The Impact of Tourism on Economic Growth: An Empirical Analysis of the Tourism-Led Growth Hypothesis in Zambia

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Abstract
This study investigates the role of tourism in economic growth, addresses inconsistencies in the Tourism-Led Growth Hypothesis (TLGH), and explores its interaction with travel services. We used the Vector Error Correction model with annual time series data from 1986 to 2022 to test the TLGH in Zambia. In the short run, the tourism variables show no statistically significant effect on economic growth. However, the speed of adjustment proved to be statistically significant in the short run, suggesting that short-term variables exhibit a contemporaneous relationship in the long run and converge to the long-run equilibrium. Hence, in the long run, tourist arrivals and receipts positively impact growth, whereas tourism expenditure and interaction with travel services have negative effects. Granger causality results align with TLGH for tourist arrivals but challenge it for tourism expenditure and receipts. Recommendations include strategic measures to enhance tourist arrivals, address expenditure impacts, and optimize revenue streams from tourism.
Keywords: *Economic growth, tourism, hypothesis, causality, travel services*
JEL Classification: O40; O47; Z30
DOI: 10.7176/JESD/16-4-08
Publication date: June 30th 2025

INTRODUCTION

Economic growth is critical for poverty reduction, improved well-being, lower mortality rates, and increased life expectancy. Consequently, developing robust economic growth models is essential for informing policies with empirical evidence, rather than subjective judgment. In Zambia, economic growth has been underperforming over the years, as evidenced by the World Bank data from 1991 to 2021. While the country experienced high growth (reaching or slightly exceeding the 7% target set under SDG8—between 2004 and 2010, recent growth rates have declined, with 2021 recording only 3.57%. This sluggish performance raises concerns about Zambia's ability to meet its developmental goals.

Historically, Zambia has relied heavily on its mining sector, particularly copper, which has been the cornerstone of its economic policy for more than 20 years. However, fluctuations in copper output and prices jeopardize economic stability, highlighting the risk of overdependence on mining. Government-initiated diversification strategies reduce the reliance on mining by investing in agriculture and manufacturing (Sikamo, Mwanza, & Mweemba, 2016). However, these efforts have resulted in limited success, as these sectors have failed to thrive and significantly complement the revenue from the mining sector. (Phiri, et al., 2020). Owing to these challenges, economic thinking in Zambia has shifted towards further diversification, with a renewed focus on tourism as a potential engine for growth. Like many African countries, Zambia has considerable tourism potential through attractions that it seeks to exploit in its new outlook that prioritizes tourism as a path for improved diversification.

This strategic shift toward tourism is part of a broader trend across Africa, where significant public infrastructure investments have spurred growth in the tourism sector. By leveraging its unique natural and cultural assets, Zambia hopes to diversify its economy, stimulate higher economic growth, and achieve sustainable development.

Zambia's struggle to achieve sustained high economic growth remains a complex multidimensional issue. A key challenge lies in the country's continued dependence on copper mining despite longstanding efforts to diversify the economy (Noyoo, 2021). Zambia initiated diversification as early as the 1960s during the First National Development Plan (1966–1970), focusing on import-substitution industrialization. Despite these strategies, Zambia remains highly reliant on the mining sector, and between 1991 and 2021, the country achieved an SDG 8 growth target of 7% per annum in only six years between 2004 and 2010 (Phiri, et al., 2020). The tourism sector has recently gained attention as a potential driver (Phiri, et al., 2020). Zambia is endowed with rich tourism resources, including Victoria Falls, wildlife, cultural heritage, and underdeveloped areas such as the Northern Tourism Circuit. Recognizing its potential, the government has invested in the tourism infrastructure and marketing. However, the effectiveness of tourism in accelerating economic growth remains unclear. Furthermore, the identified inconsistency regarding the Tourism-led Growth Hypothesis (TLGH) based on findings from contemporary empirical studies in the literature motivates this study. In this regard, the Tourism-Led Growth Hypothesis (TLGH) postulates that more resources should be allocated to the tourism industry relative to other sectors to accelerate economic growth rates (Terzi, 2015). However, empirical studies on the impact of tourism on economic growth have shown controversial results; others provide evidence of positive results (such as Sofuoglu, 2022; and Justin et al., 2021) while others show evidence of negative results (such as Khaled AL-Tamini, 2020; Anh Nguyen, 2020; and Taibi, 2020). Subsequently, some studies found evidence of causality running from economic growth to tourism output growth (such as Lord et al., 2011; Wang and Xia, 2013) whereas other studies found evidence of no causality (such as Jail et al, 2013; Tang and Tan, 2013; Banda, 2021). Additionally, the extant literature has not investigated the impact of the interaction between the tourism sector and other sectors, such as the travel services sector, on economic growth. Therefore, this study includes an interaction term between tourist arrivals and travel services in modelling economic growth to contribute to the wide body of knowledge on the impact of tourism on economic growth.

The findings in this study will be fundamental for the government to be conscious of the possible consequences or implications of investing in the tourism sector with the goal of accelerating economic growth. In this regard, the knowledge yielded in this study will serve as information that will reveal the significance of diversification with a view to empowering the tourism sector. The results of this study will also be of value to the Ministry of Tourism in Zambia for understanding the significance of the tourism sector in contributing to economic growth. This is important in improving Zambia's balance of payments, as tourism can be viewed as an export service to the rest of the world (Mutambo et al., 2025).

LITERATURE REVIEW

Empirical Literature

Extant literature and gap

The extant literature (Balaguer & Cantavella-Jordá, 2002) on TLGH reviewed thus far contributes to their first paper, which provides a basic foundation for describing the relationship between tourism and economic growth. Subsequently, (Balaguer & Cantavella-Jordá, 2002) it was discovered that international tourism tends to have a positive multiplier effect on economic growth (table 1). However, (Komain, 2019) showed a positive long-run relationship between tourism receipts and real GDP when we considered the existence of structural breaks in the model. (Haile & Megerssa, 2020) International tourism was specified in terms of tourism receipts and used as an independent variable to describe economic growth.

