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The impact of small and medium enterprises on export diversification in Algeria - An econometric study for the period (1999-2021)

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Abstract :

This study aimed to identify the reality of the small and medium enterprises sector and its impact on the diversification of exports in Algeria during the period 1999-2021, For this purpose the degree of diversification of exports was measured using the Herfindahl-Hirschmann index as a dependent variable, and the development of the number of small and medium enterprises (public and private) was presented as an independent variable.

The results of the econometric analysis - reached through the use of the eviews10 software - showed that the increase in the number of small and medium enterprises in Algeria has a positive impact on the diversification of exports, but the current number is still not sufficient to achieve the targeted diversification degrees.

Keywords : Small and Medium Enterprises, Export Diversification, Herfindahl-Hirschmann Index, ARDL Model, Algeria.

JEL Classification Codes: L27, O11.

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1. Introduction:

The global economy has borne witness to a succession of technological advancements and substantial liberalization of trade and investment systems. This has resulted in an increased interdependence among various segments of the world economy, transforming trade from a localized endeavor into a global pursuit. In the modern world of commerce, the entire globe is viewed as a marketplace. Advanced nations have diligently cultivated all sectors of their economies, particularly those in possession of competitive advantages that elevate them to prestigious economic standings. Consequently, their economies have grown robust, diversified, and resilient, shielded from external influences and economic shocks.

On the other hand, oil-exporting and resource-dependent nations continue to grapple with numerous obstacles and challenges stemming from the fluctuations in oil prices. The economic trajectory of these nations heavily relies on a single revenue source –exports- rendering their gross domestic product susceptible to various strategic impediments. Hence, diversifying exports is deemed imperative to establish an economic foundation characterized by diversity, avoiding a narrow focus on a single resource. The economy should be distributed across multiple sectors that collaborate to enhance the gross domestic product and foster sustainable growth. Investments in the small and medium-sized enterprise sector serve as a variable that can be directed towards invigorating genuine production sectors such as agriculture, tourism, and industry. This enables the exploitation of all available resources and production capacities, with the ultimate goal of achieving self-sufficiency and, consequently, diversifying exports.

Algeria, as an oil-exporting nation, has ardently endeavored in recent years to break free from its oil dependence. It has sought alternative means and embraced new strategies to diversify its exports. It is no secret that the oil sector in Algeria has dominated its exports for many years, constituting a major and the largest component of the gross domestic product. Given the relatively substantial number of small and medium-sized enterprises compared to other types of institutions, it is crucial to assess the impact of these enterprises and their capacity to achieve export diversification.

1.1. The Problem Statement: Through the aforementioned discussions, the study's problem statement comes to light, encapsulated in the following question:

what extent the growth of the small and medium enterprises sector impact on diversification of exports in Algeria during the period 1999-2021?

1.2. Hypothesis of the Study: To address the research question, the study employs the following hypothesis:

The increase in the number of small and medium-sized enterprises contributes to supporting Algeria's economy and enhancing export diversification.

1.3 Study Objectives: This study aims to:

- Define the concept of small and medium-sized enterprises and their economic role.
- Understand the current state and evolution of the small and medium-sized enterprise sector in Algeria.
- Examine the concept of export diversification and some of its indicators.
- Explore the current status of export diversification in Algeria.
- Measuring the Impact of Small and Medium-Sized Enterprises (SMEs) Growth on Export Diversification in Algeria during the Period 1999-2021.

4.1. The Significance of the Study: This research paper draws its importance from Algeria's earnest concern for the quest for options and strategies aimed at the meaningful restructuring of the commodity composition of its exports. This fundamentally enables the diversification of exports beyond hydrocarbons.

5.1The Study's Methodology: Given the nature of this study, and to answer the main problem, the descriptive and analytical approaches were relied upon, and quantitative methods were used to measure the impact of the growth of the small and medium enterprises sector on export diversification, using the statistical analysis software Eviews10.

