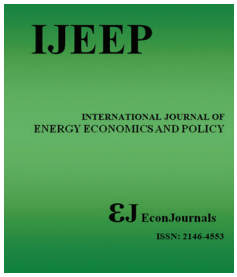

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Effect of CO_2 emissions, Renewable Energy Consumption and General Government Final Consumption Spending on Moroccan Economic Growth: ARDL Approach

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ABSTRACT

The empirical studies have shown that there is difference in association among depend and independent variables. Supported by framework's Keynesian theory of EG (Economic Growth), present research aims to examine how economic growth (EG) Morocco is influenced by REC (renewable energy consumption), general government spending, and CO_2 emissions. This research used the method of least squares ordinary assess the short- and long-term relationships between the model's variables, using an autoregressive approach for stationarity and distributed degradation. For the years 1993-2020, the research has gathered yearly data from WDI. According that empirical results, none independent variable were stationary at the first difference, but dependent variable was. A long-term association between the independent and dependent variables was shown by the model simulation utilizing the bound test. The White test revealed that there was no evidence of heteroscedasticity in the model residuals. The residuals have a normal distribution, as determined by the Shapiro-Wilk test, and the model exhibits stability throughout the time span with no structural fractures. The study's conclusions suggest that while the use of renewable energy sources and carbon dioxide emissions both exhibit notable positive trends, government spending on public goods has a substantial adverse association with economic growth.

Keywords: CO_2 Emissions, Renewable Energy Consumption, General Government Spending, Economic Growth, ARDL Technique, Morocco
JEL Classifications: E21, E61, E66, E42

1. INTRODUCTION

One of the main issues facing our planet now is change of climate and its effects regarding the surroundings (Gahlawat and Lakra, 2020 cited in Benali and Benabbou, 2023). Environmental deterioration results from rising carbon emissions that frequently accompany economies' expansion and development Benali and Benabbou, 2023). Economic theories such as Big Push theory and Keynesian demand emphasized the necessity for increased government spending as a means of enhancing public goods and hence enhancing economic well-being in an economy (quoted in Meltzer, 1981). According to Solow's growth framework, labour, capital and technological progress - all correlated with the consumption of energy - are the principal engines of growth's economy (Solow, 1956). The fact is that climate change is becoming a major global concern, and Morocco is not exempt from this reality. Morocco, currently counts among the nations that have instituted short- and medium-term renewable energy development programs. Ratifying the Kyoto Protocol in 2002 committed the nation to combating climate change with a projected energy savings of 15-20% by 2030, Morocco is currently working to minimize its reliance on foreign energy and establish a green economy over the next 10 years. This is being accomplished through the application the new proposal energy.

As of right now, no previous study has examined the association amid Morocco's growth's economic and per-person carbon dioxide emissions, nor contribution of the GDP, which is represented by

government final consumption expenditures. Present research aims to examine the connection within Morocco's economic performance, the RE share sources in consumption's entire energy, public administrations' ending consumption expenditures as a percentage of GDP, and CO_2 emissions per resident. His goal is to present a fresh viewpoint on these relationships, particularly in the Moroccan context. The association among CO_2 emissions, REC, general public spending, and EG has garnered significant attention in the economic literature. This literature has examined whether general public spending, the use of renewable energy sources, and carbon dioxide emissions have a positive, negative, or neutral impact on EG.

Present research aims to examine the association among emissions' CO_2, REC, general public spending, and EG in Morocco from the period 1993 to 2020. Based on previous empirical studies conducted in the Moroccan setting, we have selected our variables and combined them (Bouyghrissi et al., 2022, El Asli et al., 2024). This is vitally important to Moroccan policymakers because it enables them to formulate maintainable growth strategies economic growth's balance with the preservation of environment.

Our present paper prearranged in this manner: (1) the literature review is provided. (2) The models, estimating techniques, and data sources are presented. (3) presents the empirical part. (4) presents the findings conclusions.