Additionally, (Osinubi & Osinubi, 2020) inclusive growth tends to have a statistically significant impact on economic growth, as explained by tourism. Nevertheless, (Naseem, 2021) disaggregated international tourism to tourism receipts, tourism expenditures, and the number of tourist arrivals allowed us to determine the impact of different tourism factors on economic growth. In addition, (Lee, 2021) it has been argued that there has been too much attention on investigating TLGH using international tourism variables but ignoring domestic tourism expenditure. (Lee, 2021) It also contributes to the literature by showing that domestic tourism plays a fundamental role in fostering economic growth, whereas international tourism has a statistically insignificant impact on economic growth.

Furthermore, (Pérez-Montiel, Asenjo, & Erbina, 2021) most empirical studies have focused on using the Cobb–Douglas production function as the theoretical foundation to analyze TLGH based on the assumption of supply led growth. However, (Pérez-Montiel, Asenjo, & Erbina, 2021) it has been argued that TLGH can also be analyzed using the Keynesian aggregate demand (expenditure) function ($Y_t = C_t + I_t + Z_t$) with the assumption that demand leads to growth between economic growth and tourism. Consequently, a new theoretical framework based on demand-led growth, termed the Harrodian model, was developed to fit future analysis of the TLGH. Moreover, (Banda, 2021) it discovered a negative and statistically insignificant impact of tourism on economic growth with no evidence of causality. (Kyara, Rahman, & Khanam, 2021) used a response function approach to determine qualitative descriptions of the nature of the relationship and the time taken for causality between tourism and economic growth to occur. Subsequently, (Justin & Joshua, 2021) it was discovered that economies of scale tend to positively impact economic growth, as explained by international tourism and tourism-related employment.

However, despite the aforementioned studies (in particular, Balaguer & Cantavella-Jordá, 2002; Komain, 2019; Haile & Megerssa, 2020; Osinubi & Osinubi, 2020; Naseem, 2021; Lee, 2021; Pérez-Montiel, Asenjo, & Erbina, 2021; Banda, 2021; Kyara, Rahman, & Khanam, 2021; Justin & Joshua, 2021) having contributed to contemporary literature on TLGH, none of these studies have considered including an interaction term to capture the impact of international tourism as it interacts with other sectors (i.e., travel services sector) considered to be complementary to its activities on economic growth. It (Brida, Cortes-Jimenez, & Pulina, 2014) also supports this phenomenon by postulating that tourism may stimulate other economic industries through direct, indirect, and inductive effects. An increase in tourism expenditure may lead to additional activities in related industries, and the overall variation will be greater than the initial injection in spending (Brida, Cortes-Jimenez, & Pulina, 2014). Therefore, this study aims to fill this gap in the literature by including an interaction term between tourist arrivals and travel services in modeling economic growth assumed to be led by tourism to capture asymmetric effects from the interaction term on economic growth.

MATERIALS AND METHODS

Data

Secondary data were collected from the World Development Indicators (WDI) or World Bank (WB) websites. Subsequently, this study used annual time series data from 1986 to 2022. This resulted in a final sample of 37 observations.

Variables

The dependent variable in the study is economic growth while independent variables are: (1) Tourist arrivals, (2) tourism receipts, (3) tourism expenditure, (4) travel services, (5) manufacturing output, (6) agricultural output and (7) construction output, Tourist arrivals, tourism receipts and tourism expenditure are contained in "**X**"; travel services, manufacturing output and agricultural out are contained in "**C**"; and construction output is contained "**I**" assuming that other factors are constant.

Model Specification

The study employed The Vector Error Correction Model (VECM) was found to be an econometric model suitable for the type of data utilized. Initially, it was a prerequisite to use the Vector Autoregressive model (VAR) to estimate the VECM:

$$\begin{aligned} LogGDP_t = b &+ \sum_{i=1}^{k} \beta_i LogGDP_{t-i} + \sum_{j=1}^{k} v_j Agric_{output_{t-j}} + \sum_{m=1}^{k} \emptyset_m Manu_{output_{t-m}} \\ &+ \sum_{n=1}^{k} \varphi_n Construct_{output_{t-n}} + \sum_{p=1}^{k} \alpha_p Travel_{services_{t-p}} \\ &+ \sum_{q=1}^{k} \omega_q tourism_{expenditure_{t-q}} + \sum_{r=1}^{k} \delta_r tourist_{arrivals_{t-r}} \\ &+ \sum_{s=1}^{k} \mu_s tourism_{receipts_{t-s}} + \sum_{k=1}^{k} \gamma_k (tourist * travel)_{t-k} \\ &+ e_{1t} \end{aligned} \tag{21}$$

Thus, the second need is to differentiate the VAR to acquire the VECM as follows:

$$\Delta LogGDP_t = b + \sum_{i=1}^{k-1} \beta_i \Delta LogGDP_{t-i} + \sum_{j=1}^{k-1} v_j \Delta Agric_{output_{t-j}} + \sum_{m=1}^{k-1} \emptyset_m \Delta Manu_{output_{t-m}} + \sum_{n=1}^{k-1} \varphi_n \Delta Construct_{output_{t-n}} + \sum_{p=1}^{k-1} \alpha_p \Delta Travel_{services_{t-p}} + \sum_{q=1}^{k-1} \omega_q \Delta tourism_{expenditure_{t-q}} + \sum_{r=1}^{k-1} \delta_r \Delta tourist_{arrivals_{t-r}} + \sum_{s=1}^{k-1} \mu_s \Delta tourism_{receipts_{t-s}} + \sum_{k=1}^{k-1} \gamma_k \Delta(tourist * travel)_{t-k} + \boldsymbol{\lambda_1 ECT_{t-1}} + e_{1t} \quad (20.1)$$

Were:

Variables of interest (International tourism)

$tourist_{arrivals}$: Tourism arrivals

$tourism_{receipts}$: Tourism receipts

$tourism_{expenditure}$: Tourism expenditure.

