The Impact of Indirect Taxes on Economic Development in Algeria during the Period 2000-2021

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Abstract:
This research aims to show the extent of the contribution of indirect taxes in promoting economic development in Algeria for the period 2000-2021 through the gross domestic product (GDP) indicator.
Using the Autoregressive Distributed Lag (ARDL) model for time series data, we found a significant negative relationship between the GDP series and indirect taxes, where a decrease of one unit in indirect taxes leads to an increase of 0.096542 units in GDP.

Keywords: Algeria; Economic Development; Indirect Taxes; Gross Domestic Product;

ARDL Model.

Jel classification code :C22, O10, H20, E01

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1-Introduction

Taxes are considered one of the most important sources of revenue for countries, and they play a key role in achieving various economic, social, and financial goals. The effects of taxes vary depending on the adopted economic system in the country, there has been an increased reliance on taxes and their imposition and collection methods as part of a comprehensive tax policy integrated with the economic policy of each country. tax system is governed by rules and regulations that also vary from one country to another, based on the goals, circumstances, and strategies of each country.

Most countries have two tax systems: direct taxes and indirect taxes, although they differ in the extent to which they rely on, both systems or favor one over the other. During the colonial period, Algeria relied heavily on indirect taxes, and this continued after independence. However, as its economy developed, Algeria began to reduce its reliance on indirect taxes and increasingly turned to direct taxes. After the tax reforms of the 1990s, the indirect tax inspectorates were abolished, resulting in a significant decline in revenue from this type of tax, and this initiative did not go in line with the state's policy of relying on regular taxation rather than petroleum taxation to finance the public treasury.

Indirect taxes can also have a significant impact on economic development, and it is important to balance the need to finance public expenditures, encourage economic development, and maintain the competitiveness of the local economy, therefore indirect tax policies need to be balanced and fair, taking into account their impact on economic development, as well as being appropriate for economic conditions and societal needs.

Study problem:

Observer of tax policy in Algeria, especially in recent years, notices that indirect taxes have undergone several modifications and have been imposed in various forms, targeting a different set of objectives, including achieving greater income distribution fairness, tax system reform, or increasing state revenue. Some studies have also shown the impact of indirect taxes on a country's economy, with this impact varying depending on the tax policy of each country. This leads us to investigate the following question:

What is the extent of the impact of indirect taxes on economic development in Algeria during the period: 2000 to 2021?

Study Hypothesis:

To answer the problem of the study, we formulated the following hypothesis: Indirect taxes contribute to an increase in the level of economic development in Algeria, with the existence of a strong relationship between the two variables.

Importance of the Study:

The importance of this study stems from the following points:

- Indirect taxes play an important role in financing government expenditures and achieving economic development.
- Studying the impact of indirect taxes can provide insights into how consumption and spending in the economy can be directed.
- Studying the impact of indirect taxes can help identify sectors that can be strengthened or supported through appropriate tax policies.

Study Objectives:

The main objectives of this study are:

- To evaluate the impact of indirect taxes on economic development in Algeria during the period from 2000 to 2021, which contributes to estimating the economic impact of these taxes and analyzing their effects on the economy in general.
- To evaluate government policies related to taxes, as studying the potential effects of these taxes can lead to sound and effective decisions regarding restructuring and adjusting taxes to achieve economic and social goals.
- To improve economic planning, the study results can be used to improve economic planning by identifying economic sectors that are significantly affected and taking measures to promote these sectors or reduce negative impacts if necessary.
- To evaluate social justice, as the study can reveal the impact of taxes on certain segments of society, such as the poor category of society, and help make decisions about reducing taxes for these groups or achieving a fair balance in tax distribution.

Study Methodology:

In our study, we relied on a descriptive-analytical methodology to highlight the theoretical aspect of indirect taxes and economic development and a quantitative analytical methodology to study the relationship model between variables using the Autoregressive Distributed Lag (ARDL).

Study Axes:

To fulfill the purposes of the study, we divided the study into two main axes:

- The first axis: The theoretical framework for indirect taxes and economic development;
- The second axis: Measuring the impact of indirect taxes on economic development.

Previous studies:

Several studies have addressed the topic of taxes in general and indirect taxes in particular and their impact on the economy in general. Some of these studies include:

1- The study by Ben Ibrahim Gouider and Chouikat Mohamed in 2020 entitled "The Impact of Taxes on Economic Growth in Algeria: An Analytical Study Using Principal Component Analysis (PCA) Method during the Period of 2000-2015", published in the Journal of Business Administration and Economic Studies, Volume (06), N° (01). This study aimed to determine the extent of the impact of taxes on achieving economic growth in Algeria. The researchers found a strong relationship between direct taxes and the individual's share of income, unlike indirect taxes.