2. LITERATURE REVIEW

According to Keynes' growth's economic theories (Keynes, 1936 cited in Meltzer, 1981), public spending is theoretically an external factor in fostering equitable growth. Because government expenditure has a beneficial impact on sustainable development, it has been determined that government expenditure is the primary driver of aggregate demand. In this regard, Solow (1956) emphasized that the main drivers of economic expansion are labor, capital, and technological advancement they are all linked to energy use as a primary source of manufacturing. The study found that there is empirical variation in the association among growth's economic, government spending, consumption's energy and emissions' carbon dioxide. The theoretical context for present research derived Keynes' EG approach. (Keynes, 1936 referenced in Meltzer, 1981). Government spending, according to Keynes (1936), boosts production growth. Government expenditure and the relationship to economic growth exhibit different causalities (Hanadi, 2024). Nonetheless, the majority of experimental researches (Hanadi, 2024) exposed communal spending contributes positively to growth's economic. Conversely, several studies suggested that spending by the government hampered economic growth (Connolly and Li, 2016). However, regarding green energy, there was more empirical variation in the association among government spending with growth's economic.

Zhang et al. (2021) conducted study that studied the links among public research and growth spending, energy conservation, and the growth of the green economy between 2008 and 2021. Based on their findings, public expenditure on R&D and human resources is crucial to maintaining a green economy through technology-driven manufacturing practices that have a variety of benefits. Numerous studies have revealed that energy use has a major role in aggravating environmental deterioration (Hanadi, 2024). A subsequent wave of research, including those conducted by (Hanadi, 2024), established a link of causation between CO_2 and GDP development (growth). (Hanadi, 2024) looked at LR co-integration association the using energy with actual provinces' Chinese and in terms of GDP per capita. They discovered a productive, ongoing cointegrated association. Begum et al. (2015) observed changing connections between GDP growth, population expansion, and energy usage and carbon dioxide emissions. The consequences demonstration GDP per capita and using energy take beneficial effect on per capita carbon dioxide productions Malaysia's nation. Raihan et al. (2022) have demonstrated an important association amid and positive link between CO_2 emissions and economic growth. It was discovered that solitary energy usage reduced the long-term carbon dioxide emissions.

Chen et al. (2016) examined the associations amid the economies of 188 nations, their CO_2 emissions, and their energy use from 1993 to 2010. They found that, with the exception of developing countries, where there was a negative link amid the EG and EC, the association amid energy consumption and carbon dioxide emissions was unidirectional in every country. However, Chen et al. (2020) used the model threshold to investigate the connecting association amid EG and RE in a sample of 103 nations. Findings demonstrated that, next a sure threshold is gotten, using of renewable energy only serves to boost economic expansion. Moreover, a thorough assessment of Lebanon's RE probable indicates important chances for astral (solar) and breeze (wind) power (Hanadi, 2024). Investment in RE is decisive for the social and economic development of states such as Lebanon. When Taher (2017) inspected the association amid RE) consumption and EG in Lebanon between 1990 and 2012, she discovered using RE (renewable energy) increased EG.

In different research, Taher (2019) studied how change's climate has affected Lebanon's economic growth. The results presented that 2-climate change-related variables have a detrimental impact the EG, but two other factors have a beneficial impact the Lebanon's ED. Morocco's economic development, carbon dioxide metric tons per capita emissions, GGFCE (% GDP), and renewable energy use (% of total final energy consumption) have not been extensively studied. Empirical part that findings indicate that Morocco's using of RE is start take positive impact side's economic of SD, and that there is a causal association linkage of using RE and both EG and carbon dioxide emissions There are differences findings and between economies or groups of economies regarding the association linkage of government spending, CO_2 emissions, RE, sustainable EG, literature review plus Keynesian theoretical conceptual framework. Similar to this, practical researches on Moroccan economy presented variance nonetheless didn't look at every variable at once. The goal of present study is to examine the association among CO_2 emissions, REC, and government spending with regard to Morocco's capacity for EG (economic growth). As a result, a model's conceptual is shown below the following theories are elaborated:

3. METHODOLOGY AND DATA

Our research examines correlations between LT long-term and ST short-term variables with varying orders of integration using the ARDL econometric method, which was first introduced by (Pesaran et al., 2001), cited in Benali and Benabbou, 2024). ARDL is superior than earlier cointegration techniques in three ways: It is more effective for small data sets, (1) It has the ability to manage variables with differing orders of integration (I [1] or I [0]), and (2) it produces precise long-term model predictions (Harris and Solis, cited in Benali and Benabbou, 2024). We will apply the Akaike-AIC, Schwarz-SIC, and Hannan-Quin information criterion finding ideal lag number (p, q) for our model (Benali and Benabbou, 2024). Our proposal the model is based on a broader body of literature, specifically the works of Hanadi (2024). Here, we summarize the data that was gathered for Morocco between 1993 and 2020. These data, which we used for our analysis, come from the WDI. The choose of variables is constructed on preceding empirical researches in this field. Government expenditure was emphasized by way of important pilote of sustained economic expansion in Keynesian theory of growth's economic (Keynes, 1936 cited in Meltzer, 1981). Government expenditure expansion boosts sustainable economic growth, according to the Keynesian model. This study examines the production function Cobb-Douglas by way of a theoretical outline (framework), The Pedroni model modifies this, according to which Y = f(K, L, S) represents the energy required for economic growth, according to (Pedroni, 2004), S is a productive energy. The following is the study model:

$$Y = f(CO_2 \text{ emissions, } REC, GGFCS) \quad (1)$$

Where GGFCS is general government final consumption spending (percentage of GDP), REC is renewable energy consumption (percentage of total final energy consumption), CO_2 emissions (metric tons per capita), and Y is the current US GDP per capita. Our model:

$$GDP \text{ per capita}_t = \alpha_0 + \alpha_1 CO_2 \text{ emissions}_t + \alpha_2 REC_t + \alpha_3 GGFCS_t + \varepsilon_t \quad (2)$$

Where the stochastic disturbance term is denoted by ε.

As described by Pesaran and Shin (1995), an ARDL is used for example technical estimation in this study. They offered a method for cointegrating a bound technique for long-term relationships, particularly in situations when the application of the existence of a one cointegrating vector (Johansen integration) is not feasible. This method, which ignores the degree of stationarity, is known as Autoregressive Distributed Lag (ARDL). An estimate provided by ARDL is more accurate and efficient. Moreover, the ARDL parameterization findings yield both SR and LR link definitions for the variables' model.

4. RESULTS

This section uses the ARDL cointegration test methodology to analyze the long- and short-term correlations in Morocco between GDP per capita, CO_2 emissions, GGFCE, and REC. This phase involves data extraction and analysis using calculations of location, dispersion, and normality indicators. This table below gives us these calculations using EViews12.

4.1. Descriptive Statistics

The variable with the highest volatility, as determined by the descriptive study of these variables, is GDP per capita (current US GDP), while the variable with the lowest volatility, as determined by the kind of standard deviation values, is quantity of CO_2 released per capita (metric tons). Additionally, all study's variables are explained by this descriptive study are distributed normally (Jarque-Bera probabilities are more than 5%). Additionally, according to the kurtosis coefficient, all variables are flatter than the normal distribution (as this coefficient is <3). Despite a minor dip during the 2019 financial and economic crises, Morocco's economic growth is expanding, according to the model's descriptive data (Figure 1 Gdp per capita [Current US]).