$tourist * travel$: Interaction between tourist arrivals and travel services

Control variables

$Agric_{output}$: Agricultural output

$Manu_{output}$: Manufacturing output growth.

$Construct_{output}$: Construction sector output

$travel_{services}$: Travel Service Sector Output

Unobserved factors

ε_t: Error term

Subsequently, K-1 is the lag length, which is reduced by 1. Additionally, $\beta_i, v_j, \emptyset_m, \varphi_n, \alpha_p, \omega_q, \delta_r, \mu_s$ and γ_t are the short-run dynamic coefficients of the long-run equilibrium of model adjustment. Subsequently, $\boldsymbol{\lambda_i}$ is the speed of the adjustment parameter, with a negative sign. $\boldsymbol{ECT_{t-1}}$ is the error-correction term, which is the lagged value of the residuals obtained from the cointegrating regression of the dependent variable on the regressors. It contains long-run information derived from the long-run co-integrating relationship. Moreover, $\boldsymbol{e_{it}}$ is the residual, which is a stochastic error term often called impulses or innovations in shocks (Adeleye, 2018).

STUDY FINDINGS

Descriptive statistics

Table 1 details the descriptive statistics of the study variables.

Table 22: Descriptive statistics

Variable	Mean	Standard deviation	Minimum	Maximum
Economic growth	3.930	3.810	-8.625	10.298
Gross domestic product (GDP)	12,200,000,000	9,730,000,000	1,660,000,000	29,800,000,000
Tourist arrivals	608216.200	315668.800	39000.000	1266000.000
Tourism expenditure	200,000,000	148,000,000	81,000,000	511,000,000
Tourism receipts	267,000,000	288,000,000	200,000	819,000,000
Travel services	55.113	28.853	9.789	92.416
Agricultural output growth	1.950	15.735	-33.071	68.112
Manufacturing output growth	1,050,000,000	468,000,000	459,000,000	1,990,000,000
Construction output growth	34.152	6.929	22.820	47.284

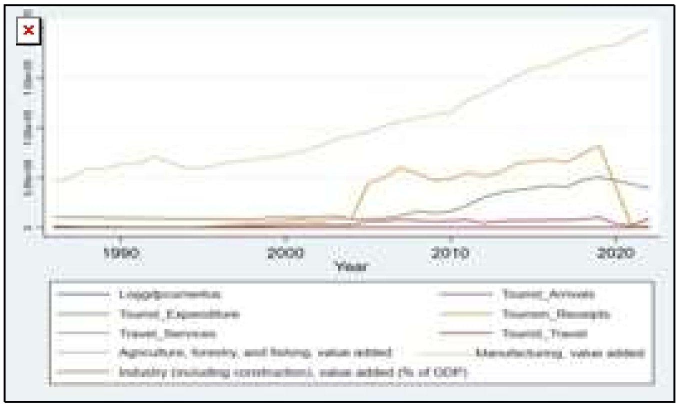
Source: Author, 2025

The study used the augmented Dickey (ADF) test to assess stationarity. At the initial level, Economic Growth (LogGDP) exhibits a test statistic of -0.700 with a high p-value of 0.8467, suggesting nonstationarity. However, after the first difference, the test statistic shifts to -4.386, with a significantly low p-value of 0.0003, indicating the attainment of stationarity. Consequently, Economic Growth, expressed as the logarithm of GDP, exhibits a stationary behavior after the first difference (see Table 2).

Table 2: Unit root tests

AUGMENTED DICKEY FULLER TEST FOR UNIT ROOT								
	VARIABLES AT LEVEL AR (0)				VARIABLES AT FIRST DIFFERENCE AR (1)			
Variable	**Lags ()**	**Test statistic**	**5% critical value**	**P-value**	**Lags ()**	**Test statistic**	**5% critical value**	**P-value**
Economic growth (LogGDP)	(1)	-0.700	-2.972	0.8467	(1)	-4.386	-2.975	0.0003
Tourist arrivals	(1)	-1.756	-2.972	0.4023	(1)	-2.936	-2.983	0.0413
Tourism expenditure	(1)	-0.810	-2.972	0.8163	(1)	-2.897	-2.975	0.0458
Tourism receipts	(1)	-1.800	-2.972	0.3807	(1)	-3.291	-2.983	0.0153
Travel services	(1)	-1.055	-2.972	0.7328	(1)	-4.458	-2.975	0.0002
Agricultural output growth	(1)	-2.830	-2.980	0.0541	(1)	-8.331	-2.975	0.0000
Manufacturing output growth	(1)	-0.795	-3.560	0.9661	(1)	-4.126	-3.564	0.0058
Construction output growth	(1)	-1.522	-3.560	0.8214	(1)	-4.402	-3.564	0.0022
Interaction term between tourist arrivals and travel services	(1)	-1.440	-2.972	0.5630	(1)	-4.294	-2.983	0.0005
PHILLIPS-PERRON TEST FOR UNIT ROOT								
	VARIABLES AT LEVEL AR (0)				VARIABLES AT FIRST DIFFERENCE AR (1)			
	Lags ()	**Test statistic**	**5% critical value**	**P-value**	**Lags ()**	**Test statistic**	**5% critical value**	**P-value**
Economic growth (LogGDP)	3	-1.106	-2.969	0.7126	3	-4.337	-2.972	0.0004
Tourist arrivals	3	-1.646	-2.969	0.4594	3	-3.179	-2.972	0.0012
Tourism expenditure	3	-0.248	-2.969	0.9325	3	-4.058	-2.972	0.0212
Tourism receipts	3	-1.481	-2.969	0.5427	3	-7.097	-2.972	0.0011
Travel services	3	-0.935	-2.969	0.7763	3	-4.058	-2.972	0.0000
Agricultural output growth	3	-1.176	-2.969	0.0000	3	-7.097	-2.972	0.0000
Manufacturing output growth	3	-10.823	-2.969	0.9990	3	-5.126	-2.972	0.0004
Construction output growth	3	2.377	-2.969	0.3990	3	-4.323	-2.972	0.0004
Interaction term between tourist arrivals and travel services	3	-1.763	-2.969	0.6836	3	-4.304	-2.972	0.0000

Figure 6: Variables at level



Agricultural Output Growth became stationary after the first difference. At the initial level, Manufacturing Output Growth records a test statistic of -0.795 with a high p-value of 0.9661, implying nonstationarity. Following the first difference, the test statistic shifts to -4.126 with a p-value of 0.0058, indicating the attainment of stationarity.

