The Influence of Government Expenditure on Economic Growth in Morocco: An ARDL Approach

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ABSTRACT

The interplay between public sector expenditure and economic growth remains a pivotal area of inquiry for scholars and policy practitioners. This investigation scrutinises the ramifications of government spending on economic growth in Morocco from 1970 to 2023. Employing the Autoregressive Distributed Lag (ARDL) estimation technique alongside data derived from the World Development Indicators, this study explores the effects of public investment, demographic variables, and foreign direct investment (FDI) on GDP over short and long-term horizons. The findings reveal a pronounced positive correlation between government expenditure and long-term economic growth, thus highlighting the essential function of public investment in driving developmental progress. In contrast, the short-term impacts of FDI and population growth on GDP are relatively modest, indicating a possible temporal lag before these factors exert their comprehensive influence. This research enriches the sparse body of literature concerning fiscal policy in Morocco and proffers substantive insights for policymakers seeking to enhance public expenditure strategies within sustainable development.

Keywords: Government Expenditure, Economic Growth, ARDL Model, Moroccan Economy, Fiscal Policy Efficiency
JEL Classifications: H50, O11.

1. INTRODUCTION

The interplay between public expenditure and economic development has emerged as a prominent subject within the field of development economics, particularly concerning emerging economies. Scholars, including Delgado (2023) and Podestá (2020), assert that targeted government investments in healthcare, education, and infrastructure can be significant catalysts for economic growth. However, the underlying dynamics are markedly more intricate. The theoretical underpinnings of public spending—including productive investments and social welfare provisions—have long been acknowledged as instrumental in fostering economic stability and resilience. This perspective is particularly relevant for nations aiming to reconcile developmental disparities and address social inequalities (Gnangoin et al., 2019). Morocco is a salient illustration of developing nations'

challenges and objectives in pursuing infrastructure, education, and healthcare investments. While these fiscal policies play a vital role in promoting short-term economic growth, there remains a robust discourse concerning their compatibility with established international frameworks, including the Sustainable Development Goals (SDGs). Proponents, such as Podestá (2023) and Rehaimi and Imloui (2023), argue that these investments establish a foundation for long-term sustainability. In contrast, critics argue that some urban-oriented infrastructure initiatives may insufficiently meet the needs of rural communities, thereby raising concerns regarding the equitable execution of these projects.

Although significant, Morocco has some structural and economic challenges that have impeded the direct relationship between public expenditure and economic growth. Regional inequalities, institutional effectiveness, and limited financial resources have

raised important questions about public expenditure's best distribution and effectiveness (Shik, 2020; Diagne et al., 2014). For example, despite more noticeable government support in some sectors like infrastructure, recent analyses point out the uncertainties and disparities in some other critical segments, which could undermine the global expected economic values of these spending (Gnangoin et al., 2019; Onifade et al., 2020). Moreover, Morocco's vulnerability to global economic fluctuations, particularly in the aftermath of COVID-19, amplifies the necessity for robust fiscal policies that effectively allocate public funds to foster sustained economic growth.

Despite the importance of public expenditure for economic growth, the Moroccan context remains underexplored in the empirical literature, especially concerning sector-specific impacts and overall expenditure efficiency. While various studies examine government spending's general impact on growth in emerging economies, few have addressed Morocco's unique structural and economic constraints within this framework (Diagne et al., 2014; Delgado, 2023). The literature reveals a notable gap regarding the impact of overall public expenditure on Morocco's economic trajectory, signalling a need for a more comprehensive analysis. An aggregate assessment that explores the contributions and inefficiencies within Morocco's public spending could provide essential insights for developing effective fiscal policies. Understanding these general inefficiencies is especially critical in light of globalisation pressures and demographic growth, which increase demands on Morocco's fiscal resources (Shik, 2020; Rehaimi and Imloui, 2023).

