

Can Digitalization Moderate the Resource Curse? The Case of Algeria

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Abstract

This study examines the effect of internet use on economic growth in Algeria and its role in moderating the growth effect of hydrocarbon rents over the period 2000–2024, using the ARDL bounds testing approach. The results confirm a long-run relationship among the variables, although the long-run coefficients are statistically insignificant. In the short run, internet diffusion is positively associated with growth, while oil rents have a positive contemporaneous effect followed by significantly negative lagged effects, consistent with the resource curse. The lagged interaction terms are positive and significant, suggesting that internet diffusion mitigates the delayed adverse effect of oil rents in the short run. Given the small sample, the findings should be interpreted with caution.

Keywords: Internet use; Oil rents; Resource curse; Economic growth; ARDL; Algeria

JEL Classification : C22, O47, O55, Q32

Introduction

Digital technologies have become key drivers of economic growth by reducing information and transaction costs, expanding access to markets, and accelerating knowledge diffusion. A comprehensive review of 208 studies examining the relationship between information and communication technologies (ICTs) and economic growth (Vu, Hanafizadeh, & Bohlin, 2020) documented a substantial body of literature in this field and concluded that research should move beyond establishing the existence of a positive relationship toward understanding how and why digital technologies influence economic performance.

However, empirical evidence does not point in a single direction. (Salahuddin & GOW, 2016) found a positive effect of Internet use on economic growth in South Africa using the autoregressive distributed lag (ARDL) approach. In contrast, (Maurseth, 2018) reported a negative effect in a broad cross-country sample, while (Haftu, 2019) found no statistically significant effect of ICT on

economic growth in sub-Saharan African countries. (Appiah-Otoo & Song, 2021) further demonstrated that the effects may vary according to countries' income levels. These contrasting findings suggest that the growth effects of digitalization may depend on the structural characteristics of national economies.

Evidence from North Africa and Algeria is similarly mixed. (Bakari & Tiba, 2019) found a negative effect of Internet use on economic growth in Algeria, Egypt, Morocco, and Tunisia over the period 1995–2017. In the Algerian context, (Hadroug & Farah, 2025) reported no statistically significant long-run effect of mobile cellular subscriptions and Internet use, whereas (Guelmine & Bousaha, 2023) found that an increase in the information and communication technology index was associated with a decline in GDP per capita. Part of this divergence may be explained by the specific characteristics of resource-dependent economies. The literature on the resource curse suggests that dependence on natural resources may undermine economic growth, particularly in developing countries, through mechanisms related to institutional quality and limited economic diversification (Badeeb, Lean, & Clark, 2017). Algeria provides a relevant case for examining this issue, as its dependence on hydrocarbons exposes economic performance to fluctuations in international oil prices. At the same time, Internet use has expanded considerably over the past two decades, raising an important research question that, to the best of our knowledge, has received limited attention in the existing literature: Can digitalization mitigate the adverse effect of hydrocarbon rents on economic growth in Algeria

This study seeks to contribute to the literature on digitalization, economic growth, and the resource curse in three main ways. First, it examines the relationship between Internet use and economic growth in Algeria as a hydrocarbon-dependent economy, using annual time-series data. Second, it incorporates an interaction term between Internet use and oil rents to test whether digitalization moderates the effect of oil rents on economic growth and whether this moderating effect is consistent with the hypothesis that digitalization mitigates the resource curse. Third, the study employs the autoregressive distributed lag (ARDL) bounds-testing approach developed by (Pesaran, Shin, & Smith, Bounds testing approaches to the analysis of level relationships, 2001), which accommodates variables integrated of different orders, provided that none is integrated of order two, (I (2)). It also draws on the small-sample critical values discussed by (Kripfganz & Schneider, 2020). The analysis covers the period 2000–2024, subject to the availability of consistent annual observations for all model variables. By doing so, the study seeks to provide empirical evidence on whether digitalization can help alleviate the potential adverse effects of oil dependence on economic growth in Algeria.