2. Small and Medium-Sized Enterprises in Algeria:

Several criteria can be employed to discern between small and medium-sized enterprises (SMEs) and other entities. These criteria can be distilled into quantitative and qualitative standards. Nonetheless, the most frequently utilized criteria are quantitative in nature due to their lucidity and ease of application. Foremost among them is the criterion of labor, denoted by the number of employees (Shabani, May 25, 2003, p. 60).

2.1. Definition of Small and Medium-Sized Enterprises (SMEs): Algeria's definition of small and medium-sized enterprises (SMEs) is encapsulated in Law No. 17-02, enacted on January 15, 2017. This law constitutes the guiding framework for the promotion of small and medium-sized enterprises. It serves as a supplement and amendment to Law No. 01-18, which was issued on December 12, 2001. In this context, Algeria has adhered to two criteria: the number of employees and the business revenue, as follows: (Official Gazette, Issue No. 02/2017, p. 05).

2.1.1 Very Small Enterprises: The definition of very small enterprises, as stipulated in Article 10 of the law, posits that they are enterprises occupying a realm between 1/9 individuals and achieving business revenue less than 40 million Algerian dinars or not exceeding the total of the annual balance sheet of 20 million DZD.

2.1.2. Small Enterprises: The definition of small enterprises is provided in Article 9 of the aforementioned law, stating that they are enterprises employing between 10/49 individuals, with an annual business revenue not exceeding 400 million Algerian dinars or the total of the annual balance sheet not ranging from 200 million Algerian dinars.

2.1.3. Medium Enterprises: Article 8 of the same law addresses the definition of medium-sized enterprises, asserting that they are enterprises that employ between 50 and 250 individuals, with an annual turnover ranging from 400 million Algerian dinars to 4 billion Algerian dinars or a total annual revenue between 200 million and 1 billion Algerian dinars. Article 5 defines small and medium-sized enterprises, irrespective of their legal nature, as “enterprises engaged in the production of goods or services, employing from 1 to 250 individuals, with a business revenue not exceeding 4 billion Algerian dinars and the total of the annual balance sheet not exceeding 1 billion Algerian dinars”.

Table (01): Classifications of small and medium enterprises in Algerian law

Classify enterprises / Specifications	Very Small Enterprises	Small Enterprises	Medium Enterprises
Number of employees	9/1	49/10	250/50
Business revenue (DZD)	40 million	400 million	400 million/4 billion
The total of the annual balance sheet (DZD)	20 million	200 million	200 million/1 billion

Source: (Official Gazette, Issue 02/2017, p. 05)

Oftentimes, there is a conflation between small and medium-sized enterprises (SMEs) and entrepreneurship. Thus, it is imperative that we distinguish between investment projects commonly referred to as "small and medium-sized enterprises", which are often rooted in tradition, and what is termed as "entrepreneurial ventures". The latter results from innovation and, over time, any venture can evolve into a small, medium, or even a large establishment. However, a small or medium-sized enterprise cannot necessarily become an entrepreneurial venture. This primarily pertains to the differentiation criteria between an enterprise and an entrepreneurial venture, which essentially revolves around the concept of the legal entity.

As previously mentioned, an enterprise relies on differentiation criteria such as capital size, the number of employees, business revenue, and the total annual revenue. This classification may categorize enterprises as very small, small, medium, or large, whether they are public or private, and their models may vary according to sectors and the type of work they engage in" (Darm & Ben Jiar, 2019, p. 290).

In this regard, EL-Najjar argue that distinguishing between entrepreneurship and small to medium-sized businesses can be achieved through three fundamental characteristics, elucidated in the following table:

Table (02): Differences between entrepreneurship and small and medium businesses

The attribute	Small and medium-sized enterprises	Entrepreneurial
Creativity	Lack ingenuity and fail to establish novelty with a global orientation.	Deliberately engage in moral creativity
Growth potentials	Constrained in their growth prospects.	Possess potent growth capabilities
Strategic objectives	Typically associated with defining target markets for sales or certain financial objectives.	Their objectives extend beyond small-scale operations, encompassing targeted growth, market share...

