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Debt, revenue, and growth: empirical analysis of the determinants of Uganda's government expenditure trajectory

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ABSTRACT

Various theories provide useful accounts of how government expenditure is determined. However, due to a mix of national and global events. It is difficult to ascertain the actual determinants. This study investigates government expenditure determinants. A time series from 1st July 1997 to 1st December 2025 from the Ministry of Finance, Planning, and Economic Development (MFPED) data portal was utilized. Descriptive statistics, unit root tests, cointegration, optimal lag tests, and the Pesaran and Shin test for establishing the level relationships for the ARDL model were conducted. Over the period, total public expenditure was averaged at UGX 1213 billion while mean tax revenues amounted to UGX 809.97 billion. Debt/grants stood at an average of UGX 79.4 billion. Economic activity averaged 114.8%, and the value of exports was approximately US\$ 243.3 million. Tax revenues boost government expenditure while debt puts it down. Reinforcing Wagner's Law, the correlation revealed that higher economic activity and export volumes hyped the government expenditure. Tax revenue, debt, exports, and economic activity positively determine government expenditure in the long run. The positive effect of tax revenue reflects the tax-to-spend hypothesis. The first differences of tax revenue, debt, and exports harm government expenditure in the short run, except for economic activity.

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Statistics for Business,
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Public Finance; Economics

1. Introduction

The issue of determinants of government expenditure has been a controversial and much-disputed subject among developing countries in Sub-Saharan Africa. In South Africa, consistent with Wagner's law, Odhiambo (2015) revealed that economic growth Granger-causes government expenditure. Maluleke (2017) revealed inconsistent results concerning the determinants of government expenditure. Another study showed a non-linear causal relationship between tax revenues and government expenditure (Sanusi, 2020). In another study, Maluleke (2018) points to urbanization, poverty, and wage rate as crucial determinants of government expenditure. Differently, Mdluli et al. (2019) highlighted unemployment, debt, and inflation as short-run determinants while institutional quality factors, such as political stability, were identified as long-term determinants. The South African determinants stress a strong disparity surrounding what determines government expenditure. In Nigeria, oil revenue, GDP, population, trade openness, oil price, taxation, and inflation have been identified as key determinants of government expenditure (Jibir & Aluthge, 2019). Interestingly, Ukwueze (2015) mentions debt as a vital determinant of government expenditure in the short-run, but the long-run effect remains unknown. Like most conventional studies, Anoke et al. (2016) attributed the rise in government expenditure to the desire for

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more public goods, reinforcing Wagner's law. It is now well established from the studies by Ologbenla (2019) and Olubiyi and Ibironke (2023) that debt, exchange rate, inflation rate, and oil prices are drivers of government expenditures. However, the mechanism that underpins price volatility and political periods remains unclear. Despite the growing fiscal deficit burden, empirical studies on the determinants of government expenditure in East Africa remain relatively scarce. In Kenya, just like other developing countries, GDP, population, trade openness, taxation, and inflation have been observed as crucial determinants of government expenditure (Gachunga, 2019). Gatauwa (2020) qualifies the previous public expenditure to have a huge impact on the present. Barngetuny (2024) maintained that political patronage is a significant determinant of government expenditure. In another study, Gatauwa (2020) provides evidence of economic growth intervening in the size of government expenditure.

Uganda is now caught between a rock and a hard place, as policymakers must decide whether to cut government expenditure to stabilize the budget, to increase revenues despite the risk of discouraging private sector activity, or to seek additional debt relief to sustain existing spending levels. About a decade ago, Uganda's debt stock was Shs 42.7 trillion (\$11.5 billion); today, this value has almost tripled to Shs 121 trillion. This has consistently worried economists and policymakers (Nahabwe, 2025). In April 1998, the World Bank and the International Monetary Fund wrote off Shs 2.4 trillion (\$650 million), relieving Uganda of the burden of repaying various loans. Furthermore, around the same period, the IMF, under the heavily indebted poor countries' initiative, wrote off over Shs 7.5 trillion (\$2 billion). During the budget breakfast meeting in 20219, Mr. David Bahati, the State Minister of Finance, Planning, and Economic Development, stated that they were cautious of the loan burden and were not ready to seek another debt forgiveness relief soon. Likewise, the then commissioner general of the Uganda Revenue Authority (URA), Doris Akol, stressed that Uganda could no longer rely on foreign handouts for infrastructural development. While all these speak to higher taxes and lower borrowing, what remains unclear is the size of the government expenditures. This has instigated debates and a total lack of consensus on what exactly determines government expenditure. For example, Bwire et al. (2013) reported tax revenue shocks. Kjær et al. (2017) assert that the desire to maintain political power determines government expenditure in Uganda. Kayizzi-Mugerwa (2002) notes the security defense needs as a catalyst for excessive spending. He further added that improved revenues and donor funding enhance it. Ali and Donald (2023) pointed to gender, political, and social factors as key determinants of government expenditure. Hisali and Ddumba-Ssentamu (2013) hold that fluctuations in foreign aid and the inelastic nature of tax revenues explain variations in government expenditure.

Today, Uganda is among the Sub-Saharan African countries with the highest tax rates in the world. The 30% corporate income tax on company profits, the 18% value added tax (VAT), and the Pay-As-You-Earn (PAYE) tax of up to 40% significantly increase the cost of doing business. Such relatively high tax burdens can constrain private sector growth, discourage investment, and ultimately slow the pace of economic development in low-income economies. With the declared tax revenue of Shs 31.369 trillion, the total public expenditures as of FY 2024–2025 were estimated to be Shs 72.8 trillion. This is the total exemplification of the tax-to-spend hypothesis. While tax revenues appear to bud over time, the rate of collection is unsustainable in the long run, especially if nationals who are taxed on the assumption of rising incomes (Wagner's Law) run out of business. In addition to growing taxes, there is the issue of debt. Uganda Debt Network (UDN) reported that the total stock of debt has reached \$32.24 billion (an equivalent of over Shs 121 trillion), with over 31.5% of the budget allocated for interest payments. The authors of this study are strongly opposed to debt relief and high taxes for Uganda to meet its budgetary needs. The phenomenon in Uganda is even beyond the tax-to-spend hypothesis. Rather, we tax, borrow, and then spend, augmenting the problem further and exacerbating the economic situation of the country. Particularly, Uganda mainly relies upon tax revenues and debt to finance its expenditures. For instance, the national budget was Shs 72.4 trillion. However, the Uganda Revenue Authority declared Shs 36.71 trillion for the FY 2025/26, higher than the Shs 31.37 trillion for the FY 2024/25 (PWC, 2025). This clearly indicates that about half of the national budget would be financed through loans and grants. The paradox here is that one is an inflow and the other is an outflow. A similar study conducted by Majur (2024) highlighted that GDP and population growth determined government spending in the long run, while the trade balance drove it in the short run. Nonetheless, what remains