The choice to apply the Vector Error Correction Model (VECM) to investigate the tourism-led growth hypothesis was justified by the results of the unit root tests. Since all variables became stationary at the first difference, the VECM is appropriate for analyzing the long-term relationships and short-term dynamics between tourism-related variables and economic growth. This model allows for the examination of both short-term fluctuations and the long-term equilibrium relationship, making it an ideal choice for exploring how tourism impacts economic growth over time.

After the first difference, the test statistic becomes -4.402 with a p-value of 0.0022, signifying the achievement of stationarity. Therefore, Construction Output Growth becomes stationary after the first difference.

Subsequently, the Interaction Term between Tourist Arrivals and Travel Services, initially at the level, exhibits a test statistic of -1.440 with a p-value of 0.5630, indicating non-stationarity. However, after the first difference, the test statistic changes to -4.294, with a significantly low p-value of 0.0005, indicating the attainment of stationarity. Thus, the Interaction Term between Tourist Arrivals and Travel Services exhibits stationary behavior after the first difference. Therefore, all variables at the level tend to be non-stationary; however, after the first difference, all variables become stationary at the 5% level of significance (see figure 7).

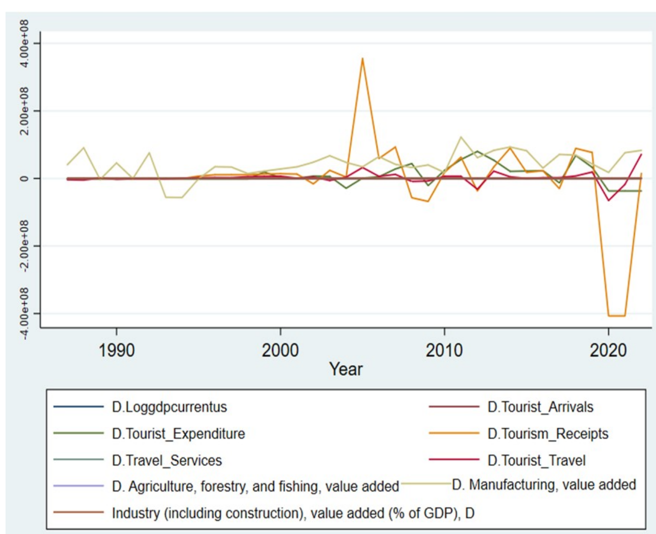


Figure 7: Variables at first difference

Furthermore, we ran a selection order criteria test to determine the optimal lag order for a vector autoregression (VAR) model. This model is a natural extension of the autoregressive model when analyzing multiple time series, in which a vector of variables is modelled as depending on their own lags and on the lags of every other variable in the vector. With regards to this, each row in table 3 corresponds to a different lag length, ranging from 0 to 4.

Table 3: Selection-order criteria

SELECTION-ORDER CRITERIA								
Lag	LL	LR	dF	P-value	FPE	AIC	HQIC	SBIC
0	-3339.12				1.1e+77	202.917	203.054	203.325
1	-3038.86	600.54	81	0.000	2.2e+71	189.628	191.001	193.709
2	-2920.35	**237.02***	81	0.000	8.0e+70	187.354	189.964	195.109
3	.	.	81	.	**-9.3e+08***	.	.	.
4	5255.07	**.**	81	.		**-300.489***	**-295.957***	**-287.021***
N								33

In our study, we carefully balanced the statistical significance of different lag orders by considering model simplicity and potential issues. Lag order 2 was chosen, as it represents a sensible choice, providing a significant improvement in model fit while avoiding potential complications observed at higher lag orders (see Table 3).

Table 4: Johansen cointegration test

JOHANSEN COINTEGRATION TEST					lags=2	
Number of observations	Maximum rank	Parms	LL	Eigenvalue	Trace statistic	5% critical value
35	0	90	-3290.1893	.	294.6607	192.89
35	1	107	-3244.327	0.92725	**202.9360**	156.00
35	2	122	-3215.0141	0.81270	144.3102	124.24
35	3	135	-3193.654	0.70494	101.5901	94.15
35	4	146	-3173.8148	0.67815	61.9118*	68.52
35	5	155	-3161.1728	0.51441	36.6277	47.21
35	6	162	-3153.3907	0.35898	21.0635	29.68
35	7	167	-3148.1168	0.26019	10.5158	15.41
35	8	170	-3143.9062	0.21385	2.0944	3.76
35	9	171	-3142.859	0.05808		

This decision aligns with the overall goal of achieving a balance between the model's goodness of fit and its practical interpretability (see Table 3).

Johansen cointegration test results indicate that the chosen time-series data contain long-term equilibrium relationships or cointegrating vectors, providing statistical information on the number of cointegrating vectors among a set of non-stationary variables.

From the results in table 4, we can conclude that the model has at least four cointegrating equations, implying that the variables in the model exhibit a long-term relationship.