Source: (Qara, 2020, p. 95).

Furthermore, there are those who add additional dimensions to the differentiation between entrepreneurship and small businesses, among them: (Mohammed & Shahab, 2018, p. 59).

- ✓**wealth creation:** Small projects aim to generate a continuous and satisfying income for their owners, surpassing traditional employment. In contrast, entrepreneurship strives to create a

continuous and enduring wealth that extends beyond modest dreams to build substantial fortunes.

✓**Risk factor:** Entrepreneurship carries a high level of risk, considering the expected price that an entrepreneur might pay.

2.2. The economic role of small and medium enterprises:

- ✓ Small and medium-sized enterprises play an effective role in accelerating development, serving as complementary and nurturing industries for larger ones. These industries can expand into the local market, contributing to gross domestic product and creating added value. They also provide goods and services to both end consumers and intermediaries, such as spare parts manufacturing, increasing the national income. Additionally, they achieve higher production rates compared to public government employment, contributing to import reduction, especially for domestically manufactured goods, and increasing commodity exports abroad
- ✓ They can be established within small spaces, as they do not require large production means and have a lower number of employees. This facilitates their establishment in homes, villages, and small shops.
- ✓ In Japan, small and medium-sized enterprises represent 97% of all enterprises and contribute to 31% of the total added value. In France, enterprises employing fewer than 250 employees account for 99.8% of all enterprises, achieving 46% of the total business volume and 53% of the total added value. The same applies to South Korea, where these enterprises contribute to more than 25% of the total added value (Safer Mustafa, 2018, p. 64).

Upon closer examination of these countries, we find that they all belong to advanced nations and major economic powers. This signifies that entrepreneurship and the growth and development of the small and medium-sized enterprise sector play a significant and vital role in achieving economic development.

Regarding the statistical evolution of small and medium-sized enterprises in Algeria, statistics indicate that their number has gradually and positively increased. In the early 1990s, the Algerian industrial fabric primarily consisted of public industrial enterprises, representing 80% of industrial capacities, while the remaining 20%, equivalent to small and medium-sized enterprises, belonged to the private sector. Furthermore, statistics also show that the growth of small and medium-sized enterprises in Algeria exceeded 78% between 2002 and 2020. Private sector enterprises constituted 99% of the total small and medium-sized enterprises. The following table illustrates the development of the number of small and medium-sized enterprises and their employment size during the study period.

Table (03): Development of the number of small and medium enterprises and their operating volume in Algeria during the period 1999-2021

years	Public enterprises	Private enterprises	Total enterprises	Number of employees	The contribution percentage to the general employment %
1999	278	148447	148725	634375	10.84
2000	393	159114	159507	635375	11.08
2001	788	244570	245358	737062	11.83
2002	788	261125	261863	731082	10.99
2003	788	287799	288587	789534	11.81
2004	788	312181	212969	838504	10.75
2005	874	245842	342788	1157856	14.39

2006	739	269806	376767	1252707	14.12
2007	666	293946	419590	1355399	15.77
2008	626	392013	519526	1540209	16.84
2009	591	455398	587494	1546584	16.33
2010	557	482892	619072	1771380	18.2
2011	572	511856	659309	1724197	17.96
2012	557	550511	711832	1848117	18.17
2013	557	601583	777816	2001892	18.53
2014	542	656949	852053	2157232	21.07
2015	532	716895	934569	2371020	22.38
2016	390	1022231	1022621	2540698	23.43
2017	267	1074436	1074503	2690246	24.78
2018	262	1092908	1093170	2724264	24.04
2019	243	1193096	1193339	2885651	30.94
2020	229	1230844	1231073	2989516	32.05
2021	225	1286140	1286365	3134968	32.87

Source: Prepared by the researcher based on statistical information reports for small and medium enterprises for the years 2000-2022, (Ministry of Industry, 2023), annual reports on economic and monetary development, (Bank of Algeria, 2023).