Accordingly, the research problem centers on the following main question:

Does the use of the internet contribute to fostering economic growth in Algeria, and does it mitigate the negative impact of hydrocarbon rents on growth during the 2000–2024 period?

To address this research problem, the following main hypotheses are formulated:

H₁: There is a positive and statistically significant effect of internet usage on economic growth in Algeria in the long run.

H₂: There is a negative and statistically significant effect of hydrocarbon rents on economic growth in Algeria (the "resource curse" hypothesis).

H₃: Internet usage mitigates the negative impact of hydrocarbon rents on growth; that is, the coefficient of the interaction term ($INT \times OILRENT$) is positive and statistically significant.

1- Literature Review

A large body of literature has examined the effect of information and communication technology (ICT) on growth. A comprehensive review of 208 studies (Vu, Hanafizadeh, & Bohlin, 2020)

pointed to the need to move from establishing a positive relationship to understanding the channels of impact. Even so, the results remain mixed. (Salahuddin & GOW, 2016) found a positive effect of internet use in South Africa using an ARDL approach, whereas (Maurseth, 2018) found a negative effect in a sample of 171 countries over 1990–2015, and (Haftu, 2019) found no significant effect in 40 sub-Saharan African countries. (Appiah-Otoo & Song, 2021) compared rich and poor countries, which reinforces the idea that the effect varies with the characteristics of the economy.

In North Africa, (Bakari & Tiba, 2019) found a negative effect of the internet on growth in Algeria, Egypt, Morocco and Tunisia over 1995–2017, and explained it by the channeling of usage toward unproductive activities. For Algeria specifically, the results differ. (Khoulati & Dardour, 2022) found a positive relationship between mobile phone subscriptions and output over 1990–2020, while (Hadroug & Farah, 2025) found no significant long-run effect of the internet and mobile phones over 1990–2022, and (Guelmine & Bousaha, 2023) concluded that a higher ICT index was associated with lower GDP per capita. What these studies share is that they treat digitalization as an independent variable, in isolation from the rentier structure of the economy.

At the Middle East and North Africa (MENA) level, (Abu Alfoul & al, 2024) studied the effect of ICT on growth in 16 countries over 1995–2018 using a panel ARDL approach. They found that ICT use drives growth while the effect of investment in ICT alone remains limited, and that institutional quality strengthens the effect of use. This result supports the idea that the effect of digitalization depends on the economic and institutional framework in which it operates. In Algeria, the authorities accelerated digitalization efforts and the strengthening of data systems during 2022 and 2023 (World Bank, 2024), which makes studying their effect all the more pressing.

The resource curse literature shows that dependence on natural resources weakens growth, especially in developing countries (Badeeb, Lean, & Clark, 2017). A study of the G10 countries by (Ze & al, 2023) confirmed that resource dependence reduced growth, consistent with the Dutch disease hypothesis, and that the effect of ICT was positive only in the long run. In Algeria, (Chekouri, Benbouziane, & Chibi, 2017) found that manufacturing exports decline after oil rent shocks, consistent with Dutch disease.

Recent studies have begun to examine the moderating role of digitalization. (Chang & al, 2023), using data from 30 Chinese provinces, showed that ICT development partially mitigates the resource curse, and that this effect varies with the level of financial development. In a sample of 101 countries, (Sharafi & Farzanegan, 2026) found that the oil curse persists in countries with low digital adoption and then weakens as digitalization rises, with a turning point beyond which oil wealth shifts from being a constraint on growth to a driver of it.

The evidence on the moderating role of digitalization is widening. (Akcan & al, 2025) studying ten BRICS+ economies over 2002–2021, found that a 1% increase in resource rents is associated with a decline in GDP per capita of about 0.16% in the long run, and that the effect of digitalization on the resource curse is nonlinear and U-shaped: low levels of digitalization deepen the negative effect, while high levels mitigate it. In the BRICS countries over 2003–2022, (Li, He, & Li, 2024) showed that resource rents harm growth and that digital governance helps break the resource curse cycle, and (Wang, Rani, & Razzaq, 2024) concluded for South Asian countries that resource rents have a negative effect on growth, with a moderating role for digital governance. At the local level, (Li, He, & Li, 2024) using data from 282 Chinese cities over 2015–2021, showed that building digital government mitigates the resource curse through industrial structure transformation.