2- The study by BoumedineBakriti in 2017-2018 entitled "Tax Policy and Economic Reform Challenges in Algeria from 1970 to 2014: An Analytical and Quantitative Study" is a doctoral thesis in economic sciences, specializing in economic analysis, from Abu BekrBelkaid University in Tlemcen. This study aimed to determine the extent of the impact of tax reforms in Algeria on improving economic and social conditions. The researcher found that regular taxation has a secondary role compared to petroleum taxation in economic development in Algeria. Despite the researcher's finding of a tangible impact of tax policy on gross domestic product (GDP), the tax reforms carried out by Algeria did not achieve the desired goals.

3- The study by BahaaEddineTouil in 2015-2016 entitled "The Role of Fiscal and Monetary Policies in Achieving Economic Growth: Case Study of Algeria 1990-2010" is a doctoral thesis in economic sciences, specializing in financial economics, from the University of El Hadj LakhdarBatna. This study aimed to identify the economic variables that have a significant impact on economic growth. The researcher found that Algeria relies on tax revenues in general and petroleum taxation in particular, making it vulnerable to fluctuations in oil and exchange rates. Additionally, the researcher found that economic growth is governed by several indicators that indicate its existence or absence.

4- The study by SheshouiHassani and Aban Shahrazad in 2020 entitled "The Impact of Regular Tax Revenues on Economic Growth: A Standard Analytical Study during the Period of 2000-2019" was published in the Journal of Tax Studies, Volume 09, Issue 02, Algeria, 2020, pp. 92-114.

5- The study by Emmanuel Saez in 2004 entitled "Direct or Indirect Tax Instruments for Redistribution: Short-Run versus Long-Run" was published in the Journal of Public Economics, issue 88. The researcher examined the use of direct and indirect taxes in redistributing national income and found that indirect

taxes are effective in redistributing national income only in the short run, while direct taxes are more effective in the long run.

2-The theoretical framework of indirect taxes and economic development:

Taxes are generally classified into direct and indirect taxes, as this division dates back to the classical school of economics and is still used in tax legislation in most countries. Indirect taxes are considered one of the most important tools used in the economic policies of states, and their revenues are used to achieve economic development in societies(Al-Mahabi & Al-Habas, 2006, p. 175).

Taxes are defined as a financial obligation imposed by the state on individuals without compensation, to finance its public expenses and achieve the objectives arising from the content of its political philosophy(Adel Faleh, 2007, p. 910).

Therefore, taxes can be defined as a financial deduction imposed by the state compulsorily on taxpayers, without compensation, taking into account their ability to pay, in order to cover public expenses.

2-1. Concept of Tax:

Many researchers explore the concept and definition of tax through the historical stages of a state's development. However, these concepts have not deviated from their general meaning. Tax has been defined as a mandatory obligation that taxpayers are required to pay to the state according to their ability, regardless of the benefits they receive from the provision of services or the fulfillment of public needs(Al-Mahabi & Al-Habas, 2006, p. 175).

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Therefore, taxes can be defined as a financial deduction imposed by the state compulsorily on taxpayers, without compensation, taking into account their ability to pay, in order to cover public expenses.

2-2. The concept of indirect tax:

The indirect tax is a tax whose base is not determined directly, it means the use of wealth elements (Saeed, 2003, p. 178). They are also defined as taxes that are imposed on goods and services and are fully or partially indirectly borne by consumers (Samuelson & Nordhaus, 2005, p. 329).

Indirect taxes are collected when an event occurs that triggers them., such as the production, import, or sale of goods to consumers. Indirect taxes are also collected without the need to issue statements or investigate the personal situation of the taxpayer (Al-Tarifi, 2017, p. 8).

Therefore, it can be said that indirect taxes are those taxes that are imposed on goods and services during different stages of expenditure, rather than being directly imposed on individuals (natural or moral persons).

2.2.1. The main advantages and disadvantages of indirect taxes:

Like other taxes, indirect taxes have their advantages and disadvantages. The most important ones are:

a. Advantages:

- Flexibility in collection: Their total revenue increases and decreases with an increase or decrease in spending and consumption, meaning that they increase during times of prosperity, causing prices to rise and thus curbing inflation, and decrease during times of recession, causing prices to fall, which helps to overcome economic downturns and achieve stability(Abu Shadi Mohammed, 2009, p. 27)

- Abundance of collection: Given that the tax base of indirect taxes is consumption, they can be imposed on all sectors, where they are paid continuously and in small amounts by each individual, and tax evasion is less likely to occur(Samuelson & Nordhaus, 2005, p. 329).

- Ease of collection: Indirect taxes are easy for taxpayers to pay, as they are paid without them feeling it, and they do not require a large number of monitors, which saves a lot of administrative costs and increases revenue (Samuelson & Nordhaus, 2005, p. 329)

b. Disadvantages:

Among the disadvantages of indirect taxes are(Al-Ajib, 2010, p. 12):

- Lack of fairness: They do not take into account the economic and personal situations of taxpayers, as they are imposed on all consumers regardless of their spending levels. They are regressive taxes, meaning that low-income groups bear their burden due to their high consumption propensity, thus redistributing national income in favor of those with low incomes.