The relationship between government expenditure and economic growth in Morocco has recently raised great interest and controversy. Findings from research vary widely, shaped by differences in study periods, methodologies, and focus areas. For instance, some studies on the impact of public expenditure in developing countries suggest that government investments can positively drive growth (Rehaimi and Imloui, 2023; Shik, 2020; Delgado, 2023). However, other research suggests that inefficiencies or uneven spending across critical sectors, like healthcare and education, may dilute these growth benefits, occasionally leading to mixed or even negative outcomes (Podestá, 2020; Onifade et al., 2020; Diagne et al., 2014). These variations in results often reflect the different fiscal frameworks and reforms at play, underscoring the importance of research considering each country's unique context.

This study explores the immediate and longer-term effects of government spending on Morocco's economic growth. By examining Morocco's distinct economic environment, this research hopes to provide insights that policymakers can use to fine-tune fiscal strategies aligned with the nation's development priorities. This study presents these findings: Government expenditure has a positive relationship with economic growth in the short and long run. Additionally, our results show that foreign direct investment and population growth have a significant positive relationship with economic growth in the long run. However, the relationship between these two variables and economic growth is insignificant in the short run.

The study is organised as follows: the first section provides an introduction, while the second section, Section 2, reviews the theoretical and empirical literature. The methodology is presented in Section 3. Sections 4 and 5 discuss the results and conclusion of the study, respectively.

2. LITERATURE REVIEW

This paper examines two opposing economic theories: Wagner's Law (1890) and the Keynesian Hypothesis (Keynes, 1937). The Keynesian Hypothesis posits that increasing public expenditure is a powerful engine of economic growth. This theory asserts that each time the government raises its spending, it enhances the purchasing power of the populace, which subsequently stimulates the economy as a whole (Webb, 1926). From a more traditional Keynesian perspective, expanding the public sector is one of the most significant means to augment aggregate demand. The demand-driven response has a multiplier effect that fosters economic growth and, during downturns, aids in lowering unemployment rates (Henrekson, 2013).

One key factor in boosting economic growth in the Keynesian manner is the increase in public spending, either across the board or in specific areas. It is also well known that such expenditure rejuvenates local markets and insulates the economy from the cyclical nature of external demand, particularly for countries heavily reliant on exports (Benavides, 2013). Therefore, public spending can be considered an exogenous agent that gives impulse to political and economic deliberations guiding growth. This has been central to policymaking in developed and emerging economies for a considerable time.

In this context, Wagner's Law presented partly conflicting opinions, asserting that public expenditure is an effect rather than a cause of economic growth. Wagner held the view that the growth of an economy will be matched by a rise in government expenditure (Henrekson, 1993). Economic growth has favoured the most progressive firms, which often attain market leader status and sometimes even reach monopoly status. Against such formidable market forces, Wagner proposed state intervention through expenditure to moderate them. Oftentimes, however, population growth does indeed follow a predictable pattern alongside economic growth, increasing demands for social services. In that respect, the state has the relative investment advantage to accommodate a growing population (Henrekson, 2013). Wagner's Law, therefore, presupposes that the growth in public expenditure is induced by wider economic development.

Sideris (2007) maintains that in the process of the industrialization of an economy, the share of public spending to total income stays on a regular path as long as per capita income increases. This pattern can be justified by the fact that during industrialization, the state assumes regulatory functions previously undertaken by the private sector. Hence, economic growth is translated into an increase in social welfare services, which generally tend to be income-elastic. The state also plays a key role in supplying capital to finance large-scale projects that meet societal demands—projects the private sector is often unable to provide.

Numerous empirical studies worldwide have analysed the relationship between public spending and economic growth across different periods, countries, and econometric models. These studies differ in terms of whether overall public spending or specific components of government spending are taken as the dependent variable. Some studies support the Keynesian approach, while others support Wagner's approach. However, the literature also includes studies that support or refute both approaches.