Figure 1: Conceptual model. H1: CO_2 (metric tons per capita) negatively influence (EG). H2: growth's economic boosted by REC (percentage of total final energy consumption). H3: GGFCS (% of GDP) negatively influences economic growth

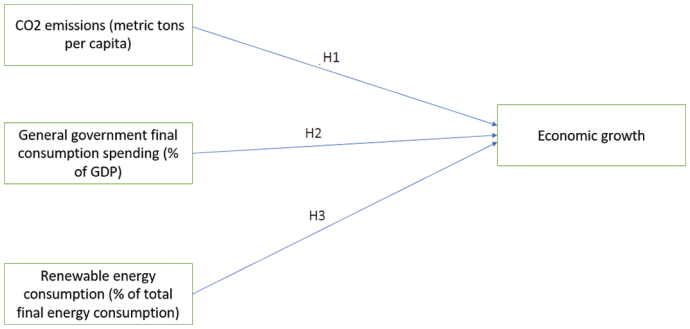
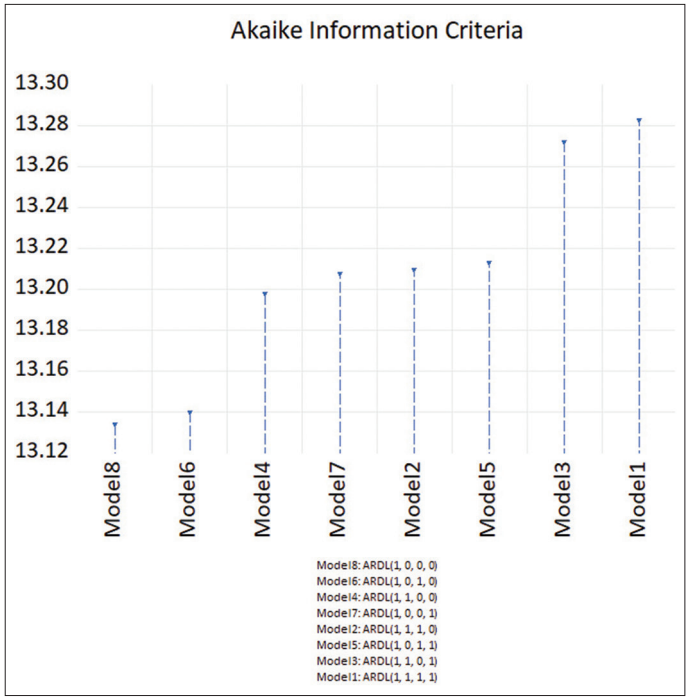
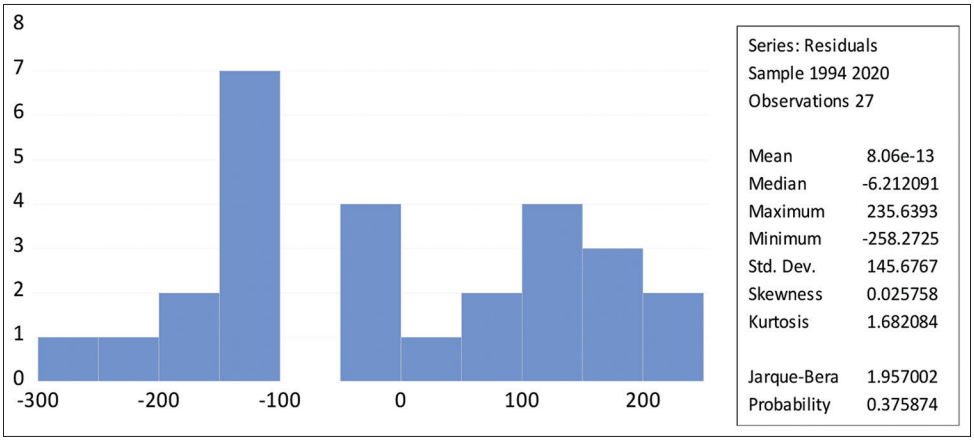