- Lack of suitability in collection: Given that most indirect taxes are collected from producers or importers, they are deprived of a portion of their capital for a certain period until it is recovered from consumers.

- Lack of stability: They decrease during times of economic recession due to people's desire to reduce their spending and transactions during this period.

2.2.2. The practical forms of indirect taxes in Algeria:

Indirect taxes are usually levied to distribute the tax burden among taxpayers, since some taxpayers may be exempt from direct taxes. Indirect taxes can be divided into two types(Hamza, 2016, p. 420):

- Taxes on consumption (spending): Whether they are general and cover all branches of consumption or specific and cover certain categories. The legislator must choose a few goods that consumers spend on to impose consumption taxes on them. It is also fair not to impose taxes on raw materials that are used in the production of consumer goods, considering that the percentage of raw materials in luxury goods is much lower than their percentage in essential goods.

As an example of this type of tax applied in Algeria, we have a value-added tax, internal consumption tax, health tax on meat, taxes on petroleum products, etc.

- Taxes on transactions (trading): These are the taxes applied in commercial transactions or the transfer of capital ownership between taxpayers. Among the types of these taxes applied in Algeria, we have stamp and registration fees, customs duties, road taxes, etc.

2.3. The development of indirect taxes in Algeria during the period (2000-2021):

Indirect taxes in Algeria witnessed several changes in their collection amounts during the period (2000-2021), as shown in the following figure:

Figure N° 01: Evolution of indirect taxes in Algeria (2000-2021)

Source: Prepared by the researcher based on the outputs of Eviews12 software

from the above figure, we notice that the collection of indirect taxes witnessed a continuous increase during the period (2010-2013), followed by a slight decrease during the period (2014-2015), and then experienced a noticeable increase in 2016 and 2020, this increase may be attributed to the introduction of some fees, such as passport stamp fees, energy efficiency fee on imported or locally produced devices that operate on electricity, gas, and petroleum products, a fee on cars and movable machines due upon the acquisition of insurance contracts, additional tax on consumed tobacco products, etc., or to the increase in prices of some consumer goods.

2.3.Economicdevelopment:

The topic of economic development has received great attention in economic studies and has begun to attract the attention of economists and politicians in both advanced and developing countries, as well as in international and regional organizations.

2.3.1. Definition of economic development:

Definitions of economic development have varied among economists and scholars, but they have agreed that it encompasses all aspects of life in society and goes beyond the concept of economic growth that dominated early writings in the field of development(Al-Qurayshi, 2007, p. 122).

The United Nations has defined economic development as the processes that work to unify the efforts of citizens and the government to improve the economic, social, and cultural conditions in local communities, and to assist them in integrating into the life of the nation and contributing to its progress as much as possible. ((Baouni, 2017, p. 779)

Economic development is also defined as the profound changes in the economic, political, and social structures of the state, which would achieve an accumulative and sustainable increase in real per capita income over an extended period of time, as well as several other non-economic outcomes(Bouazara, 2010, p. 144).

Therefore, we can say that economic development is a set of processes aimed at increasing productivity, and economic wealth, and improving the standard of living for individuals and society. It encompasses several aspects, including increasing the gross domestic product, providing employment opportunities, and developing infrastructure,among others.

Although the terms economic development and economic growth both refer to a long-term increase in real gross domestic product, the two concepts are completely different, economic growth refers to a sustained increase in national income over a long period of time without significant and tangible changes in economic, social, political, and cultural areas, while economic development means in addition to the growth of the gross domestic product, significant and broad structural changes in the aforementioned areas and legislation and systems(Al-Qurayshi, 2007, p. 124).

Therefore, the concept of economic development is more comprehensive compared to the concept of economic growth. While the latter is limited to positive quantitative change, economic development includes both quantitative and qualitative change.

2.3.2. Economic Indicators for Measuring Economic Development:

There are various economic indicators used in measuring economic development, but we focus on the most commonly used ones, including(Al-Azmi, 2021, p. 640):

a.Gross Domestic Product (GDP):

It represents the value of final goods and services produced within the economy, whether produced using domestic factors of production or foreign factors of production located within the economy, during a period of time, usually a year.

Some researchers do not oppose the use of economic growth indicators to determine the progress made towards development(Sen, 1983, p. 745), and therefore we will use the Gross Domestic Product indicator in our study due

to the availability and relative accuracy of its data compared to other indicators.

b- International Trade:

International trade is an important factor in determining the level of economic development for countries, as it reflects the strength of the economy and its ability to grow and prosper through interaction with other economies. It is well-known that developing and emerging countries strive to develop and increase the volume of international trade, as it is an important source of revenue and foreign currency that can be used to support economic development.

c- Investment:

Investment represents the change in the capital stock, and attracting more investments is an indicator of the success of economic development in the country. Therefore, efforts should be made to encourage investment by removing various obstacles and barriers, as well as coordinating efforts between the public and private sectors to unify efforts to raise the level of investments.

d- Poverty:

One of the main goals of economic development is to eradicate poverty. Therefore, it can be considered as an indicator to measure the level of economic development in the country.