Our review of the previous studies shows that most of them addressed the bilateral relationship between the digital economy and economic growth, or between hydrocarbon rents and economic growth, without combining the two variables in a single model. They also limited themselves to

estimating the direct effects of digitalization or oil rent. From this standpoint, this study seeks to fill these gaps by introducing an interaction term between digitalization and oil rent, to test whether a higher oil rent itself modifies the effect of digitalization on economic growth. Does it strengthen digitalization's contribution by providing the resources needed for investment and digital transformation, or does it weaken it because of the continued dependence on the hydrocarbon sector?

2- Methodology and Tools

2-1- Study Methodology and Variables

This study employs an econometric approach to examine the relationship between renewable energy consumption and economic growth, as well as the interactive determinant illustrating the moderating role of oil rents in this relationship within Algeria. This is achieved by applying the ARDL methodology through a series of tests and analyses, following these steps (Pesaran, Shin, & Smith, 2001) :

- Testing time-series stationarity;
- Testing for cointegration using the Bounds Test approach;
- Estimating the long-run model using the ARDL framework.

The model variables were determined based on economic theory and insights from previous studies on the subject. We identified the dependent variable as GDP per capita (denoted as GDP), which reflects the level of economic activity. The explanatory variable the number of internet users (denoted as INT) measure the extent to which the economy relies on digitalization. Another explanatory variable, oil rents as a percentage of GDP (denoted as OILR), reflects the significance of oil revenues within the Algerian economy. Data were sourced from (worldbank, 2026) . Finally, an interaction term between digitalization and oil rents (INT_OILR) was included to determine whether oil rents alter the strength or direction of the impact that the digital economy has on economic growth.

2-2- Correlation Analysis of Explanatory Variables

We conducted a Variance Inflation Factor (VIF) test; the following table presents the results:

Table (01): Multicollinearity test

Variables	VIF	1/VIF
INT	2.080	0.4807692
OILR	1.728	0.5787037
INT_OILR	1.036	0.9652509

Source: Prepared by the researchers based on outputs from the Gretl software.

The VIF test results for all variables show values not exceeding 10, indicating that the model does not suffer from multicollinearity (i.e., there is no multicollinearity issue among the variables); consequently, no variable will be excluded.

2-3- Time Series Stationarity Test

Examining the stationarity of the study variables is a fundamental prerequisite for proceeding with the analysis, as it allows for determining the order of integration for each variable using the Augmented Dickey-Fuller (ADF) test. Table (02) presents the test results and model specifications; the variables must be integrated of order I(0), I(1), or a mixture of both.

Table (02): Augmented Dickey-Fuller (ADF) test results for the time series under study.

Serie	Level			1stdifference			
	ADF Calculated	ADF Tabulated	Proba	ADF Calculated	ADF Tabulated	Proba	
GDP	-3.0609	-2.9918	0.0434	-3.2247	-2.9980	0.0314	I(0)
INT	-2.9971	-3.6121	0.1532	-5.1937	-3.6220	0.0019	I(1)
OILR	-2.1153	-3.6121	0.5119	-4.7799	-3.6220	0.0046	I(1)
INT_ OILR	-3.5995	-3.6220	0.0522	-4.1846	-3.6328	0.0169	

Source: Prepared by the researchers using EViews 13 software.

The table above presents the results of the unit root test using the Augmented Dickey-Fuller (ADF) test. The results indicate that the GDP time series is stationary at the level, as evidenced by a p-value (0.0434) that is less than 0.05, and a calculated T-statistic ($T_{cal} = -3.0609$) that is greater in absolute terms than the critical (tabulated) value ($T_{tab} = -2.9918$). Consequently, we reject the null hypothesis (H_0) which posits the existence of a unit root and accept the alternative hypothesis (H_1), which states that the series is stationary at the level, or I(0).