Figure 2: Optimal lag's selection



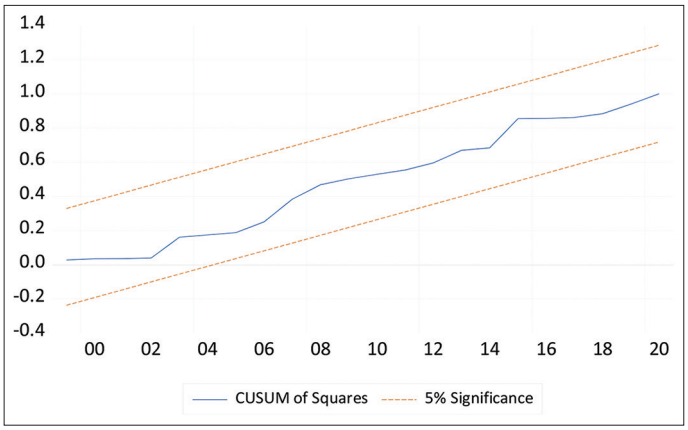
Source: Calculating's Authors using Eviews 12

Graph 1: Normality test



Source: Calculating's Authors using Eviews 12

Graph 2: Parameter stability: CUSUM of Squares test



Source: Calculating's Authors using Eviews 12

4.2. Unit Root Tests

The model variables are stationary in initial difference I (1), as indicated by the consequences in Table 2. ARDL models, according to Stock and Watson, are delicate selection orders' lag. Rendering to the lowest (SIC) and (AIC) in this econometric evaluation, the model is chosen (Stock and Watson, 1993 cited in Hanadi, 2024). Additionally, the Moroccan economy impacted by the overall spending on consumption by the General Government, which has risen over length of our study (Figure 1 Final Consumption Spending by the General Government [% of GDP]). Morocco's use of RE (renewable energy) share its overall ultimate energy usage (final energy consumption) experienced a decline between 2005 and 2011. Yule (1926) defined a non-stationary series as one that shows a unit root. A test's unit root (UR) exploited to help regulate variables' integration directive in the model. The test's unit root also assistances determine the incorporation order in the model variables. The test (ADF) is a renowned and useful control that assesses the series' stationarity in this model.

4.3. Co-Integration Bound Test and Optimal Lag

Inside the above table shows the highest lag that may be applied with (FPE), (SBIC), (AIC), and (HQIC). Given that it displays the lowest values one lags behind the other, it determines that the optimal lag is 1 (29902.01 for FPE; 13.13871 for AIC; 13.38065 for SBIC and 13.20838 for HQIC;). As indicated in Table 1, the first step in model estimating is to perform the ARDL regression at the best distributed lags constructed on the AIC. Step two involves looking at the SR and LR connections between the variables, as Table 3 illustration. Table 4's regression analysis demonstrates that as a % of GDP, GGFCE has statistically significant negative (harmful) impact on the sustainability of EG, whereas CO_2 emissions (metric tons per capita) and percentage of final energy consumed that comes from renewable energy have a positive impact. Thus, while GGFCE (% of GDP) has a negative impact on EG, REC (% of total final energy consumption) and carbon dioxide emissions (metric tons per capita) have a favorable effect, based on the LR coefficients found in the second section of Table 5.

This outcome supports (Hanadi, 2024). In the third part of Table 5, the speed of adjustment was represented by a negative value

Table 1: Variables description

Variables	Definition
GDP	GDP per capita (Current US) as proxy of economic growth
CO_2 emissions	Carbon dioxide emissions (metric tons per capita)
GGFCS	general government final consumption spending of GDP
REC	renewable energy consumption of total final energy consumption

Source: WDI

Table 2: Descriptive statistics

Descriptive statistics criteria	GDP	CO_2	GGFCE	REC
Mean	2460.017	1.446758	16.99462	14.70143
Median	2592.318	1.471459	16.90606	15.03000
Maximum	3498.583	1.955308	19.40499	22.97000
Minimum	1217.429	0.991096	14.30467	10.45000
SD	833.8227	0.290854	1.286759	3.290203
Skewness	−0.153952	−0.054651	−0.034499	0.413372
Kurtosis	1.311911	1.623676	2.109225	2.587370
Jarque-Bera	3.435192	2.223916	0.931281	0.996063
Probability	0.179497	0.328914	0.627733	0.607726
Sum	68880.49	40.50922	475.8494	411.6400
Sum Sq. Dev.	18772027	2.284099	44.70524	292.2867
Observations	28	28	28	28