Table 5: Vector error correction model short-run effects

VECTOR ERROR CORRECTION MODEL				
SHORT-RUN EFFECTS				
Variable				Number of observations=35
DEPENDENT VARIABLE: **Economic growth (LogGDP)**	Coefficient	Standard error	Z-statistic	P-value> |Z|
_e1 (Speed of adjustment)	-.0681238	.0362594	-1.88	0.060
Lag (Economic growth/ LogGDP)	.2460167	.1958265	1.26	0.209
Tourist arrivals	-1.49e-07	6.40e-07	-0.23	0.816
Tourism expenditure	-1.80e-09	1.52e-09	-1.18	0.237
Tourism receipts	5.00e-10	4.59e-10	1.09	0.276
Travel services	-.0038456	.0081261	-0.47	0.636
Agricultural output growth	.0003913	.0011521	0.34	0.734
Manufacturing output growth	-6.20e-11	1.02e-09	-0.06	0.951
Construction output growth	-.008931	.0139645	-0.64	0.522
Interaction term between tourist arrivals and travel services	3.55e-09	1.04e-08	0.34	0.734
Constant	.0650948	.0522541	1.25	0.213

Regarding the question of seeing the vector and identifying which variables are cointegrated, the test only shows the number of cointegrating vectors. To obtain specific vectors and understand which variables are cointegrated, it is necessary to estimate a vector error-correction model (VECM) that reveals the cointegrating equation (Table 5).

The short-run dynamic results from the Vector Error Correction Model (VECM) shed light on the immediate effects and adjustments within the system, following a deviation from the long-term equilibrium. The focus here is on the dependent variable "Economic Growth (LogGDP)" and its relationship with various explanatory variables.

The speed of adjustment, represented by the coefficient of the error correction term (_e1), was -0.0681238. This coefficient reflects the rate at which the system corrects itself towards long-term equilibrium following a deviation. The negative sign indicates that, on average, the system adjusts downward when it deviates from the equilibrium, and this is statistically significant at the 10% level. Therefore, given that the system of economic growth (LogGDP) defined by specified independent variables ((1) tourist arrivals; (2) tourism receipts; (3) tourism expenditure; (4) travel services; (5) manufacturing output growth; (6) agricultural output; (7) construction output; and (8) interaction term between tourist arrivals and travel services) adjusts in particular ways following a deviation from long-run equilibrium, at a 10% level of significance, the system may correct itself back to long-run equilibrium at a convergence speed of -6.8% (-.0681238 × 100%) (see Table 5).

Furthermore, the lag of the dependent variable "Economic Growth/LogGDP has a coefficient of 0.2460167. This coefficient suggests a positive relationship between the lagged value of economic growth and its current value, indicating the persistence or momentum of economic growth.

However, at the 10% significance level, the impact of the lag of the dependent variable (Lag of LogGDP) on economic growth (LogGDP) was not statistically significant, with a p-value of 0.209 (see Table 5). Furthermore, examining the impact of tourist-related variables, the coefficients for "Tourist Arrivals,Tourism Expenditure," and "Tourism Receipts were -1.49e-07, -1.80e-09, and 5.00e-10, respectively, with p-values of 0.816, 0.237, and 0.276, respectively. None of these coefficients are statistically significant at the 10% level of significance, suggesting that, in the short run, changes in these variables do not have a significant immediate impact on economic growth. Similarly, for "Travel Services," the coefficient is -0.0038456 but the p-value is 0.636, indicating that the effect is not statistically significant in the short term (see Table 5).

The VECM results indicate that despite short-run changes in independent variables being statistically insignificant in explaining shifts in Economic Growth (LogGDP), the speed of adjustment, or error correction term, is significant and negative. This significance confirms a stable long-run equilibrium relationship among the variables, meaning that any deviations from equilibrium are corrected over time. The negative error correction coefficient implies that, after a shock, the system gradually returns to equilibrium at a rate determined by the magnitude of this coefficient. With Economic Growth (LogGDP) as the dependent variable, the model includes tourist arrivals, tourism expenditure, tourism receipts, travel services, agricultural output growth, manufacturing output, construction output, and the interaction term between tourist arrivals and travel services as the independent variables. When the p-values for these coefficients are below the 10% level, we reject the null hypothesis of no effect, confirming that these variables significantly influence economic growth in the long term. Thus, although short-run dynamics may be weak, the long-run relationships are robust and meaningful.

The long-run VECM results reveal equilibrium relationships among the key variables affecting economic growth (logGDP) in Zambia. Under Johansen normalization restrictions, the estimated coefficients show that an increase in tourist arrivals (coefficient: -6.12e-06; z = -7.86; p = 0.000) is associated with a substantial and persistent positive impact on economic growth, implying that higher tourist inflows drive growth. In contrast, tourism expenditure exhibits a positive coefficient (1.23e-08; z = 3.68; p = 0.000), indicating that increased spending in this sector negatively affects growth in the long term. Similarly, tourism receipts, with a coefficient of -1.27e-08 (z = -7.97; p = 0.000), positively influenced economic growth, suggesting that increasing receipts boosted growth (see table 6).

Table 6: Vector error correction model Long-run effects

LONG-RUN EFFECTS				
JOHANSEN NORMALIZATION RESTRICTION IMPOSED				
_CE1	Coefficient	Standard error	Z-statistic	P-value> |Z|
Economic growth $(LogGDP)$	1	-	-	-
Tourist arrivals	-6.12e-06	7.80e-07	-7.86	0.000
Tourism expenditure	1.23e-08	3.35e-09	3.68	0.000
Tourism receipts	-1.27e-08	1.60e-09	-7.97	0.000
Travel services	-.1326859	.0166948	-7.95	0.000
Agricultural output growth	.017105	.0090086	1.90	0.058
Manufacturing output growth	-7.11e-09	1.38e-09	-5.14	0.000
Construction output growth	-.0645111	.0188498	-3.42	0.001
Interaction term between tourist arrivals and travel services	3.02e-07	2.35e-08	12.88	0.000
CONSTANT	22.67594	.	.	.

Travel services, recorded with a coefficient of -0.1326859 (z = -7.95; p = 0.000), also contributed positively to growth. However, the interaction between tourist arrivals and travel services yielded a highly positive coefficient (3.02e-07, z = 12.88, p = 0.000), indicating that their combined effect exerted a negative impact on economic growth. Additional variables, such as agricultural, construction, and manufacturing output growth, have coefficients that further complicate these long-term relationships. Overall, the findings underscore the complex and differentiated impacts of tourism-related variables on Zambia's economic growth over time (see table 6).