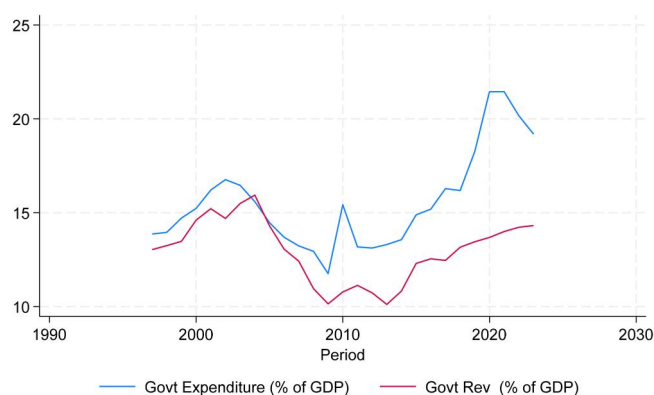


Figure 1. Trend of government expenditure and government tax revenues for the period 1997–2023.

potentially unclear is the short and long-run impact of government revenues, debt, and real GDP growth on government spending. A related study conducted in Côte d'Ivoire by Mohsen (2022) revealed that government expenditure is partly determined by national income, external debt, population size, and inflation. In developed economies, government expenditure is determined heavily by the infrastructural demands and the health of the individuals (Goel & Garg, 2016; Hassan & Mishra, 2017). Conversely, Adegboye and Akinyele (2022), as well as Facchini (2018), put that the vital determinant of government expenditure is the size of a particular country. Therefore, there is no clear consensus on what should inform government expenditure. Figure 1 illustrates the visual trends of both government expenditure and tax revenues from 1997 to 2023.

As shown in Figure 1, the early 1990s were characterized by minimal deviations in government expenditure and tax revenues. The year 2011 saw a spike in government expenditure and a rise in government tax revenues, probably due to election spending and seasonal festive end-of-year spending. After about 2015, tax revenues appear to shrink while government spending rises with no optimal stop. As seen, government expenditures outgrow their tax revenues in Uganda. This reveals that as the desire for more spending rises, a proportionate pressure on taxation is invoked. However, economists (such as Kemsley, 1998; Link et al., 2024) believe that tax hikes discourage production and prospects for future taxes.

Government gross debt instigates excessive government spending. Uganda's public debt has risen to unprecedented thresholds, reaching shillings (UGX) 96.1 trillion (\$25.3 billion or 52 percent of GDP) as of June 2023 (IMF, 2024). It is estimated that almost every Ugandan owes a tune of Shs 2.5 million to lenders. While debt and government spending are like complements, studies seem to give less attention to them. Most studies view the relationship between government debt and spending as non-linear (Adeniji et al., 2025). On the other hand, Njoku et al. (2022) stressed that a significant portion of government debt is used to finance capital projects. Additionally, government consumption and tax revenue have a significant negative relationship with the levels of public debt in Africa (Appiah-Kubi et al., 2022). Furthermore, Van et al. (2018) showed that an increase in the tax rate on returns to assets leads to an increase in government expenditure, consumption, and domestic debt. Also, Al-Majali (2025) maintained that the government expenditure influences about 28% of the GDP.

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Figure 2, government debt appeared to rise between 1997 and 2003 and fell to a minimum in the year 2009, rose sharply in the years 2011–2012, and rose sharply between 2012 and 2016. The patterns in debt and spending seem to be highly significant during election seasons in the country. Studies show that population size has a significant impact on government spending.

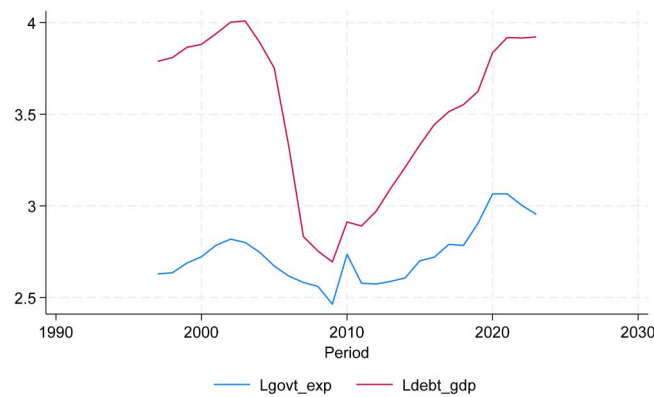


Figure 2. Government expenditure *versus* government debt for Uganda for 1997–2023.

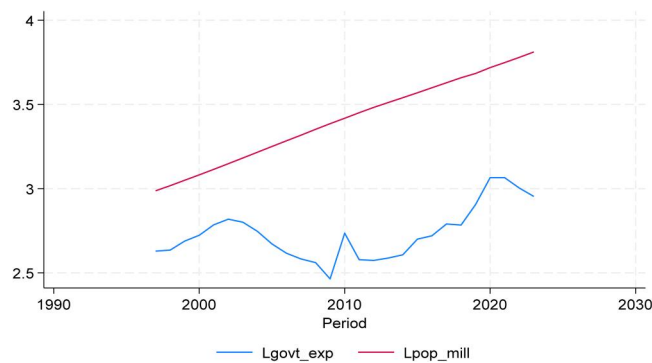


Figure 3. Government expenditure *versus* population for Uganda between 1997 and 2023.