2.3. The reality of supporting small and medium enterprises in Algeria: Given the importance of the small and medium enterprises sector to the national economy and the strategy of diversifying the economy outside the oil sector, the authorities have undertaken several reforms since the 1990s, focusing on encouraging domestic and foreign investment. They have adopted several mechanisms to support and accompany small and medium enterprise projects in order to ensure its success and growth, it established investment agencies such as the National Agency for the Support and Promotion of Investment (APSI), which was transformed according to Investment Law 01-03 of August 20, 2001, relating to investment development, to become the National Agency for Investment Development ANDI (Official Gazette, 08/20/2001, page 8), as well as The National Agency for the Support and Development of Entrepreneurship (ANADE) (formerly ANSEJ) and the National Unemployment Insurance Fund (CNAC) created the National Agency for the Management of Microcredit (ANGEM).

2.3.1. The National Agency for Investment Development (ANDI): This agency is tasked with several responsibilities and provides numerous advantages, including the following: (The National Agency for Investment Development, 2023)

- Facilitating necessary measures for investors by addressing obstacles and challenges faced in the investment process.
- Issuing decisions related to granting privileges after ensuring that the approved investment projects are eligible for benefits.
- Reducing corporate profit tax by 15% for the benefit of small and medium-sized enterprises located in eligible highlands regions and by 20% for those located in eligible southern regions.
- Granting temporary exemptions from income tax on corporate profits or total income tax and professional tax for five (5) years, as well as providing a 3% reduction in the interest rate applied to bank loans for investments in certain industrial sectors.
- Exempting from all customs duties, equivalent fees, and tax liabilities, as well as providing VAT exemption for equipment related to research and development acquired from the local market or imported.
- Providing bank loans not exceeding 70% of the total investment amount.
-

2.3.2 The National Agency for Support and Development of Entrepreneurship (ANADE): is a special-purpose public entity with legal personality and financial independence. It operates through a network of 61 agencies in addition to branches in key regions. ANADE focuses on supporting project leaders in establishing and expanding small enterprises that produce goods and services (The National Agency for Support and Development of Entrepreneurship, 2023). The agency performs the following tasks:

- Developing relationships with various system partners (banks, taxes, CNAS and CASNOS, etc).
- Establishing multi-sectoral partnerships to identify investment opportunities across different sectors.
- Provision of training in small project management techniques for the benefit of project owners.

2.3.3. The National Unemployment Insurance Fund (CNAC): Its tasks include: (The National Unemployment Insurance Fund, 2023)

- Continuously monitoring the membership cards and collecting the contributions allocated for financing.
- Providing guidance and advice to project owners to empower them to make effective decisions among the available options.
- Equipping project owners with the necessary knowledge to execute and manage their projects.
- The fund provides tripartite financing (personal contribution, interest-free loan provided by the fund, bank loan) to entrepreneurial project owners based on the investment amount.

3. Export diversification strategy in Algeria:

Algeria is considered one of the most significant oil-producing and exporting countries. It has shown great interest in this resource, considering it the primary source for increasing revenues and achieving a surplus in the trade balance. However, it has significantly neglected other sectors, causing a considerable delay in economic development and technological advancement to keep pace with global changes. Therefore, it is essential to explore new strategies to break free from oil dependence and achieve economic diversification, which ensures economic stability and prevents economic crises in case oil prices collapse.

1.3. The Concept of Export Diversification: Export diversification refers to altering the export product structure by modifying the share of products aimed at exportation or by introducing new products. In general, it involves expanding the basket of exports (DJOUDANE & MAHOUI, 2021, p. 202). It also implies gaining access to new markets with either existing or new products (MAZOUZI & GUEIDER, 2020, p. 304). Furthermore, it signifies the ability of a country's production apparatus to achieve flows of goods, services, information, and more to global countries and markets. Through this, it aims to create added value and economic growth (MAZOUZI & GUEIDERI, 2020, p. 314).