2.3.3. Economic development in Algeria during the period (2000-2021):

Algeria, like other countries, has sought to achieve economic development. This is evident through the adoption of development strategies and plans aimed at achieving economic development goals, primarily increasing real income, providing goods and services, and job opportunities for individuals in society, improving the level of health, education, and cultural services, as well as paying off debts and achieving national security for the country(Barbar & Boulema, 2022, pp. 373-386).

During the period 2000-2021, Algeria faced several economic and social challenges, including fluctuations in oil prices, which is the main source of revenue in Algeria, in addition to local and international security, political, and economic challenges. However, Algeria was able to achieve moderate economic growth during this period, with an average annual growth rate of Gross Domestic Product (GDP) according to statistics from the Bank of Algeria of around 3.6%.

During this period, Algeria also developed development plans and programs, which primarily included the following(Dukara Jalal, 2022, p. 346):

a.The Economic Revitalization Plan (2001-2004):

This plan was allocated a budget of $0.1 billion and aimed to revitalize the economic environment through supporting wealth-producing activities, value-added job opportunities, improving the standard of living for individuals, supporting regional balance, and strengthening public services in the fields of irrigation, transportation, and infrastructure. In general, this program aimed to address the decade-long delay caused by the crisis, reduce the cost of implemented reforms, and contribute to achieving overall sustainability.

b. The Complementary Growth Support Program (2005-2009):

This program includes two main pillars. The first is the establishment of an investment program with a budget of approximately 11 billion $, with priority given to supporting infrastructure, revitalizing economic sectors, and combating unemployment. The second pillar focuses on controlling current expenditures by maintaining wage stability and improving public debt management.

c- The Public Investment Program (2010-2014):

This development program was allocated a budget of approximately 190 billion $. Through this program, the state aimed to achieve economic diversification by programming the establishment of 100,000 small and medium-sized enterprises, supporting rural agricultural development, improving transportation and water distribution infrastructure, as well as implementing important projects in the education, health, and housing sectors.

d- The Economic Growth Consolidation Program (2015-2019):

This program is a continuation of previous development programs, aiming to maintain social gains, streamline social transfers, give more attention to economic diversification and rural development, and encourage productive investment that generates wealth and job opportunities. Through this program, the government aims to achieve a 7% annual growth rate to reduce unemployment and improve living conditions for individuals.

On the other hand, the state revealed a new growth model in July 2016, which included achieving a growth rate of 6.5% in Gross Domestic Product (GDP) outside of the hydrocarbon sector until 2030, as well as doubling the contribution of the manufacturing sector to GDP from 5.3% in 2015 to 10% by 2030.

Figure N° 02: Development of Gross Domestic Product (GDP) in Algeria during the period 2000-2021.
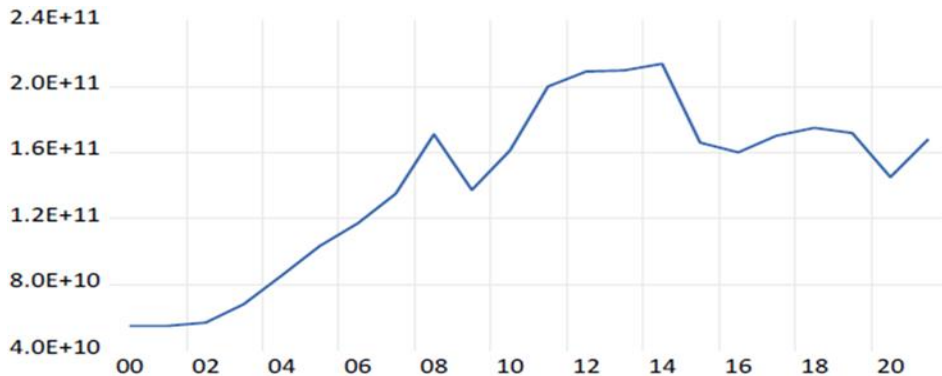
Source: Prepared by the researcher based on the outputs of Eviews12 software

According to the above figure, there was an ascending growth of Gross Domestic Product (GDP) in Algeria during the period 2000-2008, followed by a decline in 2009 due to the global financial crisis. Then, there was a new development until 2014, followed by a sharp decline due to the drop in oil prices in the global markets. Additionally, there was another decline in 2020 due to the global health crisis (COVID-19 pandemic), followed by a new recovery in 2021.

3- Measuring the impact of indirect taxes on economic development in Algeria during the period 2000-2021

To test the impact of indirect taxes on Gross Domestic Product (GDP), we will rely on annual data provided by the World Bank and the General Directorate of Taxes in Algeria. To achieve this, we will focus on the following points:

3.1. Study variables and the model used:

We will summarize the study variables used in Table (01):

Table N° 1: Definition of study variables.