Larger populations are generally associated with higher government spending, as seen in studies from Nigeria and global analyses, where population growth leads to increased public expenditure to meet rising demands for services and infrastructure (Akinlo, 2013; Jetter & Parmeter, 2013). In Cameroon, greater population size and density improve the efficiency of local public spending, suggesting that larger populations can benefit from economies of scale and more effective allocation of resources (Nkoa et al., 2024).

Over the study period, there has been a steady increase in the population of Uganda, as seen in Figure 3. However, government expenditure has always exhibited a trend with peaks in 2006, 2011, and 2021.

Several studies indicate that increases in real GDP growth can lead to higher government spending, particularly on recurrent expenditures, while capital expenditures (such as infrastructure investment) tend to have a stronger positive impact on GDP growth itself, suggesting a feedback loop between the two variables (Mensah & Adukpo, 2025; Paudel & Khanal, 2024). For example, in Ghana, a bidirectional relationship exists between capital expenditure and economic growth, while economic growth unidirectionally influences recurrent expenditure (Mensah & Adukpo, 2025). In Nigeria, capital expenditure was found to be inversely related to real GDP growth, while recurrent expenditure showed a positive relationship, though neither had a significant long-term impact (Akomolehin, 2025; Ebipre & Eniekezimene, 2020). Noteworthy, currently there is no study that has investigated determinants of government expenditure, focusing mainly on the macroeconomic aggregates, as in this current study.

While government expenditure shows trends in particular periods between 1997 and 2023, real GDP appears to have cyclical components in which we experience up and downward large and moderate swings, see Figure 4. The volatilities in the real GDP growth could be attributed to the agricultural fluctuations since Uganda is an agricultural economy. This study addresses many questions, such as whether tax revenue, debt, economic activity, and exports determine the size of the government expenditure.

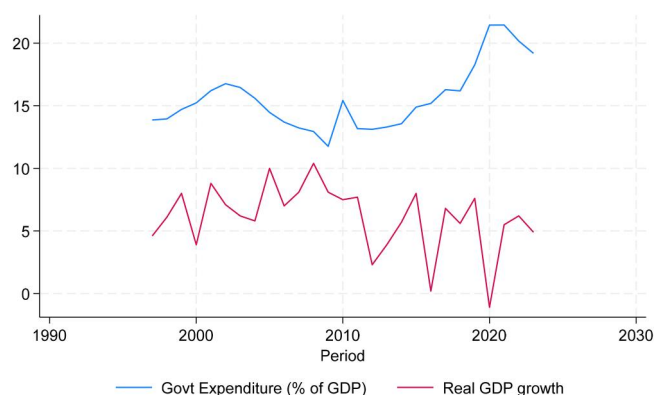


Figure 4. Government expenditure versus the real GDP growth for Uganda.

2. Literature review

2.1. Theoretical review

Different theories exist in the literature regarding public expenditure. We shall trace back to Wagner's law, which posits that public expenditure rises with economic development and increasing incomes. He postulated that as an economy develops over time, it is accompanied by intensive and extensive increases in activities and resources for the government, which give rise to government expenditure. Factors such as industrialization, urbanization, and the rise of the population, economic development, and social instability are explained as the primary sources of government expenditure. Pretty much of the current literature on public expenditure pays particular attention to Wagner's Law. For instance, Paparas et al. (2019), taking the case of the United Kingdom, explained that Wagner's theory hypothesizes that public sector growth is overproportioned compared to national incomes as economies expand. However, he also discussed the Keynesian hypothesis, which posits that an increase in government expenditure later leads to economic growth, showing an opposite causal direction to Wagner's Law. Similarly, Kuckuck (2014) tested Wagner's Law at two different stages of development and revealed that the theory is an increasing state activity. He emphasized that the theory shows a clear positive relationship between economic development and the scope of the public sector, as a key public sector theory. However, he added to it the theory of Peacock and Wiseman's hypothesis, which emphasizes the recurrence of abnormal situations causing sizeable jumps in the public expenditure. In the same vein, Abizadeh (1988) hailed Wagner's Law of the rising share of government expenditure as a long-standing theory linking the growth of public spending to industrialization and change. One study by Sandmo (1987) mentions the pure theory of public expenditure and taxation as a theoretical approach in public economics, often associated with RA Musgrave. He further cites the Lindahl theory (1919) as one of the first clear formulations of a theory of public expenditure with a positive interpretation, involving individuals bargaining over the expenditure level. Much of the current literature perpetuates out-of-date notions of Wagner's Law (see, for instance, Jibir & Aluthge, 2019), highlighting that growth in real incomes facilitates the relative expansion of welfare expenditure. This may not be true in all cases in the Sub-Saharan African countries, where much of the public spending does not result from the high incomes of nationals but from the interests of a small group of those running the governments. This does not seem to cure the problem of debt, nor improve the budget position, but rather escalates both. As supported by this study and other studies, governments must tax nationals below a certain threshold because further enhancements may instead discourage nationals from participation in business and trade, which worsens both public finance and fiscal sustainability position. This study was strongly supported by the Keynesian theory of public finance and spending. The theory was developed by John Maynard Keynes in the year 1936. The theory argues that total spending in an economy is the main driver of output and employment. Simply put, contrary to Wagner's Law that views public spending to be ignited by higher incomes, the Keynesian theory suggests that public expenditure in vital infrastructure such as healthcare, education, and social protection can directly raise aggregate demand, leading to higher production, employment, and improved household incomes. For vulnerable countries like

Uganda that experience economic recessions frequently, governments reduce taxes and direct expenditures to productive ventures to stimulate demand. Therefore, this study is based on the tax-and-spend theory, which advocates that government revenue causes government expenditure, as proposed by Friedman (1978).