Source: Calculates of authors Eviews12

Table 3: Unit root test

Variable	Series		P-value	Series in first difference		P-value
	Test statistic	Dickey-Fuller critical value (5%)		Test statistic	Dickey-Fuller critical value (5%)	
GDP	−3.341	−3.632	0.085	−4.209	−3.595	0.013
CO_2 emissions	−3.107	−3.587	0.124	−6.376	−3.595	0.000
GGFCE	−2.999	−3.587	0.150	−8.671	−3.595	0.000
REC	−2.246	−3.587	0.446	−4.886	−3.595	0.003

Source: Calculating's Authors using Eviews 12

Table 4: Maximum number of lags

Number of lags	Final prediction error	Akaike information criterion	Schwarz Bayesian information criterion	Hannan–Quinn information criterion
0	65807.56	13.92990	14.12346	13.98564
1	29902.01*	13.13871*	13.38065*	13.20838*
2	32248.05	13.21062	13.50095	13.29423

Source: Calculating's Authors using Eviews 12

Table 5: ARDL regression

ARDL (1,0,0,0)				
Sample			**1993-2020**	
observations			27	
R-squared			0.967	
Adj R-squared i			0.962	
Prob>F			0.0000	
Log Likelihood			−172.2994	
	Coefficient	**Std. err.**	**T**	**P > |t|**
GDP (-1)	0.763820	0.143886	5.308493	0.0000
CO_2 emissions	900.0973	417.0681	2.158154	0.0421
GGFCE	−73.56820	33.38428	−2.203678	0.0383
REC	10.05439	14.92074	0.673853	0.5074
C (constant)	433.1664	706.1096	0.613455	0.5459

Source: Calculating's Authors using Eviews 12, ARDL: Autoregressive distributed lag model

(−0.236180) in Table 4 (ADJ to the GDP per capita, current US). This value measures how well the dependent variable responds in a single period to the equilibrium relationship deviance or how quickly the equilibrium is distorted. In the short-run connection, two positive coefficients (900.0973 and 10.05439) are found. This indicates that the LR equilibrium deviation is ignored and only SR fluctuations taken into account.

The Akaike information criterion (AIC) is a measure of the quality of a statistical model proposed by Hirotugu Akaike in 1973. When estimating a statistical model, it is possible to increase the likelihood of the model by adding a parameter. Therefore, after Figure 2: optimal lag's selection, we will choose the model with the minimum information, and therefore model 8 (1,0,0,0) our optimal model.

4.4. Long-run and Short-run Dynamics

The ARDL bound test is utilized as a co-integration technic to assess the long-term link between the model variables (Pesaran et al., 2001).

We have now reached the most crucial stage, which is the verification of the cointegration between public revenue and expenditures to determine whether or not public debt in Morocco can be sustained. To do this, one refers to the Pesaran cointegration test. This test is discussed in detail beforehand, and the calculated statistical value of the test is compared against critical values (which define bounds). Three scenarios are possible:

- When the Fisher value is higher than the upper bound, the two variables are cointegrated.
- There is no cointegration if the Fisher value is less than the lower bound.
- If the Fisher value is split between the two bounds, it is impossible to draw a conclusion. Thus, Table 7. ARDL regression: the Bound testsince we have the value of F: 3.59 is greater than the limit of 3.586 at the 10% significance level, The presence of a cointegration relationship allows us to estimate the long-term effects between the variables

Created on Table 6 data, the F-statistic is 3.591 greater than 10% (as the F critical values = 3.586). Consequently, the test rejects the null hypothesis (Kripfganz and Schneider, 2020). implies that the exogenous and endogenous variables have a LR (Long-Run) connection. To diagnose this model, we need: firstly heteroscedasticity. Secondly, normality, and otherly the model stability. The heteroscedasticity is important to identify whether the variance of the model residuals is constant or homoscedastic. establishing the relationship between the independent variables and the existence of the model residuals. The White test is a useful tool for confirming heteroscedasticity because it is founded on the Chi-Square distribution and used in conjunction with other methods (Cameron and Trivedi, 2005). The estimated model residuals are distributed randomly since there is no heteroscedasticity. We have determined that the residues are homoscedastic.

