supported hypothesis 1. This finding corresponds with the study of some researchers (21, 22) which also indicate a direct relationship between taxation and economic growth. This study also suggests that the value of tax revenues earned by the UK will rise in tandem with its economic expansion. The study's findings confirm hypothesis 2, which contradicts (15) notion about the non-linear, significant impact of taxes on economic development. The study also looked at the relationship between taxation and economic growth. The analysis found a substantial linear link between taxes and economic growth after adjusting for unemployment and inflation. Furthermore, this study aims to detect any structural deviations from the trajectory of economic growth and taxation in the United Kingdom during the Russia-Ukraine conflict. Figure 1 shows the Gross Domestic Product (GDP) of the United Kingdom from 2000 to 2022. It suggests that GDP will drop significantly in 2022, which could be related to UN economic sanctions against Russia that significantly lowered commerce between the UK and Russia. Furthermore, Figure 2 showed how the tax burden on the United Kingdom decreased in 2022, while Figure 3 highlighted the significant increase in tax revenues brought about by the crisis between Russia and Ukraine in the same year. Nonetheless, the Russia-Ukraine war in 2022 caused a sharp rise in tax revenue, which significantly helped to close

the deficit. The GDP and tax burden of the UK, however, fell precipitously.

This study presents two major findings: first, there is a significant linear relationship between taxation and economic growth and second, the value of tax revenues earned by the UK will rise in tandem with its economic expansion. The wider ramifications of the findings is that an increase in taxation will ensure economic growth, hence the policies of government can be directed at opening up windows for more taxation receipts without increasing the tax burdens on individuals and corporations.

Conclusion

It is concluded by this study that a direct relationship exist between taxation and economic growth in UK hence an increase in taxation will lead to economic expansion. Also, the value of tax revenues earned by the UK rises in tandem with its economic expansion over the years which is an indication there is robust fiscal strategy policies by the government. Since the value of tax revenues has a significant and favorable impact on the expansion of the UK economy, to maintain economic growth, the UK government needs to adopt a sustainable fiscal strategy that makes that lavish rise in tax receipts possible.

Abbreviations

GDP: Gross Domestic Product, UK: United Kingdom.

Acknowledgement

We thank Shehu Abdulkarim Ibn and Aisha Ahmad Ishaq for reviewing the research model and providing valuable feedback.

Author Contributions

Abdulgaffar Muhammad: conceptualization, formal analysis, original draft. Okwuise UY and Ogbohoro Vincent: methodology, validation. Bokumo Esther Chidi and Edeme Nelson C: reviewing, editing manuscript. Anthony Kolade Adesugba: data normalization, restructuring.

Conflict of Interest

The authors declare no conflict of interest.

Ethics Approval

Not applicable.

Funding

The research is privately funded by the authors.

References

1. Korkmaz S, Yilgor M, Aksoy F. The impact of direct and indirect taxes on the growth of the Turkish economy. Public Sector Economics. 2019;43(3):311-323.
2. United Nations. Global economic output in the world, developed and developing economies. 2023. https://www.un.org/development/desa/dpad/publication/world-economic-situation-and-prospects-june-2023-briefing-no-172/
3. Yadawananda N, Achal KG. Tax structure and economic growth: A study of selected Indian states. Journal of Economic Structures. 2020;9(38):1–12.
4. Lyons T. The EU-UK trade and cooperation agreement. British Tax Review. 2021;1:26-29.
5. James K. The rise of the value-added tax. Cambridge: Cambridge University Press. 2015.
6. De la Feria R, Walpole M. The impact of public perceptions on general consumption taxes. British Tax Review. 2020;67/5: 637-669.
7. Masood M, Sohaib Y, Syed AA. Tax revenue and economic growth: An empirical analysis for Pakistan. Journal of World Applied Sciences. 2010;10(11):41-52.
8. John OA, Dickson OE. Tax revenue and economic growth in Nigeria. Journal of Taxation and Economic Development. 2020;19(1):15–34.
9. Edewusi DG, Ajayi IE. The nexus between tax revenue and economic growth in Nigeria. International Journal of Applied Economics, Finance and Accounting. 2019;4(2),45–55.
10. Mdanat MF, Shotar M, Samawi G, Muloot J, Arabiyat TS, Alzyadat MA. Tax structure and economic growth in Jordan, 1980-2015. EuroMed Journal of Business. 2018;1(1):102-127.
11. Eyisi AS, Egiyi MA, Okafor VI. A comparative analysis of the VAT system of developed and developing economies (UK and Nigeria). Research Journal of Finance and Accounting. 2017;8(22):66–72.
12. Biersteker T. Sanctions against Russia and the role of the United Nations. 2022 https://globalchallenges.ch/issue/12/sanctions-against-russia-and-the-role-of-the-united-nations/
13. Organisation for Economic Co-operation and Development. Tax-to-GDP ratio. 2022 https://www.oecd.org
14. Cloyne J, Ferreira C, Froemel M, Surico P. Taxes and growth: New narrative evidence from interwar Britain. NBER Working Paper. 2018;24659. https://www.nber.org/papers/w24659
15. Jaimovich N, Rebelo S. Nonlinear effects of taxation on growth. Journal of Political Economy. 2017;125(1):265-291.
16. Mertens K, Olea JLM. Marginal tax rates and income: New time series evidence. Quarterly Journal of Economics. 2018;133(4):1803-1814.
17. Zidar O. Tax cuts for whom? Heterogenous effects of income tax changes on growth and employment. Journal of Political Economy. 2019;127(3):1437-72.
18. Ljungqvist A, Smolyansky M. To cut or not to cut? On the impact of corporate taxes on employment and income. NBER Working Paper. 2018. https://dx.doi.org/10.2139/ssrn.2536677