Furthermore, this study explores the impact of tourism receipts and travel services on economic growth. Tourism receipts were found to have a highly negative and statistically significant coefficient of -1.27e-08 (p-value = 0.000), indicating that an increase in tourism receipts led to a substantial and persistent increase in economic growth. On the other hand, the impact of travel services on economic growth is positive and statistically significant, as indicated by the coefficient of -0.1326859 (p-value = 0.000). Additionally, the interaction between tourist arrivals and travel services was highlighted, revealing a highly positive and statistically significant coefficient (3.02e-07, p = 0.000), indicating a substantial and persistent negative impact on economic growth in the long run. These findings underscore the nuanced relationship between tourism-related factors and economic growth (table 6).

The Granger causality test was used to determine whether one time series could predict the other. The Granger causality test was used to evaluate the validity of the Tourism-Led Growth Hypothesis, which posits that tourism leads to economic growth(Balaguer & Cantavella-Jordá, 2002). The Granger causality test uses the null hypothesis (H_0), which assumes that there is no causal relationship between two time series. If the p-value is less than a certain significance level (typically 0.05 or 5%), we can reject the null hypothesis, indicating that there is a Granger causal relationship between the two-time series.

The first set of null hypotheses focuses on the Granger causality between tourist arrival and economic growth, which was rejected. This implies that there is significant evidence suggesting that tourist arrivals Granger-cause economic growth (see Table 7).

Table 7: Granger causality test

Hypothesis	chi2	df	Prob > chi2	Sign of coefficient in the long run
H_0 : Tourist arrivals does not Granger cause Economic growth	14.092	1	0.000	+
H_0 : Economic growth does not Granger cause Tourist arrivals	2.6676	1	0.102	
H_0 : Tourism expenditure does not Granger cause Economic growth	4.092	1	0.043	−
H_0 : Economic growth does not Granger cause Tourism expenditure	9.0925	1	0.003	
H_0 : Tourism receipts does not Granger cause Economic growth	.54495	1	0.460	+
H_0 : Economic growth does not Granger cause Tourism receipts	2.8214	1	0.093	
H_0 : The interaction term between tourist arrivals and travel services does not Granger cause Economic growth	8.9625	1	0.003	−
H_0 : Economic growth does not Granger cause the interaction term between tourist arrivals and travel services	.29784	1	0.585	

We fail to reject the hypothesis that Granger-causality between economic growth Granger-causes tourist arrivals. Regarding the relationship between tourism expenditure and economic growth, there is evidence to suggest that tourism expenditure Granger causes economic growth, as the hypothesis was rejected (see Table 7). Similarly, we establish that economic growth Granger-causes tourism expenditures. In the fifth set, we observed insufficient evidence to reject the null hypothesis. Therefore, tourism receipts may not Granger-cause economic growth. Furthermore, we established that economic growth may not Granger-cause tourism receipts. The next set of hypotheses examines the interaction between tourist arrivals and travel services in relation to economic growth. Here, we observe evidence to suggest that the interaction term between tourist arrivals and travel services Granger-causes economic growth. Finally, we established that economic growth may not Granger-cause the interaction term between tourist arrivals and travel services (see Table 7).

Therefore, Granger causality results show that the Tourism-Led Growth Hypothesis (TLGH) holds in terms of the positive impact of tourist arrivals on economic growth, considering the evidence found for unidirectional positive causality running from tourist arrivals to economic growth. However, the Tourism-Led Growth Hypothesis does not hold in terms of the impact of tourism expenditure on economic growth, because the impact is negative, even though there is bidirectional causality between tourism expenditure and economic growth. Additionally, the Tourism-Led Growth Hypothesis does not hold in terms of the impact of tourism receipts on economic growth because causality runs from economic growth to tourism receipts (see Table 7). Lastly, the Tourism-Led Growth Hypothesis (TLGH) also does not hold in terms of the impact of the interaction term between tourist arrivals and travel services on economic growth because even though the causality is unidirectional, it is negative (see Table 7).

The impulse response function (IRF) results show that in the first period (0-1), a one-standard-deviation shock on tourist arrivals has a positive impact on economic growth (LogGDP). Furthermore, from periods 1 to 4, further increases in tourist arrivals continue to have positive impacts on economic growth (LogGDP), as they return to their initial values. This suggests that an unexpected increase in the number of tourists visiting a particular area was associated with an increase in economic growth during the initial period, immediately following the shock (see figure 8).

Furthermore, the impulse response function (IRF) results show that in the first period (0-1), one standard deviation shock on tourism expenditure has an immediate positive impact on economic growth (LogGDP). Similarly, from periods 1 to 4, further increases in tourism expenditure continue to have positive impacts on economic growth (LogGDP), and they do not return to their initial values (see figure 8). This implies that a sudden increase in spending related to tourism has an immediate and favorable effect on the economy, leading to a positive change in LogGDP during this initial period (see figure.

Moreover, the results from the Impulse Response Function (IRF) reveal that during the first period (0-1), a one-standard-deviation shock to tourism receipts exerts an immediate positive influence on economic growth (LogGDP). Similarly, in the subsequent periods from 1 to 4, continued increments in tourism receipts have a positive impact on economic growth (LogGDP). However, over the course of periods 2–4, there was a gradual decline, ultimately returning to the initial values, as shown in figure 8.

This signifies that a sudden surge in expenditures associated with tourism promptly and favorably affects the economy, resulting in a positive shift in logGDP during the initial period, as shown in figure 8. Despite the sustained positive effects in the short term, the slow decline observed from periods 2 to 4 implies a tendency for these effects to taper off and return toward baseline values over time.

In addition, the results from the Impulse Response Function (IRF) reveal that during the first period (0-1), a one-standard-deviation shock to travel services does not exert an immediate positive or negative influence on economic growth (LogGDP).