2.2. Empirical literature review

Various scholars have applied different theories to their study of determinants of government expenditure. Mokoena (2025) investigated the drivers of changes in the government expenditure. The study conducted a critical review of the literature, culminating in the construction of a conceptual framework to understand the drivers of instabilities in public expenditure. The study identified population growth, per capita burden of social welfare amenities, incremental budgeting system, trade openness, national income, and public service demands. This finding is typical of Wagner's theory because the identified determinants clearly reflect the structural demand-side pressures, such as population growth and public service demands, per capita welfare demand, where the richer individuals demand redistribution and service. In addition, Adel (2022) analyzed the main determinants of the government expenditure in Côte d'Ivoire. He examined the effect of external debt, national income, inflation, and population on government expenditure using the ADF unit root tests, the Johansen cointegration test, and the CUSUM test for parameter stability. Results showed that external debt, national income, and population positively influence government expenditure, while inflation harms it. Likewise, this study also voices out Wagner's theory. To put some context to it, the national income is a core Wagner mechanism, population size is a catalyst for demand for services, and external debt shows existing financial constraints. This means that as economies grow, public expenditures increase. Similarly, another study exemplifying Wagner's theory was by Aregbeyen and Akpan (2013), who looked at the long-term determinants of government expenditure using a more disaggregated analysis for Nigeria. This study employed the Ordinary Least Squares (OLS) technique, tested for violations, and found that debt servicing, population growth, and inflow of foreign aid lead to higher government spending. Furthermore, Jibir and Aluthge (2019) modelled the determinants of government expenditure in Nigeria. Theoretically, the study employed Wagner's Law and added some new variables, such as oil revenue, trade openness, public debt, exchange rate, oil price, taxation, and inflation rate. Empirically, the study utilized the ARDL model to investigate whether each of these variables determined government expenditure. Their study results indicated that oil revenue, GDP, trade openness, oil price, taxation, and inflation are the crucial determinants of government expenditure in Nigeria. Moreover, Tilahun (2021) also utilized the ARDL to test the validity of Wagner's Law in Ethiopia. The study aimed to explore the determinants of public investment in Ethiopia and identify the main influencing factors on the level of public investment. Preliminary results indicate a long-run relationship between the study variables. Furthermore, the real per capita GDP had a positively significant effect on the level of public investment. Also, the study showed a positive relationship between public and private investment.

Scant evidence supports the Keynesian theory of government expenditure. To begin with, Poku et al. (2022) examined the impact of government expenditure on economic growth in Ghana. The study employed an ARDL model using data ranging from 1970 to 2016. Results indicated that government expenditure had a significant impact on economic growth in the short run. Secondly, Ngigi et al. (2024) explored the role of government spending in fostering economic development in Kenya. The study employed the ARDL model and the Support Vector Machine model (SVM) to estimate the effect of public spending on the economy of Kenya from 1980 to 2021. Findings showed that education halts economic development in Kenya in the short run and improves it in the long run. This study showed that expenditure on education, defense, and health positively improves the economic development of Kenya. However, despite employing ARDL techniques, the study focused primarily on sectoral expenditure and economic growth, with limited attention to the broader fiscal dynamics between revenue, debt, exports, and aggregate public expenditure. This is in strong agreement with the Keynesian theory because it concentrates on the sectoral spending (education, health, defense) to spur economic growth. In addition, Abdihamid et al. (2025) empirically investigated the effect of government expenditure on unemployment in Somalia. This study utilized the Autoregressive Distributed Lag (ARDL) Model to estimate the short

and long-run effects of ODA, GDP growth, unemployment, and agriculture value addition on unemployment. Results highlighted expansions in government expenditures, GDP growth, and agricultural output as key factors responsible for declines in unemployment in Somalia, while short-run determinants were GDP and value addition. Fiscal expansion is used as a tool to improve real economic outcomes. If government expenditure is used for macroeconomic improvements clearly shows the Keynesian theory in play. Merrifield (2000) tested the hypothesis that many institutional and political factors affect fiscal outcomes. He intended to show that the preferences of public officials, and the decision processes used to act on those preferences, matter. Regression modelling that followed showed that several variables rarely mentioned as important determinants of fiscal outcomes, and even less often included in models of taxation, expenditure, or growth of government, are quite robust determinants.

There is a relatively small body of evidence pointing to the tax to spend hypothesis. Firstly, a study by Maluleke (2017), which examined the determinants of government expenditure using the analysis of empirical literature from 1995 to 2016, identified among many factors government revenue, trade openness, poverty, public debt, dependency ratio, population, and urbanization. In cases where revenue is associated with a rise in government expenditure is a case scenario of the tax to spend hypothesis. Also, Aladejare (2019) tested the robustness of public spending determinants on public spending decisions in Nigeria between 1970 and 2016. The ARDL and the Toda-Yamamoto causality procedures were conducted. Results revealed that an increase in the oil price, inflation rate, and the exchange rate were key determinants of public spending in Nigeria. Therefore, any oil price rise is a signal for government revenue, especially for oil-dependent economies like Nigeria, South Sudan, and many other developing countries. This is a total alignment of the tax to spend hypothesis. Lastly, Olubiye and Ibironke (2023) sought to find out if the determinants of government expenditure are symmetric or asymmetric. To address the issue of asymmetry, a nonlinear autoregressive distributed lag model was employed. Data from relevant sources spanning 1981 and 2021 were utilized. Results from the modelling showed that the asymmetric tax revenue has the potential to drive capital expenditure but significantly positively influences recurrent expenditure. Henceforth, the study implies that changes in government revenue (tax revenue) translate into changes in government expenditure, pulling out one of the major tenets of the tax to spend hypothesis.