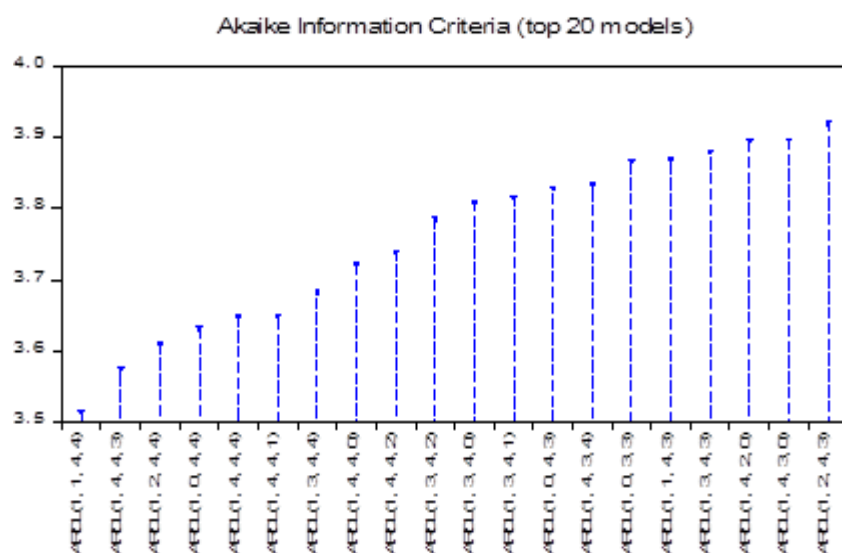
As for the INT, OILR, and INT_OILR time series, they were found to be non-stationary at the level; their p-values were greater than 0.05 (0.1532, 0.5119, and 0.0522, respectively), and their calculated T-statistics were smaller in absolute terms than the critical values. Therefore, the null hypothesis cannot be rejected at the level. However, upon taking the first difference, all three series became stationary: the p-values fell below 0.05 (0.0019, 0.0046, and 0.0169, respectively), and the calculated T-statistics exceeded the critical values in absolute terms. This leads to the rejection of the null hypothesis and the acceptance of the alternative hypothesis, confirming that these series are stationary at the first difference, or I(1).

Given that the test results reveal a mix of integration orders specifically I(0) and I(1) with no series integrated of the second order, I(2), the use of the Autoregressive Distributed Lag (ARDL) bounds testing approach for cointegration is justified. This allows us to proceed with the estimation of the ARDL model.

- **Selection of Optimal ARDL (p,q) Lag Lengths**

The Akaike Information Criterion (AIC) was used to determine the lag lengths. It was found that the optimal lag structure for the model is ARDL (1,1,4,4) specifically, a lag of 1 for the dependent variable (GDP). The following figure illustrates this:

Figure (01): Optimal Lag Length Test



Source: EViews 13 program outputs

2-4 Cointegration test using the Bounds Test approach

After determining the appropriate model specification, the long-run cointegration relationship is examined using the Wald test, as presented below:

Table (03): (Bounds Test)

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	5.399969	10%	2.37	3.2
k	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

Source: EViews 13 program outputs

The bounds test results show that the F-statistic (5.39) exceeds both the lower and upper critical bounds at the 10% and 5% significance levels, rendering the result conclusive in itself. Furthermore, the error correction term (ECM) is negative and statistically significant (0.0003), which supports the existence of a long-run equilibrium relationship among the variables.