Considering the above definitions, export diversification involves expanding the range of exported products and/or targeting new markets for the distribution of these products. This diversification aims to reduce the risk of relying on a single resource and create multiple income sources.

2.3. Export Diversification Patterns and Objectives: Diversification patterns vary based on the strategies adopted by the state. The production structure of a country can be made more diversified on one hand, while on the other hand, the basket of exports can be expanded through diversification or entering new markets. Consequently, we can distinguish between the following: (BAHI & ROUAINIA, 2016, p. 136)

- **Diversification of the production structure (industrial):** It can assist in depending on a limited range of production activities and avoiding undesirable phenomena such as the resource curse or the Dutch disease. Production diversification can facilitate structural changes towards higher technology and skill levels.
- **Market diversification:** Excessive reliance on a single market or a few markets can negatively impact the economy. Therefore, accessing new markets with new products is necessary to achieve greater external savings. This allows the state to gain industrial competitiveness, such as technological skills, and establish new marketing channels, especially for small and medium-sized enterprises that need support in entering new product lines.

The objective of export diversification in oil-exporting countries is to reduce reliance on oil and its revenues, achieve revenue diversification, and, simultaneously, reduce the role of the public sector while promoting the role of the private sector in development. This goal is achieved through: (YOUSFIAT, NAIMAOUI, & BABA AHMED, 2017, p-p. 17-18)

* **Developing and expanding non-oil sectors:** Given the fluctuations in the oil market, many countries seek to diversify their economies and promote various sectors such as agriculture, industry, and services to increase their contribution to the gross domestic product and reduce dependence on oil."
* **Enhancing the role of the private sector in economic activity:** Many nations endeavor to augment the contribution of the private sector to economic growth and the creation of fresh employment opportunities. The private sector is often regarded as a principal driver for achieving economic development and fostering economic diversification.
* **Safeguarding the nation's economy from external shocks:** The significance of this objective is particularly pronounced in countries reliant on oil as a primary commodity. Oil is a global commodity with prices determined by supply and demand dynamics, as well as political and natural factors. Frequently, oil price determination lies beyond the control of producing and exporting nations due to economic, political, and natural crises. The oil market is characterized by price instability, exposing these rentier economies to recurrent crises.

3.3. Indicators of Export Diversification Measurement: Export diversification is gauged using various indicators, with a notable example being the Herfindahl-Hirschman Index (HHI). This index assesses the structural composition and diversity of a variable. It is often employed to measure diversity in the composition of a phenomenon and the structural changes that occur within its components. The formula for calculating it is as follows: (Hassani & Saham, 2017, p. 190)

$$H.H.I = \frac{\sqrt{\sum_{i=1}^{n} (xi / x)^2} - \sqrt{1 / N}}{1 - \sqrt{1 / N}}$$

Where:

N: represents the number of activities.

Xi: denotes the value of the variable in activity i.

X: represents the total value of the variable across all activities.

The value of the Herfindahl-Hirschman Index ranges between zero and one, wherein a value approaching zero signifies greater export diversification, and conversely.

3.4. The Structure of Exports and the State of Diversification in Algeria: The structure of exports in Algeria during the period spanning from 1999 to 2021 can be summarized through the following table (Table 04):