Variable	Type	Content
Y	dependent	Gross Domestic Product (GDP) rate.
X1	independent	Regular tax revenues
X2	independent	Indirect tax

Source: Prepared by the researcher.

If we assume a linear form for the functional relationship between these variables, the standard model to be estimated can be written as follows:

$$Y = \beta_0 + \beta_1 X_t + \beta_2 X_t + \varepsilon_t \dots \dots (1)$$

3.2. Estimating the model:

economic measurement, which usually leads to the problem of spurious estimation. This is due to the presence of non-random components in time series data that affect their trend, and therefore the possibility of affecting the dynamic relationships between the different variables used in the model. To estimate the model, we follow the following steps:

3.2.1. Study of the Stationarity of Time Series:

The study of the stationarity of time series is considered an issue for detecting the presence of components that may cause spurious estimation problems. Among the tests used are the ADF and PP tests, but before using them, we will graphically represent the time series to get a preliminary idea about their characteristics. It becomes clear through the graphical representation of the time series for the study variables that their evolution over time does not follow a stable pattern. Therefore, we assume that these series are non-stationary.

Figure N°3: Representation of Time Series
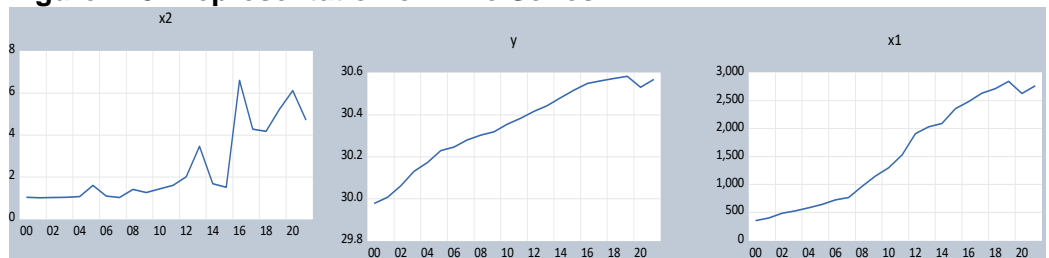
Source: Prepared by the researcher based on the outputs of Eviews12 software

Based on the above figure, we will now use the ADF and PP tests to confirm the non-stationarity of the time series, as shown in the following table:

Table N°2: Results of the unit root test for time series

time series	ADF Test					PP Test				
	With the presence of the intercept and the overall trend.		With the presence of the intercept only.		without them	With the presence of the intercept and the overall trend.		With the presence of the intercept only.		without them
At the level	b=0*	λ=0*	c=0*	λ =0	λ=0	b=0	λ=0	c=0	λ=0	λ=0
Y	0.977	0,965	0,005	0,039	0,999	0,977	0,965	0,005	0,039	0,999
X1	0,069	0,348	0,024	0,926	0,999	0,132	0,712	0,024	0,92	0,996
X2	0,004	0,033	0,503	0,977	0,977	0,004	0,034	0,103	0,413	0,546
After conducting the first difference.										
X1	0,917	0,051	0,012	0,011	0,219	0,917	0,052	0,127	0,011	0,031
X2	0,223	0,000	0,076	0,000	0,000	0,636	0,000	0,368	0,000	0,000

Source: Prepared by the researcher.

Based on the outputs shown in the above table and using the Dickey-Fuller methodology to confirm the presence of unit root in the time series, we can summarize the stationarity of the time series as follows:
- The Gross Domestic Product (GDP) series is stationary at the level with the presence of the intercept, and we write Y→I (0).
- The regular tax revenue series is stationary at the first difference, and we write X1→I (1).
- The non-direct taxes series is stationary at the first difference, and we write X2→I (1).

3.2.2. cointegration test:

Since the time series are not stationary at the same level, it is not possible to test for the presence of cointegration using the Johansen test. Therefore, we resort to the technique developed by Pesaran et al. (2001). Since the used time series meet the basic condition of this technique, we can follow the sequential steps of this method to confirm the existence of long-run comovement between the time series. This technique can be applied using the following steps:

- Select the optimal lag length for the first differences of the variables in the unrestricted error correction model (UECM), based on the minimum values of the Akaike and Schwarz criteria.
- Then, write the ARDL (P,q1,q2,q3) model for the variables included in the model, according to the following relationship:

$$Y_t = \beta_0 + \sum_{i=1}^{P-1} \beta_{1i} \Delta Y_{t-i} + \sum_{i=0}^{q_1-1} \beta_{2i} \Delta X1_{t-i} + \sum_{i=0}^{q_2-1} \beta_{3i} \Delta X2_{t-i} + \emptyset_1 Y_{t-1} + \emptyset_2 X1_{t-1} + \emptyset_3 X2_{t-1} + \mu_t \ldots \ldots \ldots (02)$$

The optimal model with the minimum values of the aforementioned criteria is selected by estimating this model using different lag lengths and using the statistical software Eviews12 to estimate various models while giving the values of the mentioned criteria, which facilitates the selection process.
This is confirmed by the results shown in the following figure.