It is appropriate to confirm the normality of the errors in order to compute prediction intervals and conduct Student parameter tests. The Graph 1 (Normality test) (The Jarque-Bera test (1984) allows one to verify the normality of a statistical distribution by utilizing the concepts of skewness (asymmetries) and Kurtosis (aplatissement) (BOURBOUNNAIS, R. 2000). Thus, The above results suggest that the residuals are white Gaussian noises (following a normal distribution), as indicated by the higher than 5% Jarque-Bera probability.

Table 6: Results of ARDL short-run (SR), long-run (LR), and ADJ

ARDL (1,0,0,0) regression				
Short-Run (SR)				
Variables	**Coefficient**	**Standard Error**	**T**	**P > |t|**
CO_2 emissions	900.0973	417.0681	2.158154	0.0421
GGFCE	−73.56820	33.38428	−2.203678	0.0383
REC	10.05439	14.92074	0.673853	0.5074
C (constant)	433.1664	706.1096	0.613455	0.5459
Long-Run (LR)				
Variables	**Coefficient**	**Standard Error**	**T**	**P > |t|**
CO_2 emissions	3811.058	1044.837	3.647516	0.0014
GGFCE	−311.4915	246.9098	−1.261560	0.2203
REC	42.57080	72.53359	0.586912	0.5632
C (constant)	1834.049	3496.202	0.524583	0.6051
Sample			**1993–2020**	
Number of observations			27	
R-squared			0.349	
Log likelihood			−172.2994	
Adj R-squared I			0.349	
ADJ				
	Coefficient	**Std. err.**	**T**	**P > |t|**
GDP per capita	−0.236180	0.051268	−4.606753	0.0001

Source: Calculating's Authors using Eviews 12

Table 7: ARDL regression: The bound test

F: 3.59	**27 observations, 3 variables**					
F Test	**10%**		**5%**		**1%**	
	I (0)	**I (1)**	**I (0)**	**I (1)**	**I (0)**	**I (1)**
F	2.676	3.586	3.272	4.306	4.614	5.966

Source: Calculating's Authors using Eviews 12

Table 8. White's test: Heteroscedasticity

Source	**Prob. chi2 (14)**	**df**	**P**
Prob. F (14,12) >Prob. Chi-square (14)=0.5517	-	-	-
Heteroskedasticity	0.4424	27	0.5517

Source: Calculating's Authors using Eviews 12

4.5. Test of Heteroscedasticity and CUSUM of Squares

In order to calculate prediction intervals and perform Student parameter tests, it is important to confirm the normality of the errors. The Jarque-Bera test (1984) allows one to verify the normality of a statistical distribution by utilizing the concepts of skewness and Kurtosis (BOURBOUNNAIS, R. 2000). The above (Table 8) results demonstrate that the residuals are white Gaussian noises that follow a normal distribution law since the Jarque-Bera probability equal 37.58% is greater than 5%. Furthermore, the CUSUM of Squares test, which contains two right-hand branches that indicate the limits of the interval and is CUSUM of the squares of the cyclical residuals, is the most appropriate test for assessing model's stability. Based above graph showing the CUSUM of Squares results' test, we can state that the estimated model is stable because the curve does not diverge from the pointily. Thus, the coefficients remain constant over time. The model test results indicate the LR linking between the endogenous and exogenous variables carbon dioxide emissions (metric tons per capita), general government final consumption spending (% of GDP), and REC (% of total final energy consumption). These following studies (Hanadi, 2024). Moreover, the research findings are in line with the noteworthy beneficial long-term influence of CO_2 emissions (metric tons per capita) and REC (% of total final energy consumption) on Moroccan economic growth (Hanadi, 2024). So, H2 and H3 are accepted by this study. Next, the research discovered that general government spending takes detrimental impact on Moroccan economic growth, which's dependable consequences of Zhang et al. (2021) and Connolly and Li (2016). H1 is accepted by the study.