In addition, we estimated the long-run coefficients, with the following results:

Table (04): Long-run cointegration coefficient estimates

Levels Equation Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INT	0.973343	3.712655	0.262169	0.8007
OILR	5.714967	4.490385	1.272712	0.2438
INT_OILR	0.406855	1.397334	0.291165	0.7794
C	-23.96980	13.01060	-1.842328	0.1080
EC = GDP - (0.9733*INT + 5.7150*OILR + 0.4069*INT_OILR -23.9698)				

Source: EViews 13 program outputs

Table (05): Short-run cointegration coefficient estimates

ECM Regression Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INT)	11.37059	4.827344	2.355455	0.0507
D(OILR)	12.27923	5.832120	2.105449	0.0733
D(OILR(-1))	-14.82272	1.973371	-7.511372	0.0001
D(OILR(-2))	-17.13235	3.820569	-4.484241	0.0029
D(OILR(-3))	-11.11820	3.182290	-3.493772	0.0101
D(INT_OILR)	-1.305767	1.631581	-0.800308	0.4498
D(INT_OILR(-1))	2.259209	0.550594	4.103222	0.0046
D(INT_OILR(-2))	3.246302	0.757671	4.284582	0.0036
D(INT_OILR(-3))	1.752987	0.572981	3.059416	0.0183
CointEq(-1)*	-1.707108	0.262080	-6.513703	0.0003

Source: EViews 13 program outputs

It can be observed from the tables above that the p-values for both the constant and the stationary variables exceed 0.05 in the long run; consequently, the coefficients lack statistical significance. This finding reinforces the earlier conclusion that a cointegrating relationship exists among the variables under study. Furthermore, the results indicate a short-run dynamic relationship between the variables. The estimated error correction term with a value of $\text{CointEq}(-1) = -1.7071$ is negative and statistically significant (p-value = 0.0003, which is less than 5%). This term measures the proportion of disequilibrium in the dependent variable that can be corrected from one period to the next in this case, at a rate of 170.7%. This implies that if a deviation from equilibrium occurs, it would take approximately 12 months to return to the long-run equilibrium level.

2-5 Model Diagnostic Tests

Several tests were conducted to verify the performance quality of the selected model, as follows:

- **Error Autocorrelation Test (LM Test):**

To ensure the absence of autocorrelation, we employed the Breusch-Godfrey serial correlation LM test; the results are presented in the following table:

Table (06): Results of the Error Autocorrelation Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.233977	Prob. F(2,16)	0.7940
Obs*R-squared	0.681984	Prob. Chi-Square(2)	0.7111

Source: EViews 13 program outputs

From this table, we observe that the Prob(F-stat) is 0.7940 (greater than 0.05) and the Prob (Chi-Square (1)) is 0.7111 (greater than 5%). Therefore, we accept the null hypothesis of no residual autocorrelation and reject the alternative hypothesis; consequently, there is no autocorrelation problem.

- **Test for Error Variance Stability:**

To detect heteroskedasticity, we use the ARCH Heteroskedasticity Test; the results are shown in the following table:

Table (07): Results of the heteroskedasticity test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

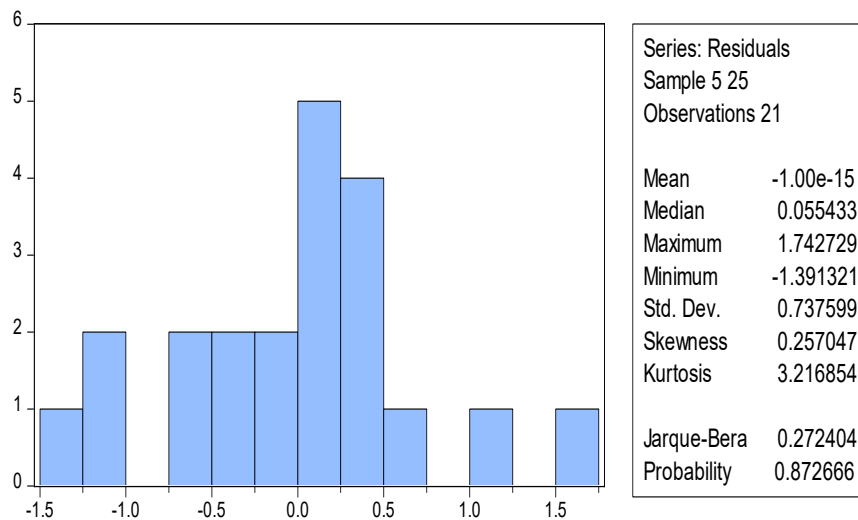
F-statistic	1.564042	Prob. F(13,7)	0.2831
Obs*R-squared	15.62180	Prob. Chi-Square(13)	0.2702
Scaled explained SS	1.923958	Prob. Chi-Square(13)	0.9998