Table (04): The development of exports in Algeria during the period 1999-2021

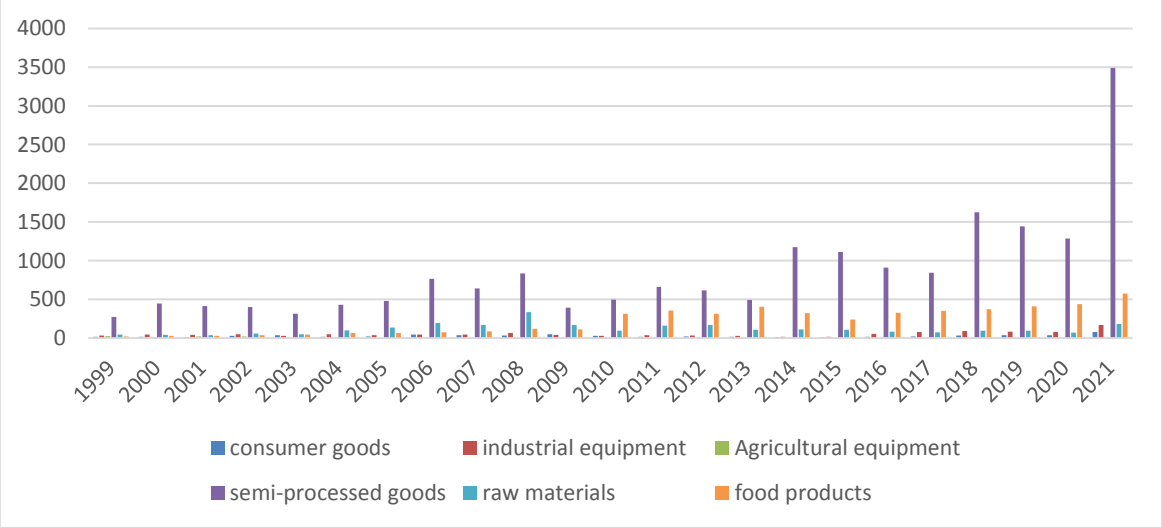
years	1999	2000	2001	2002	2003	2004	2005	2006
Hydrocarbon exports(%)	96.6	97.3	97.1	96.8	98.1	97.9	98.4	97.9
Non-hydrocarbon exports(%)	3.4	2.7	2.9	3.2	1.9	2.1	1.6	2.1
years	2007	2008	2009	2010	2011	2012	2013	2014
Hydrocarbon exports(%)	98.2	98.2	98.3	98.3	98.3	98.4	98.4	97.3
Non-hydrocarbon exports(%)	1.8	1.8	1.7	1.7	1.7	1.6	1.6	2.7
years	2015	2016	2017	2018	2019	2020	2021	-
Hydrocarbon exports(%)	95.7	95.3	96	94.6	94.1	91.3	88.3	-
Exports beyond hydrocarbons(%)	4.3	4.7	4.0	5.4	5.9	8.7	11.7	-

Source: Prepared by the researcher based on data from annual reports on the economic and monetary development of Algeria.

Through the table 4, we discern the dominance of oil exports, exceeding 95% in most years. Conversely, non-oil exports during the same period exhibited notably low percentages, signifying their limited contributions to the export structure. This places Algeria in a challenging economic situation, particularly amidst the fluctuations in oil prices. The year 2021 witnessed a slight increase in the percentage of non-oil exports, marking the highest ratio during the study period.

Concerning the most significant non-oil exports in Algeria, as presented in Figure 01 - semi-processed goods take the lead with a value of $3,490 million in 2021, the highest recorded value. Following closely are food products, registering $576 million during the same year. Subsequently, raw materials amount to $182 million, followed by industrial equipment, consumer goods, and finally, Agricultural equipment.

Figure (01): Exports of non-oil products in Algeria for the period 1999-2021
Unit: (million dollars)



Source: Prepared by the researcher based on the annual reports on the economic and monetary development of Algeria, (2004, 2008, 2012, 2017, 2021).

By employing the mathematical formula of the Herfindahl-Hirschman Index, we have gauged the degree of export diversification in Algeria for the study period. We summarize the index results in the following table:

Table (5): Export Diversification Index (Herfindahl-Hirschman) for the Algerian economy for the period 1999-2021.

years	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
HHI	0.95	0.96	0.95	0.95	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
years	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	-
HHI	0.97	0.97	0.97	0.96	0.93	0.92	0.94	0.91	091	0.86	0.82	-

Source: Prepared by the researcher based on the mathematical formula of the Herfindahl-Hirschman Index.

Noteworthy is the proximity of most of these values to 1, indicative of an exceedingly high degree of concentration. Furthermore, a slight decline in the index values during the 2020-2021 period is observed, signifying a marginal increase in Algeria's export diversification during these two years.