The most appropriate test for evaluating the stability of the model is the CUSUM of Squares test, the Graph 2 (Parameter stability: CUSUM of Squares test) which is based on the sum of the squares of the recursive residuals and is used between two right-hand curves that represent the interval's bounds. Based on the above graph showing the CUSUM of Squares test results, we can state that the estimated model is stable because the curve does not diverge from the dotted. Thus, the coefficients remain constant over time. Overall, the findings of the various diagnostic tests have led to the validity of our ARDL model (1,0,0,0).

5. DISCUSSION AND CONCLUSION

Studies and empirical research pertaining to the relationship between general government final consumption spending (% GDP), REC (% total final energy consumption), and carbon dioxide emissions (metric tons per capita) as well as EG sustainability revealed differences. The consequences exposed how variables' test remained related throughout time. This finding supports the core Keynesian assumptions that government spending and economic growth have a weighty positive association (Keynes, 1936 cited in Meltzer, 1981). Though, this research's findings defied Keynesian premise by demonstrating the detrimental effects of general government spending on EG Results corroborate those the Zhang et al. (2021), Connolly and Li (2016), which could be attributed to research and development flaws. Zhang

et al. (2021) claim that governmental funding for scientific research and development is important to sustaining EG. Also, this study's findings demonstrated that there is a positive correlation (impact) between carbon dioxide emissions (metric tons per capita) and RE consumption (percentage of TFEC [total final energy consumption]) that promotes economic growth. This validates earlier discoveries (Hanadi, 2024), and Bouyghrissi et al. (2021) shown that the long-term cointegration of using energy and EG is favorable. empirical results of Bouyghrissi et al. (2021) show assuming there is a connection of causation between the use of RE and both EG and carbon dioxide emissions, and that Morocco's use of renewable energy is starting to possess a favorable impact Concerning the sustainable development's economic components: For the years 1993-2020, this study looked at the effects of general government final consumption spending (% of GDP), REC and CO_2 emissions (metric tons per capita) on Morocco's ability to have sustainable economic growth. Verifying stationarity was the first step in the econometric test. Test of Unit Root findings exposed at the initial difference, the series remain stationary. The study, which used ARDL estimation, discovered that, in the first lag, REC (% of total final energy consumption) possessed a noteworthy advantage (had a significant positive) impact on CO_2 emissions (metric tons per capita), while renewable energy consumption (% of total final energy consumption) had a negative impact on EG, based on GDP per capita (current US). The long-run coefficients support the literature by demonstrating that while GGFCE (% of GDP) has an adverse (negative) effect, CO_2 emissions (metric tons per capita) and GGFCE (% of GDP) have significant positive influence the development of the Moroccan economy. However, there are two reported positive coefficients by SR connection. The implies only short-term fluctuations are considered, and the LR equilibrium nonconformity is neglected. The researches' conclusions show that Morocco"s reliance on renewable energy is vital for nation's capacity for maintaining EG.

In this regard, the Moroccan officials should place a higher priority on encouraging to use sources of renewable energy and tightening carbon dioxide emission restrictions in order to increase economic well-being, even though carbon dioxide emissions have a favorable impact on economic expansion, which measuring the economic productivity. Third, given the negative effect Moroccan the impact of government spending on EG, the issue of the direction of government spending—that is, away from research and development—should be brought up. Report recommends that the policies of the Moroccan government be changed to emphasize Long-term viability requires spending by the government on R&D as opposed to consumption.

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