Another study by Akanbi (2014) empirically examined the pattern and drivers of government expenditure in Nigeria. The study employed a public choice framework, and the model was estimated with the aid of the time-series data spanning from 1974 to 2012. The study employed the Johansen estimation technique. Findings revealed that capital and recurrent expenditure are resilient to shocks in the total government expenditure. Also, the effects of governance show that recurrent expenditure is not affected by any elements of poor governance as much as are capital and general spending. Previous studies appear to reaffirm the notion that taxation, debt, real GDP, population, aid, and other macroeconomic factors are critical determinants for government expenditure (Adel, 2022; Aregbeyen & Akpan, 2013; Iyassu et al., 2024; Jibir & Aluthge, 2019; Maluleke, 2017; Mokoena, 2025). However, very little was found in the literature regarding the influence of higher taxes, yet it's documented that the tax rates in most Sub-Saharan African countries are the highest in the world (Fjeldstad & Rakner, 2003; Kayaga & Lahey, 2007; Keen & Mansour, 2010). To put some context, in Uganda, resident individuals pay up to a 30% income tax plus a 10% surcharge above 120m per year. This includes 18% VAT and 10–40% pay as you earn, as well as a 15% withholding tax. The authors in this paper, as reinforced in the long-run estimates, strongly believe that these high taxes make it quite impossible to build a long-lasting capital, and it instigates the desire for public expenditure, leaving us completely at the mercy of aid and loans. Up to now, the previous studies on public expenditure in Uganda have tended to focus on static rather than dynamic time-series methods. This makes it hard to investigate the behavioral implications of financial time-series variables over and beyond the current period. For instance, Ali and Donald (2023) utilized gender-disaggregated expenditure incidence analysis. Bwire (2017) used a cointegrated vector autoregressive (CVAR) model. Hassler et al. (2017) employed the political-economy Factors Analysis. Aragie and Pauw (2019) utilized a recursive dynamic computable general equilibrium (CGE) model. Fan and Zhang (2012) used a system approach, including seemingly unrelated regression (SUR), three-stage least squares (3SLS), and full information maximum likelihood (FIML). Lofgren et al. (2008) and Sennoga and Matovu (2013) designed and implemented the Computable General Equilibrium (CGE) framework.

Table 1. Study variables and description.

Abbreviation	Variables	Measurement	Expected sign	Source
Govt exp	Government expenditure	UGX billion		IMF
Govt rev	Government revenue	UGX billion	+	IMF
Debt	Government gross debt	UGX billion	–	IMF
Economic growth	Composite Index of Economic Activity (CIEA)	% Of GDP	+	IMF
Total exports	Total exports	US\$ million	–	IMF

Source: Author's own computation, 2025.

Mawejeje and Munyambonera (2017) employed panel cointegration tests, panel cross-section dependence tests, panel error correction-based Granger causality tests, and panel impulse response functions. To address this gap, the study applied the autoregressive distributed lag (ARDL) approach, which allows the analysis of both short-run dynamics and long-run effects even when variables are integrated at different orders. This approach, therefore, provides a clearer and more reliable framework for examining the relationship under investigation. Therefore, this study utilized the tax to spend hypothesis to examine debt, revenue, and real GDP growth as potential determinants of government expenditure in Uganda.

3. Methodology

3.1. Data source

The data used for the study were downloaded from the Ministry of Finance, Planning, and Economic Development data portal for Uganda. To obtain a larger dataset, monthly time series were collected. The data spanned the period from July 1997 to December 2025, covering a total of 342 observations. The Ministry of Finance, Planning, and Economic Development (MFPED) data portal query is found at <https://mepd.finance.go.ug/apps/macro-data-portal/>.

3.2. Variable description

The dependent variable was total government expenditure expressed in UGX billions. The independent variables were total government revenues (UGX billion), domestic debts/grants, total exports value exported at Cost (US\$ Million), and economic growth measured by the composite index of economic activity (%), as shown in Table 1.

3.3. Data analysis techniques

The analysis was performed for both descriptive and inferential statistics. Time series analysis involved unit root tests, lag order selection using AIC, BIC, SQIC, and other tests. Moving on, cointegration was tested with the aid of the Pesaran and Shin Bounds test. The prediction model involved a dynamic model known as the Autoregressive Distributed Lag model (ARDL). To avoid the limitations inherent in estimating a static model, we estimated a regression equation that can be enhanced by incorporating lagged values of both the dependent and independent variables. Additionally, a separate group of exogenous variables, denoted as z_t , can be introduced, these variables can help capture short-term variations in y_t without influencing its long-run equilibrium. It is assumed that all elements in z_t are stationary. This augmentation is intended to produce a dynamically complete model, ensuring that the regression error term u_t does not exhibit serial correlation.

$$y_t = c_0 + c_1 t + \sum_{i=1}^p \phi_i y_{t-i} + \sum_{i=0}^q \beta_i' x_{t-i} + \gamma z_t + u_t$$

With such a dynamic model, we no longer need to worry about potentially running a spurious regression.

Table 2. Descriptive statistics for government expenditure, government revenue, government gross debt, population size, real GDP growth, and interest rate paid on debt for the period 1997–2023.

Variable	Mean	Median	SD	Min	Max	Skewness	Kurtosis
Govt-exp	1213.03	737.1879	1204.79	82.64093	5913.712	1.240851	3.913713
Tax rev	809.97	501.5972	809.2311	58.20358	4517.452	1.311019	4.572752
Debt	79.44237	54.62551	66.38737	0.834909	354.2085	1.722298	6.005563
Econ-growth	114.8117	113.7	33.75182	59.9	181.5	0.154173	1.902412
Exports	243.3375	213.2841	230.6032	25.19844	1496.455	2.19162	9.133567

Source: Author's own computations, 2025.

Table 3. Correlation of government expenditure with revenues, debt, population size, real GDP growth, and interest payments.

Variables	(1)	(2)	(3)	(4)	(5)
(1) Govt expenditure	1.000				
(2) Tax revenue	0.9260*	1.0000			
(3) Debt	0.2150*	0.2258*	1.0000		
(4) Economic activity	0.9197*	0.9244*	0.1399*	1.0000	
(5) Exports	0.8642*	0.8739*	0.1492*	0.8065*	1.0000

Source: Author's own computations, 2025.

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

3.4. Diagnostic tests

Before model estimation, unit root tests were conducted as well as cointegration tests. In addition, lag selection tests using the AIC and the BIC were done to achieve the most suitable model, and the parameter stability tests were used to assess the possible structural breaks. The model was tested for serial correlation, heteroskedasticity, model specification, and multicollinearity. Results indicated that there was no serial correlation, heteroskedasticity, or multicollinearity associated with the ARDL model estimated as seen in the [Supplementary Material](#).