Figure N°4: Optimal ARDL Model within 20 Selected Models.
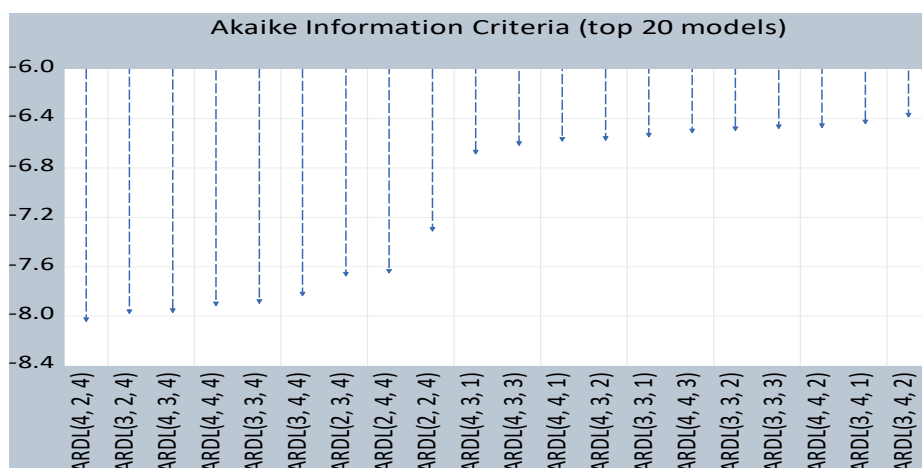
Source: Prepared by the researcher based on the outputs of Eviews12 software

From the above figure, it is evident that the minimum value of the Akaike criterion corresponds to the longest column (as the values are negative), which intersects with the ARDL (4,2,4) model.
Estimate the model shown in equation (02) using Ordinary Least Squares (OLS) and then confirm the presence of cointegration using the Wald test. After conducting this test on the mentioned model, we obtained the following results**:**

Table N°3: Results of Wald Test for Confirming the Presence of Cointegration

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	40.08172	10%	2.63	3.35
k	2	5%	3.1	3.87
		2.5%	3.55	4.38
		1%	4.13	5
Actual Sample Size	18	Finite Sample: n=35		
		10%	2.845	3.623
		5%	3.478	4.335
		1%	4.948	6.028

Source: Prepared by the researcher

Comparing the calculated test statistic with the critical value, we observe from the table that the calculated Fisher statistic (F-statistic=40.08) is greater than the upper table value at all confidence levels. Therefore, we conclude that there is long-run comovement between the time series, which allows us to continue estimating the Error Correction Model (ECM) based on the ARDL technique.

3.2.3. Estimation of Long-Term Parameters and Error Correction Model
a- Estimation of Long-Term Parameters:

We can summarize the results of the parameter estimation in the following table:

Table N°4: Results of Estimating Long-Term Parameters

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X1	0.000257	2.00E-05	12.83505	0.0001
X2	-0.096542	0.019651	-4.912933	0.0044
C	30.26730	0.043925	689.0702	0.0000

Source: Prepared by the researcher

From the table, it is evident that there is a statistically significant positive relationship between the regular tax revenue series and the Gross Domestic Product (GDP) rate. Specifically, for every one-unit increase in the regular tax revenue, the GDP rate increases by 0.00002 units.

Additionally, there is a statistically significant negative relationship between both the non-direct taxes series and the GDP rate, where an increase of one unit in the non-direct taxes series leads to a decrease in the GDP rate by 0.096 units.

B- Estimation of Short-Term Parameters and Error Correction Model:

Error correction models are used to identify the adjustment coefficient, which represents the speed of the return to equilibrium in the long term in case of short-term disturbances. The results of estimating this coefficient are shown in the following table:

Table N°5: Results of Estimating Short-Term Parameters

ARÐL Error Correction Regression
Dependent Variable: D(Y)
Selected Model: ARDL(4, 2, 4)
Case 2: Restricted Constant and No Trend
Date: 12/24/22   Time: 22:27
Sample: 2000 2021
Included observations: 18

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(Y(-1))	-0.464111	0.055330	-8.388047	0.0004
D(Y(-2))	0.272052	0.063263	4.300328	0.0077
D(Y(-3))	0.115645	0.056681	2.040278	0.0968
D(X1)	4.14E-05	7.61E-06	5.430809	0.0029
D(X1(-1))	-0.000114	1.00E-05	-11.42982	0.0001
D(X2)	0.002098	0.000948	2.212466	0.0779
D(X2(-1))	0.028483	0.002117	13.45486	0.0000
D(X2(-2))	0.018976	0.001613	11.76620	0.0001
D(X2(-3))	0.011748	0.001013	11.59875	0.0001
CointEq(-1)*	-0.341466	0.021320	-16.01634	0.0000

Source: Prepared by the researcher

From the above table, it is evident that most of the short-term parameters are significant at a 5% level of significance. However, the most important parameter is the error correction coefficient, where the negative value of -0.341 indicates that the disturbances included in the proposed short-term model are automatically corrected within two years and six months after the occurrence of the disturbance.