Source: EViews 13 program outputs

From the table above, we observe that the p-value for the F-statistic is 0.2831, which is greater than 5%. Consequently, the null hypothesis is accepted and the alternative hypothesis is rejected; this indicates the absence of heteroscedasticity (non-constant error variance) in the model.

- **Normal distribution of residuals:**

The Jarque-Bera test is used to verify the normality assumption. The test result was non-significant ($\alpha > 0.05$), confirming that the residuals follow a normal distribution. Specifically, the Jarque-Bera statistic is 0.2724 with a p-value of 0.8726 (which exceeds 0.05); thus, the null hypothesis is accepted, confirming that the model's residuals are normally distributed, as illustrated in the following figure.

Figure (02): Normal distribution of residuals

Source: EViews 13 program outputs

- **Test for Functional Form Specification:**

The validity of the estimated model's specification and design (functional form validity) is tested using the Ramsey test. The null hypothesis states that the functional form is correctly specified.

Table (08): Ramsey Test Results

	Value	df	Probability
t-statistic	1.506655	6	0.1826
F-statistic	2.270010	(1, 6)	0.1826

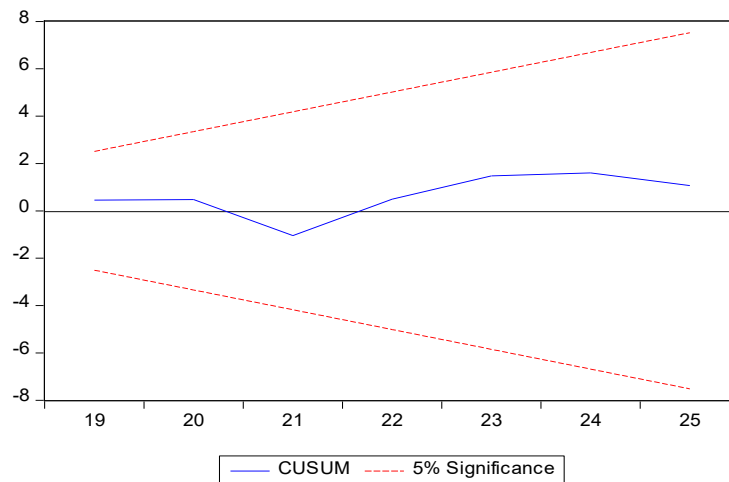
Source: EViews 13 program outputs

The table shows that the Ramsey test (Fisher) probability value (prob = 0.1826) is greater than 5%; therefore, we accept the null hypothesis, indicating the validity of the model's functional form.

- **Structural Stability Test for Model Parameters (CUSUM and CUSUM of Squares):**

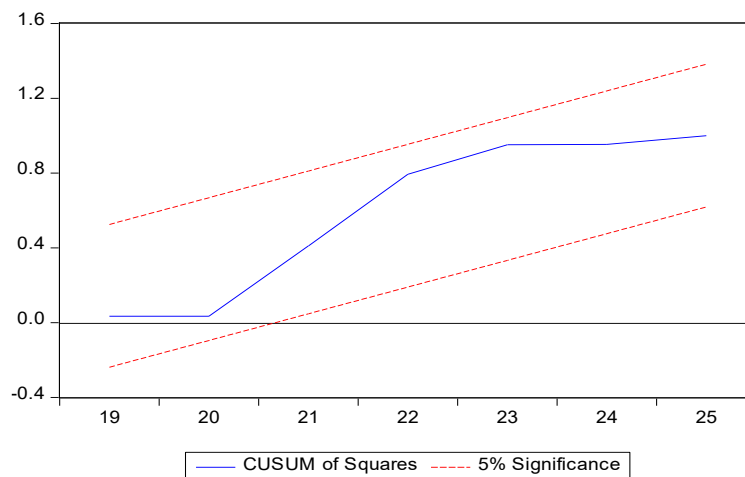
The model is observed to be stable, as the plots for both the CUSUM test and the CUSUM of Squares test remain within the critical bounds at the 0.05 significance level.