4. Results and discussion

According to the results in [Table 2](#), Uganda's government expenditure between 1st July 1997 to 1st December 2025 averaged UGX 1213 billion. With a higher spread of UGX 1204 billion, public expenditure was highly skewed and somewhat leptokurtic.

On the other hand, the mean tax revenues for the same period amounted to UGX 809.97 billion and had almost a similar deviation of the observations from the true value. The skewness and kurtosis values of UGX 1.3 and UGX 4.6 billion represent more volatile and non-symmetric data over the period.

Domestic debt stood on average at UGX 79.4 billion, accompanied by a standard deviation of UGX 66.4 billion. Debts were filled with excessive skewness and significant swings, $Sk = 1.72$; $Kurt = 6.01$.

Interestingly, economic activity measured by the composite index of economic activity was averagely 114.8% against a standard deviation of 33.8%. The indicator for economic activity was stable and did not have substantial skewness and kurtosis values.

Lastly, the mean export value was US\$ 243.3 million, associated with a higher standard deviation of US\$ 230.6 million. Adding to this, exports for Uganda were coupled with higher skewness values and excessive kurtosis of 6.13.

4.1. Pairwise correlations

Results from [Table 3](#) reveal a strongly positive correlation between tax revenues and government expenditure, $corr = 0.926$. This means the higher the taxes, the more the government expenditure. This further reinforces the tax and spend hypothesis, which argues that tax revenues create the necessary space for increased government spending.

Also, the positive correlation ($corr = 0.215$) indicates that the more domestic debt, the higher the public expenditures of Uganda. This suggests that higher domestic arrears call for more public spending due to enhanced capital flows. This means that more debt accumulated reduces the fiscal space

Table 4. Testing for stationarity using the ADF test, the Phillips-Perron test, and the DF-GLS test at levels, first, and second differences.

Variables	Augmented dickey fuller test		Phillips-Perron test		DF-GLS test	
	Level	1st diff	Level	1st diff	Level	1st diff
	Test statistic	Test statistic	Test statistic	Test statistic	Test statistic	Test statistic
Govt exp	−3.9***	−30.9***	−2.6	−45.9***	−4.9***	−20.4***
Tax rev	−3.7***	−30.7***	−1.9	−75.7***	−4.8***	−22.6***
Debt	−16.7***	−31.0***	−16.8***	−47.7***	−11.3***	−22.6***
Econ activity	−0.7	−19.5***	1.6	−20.2***	−1.4	−11.6***
Exports	1.1	−29.9	1.4	−32.5***	−0.022	−9.293***

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5. Cumulative sum test for parameter stability.

Type	Test	Critical value		
	Statistic	1%	5%	10%
Recursive	0.8000	1.143	0.9479	0.8499

available for more productive expenditures through debt servicing costs. In other words, obtaining loans/debt for the government is an expenditure in itself.

The higher the economic activity, the more the public expenditure of Uganda, $\text{corr} = 0.9197$. This finding, in line with Wagner's Law, suggests that more economic expansion increases the demand for public services, thus, a higher government expenditure.

Similarly, exports value is strongly correlated to the public expenditure of Uganda, $\text{corr} = 0.8642$. Uganda heavily relies on a few selected agricultural crops for exports, which means for these to gain competitiveness, there is a need for infrastructure, such as roads to make them available to the markets.

Based on the ADF results presented in Table 4, public spending, tax revenues, and debt were stationary at levels, while the level of economic activity and exports were non-stationary. This finding was consistent with findings from the Dickey-Fuller Generalized Least Squares test. On the contrary, the Phillips-Perron test revealed that only government debt was stationary at levels, rendering all other series non-stationary. The level of dispute between these tests has been observed in prior studies, such as that of Paparoditis and Politis (2018), which showed that the two tests, ADF and Phillips Perroni, provide a tremendous disagreement. Similarly, Phillips and Perron (1988) noted that the Phillips-Perron test corrects the conventional regression statistics to account for serially correlated and heterogeneously distributed innovations, which the original Dickey-Fuller tests do not intrinsically do, potentially leading to different findings. Interestingly, Faldziński (2019) supported that the power of the Perron test to reject the null hypothesis of a unit root decreases if a structural break is present and ignored. Therefore, we proceeded with tests for structural breaks, and the results are as follows.

Against the null hypothesis of no structural breaks, Table 5 reports a test statistic of 0.8000, which is relatively lower than all the critical values at 1%, 5%, and at the 10%. This suggests that we resoundingly fail to reject the null hypothesis. This shows that the model contains structural stability and can be used for policy decision-making.

4.2. Lag selection criteria

Although the ARDL (2 1 0 1 2) shows slightly lower AIC and BIC values, the model uses more lags and worsens the risk of overfitting, especially when the sample size is moderate (237). The study selected the ARDL (1 1 1 1 1) for easy interpretability, consistency with prior studies, and model parsimony.

The Pesaran et al. (2001) test, as put out by Pesaran et al. (2001), involves using critical value bounds derived from two sets of asymptotic critical values, one assuming all regressors are purely $I(1)$ and the other assuming all are purely $I(0)$, to allow conclusive inference without knowing the integration/cointegration status of the regressors. The results presented in Table 6 show that the F -ratio and the t -test values are greater than the critical values for $I(0)$ and $I(1)$ regressors, supporting the rejection of the null hypothesis. This implies that there was no level relationship, indicating that long-run parameters can

Table 6. Akaike's information criterion and Bayesian information criterion.

Model	N	ll (null)	ll (model)	df	AIC	BIC
ARDL (2 0 0 1 1)	237	.	−1774.6338	9	3567.268	3598.48
ARDL (1 1 1 1 1)	237	.	−1769.3371	10	3558.674	3593.355
ARDL (2 1 0 1 2)	236	.	−1764.4905	11	3550.981	3589.083
ARDL (2 2 2 2 2)	236	.	−1761.514	15	3553.029	3604.986

Source: Author's own computations, 2025.

Table 7. Pesaran et al. (2001) bounds test.