19. Gunter LM, Feuerbacher EN, Gilchrist, RJ, Wynne CDL. Non-linear effects of tax changes on output: The role of the initial level of taxation. NBER Working Paper. 2019. https://www.nber.org/papers/w26570
20. Nguyen D, Rosseel L Grieve J. The macroeconomic effects of income and consumption tax changes. American Economic Journal: Economic Policy. 2021;13(2):439-66.
21. Alinaghi N, Reed WR. Taxes and economic growth in OECD countries: A Meta-Analysis. Public Finance Review. 2021;49(4):32-42.
22. Arnold JM, Brys B, Heady C, Johansson Å, Schwellnus C, Vartia L. Tax policy for economic recovery and growth. Econ J. 2011;121(550):59–80.
23. Widmalm F. Tax structure and growth: Are some taxes better than others? Publ Choice. 2001;107(3):199–219.
24. Angelopoulos K, Economides G, Kammas P. Tax-spending policies and economic growth: Theoretical predictions and evidence from the OECD. Eur J Polit Econ. 2007;23(4):885–902.
25. Kate F, Milionis P. Is capital taxation always harmful for economic growth? Int Tax Publ Finance. 2019;26(4):758–805.
26. Alm J. Rogers J. Do state fiscal policies affect state economic growth? Publ Finance Rev. 2011;39(4):483–526.
27. Prillaman SA, Meier KJ. Taxes, incentives, and economic growth: assessing the impact of pro-business taxes on US state economies. J Polit. 2014;76(2):364–379.
28. Solow RM. Growth theory. An exposition. Clarendon Press; Oxford. 1970.
29. Heimberger P. Corporate tax competition: A meta-analysis. European Journal of Political Economy; 2021;15(2):43-54
30. Martínez-Ferrero J, Frías-Aceituno JV. Relationship between sustainable development and financial performance: International empirical research. Bus Strat Environ. 2015;24(1):20–39.
31. Aghion P, Howitt PW. The Economics of Growth. 2008. https://scholar.google.com/scholar?q=Aghion+P.+Howitt+P.W.+The+Economics+of+Growth+2008+MIT+press
32. Lee Y, Gordon RH. Tax structure and economic growth. Journal of public economics. 2005 Jun 1;89(5-6):1027-43.
33. Gomis-Porqueras P, Smith R. Income taxation and growth: New insights from public policy expansion. J Econ Dyn Control. 2020;118:103974.
34. Abd Hakim T, Karia AA, David J, Ginsad R, Lokman N, Zolkafli S. Impact of direct and indirect taxes on economic development: A comparison between developed and developing countries. Cogent Economics & Finance. 2022 Dec 31;10(1):2141423.
35. Dackehag M, Hansson Å. Taxation of income and economic growth: An empirical analysis of 25 rich OECD countries. OECD Publishing; Washington DC, USA. 2012.
36. Gemmell N, Kneller R, Sanz I. The timing and persistence of fiscal policy impacts on growth: Evidence from OECD countries. The Economic Journal. 2011 Feb 1;121(550):F33-58.
37. Barro RJ, Redlick CJ. Macroeconomic effects from government purchases and taxes. The Quarterly Journal of Economics. 2011 Feb 1;126(1):51-102.
38. Poulson BW, Kaplan JG. State income taxes and economic growth. Cato J. 2008;28:53.
39. Fossati SM. The effects of taxes on economic growth: An analysis of the Swiss case. J Int Bus Econ. 2020;20:14–25.
40. Levaggi R. Fiscal policy, growth and income distribution in OECD countries. Empirica. 2020;47:549-568.
41. Thum M. Economic growth and tax revenue in Germany: An empirical investigation. Int Tax Public Finance. 2020;27:1135–1162.
42. Babatunde OA, Ibukun AO, Oyeyemi OG. Taxation revenue and economic growth in Africa. Journal of accounting and taxation. 2017 Feb 28;9(2):11-22.
43. Vintilă G, Gherghina ŞC, Chiricu CŞ. Does fiscal policy influence the economic growth? Evidence from OECD countries. Econ Comput Econ Cybern Stud Res. 2021;55(2):229–246.
44. Mutaşcu MI, Crasneac AO, Dănuleţiu DC. The taxes impact on the economic growth: The case of European Union. LMU; Munich Germany. 2020.
45. Mertens K, Ravn MO. The dynamic effects of personal and corporate income tax changes in the United States. American Economic Review. 2013 Jun 1;103(4):1212-47.
46. Akcigit U, Kerr WR. Growth through heterogeneous innovations. Journal of Political Economy. 2018 Aug 1;126(4):1374-443.
47. Popov V, Zaharia M. Taxes, institutions and economic growth in European Union countries. Eur J Polit Econ. 2022;71:101991.
48. World Development Indicators. Economy & growth. 2022. https://data.worldbank.org/indicator
49. Zikmund W, Babin B, Carr J, Griffin M. Business research methods. 9th ed. Ohio; Publisher Cengage Learning. 2012.