Several studies have analyzed the relationship between government spending and economic growth in a multivariate framework and across countries and regions using different econometric techniques. Chang et al. (2004) examined this relationship between government spending and economic growth in South Korea, Taiwan, Thailand, Australia, Canada, Japan, New Zealand, the USA, the UK, and South Africa using the Johansen-Juselius cointegration test and Granger causality test. The findings of the authors establish Wagner's law for South Korea, Taiwan, Japan, the UK, and the USA, while they failed to establish any significant causal relationship in the remainder of the countries.

In a related study, Bose et al. (2007) further show that while investment spending has a positive and significant impact on economic growth, current spending has a marginal effect through panel data analysis of 30 countries from 1970 to 1990. For Nigeria, using the ARDL model along with causality tests through the Toda-Yamamoto approach, Babatunde (2011) estimated for the period between 1961 and 2005 and found Wagner's law not to hold.

In the case of New Zealand, Kumar et al. (2012) detected evidence of a long-run cointegration relationship between per capita income and the ratio of government spending to income, thus supporting Wagner's law during the period under review. Yildiz and Sarisoy (2012), through panel data, gave evidence that Wagner's and Keynes' laws can be applied in OECD countries from 1990 to 2010.

Gangal and Gupta (2013) found that, from 1998 to 2012, public spending and economic growth exhibited bidirectional causality in India, supporting both Wagner's and Keynes' laws. In the Wang et al. (2016) study on Romania, using the ARDL Bounds Test along with ten models reflecting Wagner's and Keynes' theories, long-term relationships were observed in all but two models, though some Keynesian coefficients were insignificant. Cavicchioli and Pistoresi (2016), in their study of Italy, confirmed the existence of a threshold cointegration relationship between public spending and economic growth. However, they noted that the non-linear behavior, due to wartime peaks in defense-related expenditure, was temporary. Finally, Keho (2017) found that Keynes' law held in Cameroon and Côte d'Ivoire, whereas Wagner's law applied to Kenya and Senegal.

Churchill and Yew (2017) pointed out that government spending on education has a positive impact in developed countries, while the effect is lower in less developed countries. Chikalipah and Okafor (2019), using time series methodology, reached controversial conclusions, noting that in the long term, there is a relationship between the variables, but only GDP seems to influence education

spending. In Osiobe's (2020) study, employing panel unit root tests and panel cointegration analysis, it was found that government spending on education had a significant and positive relationship with economic growth in both the short and long term in eight Latin American countries from 2000 to 2014.

Using panel unit root testing and panel cointegration analysis, Osiobe (2020) found a significant and positive relationship between government expenditure on education and economic growth in both the short and long run across eight Latin American countries from 2000 to 2014. Le and Tran (2021) similarly provided evidence of a bidirectional causality relationship between economic growth and government spending on education in Vietnam from 2006 to 2019. In North Macedonia, Ziberi et al. (2022) used instrumental variables and identified a positive relationship between government spending on education and economic growth, with GDP as the dependent variable, for the period spanning 1977-2020. Okerekeoti (2022), analyzing Nigeria from 1999 to 2020 using regression analysis, concluded that government spending has a positive and significant effect on real GDP.

To apply the concept to economic growth, Villela and Paredes (2022) provided an analysis of the effect of government expenditure on education and accumulation of human capital on economic growth in Honduras between the years 1990 and 2020. The authors indicate that there was no established relationship between government expenditure on education and economic growth. Again, it was the case that little or no contribution of human capital to growth is warranted by human capital accumulation so nascent. Even a set of control variables considered basic in the literature does not bring total assurance of sustainable economic growth with huge challenges both for the government and the population to overcome, according to the debate of the authors. Mulugeta Emeru, in his study on Ethiopia (2023), presented the impact of economic growth on government spending analysed by applying Johansen's cointegration test and VECM for assessing short- and long-run associations between government spending and economic growth. He found that the proportion of government expenditure on education positively and significantly impacts economic output growth, both in the short and long run. However, government spending on agriculture negatively influenced economic growth in the long run. In the long run, investment positively contributed to the influence of economic growth and defence spending. Government spending also had a slight positive effect on economic growth in both the long and short term, and health spending had a positive and significant contribution to influencing economic growth in both time frames.