Figure (03): CUSUM Test



Source: EViews 13 program outputs

Test) CUSUM of Squares(Figure (04):



Source: EViews 13 program outputs

Discussion of Results

The estimated long-run relationship shows that the coefficient of internet use is 0.9733, but it is not statistically significant ($p = 0.8007$). This result indicates insufficient statistical evidence that the spread of internet use has a stable effect on the economic growth rate in Algeria over the study period. It can be explained by the fact that the expansion of internet use does not automatically raise economic growth unless it is accompanied by improvements in firm productivity, the development of digital skills, stronger innovation, and wider use of technology in productive activities. In an economy that depends heavily on hydrocarbons, internet diffusion alone may not be enough to bring about the structural transformation needed to convert digital gains into sustainable growth. The lack of significance may also reflect that the indicator used captures internet penetration more than the productive use of digital technology. Therefore, this result does not necessarily contradict the economic importance of digitalization; rather, it suggests that its effect on growth may depend on the institutional and productive environment in which the technology is adopted.

The coefficient of oil rents is 5.7150 with a p-value of 0.2438, meaning that the coefficient is positive but statistically insignificant. Accordingly, the results do not allow us to establish a long-

run effect of oil rents on the economic growth rate in Algeria within the estimated model. Economically, this result can be explained by the fact that oil revenues may support economic activity by financing public spending, investment, and infrastructure, yet their effect on sustainable growth depends on how these revenues are used. If they are directed mainly toward current expenditure or remain tied to oil price fluctuations, they may not translate into a sustained increase in productivity or a diversification of the productive base. This reading is consistent with the theoretical debate on the resource curse, which does not imply that natural resources always reduce growth, but rather that dependence on them may constrain economic performance when revenues are not managed efficiently or are not used to promote economic diversification. Nevertheless, the insignificance of the oil rent coefficient in this study means that this explanation cannot be confirmed causally on the basis of this result alone.

The interaction term between internet use and oil rents is the pivotal variable in this study, as it allows us to test whether the effect of oil rents on economic growth varies with the level of digitalization. The long-run interaction coefficient is 0.4069, but it is not statistically significant ($p = 0.7794$). Although the positive sign may theoretically be consistent with the possibility that digitalization helps improve the use of oil revenues, the absence of statistical significance does not allow us to confirm this role. This may be explained by the possibility that digital transformation in Algeria has not yet reached a level sufficient to alter the structural relationship between hydrocarbon dependence and economic growth. Mitigating the resource curse may require using digital technology to improve the efficiency of public spending, enhance transparency, develop financial services, support small and medium-sized enterprises, and stimulate productive activities outside the hydrocarbon sector. Hence, internet diffusion alone may not be sufficient to bring about this transformation. Accordingly, the long-run results do not provide sufficient statistical evidence that digitalization mitigates the resource curse in Algeria. This does not mean that such a role is impossible; rather, its effect did not appear significantly given the indicators, the period, and the model specification adopted.

In the short run, the estimation results show that the coefficient on the change in internet use is positive at 11.3706 and statistically significant at the 10% level ($p = 0.0507$). This result points to a positive association between internet diffusion and economic growth in Algeria. It can be explained by the fact that wider internet use facilitates access to information, reduces transaction costs, improves communication between firms and economic agents, and supports commercial and service activities. However, this result provides relatively limited statistical evidence and is not sufficient on its own to establish a causal relationship between internet diffusion and economic growth.