Similarly, in the subsequent periods from 1 to 4, continued increments in travel services do not exert any positive or negative effects on economic growth (LogGDP). This shows that economic growth does not respond to shocks due to the increase in travel services (see figure 8). Moreover, the results from the Impulse Response Function (IRF) reveal that during the first period (0-1), a one-standard-deviation shock to the interaction between tourist arrivals and travel services exerts an immediate positive influence on economic growth (LogGDP). Similarly, in the subsequent periods from 1 to 4, continued increments in the interaction between tourist arrivals and travel services continue to have positive effects on economic growth, despite the impact slowly reducing over time (LogGDP) (see figure 8).

Diagnostic tests

The Lagrange Multiplier (LM) test for the Vector Error Correction Model (VECM) is a diagnostic test that checks for autocorrelation in the residuals of the model.

Table 8: Lagrange multiplier test

LAG	CHI-SQUARE	DF	Prob > chi2
1	95.5221	81	0.12907
2	68.4771	81	0.83808

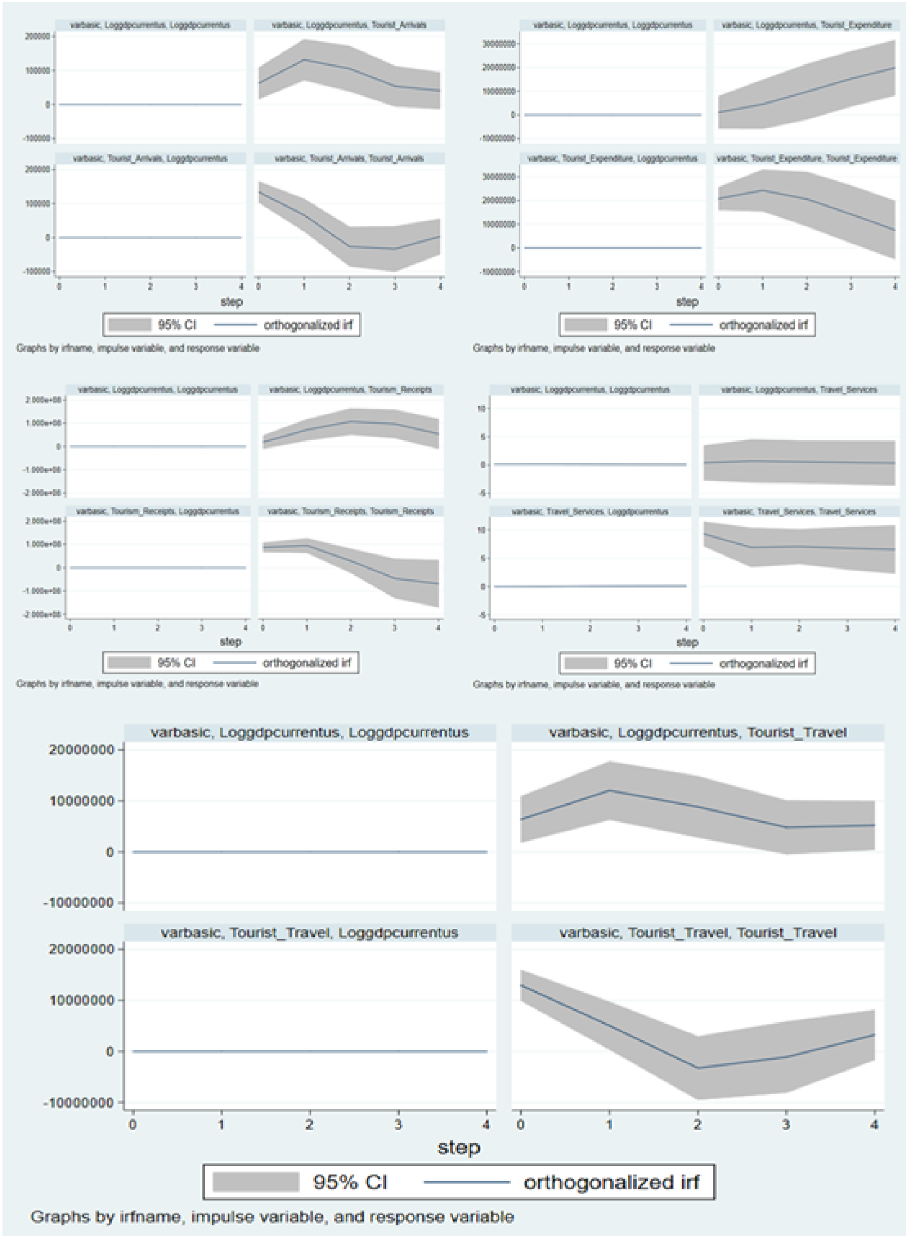


Figure 8: Impulse response functions

Based on the results obtained (and presented in table 8), we can conclude that, for lag lengths of 1 and 2, there is no statistically significant evidence of autocorrelation in the residuals of the VECM.

The stability of the VECM can be analyzed using the plot yield from the CUSUM test (shown in figure 6). The graph in figure 9 confirms the stability of VECM.

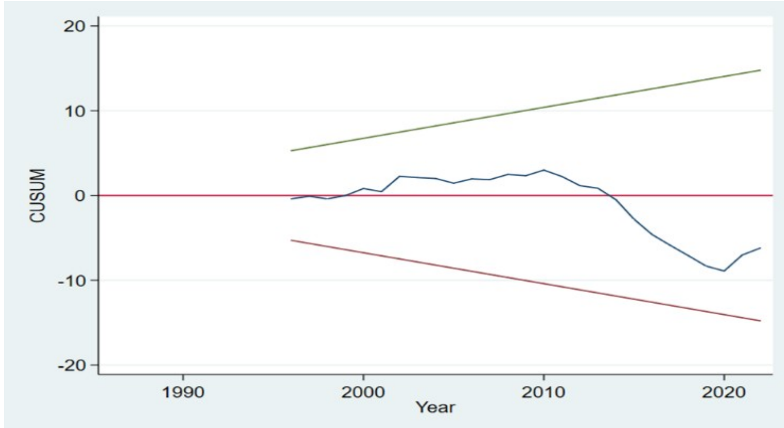


Figure 9: CUSUM Test

With respect to the CUSUM test (shown in figure 13), when we assess the stability of each model parameter using the fluctuations in the corresponding model scores (also known as contributions to the gradient of the model or estimating functions), the model fits well throughout the entire sample period, and the corresponding scores fluctuate randomly around zero. This indicates that the VECM satisfies the stability condition (Figure 9).