The findings regarding the relationship between public expenditure and economic growth exhibit considerable variability, contingent upon the methodologies employed for calculation, the specific expenditures considered, and the geographical regions analysed. Notably, there is a paucity of studies concentrating on the dynamics of public spending and economic growth specifically within the context of Morocco. Existing research on this subject reveals a dichotomy of perspectives; some studies propose a positive correlation, while others suggest a negative one. Such divergence

implies that the impact of public expenditure on economic growth is intricately linked to the composition of expenditures as well as the unique economic conditions inherent to each country.

3. METHODOLOGY AND DATA

3.1. The Empirical Model

Based on the previous and most recent empirical literature to examine the effect of government expenditure and economic growth (Nyasha and Odhiambo, 2021; Selvanathan et al., 2021) we use the symmetric ARDL model of Pesaran et al. (2001) as framework. The representation of an unrestricted error correction (UEC) model is given as follows:

$$\Delta GDP_t = \alpha_0 + \alpha_1 GDP_{t-1} + \alpha_2 FDI_{t-1} + \alpha_3 POP_{t-1}$$
$$+ \alpha_4 GEXP_{t-1} + \sum_{j=1}^{k1} \beta_{1j} \Delta GDP_{t-j} + \sum_{j=0}^{k2} \beta_{2j} \Delta FDI_{t-j}$$
$$+ \sum_{j=0}^{k3} \beta_{3j} \Delta POP_{t-j} + \sum_{j=0}^{k4} \beta_{4j} \Delta GEXP_{t-j} + \varepsilon_t$$

Where α_0 is an intercept, ε_t is a white noise error term, GDP_t stands for GDP growth at the time t, FDI_t indicates the foreign direct investment at the time t, POP_t represents the (log) of population growth at the time t, $GEXP_t$ is the government expenditure at time t. The symbol (Δ) is the first difference operator, while k_1, k_2, k_3, and k_4, are the lag orders of the dependent and explanatory variables, respectively, selected according to the Akaike Information Criterion (AIC).

To estimate the parameters of the model proposed in Eq (1), ordinary least square (OLS) method is used. Under the null hypothesis (i.e., P_t, CR_t, S_t, and T_t, are not cointegrated), the coefficients of the lagged levels of these variables in Eq (1) are jointly zero ($\alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = 0$). The null hypothesis of non-cointegration between the variables can be tested using either the *F-test* of Pesaran et al. (2001) or the t_{BDM}-*test* statistic of Banerjee et al. (1998). The *F-test* procedure relies on two critical bounds, the upper and the lower one. If the empirical value of the *F-test* exceeds the upper bound, the null is rejected (there is evidence of long-run relationship between the variables considered in the model); if this value lies below the lower bound, the variables are not cointegrated; if it lies between the critical bounds, the test is inconclusive. Alternatively, the implementation of the t_{BDM}-*test* statistic involves testing the null hypothesis of no-cointegration (H$_0$: $\alpha_1 = 0$) against the alternative of cointegration (H$_1$: $\alpha_1 < 0$). Similarly, the t_{BDM}-*test* relies on two critical bounds (the upper and the lower one). If the t_{BDM}-*test* value exceeds the I(1) bound the null is rejected and there is cointegration; if it lies below the I(0)bound, the null is not rejected; if it lies between the bounds the test is inconclusive. It is relevant to mention that the ARDL estimator has several advantages: it jointly estimates both short- and long-run parameters, and shows good performances in small samples. Moreover, the ARDL estimator is applicable irrespective of whether the regressors are I(0) or I(1).[1]

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1   However, users must ensure that regressors are not of order I(2) or more and that seasonal unit roots have been removed from the series.