The contemporaneous change in hydrocarbon rents has a positive coefficient of 12.2792, statistically significant at the 10% level ($p = 0.0733$). This may reflect the role of oil revenues in supporting public spending and domestic demand, which positively affects economic activity in the short run. By contrast, the lagged coefficients of hydrocarbon rents are negative and statistically significant, at -14.8227 , -17.1324 , and -11.1182 , respectively. This pattern suggests that the positive contemporaneous effect does not necessarily persist in subsequent periods. One possible economic explanation is that the dependence of economic activity on oil revenues makes it vulnerable to oil cycle fluctuations, and weak productive diversification may limit the sustainability of growth. Dutch disease mechanisms may also be discussed as a possible explanation, without regarding the current results as direct evidence that this mechanism holds.

The contemporaneous interaction coefficient between internet use and hydrocarbon rents is not statistically significant ($p = 0.4498$), indicating no evidence of an immediate moderating effect of digitalization on the relationship between rents and economic growth. By contrast, the lagged interaction coefficients are positive and statistically significant, at 2.2592, 3.2463, and 1.7530, with p -values of 0.0046, 0.0036, and 0.0183, respectively. These results indicate that the interaction between digitalization and hydrocarbon rents is associated with economic growth more positively in later periods. This may be explained by the possibility that the gains from digitalization take time to translate into institutional efficiency, resource allocation, and the development of economic activities.

Nevertheless, interpreting these coefficients as evidence of mitigating the resource curse requires caution; the marginal effect of hydrocarbon rents should be examined at different levels of internet use, and the joint significance of the lagged interaction coefficients should be tested. In this way, it can be assessed whether the moderating role of digitalization indeed limits the potential adverse effects of hydrocarbon dependence in the short run.

Finally, the error correction coefficient, $\text{CointEq}(-1)$, is -1.707 with a p -value of 0.0003, that is, negative and statistically significant. This result indicates the presence of a mechanism for adjusting deviations from the equilibrium path within the model, with a high speed of adjustment. However, since the coefficient exceeds unity in absolute value, it suggests that the system may overshoot the equilibrium path before stabilizing.

Conclusion

This study aimed to examine the effect of internet use on economic growth in Algeria and whether it moderates the effect of hydrocarbon rents over the period 2000–2024, using the ARDL approach. The bounds test confirmed the existence of a long-run relationship among the variables, and the error correction term was negative and significant (-1.707), with a high speed of adjustment suggesting that the system may overshoot the equilibrium path before stabilizing. However, the long-run coefficients of internet use, hydrocarbon rents, and their interaction term were statistically insignificant. Therefore, the study does not provide sufficient evidence of a stable effect of any of them on growth over the study period, nor that digitalization mitigates the resource curse in the long run.

In the short run, the change in internet use was positively associated with growth at the 10% significance level, which constitutes relatively limited statistical evidence. Hydrocarbon rents had a positive contemporaneous effect at the 10% level, followed by negative and significant lagged coefficients, consistent with oil-cycle fluctuations and weak productive diversification, without regarding this as direct evidence of Dutch disease. The lagged interaction coefficients were also positive and significant, suggesting that digitalization may play a moderating role that materializes with a time lag. However, interpreting this as a mitigation of the resource curse remains conditional on examining the marginal effect of rents at different levels of internet use and testing the joint significance of the interaction coefficients. Given the small sample size and the large number of lags, these results should be treated as preliminary indications rather than conclusive causal evidence.

Based on the above, we propose several recommendations, chiefly: aligning public spending with the hydrocarbon price cycle; moving from internet diffusion to its productive use; linking digitalization to economic diversification; directing part of oil revenues to digital and productive

investments rather than current expenditure to strengthen growth sustainability; and providing regular official data on the digital economy and connectivity quality to enable policy evaluation and more precise research.

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