Kripfganz and Schneider (2016) critical values and approximate <i>p</i> -values								
H0: no level relationship					<i>F</i> = 41.202			
Case 3					<i>t</i> = −14.3			
	10%		5%		1%		<i>p</i> -Value	
	l(0)	l(1)	l(0)	l(1)	l(0)	l(1)	l(0)	l(1)
<i>F</i>	2.464	3.545	2.894	4.055	3.825	5.136	0.000	0.000
<i>t</i>	−2.559	−3.649	2.861	−3.981	3.448	−4.605	0.000	0.000

Table 8. ARDL (1,1,1,1,1) model for predicting determinants of government expenditure.

Log likelihood = −1769.3371						
Number of obs = 237						
<i>R</i> -squared = 0.5269						
Adj <i>R</i> -squared = 0.5082						
Root MSE = 431.8913						
Predictor	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>	Lower 95% CI	Upper 95% CI
Adjustment (ADJ) term						
Govt expenditure	−.976256	.0682701	−14.30	0.000	−1.11078	−.8417319
Long run (LR) coefficients						
Tax revenues	.4668614	.1451441	3.22	0.001	.1808594	.7528635
Debt	1.454832	.597192	2.44	0.016	.2780837	2.631581
Exports	.7972002	.2729832	2.92	0.004	.2592952	1.335105
Economic activity	18.0388	2.937099	6.14	0.000	12.25133	23.82626
Short run (SR) coefficients						
Δ Tax revenues (D1)	−.2005802	.1035025	−1.94	0.054	−.4045287	.0033683
Δ Debt (D1)	−.9711215	.4229007	−2.30	0.023	−1.804434	−.1378085
Δ Export (D1)	−.9775902	.4965296	−1.97	0.050	−1.955987	.0008063
Δ Economic activity (D1)	90.14604	30.22915	2.98	0.003	30.58042	149.7117
Constant	−1328.96	220.8629	−6.02	0.000	−1764.164	−893.7568

Source: Author's own computations, 2025.

now evidently be estimated with the aid of the ARDL model (Jayasinghe & Udayaseelan, 2010; Jordan & Philips, 2018; Kripfganz & Schneider, 2016).

Table 7 shows that the model explains about 53% of the variations in the government expenditure ($R^2 = 0.5269$). The adjustment term has a statistically significant coefficient of −.976256, confirming a stable long-run relationship between public spending and its determinants. Furthermore, this negative coefficient shows that ~98% of any short-run disequilibrium in public spending attains correction within one period. For the Ugandan economy, these results indicate that the fiscal authorities, specifically the Ugandan Revenue Authority (URA), respond quickly to any deviations that occurred during this period (Table 8).

In the long run, tax revenue has a positive and statistically significant effect on government expenditure. A one-unit increase in tax revenue is associated with a 0.47-unit increase in government spending. This indicates that Uganda's public expenditure is largely revenue-driven, meaning that improvements in domestic revenue mobilization directly expand the government's spending capacity. For the Ugandan economy, this reflects the importance of strengthening tax administration and broadening the tax base to finance public services and development programs sustainably. Therefore, in a bid to reduce unnecessary budget spending, the government needs to introduce tax cuts in a bid to strengthen tax compliance and reliability among the public businessmen and women. Consistent with previous findings, which indicate that tax revenues cause government expenditures in the long term (Gurdal et al., 2021). This tax-and-spend hypothesis is not only applicable to the developing countries, Chang et al. (2002)

showed that even for developed economies like Japan, South Korea, Taiwan, the UK, and the USA, there is a unidirectional causality running from revenues to spending, supporting the 'Tax-and-Spend' hypothesis. Equally important, debt also exhibited a positive and significant long-run relationship with government expenditure. A one-unit increase in debt raises government expenditure by about 1.45 units, suggesting that borrowing plays a key role in financing public spending beyond what is supported by tax revenues alone. While this reflects reliance on both domestic and external borrowing to fund infrastructure, social services, and development projects, debt acquisition enables expenditure expansion. These results corroborate those of Odo et al. (2016) who found that much of the acquired debt in Africa is triggered by deficit financing. Similarly, Bentour (2022) suggested that the effects of accumulated public debt in times of expansion are likely transmitted through Ricardian equivalence and concerns about high long-term interest rates, which leads to a crowding-out effect and thus lowers fiscal multipliers. Therefore, to reduce excessive public spending, the government of Uganda needs to reduce borrowing for unproductive activities. Along with this, exports have a positive and significant long-run effect on government expenditure. This implies that improved export performance enhances fiscal space, likely through higher foreign exchange earnings, increased trade-related taxes, and stronger overall economic activity. Contrary, Gemmell et al. (2008) found that trade openness to international trade does not have a robust effect on the total size of government expenditure. However, the findings are consistent with the argument advanced by Garrett (2001) that high levels of export trade are associated with high levels of government spending. Therefore, this indicates that policies promoting export diversification and value addition can indirectly support higher and more stable government spending. Economic activity emerged as the most significant long-run determinant of government expenditure. Its coefficient of 90.14604 suggests that sustained economic expansion substantially increases public spending capacity. While this typically shows Wagner's Law, it also reveals the pro-cyclical nature of fiscal policy, where periods of strong growth enable higher revenues and borrowing capacity, allowing the government to expand expenditure on development priorities. Also, this indicates that the level of economic activity is a catalyst for more spending. Many scholars have explained this economic phenomenon, that is to say, Lamartina and Zaghini (2011) explained that, consistent with Wagner's Law, economic development is associated with an increased role of government activities. Also, Akonji et al. (2013) confirmed Wagner's Law by reporting a long-run tendency for public expenditure to increase in response to the growth in the Gross Domestic Product. Furthermore, Barra et al. (2020) added that public spending reacts more to positive changes in economic growth when high-income countries are considered.