3.2. Data

This section outlines the data and the variables we have chosen to utilise in this empirical analysis. The study variables comprise GDP growth (GDPG), government expenditure (GEXP), population growth (POP), and foreign direct investment (FDI). All the data is taken from the World Development Indicators. In line with the literature, GDP growth is represented by the annual GDP growth rate, whilst Gross Fixed Capital Formation is expressed as Gross Fixed Capital Formation as a percentage of GDP. We proxy government expenditure with the annual percentage growth in government final consumption expenditure. Additionally, population growth is proxied using the annual population growth rate, whilst net inflows of foreign direct investment as a percentage of GDP are employed as the measure of FDI.

The graph above, Figure 1, shows that both time series have an ascending trend and are strongly correlated, with a coefficient of correlation equal to 87.84%. Morocco has recorded a constant rise of its long-term real GDP throughout the time span, with an average annual growth rate of 3.42% for the last 20 years. Similarly, the government expenditure was growing with an average annual rate of 4.15%.

4. RESULTS AND DISCUSSION

This section discusses the results of the empirical analysis. Table 1 presents the descriptive statistics of the collected data.

Table 1 illustrates the descriptive statistics of the variables analysed in this study. The Gross Domestic Product (GDP) growth rate exhibits a mean value of 4.13 and a standard deviation of 3.85, indicative of moderate variability. The highest recorded GDP growth was 12.37, whereas the lowest was −7.18, reflecting a substantial range in growth performance throughout the observed periods. As an independent variable, Foreign Direct Investment (FDI) exhibited a mean value of 1.36 alongside a standard deviation of 1.27, indicating lower variability relative to gross domestic product (GDP). The highest recorded FDI level was 6.44, while the lowest was −0.27, suggesting the occurrence of positive inflows and instances of disinvestment throughout the analysed timeframe. Conversely, population growth (POP) demonstrated the least variability among the investigated variables, with a standard deviation of 0.58 and a mean value of 1.73. The observed maximum population growth rate was 2.66, while the minimum

Table 1: Descriptive statistics

Statistic	GDP	FDI	POP	GEXP
Mean	4.132119	1.359086	1.728801	3.738756
Median	3.737983	1.00597	1.47812	2.449371
Maximum	12.37288	6.444129	2.656761	44.34547
Minimum	−7.17821	−0.26578	1.014838	−11.5774
Standard deviation	3.852747	1.275404	0.577438	9.163432
Skewness	−0.37983	1.423661	0.523372	2.313966
Kurtosis	3.828329	5.913144	1.629026	10.61795
Jarque-Bera	2.842205	37.33572	6.694299	178.7646
Probability	0.241448	0	0.035184	0
Sum	223.1344	73.39066	93.35527	201.8928
Sum Sq. Dev.	786.714	86.21277	17.67202	4450.33
Observations	54	54	54	54

Source: Author's compilation

recorded was 1.01, indicating a relatively stable trajectory of population growth during the periods analysed. Additionally, Government Expenditure (GEXP) exhibited a mean value of 3.74, accompanied by a high standard deviation of 9.16, which signifies considerable variability in expenditure levels. The highest recorded government expenditure reached 44.35, in contrast to the lowest of −11.58, suggesting significant fluctuations in fiscal policies or spending across the periods under review.

4.1. Stationary Tests

The findings presented in Table 2 demonstrate the stationarity of the variables. According to both the ADF and KPSS tests, only GDP growth and Government Expenditure (GEXP) are stationary at their level. In contrast, Foreign Direct Investment (FDI), Population growth (POP) were non-stationary at the level but achieved stationarity at the 5% significance level after differencing. These results indicate that all variables, except for GDP growth and Government Expenditure (GEXP), are integrated of order one (I(1)), while GDP growth and Government Expenditure (GEXP) are integrated of order zero (I(0)).