3.3. Diagnostic Tests for the Estimated Model:

These tests are used to ensure the quality of the estimated model, by checking the classical assumptions of the standard model and ensuring that it is free from standard problems, thus enabling its use for interpretation or prediction. In this regard, we have many tests, the most important of which are summarized as follows:

3.3.1. Test for Autocorrelation of Errors:

The Breusch-Godfrey test is considered one of the best tests in this regard, and its results are summarized in the following table:

Table N°6: Results of Test for Autocorrelation of Residuals

| Breusch-Godfrey Serial Correlation LM Test:			
Null hypothesis: No serial correlation at up to 2 lags			
F-statistic	0.080664	Prob. F(2,3)	0.9244
Obs*R-squared	0.918576	Prob. Chi-Square(2)	0.6317

Source: Prepared by the researcher

Based on the results in the table, we find that the calculated value of the Fisher test (F-statistic=0.9244) is less than the table value at a 5% level of significance. Therefore, we accept the null hypothesis, which translates to no autocorrelation between the residuals.

3.3.2. Normality of residuals:

The Jarque-Bera test is used to check the normality of the residuals, where the null hypothesis suggests that the errors follow a normal distribution. The results of this test are shown in the following figure:

Figure N° 5: Results of Jarque-Bera Test on Residuals
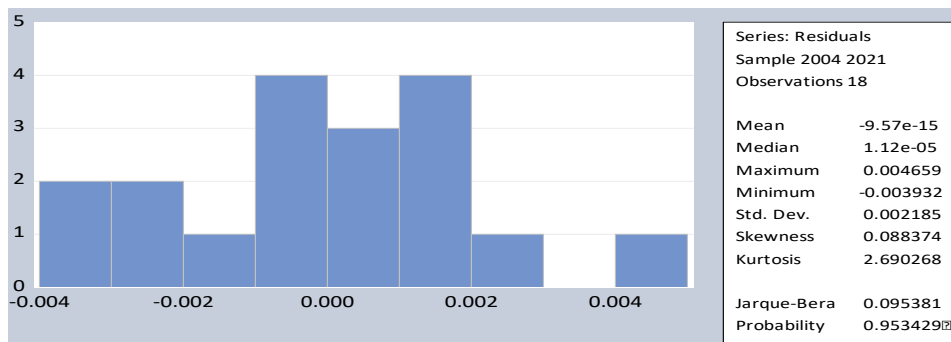
Source: Prepared by the researcher based on the outputs of Eviews12 software

From the figure, it is evident that the histogram of the residuals takes a shape similar to the bell curve of the normal distribution. Moreover, the probability value of the Jarque-Bera test (equal to 0.953) is greater than 5%, and therefore, we accept the null hypothesis, which suggests that the errors follow a normal distribution.

3.3.3. Test for Homoscedasticity
To confirm the assumption of homoscedasticity, we use the Breusch-Pagan-Godfrey test, as shown in the following table:

Table N°7: Results of the Breusch-Pagan-Godfrey Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
Null hypothesis: Homoskedasticity			
F-statistic	0.726592	Prob. F(12,5)	0.7000
Obs*R-squared	11.43980	Prob. Chi-Square(12)	0.4917
Scaled explained SS	0.746000	Prob. Chi-Square(12)	1.0000

Source: Prepared by the researcher

Since the calculated value of the Fisher test is less than the table value at a 5% level of significance, we accept the null hypothesis, which suggests that the variance of the errors is constant or homoscedastic for the estimated model.

3.3.4. Ramsey Reset Test:
This test is used to assess the suitability of the model in terms of its functional form for expressing the relationship between the economic variables. The results of this test are as follows:

Table N°8: Results of Ramsey Reset Test

| Ramsey RESET Test			
Equation: UNTITLED			
Omitted Variables: Squares of fitted values			
Specification: Y Y(-1) Y(-2) Y(-3) Y(-4) X1 X1(-1) X1(-2) X2 X2(-1) X2(-2) X2(-3) X2(-4) C			
	Value	df	Probability
t-statistic	0.614589	4	0.5721
F-statistic	0.377720	(1, 4)	0.5721
Likelihood ratio	1.624205	1	0.2025

Source: Prepared by the researcher

Since the probability value of the Fisher test is greater than the 5% level of significance, we can accept the proposed functional form for expressing the relationship between the economic variables studied.

3.3.5. Stability Test for the Estimated ARDL Model:
From the following figure, it is evident that the estimated coefficients for the ARDL model used are structurally stable, where the figure for the two test statistics falls within the critical bounds at a 5% level of significance.