3.5. The strategic sectors upon which reliance can be placed: In July 2016, Algeria relied on a strategy to confront the repercussions of the oil price crisis, called the new model of economic growth, which carries with it structural reforms affecting all aspects of the economy aimed at achieving a change in the existing economic structure in light of the future vision of 2030 horizons for the transformation from a rentier economy to a diversified economy (Qassimi & Falaq, 2022, p. 270). The dependable sectors for increasing non-oil production and exports, if they are well exploited, are:

3.5.1. Mining, Mining Industries, and Petrochemicals Sector: This sector can contribute significantly to the non-oil GDP by reaching up to 10% by 2030. Utilizing untapped materials and minerals, of which there are 32 in Algeria, only 18 are currently exploited, leaving 14 resources untapped.

3.5.2. Agriculture and Food Industries Sector: Developing the agriculture sector to achieve self-sufficiency through private investment, raising the added value of the agricultural sector, enhancing productivity, and fostering innovation as a means of modernizing and rejuvenating the sector. The province of El Oued serves as a successful model in this sector, making significant strides in agricultural development within the region due to its favorable climate.

3.5.3. Tourism Sector: New strategies should be adopted to activate the role of tourism in Algeria. Algeria boasts a favorable tourist climate that can attract numerous visitors. Investment in this sector, as neighboring countries have done, is imperative. In these neighboring nations, tourism contributes to 50% of their revenue and employs millions of individuals. In contrast, Algeria's tourism sector has yet to significantly increase state revenue and employment opportunities.

3.5.4. Small and Medium-Sized Enterprises (SMEs) Sector: Algeria faces a scarcity of public and private economic enterprises. Therefore, stimulating the establishment of SMEs, particularly through administrative simplification and its integration with information and communication technology to reduce transaction costs, is essential. Developing emerging companies by implementing measures related to establishing incubators is vital, with partnerships encouraged between the public sector, ministries, and agencies overseeing small and medium-sized enterprises, along with universities and centers of support for these institutions, to create incubator programs (Ali, 2022, p. 435).

4. Econometric analysis:

Having previously delved into the theoretical and analytical foundations concerning the evolution of small and medium-sized enterprises and export diversification strategies, we shall endeavor in this axis to conduct a Econometric analysis of the impact of the number of small and medium-sized enterprises on the export diversification index in Algeria

4.1. Model Variables: The model variables consist of the following:

- **Dependent Variable:** It represents the export diversification index denoted as Y, which was calculated over the period from 1999 to 2021.
- **Independent Variables:** Represented by the number of small and medium-sized enterprises (public X_1 and private X_2), obtained from reports of the Ministry of Industry during the period from 1999 to 2021.

4.2. Mathematical Form of the Model: Since it involves a relationship between two independent variables and a dependent variable, the multiple linear regression method is used to estimate the Econometric model. The form of the function is as follows:

$$Y = B_0 + B_1 X_1 + B_2 X_2 + U_t$$

Where U_t represents the random error term, and t denotes time.

The stationarity of time series was studied using the Augmented Dickey-Fuller (ADF) test for the study variables. The results indicate that the variables included in the model are stationary at either the level or the first difference, as illustrated in Table (06).

Table (06): Testing the stationarity of the time series

variables	level			first difference			decision
	Probability	tabular value	critical value	Probability	tabular value	critical value	
Y	1.0000	-3.690	2.567	0.0083	-3.644	-4.561	I(1)
X_1	0.0441	-1.957	-2.017	-	-	-	I(0)
X_2	0.8503	-1.338	-3.632	0.0111	-4.416	-3.644	I(1)