4.2. ARDL Bounds Test Cointegration Results

After confirming that the variables are integrated in different orders, we examine whether cointegration exists among them using the ARDL bounds test approach formulated by Pesaran et al. (2001) based on the error correction representation. This test primarily relies on the joint F-statistic, whose asymptotic distribution is non-standard under the null hypothesis of no cointegration (i.e., $\alpha1 = \alpha2 = \alpha3 = \alpha4 = 0$) against the alternative hypothesis of a cointegrating relationship (i.e., $\alpha1 \neq \alpha2 \neq \alpha3 \neq \alpha4 \neq 0$). Under the bounds test, it is assumed that the model includes both I(0) and I(1) variables, generating two sets of critical values. The first set assumes that all variables in the ARDL model are integrated of order zero (I(0)), while the second set is based on the assumption that the variables are integrated of order one (I(1)). The procedure entails estimating the equation using ordinary least squares (OLS) and testing for the joint significance of the lagged levels of the variables. The null hypothesis of no cointegration is rejected if the F-statistic exceeds the critical values for both I(0) and I(1) regressors; otherwise, it is not rejected (Belloumi, 2014). Given the limited data span

(53 observations), we depend on the critical values provided by Narayan (2004; 2005). The results are displayed in Table 3.

The comparisons show that the null hypothesis of no cointegration is rejected at both the 5% and 1% significance levels, with Model Selection Criteria of (1,0,1,1) and based on the Akaike info criterion, indicating unique cointegrating relationships among the variables in the model. The computed F-statistic (41.36) exceeds the upper critical bound values of 3.2, 3.67, and 4.66 at the 10%, 5%, and 1% significance levels, respectively. This suggests a long-run equilibrium relationship among the factors under consideration, as the F-statistic surpasses the lower and upper critical values across all significance levels (1%, 5%, and 10%). In conclusion, the results indicate a significant long-run relationship between the variables in the study.

4.3. ARDL and ECM Results

To evaluate the effect of the selected variables on GDP growth, we examine the long-term contributions of Foreign Direct Investment, Gross Capital Formation, Population growth, and Government Expenditure. These findings are summarised in Table 4.

In Table 4, the error correction term (referred to as "Adjustment," which represents the first lag of GDP growth) is negative and statistically significant, with a value of −1.6266. This term denotes the speed with which the system returns to equilibrium following a shock in the long-run equilibrium relationship. A negative and significant error correction term indicates how swiftly the variables revert to equilibrium. A higher absolute value of the adjustment coefficient indicates a quicker adjustment process. The adjusted R-squared value is 0.824, suggesting that the independent variables explain approximately 82% of the changes in output growth. Consequently, given the high percentage of the R-squared, the model can be interpreted as having a good fit.

Other findings show that, in the long run, GDP growth is positively associated with Foreign Direct Investment (0.8318), population growth (4.863), and government expenditure (0.2242). These variables serve as strong predictors of GDP growth. This result is in line with a priori expectation and also consistent with Sghaier and

Table 2: Stationary results

Variable	ADF Test				KPSS Test			
	Constant		Constant and trend		Constant		Constant and trend	
	Test statistic	Conclusion	Test statistic	Conclusion	Test statistic	Conclusion	Test statistic	Conclusion
Panel A: Levels								
GDP	−11.6***	Stationary	−12.36***	Stationary	0.35*	Stationary	0.06	Stationary
FDI	−1.96	Non-stationary	−2.61	Non-stationary	0.72**	Non-stationary	0.17**	Non-stationary
POP	−0.95	Non-stationary	−2.78	Non-stationary	0.82***	Non-stationary	0.13*	Stationary
GEXP	−4.86***	Stationary	−4.87***	Stationary	0.17	Stationary	0.13*	Stationary
Panel B: First Difference								
GDP	−11.38***	Stationary	−11.26***	Stationary	0.21	Stationary	0.21	Stationary
FDI	−16.99***	Stationary	−16.85***	Stationary	0.19	Stationary	0.15*	Stationary
POP	−3.30**	Stationary	−3.26*	Stationary	0.09	Stationary	0.09	Stationary
GEXP	−7.75***	Stationary	−7.67***	Stationary	0.12	Stationary	0.112492	Stationary

***, **, *indicate significance at 1%,5% and 10%, respectively. The variable POP is transformed to natural logarithm
Source: Author's compilation