Table 9: Jargue-bera test

JARGUE-BERA TEST

Equation	Chi-square test statistic	DF	Prob >Chi2
Economic growth $(LogGDP)$	0.005	2	0.99737
Tourist arrivals	12.253	2	0.00218
Tourism expenditure	1.156	2	0.56097
Tourism receipts	40.085	2	0.00000
Travel services	1.427	2	0.48984
Agricultural output growth	3.474	2	0.17604
Manufacturing output	2.239	2	0.32642
Construction output	0.804	2	0.66905
Interaction term between tourist arrivals and travel services	0.892	2	0.64025

The Jarque-Bera test is a goodness-of-fit test used to determine whether the data have skewness and kurtosis that match a normal distribution. Vector Error Correction Models (VECM) were used to verify the normality of the residuals in the model. For each equation listed in the test, the chi-square statistic, degrees of freedom (DF), and probability (p-value) were reported.

We start by examining the Jarque-Bera test results for economic growth (LogGDP). The chi-square test statistic was 0.005, with two degrees of freedom, and the probability (Prob > Chi2) was 0.99737. As the p-value is greater than the conventional significance level of 0.05, there is insufficient evidence to reject the null hypothesis that economic growth follows a normal distribution. This suggests that the distribution of the economic growth data is not significantly different from a normal distribution (see Table 9). Furthermore, we observe that the distribution of tourist arrival data deviates from the normal distribution.

For tourism expenditure, there was no significant evidence to reject the null hypothesis, indicating that the distribution of tourism expenditure data was consistent with a normal distribution. In tourism receipt, we observe that the distribution deviates significantly from a normal distribution. The distribution of the travel service data is consistent with a normal distribution. The Jarque-Bera test results for agricultural output growth, manufacturing output, construction output, and the interaction term between tourist arrivals and travel services follow a similar pattern.

CONCLUSIONS

This study investigates the impact of tourism on Zambia's economic growth by testing TLGH, with a focus on three tourism variables: tourist arrivals, tourism expenditure, and tourism receipts. Additionally, this study introduced an interaction term between tourist arrivals and travel services to explore the combined effect on growth. The analysis employs a Vector Error Correction Model (VECM) and Granger causality tests to examine both short- and long-run dynamics.

In the short run, tourism-specific variables do not exhibit statistically significant effects on economic growth; however, the significant speed of adjustment (–6.8%) indicates that short-run deviations are corrected towards long-run equilibrium. In the long run, the results reveal that tourist arrivals have a positive and statistically significant impact on economic growth, and that tourism receipts contribute positively. Travel services similarly exert a positive long-run influence on growth. Conversely, tourism expenditure negatively affects economic growth in the long-term, suggesting that higher spending in this area may be detrimental. Moreover, the interaction term between tourist arrivals and travel services was negative and statistically significant, indicating that the combined effect of these variables can adversely affect growth.

The Granger causality tests further support these findings. Unidirectional positive causality runs from tourist arrivals to economic growth, supporting the TLGH for this variable. Although tourism expenditure and economic growth exhibit bidirectional causality, the net effect of tourism expenditure is negative, challenging TLGH.

Additionally, the causality from economic growth to tourism receipts, rather than vice versa, suggests that growth drives tourism receipts. The negative unidirectional causality of the interaction terms contradicts the TLGH framework.

Overall, while the study confirms that tourist arrivals and travel services contribute positively to Zambia's long-run growth, it challenges conventional TLGH assumptions regarding tourism expenditure and receipts. These differentiated causal effects call for nuanced policies that leverage tourism to achieve sustainable economic growth in Zambia.

Recommendations

Tourist Arrivals: Government should prioritize increasing international inbound tourist volumes. This can be achieved through the following practical actions:

- Strengthen destination marketing by scaling up international tourism campaigns focused on Zambia's unique natural and cultural attractions (e.g., Victoria Falls, national parks, and heritage sites).
- Simplify visa processes and border entry requirements to make travel to Zambia more accessible, especially for tourists from key regional and global markets.
- Develop regional partnerships with neighboring countries for multi-country tourist packages, boosting cross-border travel volumes.
- Enhance safety, sanitation, and tourist information services to improve visitor satisfaction and attract repeat tourism.

Tourism Expenditure on Accommodation Services: Improve efficiency or value leakage in the lodging sector through

Promote domestic ownership and participation in the hospitality industry to reduce capital flights and enhance local income retention.

- Incentivize reinvestment and quality upgrades in accommodation facilities through tax rebates, matching grants, or soft loans for locally registered establishments.

- Regulate pricing and improve transparency in the hospitality sector to ensure competitive and reasonable rates for tourists, which could lead to increased spending in other high-multiplier areas of the economy.
- Strengthen hospitality training programs to improve service delivery and boost the productivity of accommodation service providers.

Tourism Receipts from Carriage Services and Park Entrance Fees

- Upgrade and expand park facilities, guide tours, and logistical services to encourage repeat visits and longer tourist stays.
- Introduce dynamic pricing strategies for park entry and tour services that balance affordability with revenue optimization, particularly for premium-nature-based experiences.
- Enhanced conservation and reinvested revenue from park fees to maintain the ecological health and accessibility of national parks and game reserves, ensuring the long-term viability of these revenue streams.

Data availability: The dataset that supports the findings of this study are available on the World Bank website https://data.worldbank.org/indicator/ST.INT.ARVL?locations=ZM

Conflict of interest: The author has no conflict of interest.

Funding: Authors has not received any funding on this research

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