Figure N°6: Cumulative Sum of Residuals and Cumulative Sum of Squared Residuals
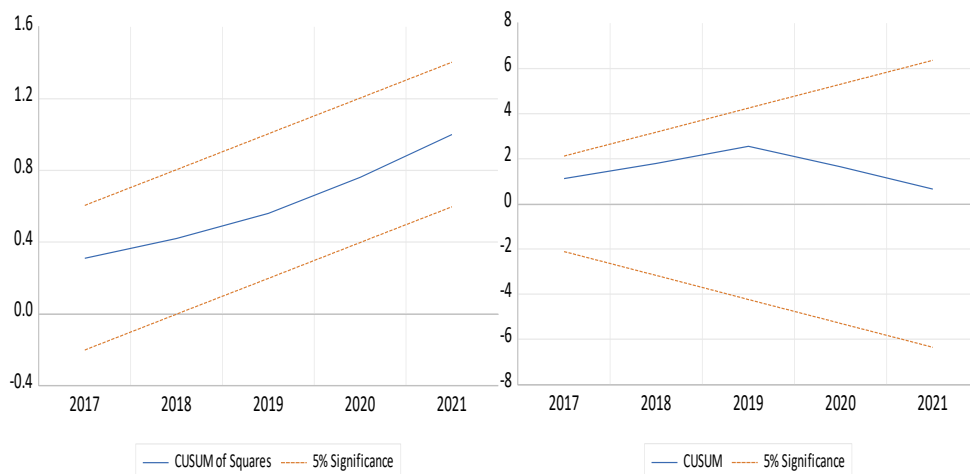
4- Conclusion

Indirect taxes are one of the sources that countries rely on to finance public treasury and economic development. Through this study, we attempted to measure the impact of indirect taxes on economic development in Algeria, using the Gross Domestic Product (GDP) as a proxy. The following results were obtained:

- There is a statistically significant positive relationship between the total ordinary tax revenues and the GDP, which is consistent with economic theory.

- There is a statistically significant negative relationship between indirect taxes and the GDP. This can be explained by the fact that a decrease in indirect taxes leads to an improvement in the components of total demand, especially investment, and consumption. Thus, a decrease in indirect taxes enhances consumption levels and increases investment, which necessarily leads to an increase in the GDP since both investment and consumption are components of total demand.

Based on the obtained results, the following recommendations can be proposed:

- Ensure the qualitative training of tax administration personnel in the field of indirect taxes.

- Design an indirect tax system that achieves a balance between tax revenue collection and economic development.

- Determine the appropriate level of indirect tax and the products and services on which the tax should be imposed based on economic policy objectives.

- Consider reducing the negative impact of indirect taxes on low-income groups by identifying the targeted categories and providing them with appropriate support.

5- bibliography

Abu Shadi Mohammed, I. (2009). Egyptian Tax Legislation. Egypt: Dar Al-Nahda Al-Arabiya.

Adel Faleh, A.-A. (2007). Finance, and Tax Legislation,. Amman: Al-Hamid Publishing House.

Al-Ajib, H. (2010). Indirect Taxes in Syria: Their Reality, Economic Effects, and Future Trends, Master's Thesis in Economics and International Relations. Aleppo University, Syria.

Al-Azmi, L. M. (2021). Economic Development Indicators in Africa - Analytical Framework. Journal of African and Nile Basin Studies and Research , Vol 2 (N 2), .

Al-Mahabi, M. K., & Al-Habas, K. A.-K. (2006). Public Finance and Tax Legislation. Damascus: University of Damascus Publications.

Al-Qurayshi, M. (2007). Economic Development: Theories, Policies, and Topics (1st ed ed.). Jordan: Dar Wael Publishing.

Al-Tarifi, H. (2017). Estimating the Function of Indirect Taxes in Sudan - An Applied Study, Master's Thesis. Sudan: University of Gezira.

Baouni, L. (2017). Economic Growth and Development with a Comparative Study of Economic Growth and Development in Algeria (1970-2010). Journal of Studies in Economics , Vol. 06 (No. 02).

Barbar, H., & Boulema, H. (2022). , "The Contribution of Petroleum Taxation to Economic Development in Algeria in the Face of Oil Price Fluctuations, 2000-2019, Using Path Analysis,". Al-Mu'ayyad Journal , Vom 13 (N 1).

Bouazara, A. (2010). New Trends in Human Development Approach. Al-Muassassa Magazine (N 4).

Dukara Jalal, A. (2022). "Institutions and Economic Development in Algeria, South Korea, and Malaysia," Ph.D. thesis in Economics and Public Management. Algeria: Mustapha Stambouli University of Mascara.

Hamza, A.-A. (2016). The Impact of Indirect Taxes on Economic Growth in Algeria: Analytical and Standard Vision during the Period (1990-2013). Ma'arif Journal , Vo 11 (N 20).

Samuelson, A., & Nordhaus, D. (2005). Economics, McGraw-Hill, New York. McGraw-Hill, New York.

Sen, A. (1983). , Development which way now, .1983. Economic Journal , Vol.93 (n°372).

Saeed, F. M. (2003). Principles of Public Finance. Syrie: Aleppo University.