Abida (2013), who found a positive relationship between economic growth and FDI for a panel of 4 countries in North Africa.[2] The positive relationship between economic growth and population growth is in line with the findings of Rehman (2019). Crucially for our analysis, we observe that GDP growth is positively and significantly connected to government expenditure in the long run. This relationship is not only statistically significant but also economically meaningful, as the estimate suggests that a 1% rise in government expenditure leads to a 0.22% increase in GDP growth in the long run, holding all other factors constant. Our results are consistent with Bahaddi and Karim (2017), who similarly found that government expenditure has an insignificant impact on economic growth in Morocco. In contrast, our findings contradict those of Adefeso (2016) who revealed an inverse relationship between productive government expenditure and economic growth in sub-Saharan Africa.

The short-run dynamics, as analysed through the Error Correction Model (ECM), indicate that population (LPOP) and government spending (GEXP) exert different immediate influences on the dependent variable. Specifically, the coefficient for the population change (ΔLPOP) is −24.23, with a t-statistic of −1.627, which shows that this effect is not statistically significant at typical levels. This suggests that, in the short term, shifts in population do not meaningfully impact the dependent variable within this model.

On the other hand, the short-term coefficient for government expenditure (ΔGEXP) is 0.0958, with a t-statistic of 1.998, indicating it is statistically significant at the 10% level. This finding suggests a modest yet significant positive effect of government spending on the dependent variable in the short run, implying that government expenditure may play a role in immediate adjustments before reaching a stable long-run equilibrium. The findings of this study align with prior research conducted by Nyarko-Asomani et al. (2019). It is

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[2]   The panel consists of Tunisia, Morocco, Algeria and Egypt.

Table 3: Bounds testing results

F-Statistic	Significance level	Lower bound	Upper bound
41.36***	10%	2.37	3.2
	5%	2.79	3.67
	1%	3.65	4.66

***, **, *indicates significance at 1%, 5%, and 10%, respectively
Source: Author's compilation

Table 4: Error correction results ARDL (1,0,1,1)

Constant	1.8585 (1.312)
Long-run estimates	
FDI	0.8318c (1.942)
LPOP	4.863a (2.797)
GEXP	0.2242a (3.960)
Adjustment	
GDPG (−1)	−1.6266a (−14.363)
Short-run estimates	
Δ(LPOP)	−24.23 (−1.627)
Δ(GEXP)	0.0958c (1.998)
N° of Obs.	53
R^2	0.824

Numbers in parentheses are t-statistics based on white heteroscedasticity-consistent standard errors. statistical significance: a,b,c indicate 1, 5 and 10% levels, respectively
Source: Author's compilation

indicated that heightened government expenditure impacts immediate production and consumption activities, resulting in a short-term enhancement of economic growth. This observation serves to validate the Keynesian theory regarding government expenditure.
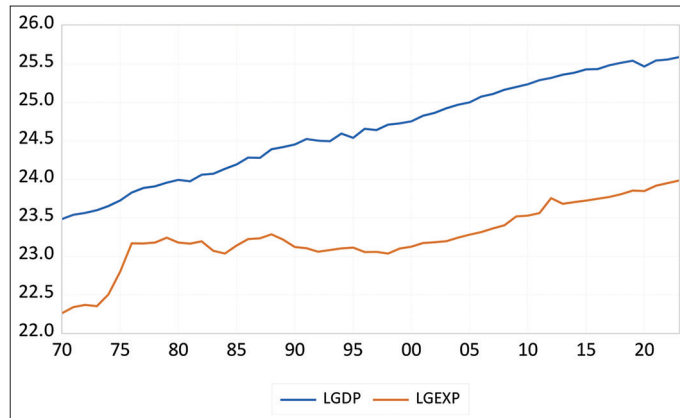
4.4. Diagnostic Tests Results