In the short run, changes in tax revenue show a statistically significant negative effect on government expenditure. This suggests that sudden increases in tax revenue do not immediately translate into higher spending and may instead be saved, used to reduce deficits, or delayed due to budget rigidities. For Uganda, this points to institutional and administrative lags in fiscal execution, where expenditure adjustments follow revenue changes with a delay. This finding sparks enormous debate regarding the effect of tax revenues on government spending in the short run. Similar to this study, Taha and Loganathan (2008) revealed that the implications for changes in tax policy to either increase or decrease the taxpayer burden cannot be observed in the short run, suggesting a lack of immediate effect. Differently, Narayan (2005) observed neutrality between revenue and expenditure for the remaining countries in the short run, suggesting no causal effect, either positive or negative. Differently, Khan et al. (2021) found that government revenues significantly influence government expenditures in the short run. In addition, findings revealed that short-run changes in debt have a negative and significant effect on government expenditure, indicating that new borrowing initially constrains spending. This may reflect short-term debt servicing pressures or fiscal consolidation efforts following borrowing. In the Ugandan context, this suggests that while debt supports expenditure in the long run, short-term borrowing may temporarily limit spending flexibility due to repayment obligations. Similarly, short-run changes in exports exert a significant negative effect on government expenditure. This indicates that short-term export rises do not immediately increase public spending, possibly due to volatility in export earnings or delays in translating trade gains into fiscal revenues. The intuition behind this finding is explained by the tax smoothing hypothesis. In the short run, when more money is realized from the exports of goods and services, the government immediately withdraws from sudden financing pressures. Differently put, when more money from agricultural exports is realized either through taxes or foreign exchange, the

fiscal authorities, such as the Ministry of Finance, Planning and Economic Development (MFPED), and the Uganda Revenue Authority (URA), would refrain from spending to avoid widening the deficit and creating more debts. Additionally, the findings indicate that improvements in economic activity, both in the short and long run, stimulate government expenditure. Higher economic activity enhances labor productivity and strengthens the balance of payments, enabling the government to meet fiscal obligations and expand expenditure on public programs. This is consistent with a previous study by Poku et al. (2022), who found that government expenditure and economic growth were positively related in the short run.

5. Conclusion

Findings revealed that long-run government expenditure in Uganda was driven by a combination of fiscal capacity, financing choices, trade performance, and overall economic activity in the long run. Tax revenue exerted a positive and significant influence on public spending, confirming that expenditure expansion largely followed revenue availability and supporting the tax-and-spend hypothesis. This indicated that improvements in domestic revenue mobilization had previously translated into higher government spending, emphasizing the need for efficient and credible tax systems. Public debt also showed a strong positive long-run effect on expenditure, implying that borrowing had been used to complement tax revenues in financing development needs, although this raised concerns about expenditure sustainability when borrowing financed unproductive activities. Export performance further contributed positively to government spending, suggesting that stronger external trade had expanded fiscal space through higher foreign exchange earnings and trade-related revenues. Most importantly, economic activity emerged as the dominant long-run determinant of government expenditure, consistent with Wagner's Law, showing that sustained economic growth had significantly increased the scale of government involvement in the economy.

In the short run, the study found that short-run changes in tax revenue had a negative and statistically significant effect on government expenditure, indicating that sudden revenue increases did not immediately translate into higher spending due to institutional rigidities and administrative lags in budget execution. Short-run changes in public debt also exerted a negative and significant influence on expenditure, suggesting that newly acquired borrowing initially constrained spending through debt servicing pressures and short-term fiscal consolidation efforts. Similarly, short-run fluctuations in exports showed a negative and marginally significant effect on government expenditure, reflecting the limited capacity of volatile export earnings to support immediate fiscal expansion and the vulnerability of fiscal planning to external shocks. In contrast, short-run changes in economic activity had a strong positive and significant effect on government expenditure, implying that periods of rapid economic growth quickly translated into increased public spending.

Empirical debates on public spending and fiscal sustainability indicate a unidirectional relationship between tax revenue and government expenditure (Gurdal et al., 2021). Roşoiu (2015) showed that government revenues had a more influential role in determining economic growth than spending. Sriyana (2009) indicated that unidirectional causality implies that an increase in the tax revenue is accompanied by a similar increase in the public expenditures, which worsens the fiscal deficit problem. Differently, Anderson et al. (1986) fails to identify any link between tax revenues today and the incoming rise in government expenditure. However, Blackley (1986) applied statistical tests to argue that revenue growth only precedes the expenditure growth, further supporting the notion that increased revenues stimulate greater spending rather than deficit reduction. Similarly, studies such as those by Marlow and Manage (1987) and Ram (1988) revealed that higher revenues simply influence spending but do not attempt to close the fiscal deficit gap. Findings clearly indicate that in the long run, any unit rise in the tax revenues exacerbates the public expenditure, widening the budget deficit. Therefore, increased taxation should not be used as a tool for fiscal regulation and for closing the budget gap for Uganda and most other developing countries. The demand for services and infrastructure in developing countries, including Uganda, is high, and any attempts to raise taxes in a bid to support the economy would instead crowd out the economy through over-borrowing resulting from increased expenditures.

The Pesaran et al. (2001) bounds test indicated that there was no level relationship, indicating that long-run parameters can now evidently be estimated with the aid of the ARDL model. The Breusch–Godfrey LM test for autocorrelation revealed that the model was free from serial correlation and that the estimates are reliable. In addition, the Breusch–Pagan/Cook–Weisberg test for heteroskedasticity presented a constant variance, indicating that there were normal error terms in the residuals. The model passed the parameter stability test, showing that there were no structural breaks. However, the model was found to have some omitted variables based on the Ramsey reset test. Likewise, the model, despite having a mean VIF value of <20 , revenues were found to be moving in the same direction as the level of economic activity.

6. Study limitations

While the study highlights important implications for fiscal sustainability, it is limited by potential volatility in monthly data and the absence of inflation control adjustments, which may influence the short-run dynamics of expenditure and revenue.

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Author contributions

CRedit: **Robert Wadada**: Conceptualization, Formal analysis, Writing – original draft; **Felix Wamano**: Supervision, Validation, Writing – review & editing; **John Bosco Asimwe**: Supervision, Validation, Writing – review & editing; **Paul Okitoi**: Resources, Supervision, Validation, Writing – review & editing.

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Data availability statement

The data that support the findings of this study are available on request from the corresponding author, R.W. The data used is also available at the Ministry of Finance, Planning, and Economic Development data portal (see, for instance, <https://mepd.finance.go.ug/apps/macro-data-portal/>).

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