To improve the stability and robustness of our model, we conduct a series of diagnostic tests. Ensuring the model is free from issues such as autocorrelation, heteroscedasticity, and misspecification is essential. Ideally, the test statistics across these diagnostics should yield insignificant results, confirming the econometric model's robustness.
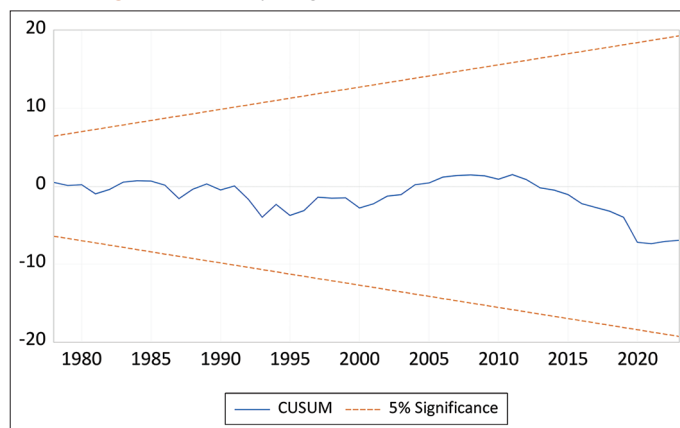
To confirm the validity of the findings from this study, a stability diagnostic test is performed using CUSUM (which is suitable for ARDL) at a significance level of 5%. The CUSUM curve shows that the models are stable. Figure 2 illustrates the CUSUM test for GDP_t in ECM in the ARDL model.

Moreover, a residual diagnostic assessment is conducted using the Breusch-Godfrey tests for serial correlation and heteroskedasticity. The results of these tests, shown in Table 5, indicate that the models lack serial correlation and heteroskedasticity. These findings affirm the study's results' validity and reliability, supporting both theoretical and practical implications and making a significant contribution to the existing literature.

Figure 1: GDP and government expenditure in logarithm and real terms (Source: World Development Indicators)

Figure 2: Stability diagnostic – CUSUM test in ECM

Table 5: Diagnostic and stability test results

Test	Statistic	P-value
Autocorrelation	0.5721	0.5685
Heteroscedasticity	0.9543	0.4664

Source: Author's compilation

5. CONCLUSION AND POLICY IMPLICATIONS

The examination of the impact of public expenditure on economic growth has garnered significant attention within the context of developing economies. A thorough literature review indicates that productive public spending is a variant of public investment that promotes developmental progress and endogenous growth, thereby facilitating equilibrium amidst a transition dynamic prevalent in developed economies. Within this framework, investigating this correlation in Morocco presents a particularly intriguing case, considering the concurrent rise in public expenditure alongside the overall expansion of its economy.

This article analyses annual time series data from 1970 to 2020 using the ARDL econometric technique. It is found that Foreign Direct Investment, population growth, and Government Expenditure positively and significantly impact GDP growth in the long run. On the other hand, the Error Correction Model (ECM) analysis reveals differing short-term effects of population growth and government spending on the dependent variable. Although population changes exhibit insignificant short-run effects, government expenditure demonstrates a positive coefficient of 0.0958 and a statistically significant effect. This suggests that government spending plays a modest role in facilitating short-term economic adjustments. These results correspond with the findings of Nyarko-Asomani et al. (2019), thereby reinforcing the Keynesian perspective that an increase in government expenditure is conducive to stimulating economic growth in the short run.

The findings of this study carry significant policy implications. The government should leverage expenditure to stimulate short-term economic growth in Morocco, prioritising increased investment in profitable initiatives to enhance GDP growth in the near term. Additionally, the government needs to invest in long-term profitable projects to maximise the sustained benefits of its expenditures on economic development. Furthermore, the government should cultivate a favourable business environment to attract greater Foreign Direct Investment (FDI) inflows, further bolstering GDP growth. Finally, policymakers should devise a well-structured strategy to manage population growth, given its detrimental effects on economic performance.

Finally, future research should further disaggregate public spending components—such as expenditures on education, health, and infrastructure—to allow for a more detailed and explanatory analysis of the structural factors influencing Morocco's economic growth.

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