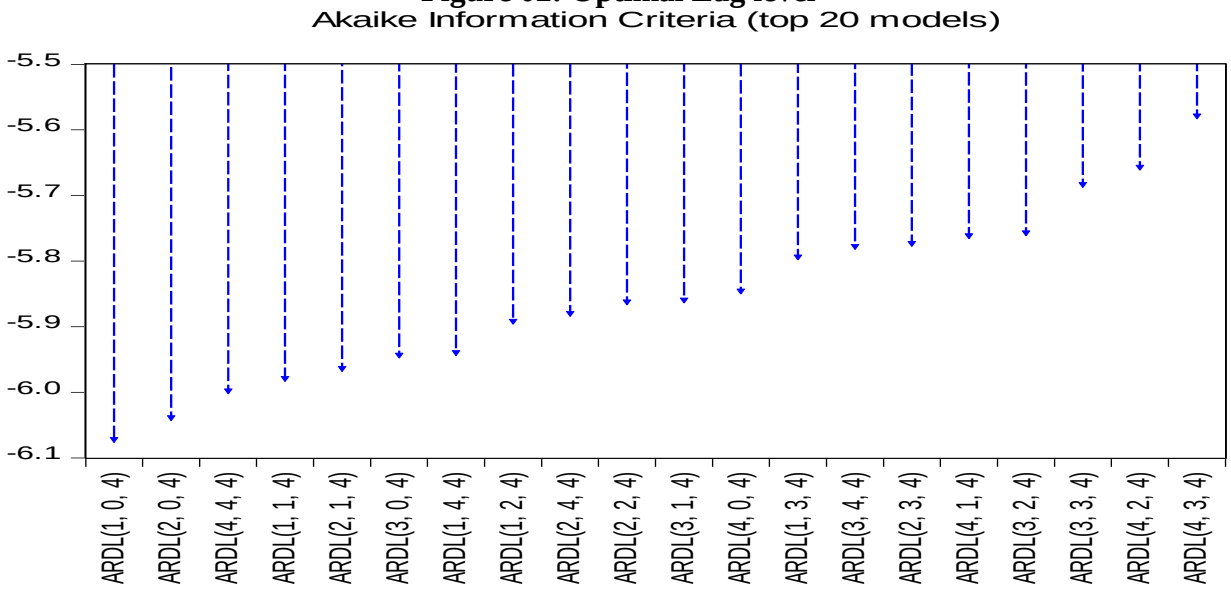
Source: Prepared by the researcher based on the outputs of EViews software.

Through the stability outcomes elucidated in the preceding table, we discern that the appropriate approach for model estimation is the Autoregressive Distributed Lag for distributed time lags (ARDL) model, given the absence of a second-level (2) or higher integrated series.

4.3. Model Estimation: The estimation of the ARDL model necessitates the following steps:

- **Optimal Lag level Testing:** The figure below illustrates the test results based on the Akaike criterion.

Figure 02: Optimal Lag level



Source: Prepared by the researcher based on the outputs of EViews software.

Figure (02) presents the top twenty models according to the Akaike Criterion, where the ARDL(1.0.4) model Giving smallest AIC value.

- Estimation Results: Table 07 delineates the estimation results for the best model.

Table (07): ARDL model estimation results

Dependent Variable: Y
Method: ARDL
Date: 08/25/23 Time: 12:08
Sample (adjusted): 2003 2021
Included observations: 19 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): X1 X2
Fixed regressors: C
Number of models evalulated: 100
Selected Model: ARDL(1, 0, 4)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Y(-1)	0.636333	0.171794	3.704047	0.0035
X1	-4.79E-05	5.12E-05	-0.934433	0.3701
X2	-1.85E-08	4.61E-08	-0.400095	0.6967
X2(-1)	6.98E-08	5.13E-08	1.362055	0.2004
X2(-2)	-1.07E-07	5.01E-08	-2.131640	0.0564
X2(-3)	8.46E-08	4.97E-08	1.703785	0.1165
X2(-4)	-1.51E-07	3.97E-08	-3.798587	0.0030
C	0.419368	0.192375	2.179952	0.0519

R-squared	0.966723	Mean dependent var	0.943158
Adjusted R-squared	0.945546	S.D. dependent var	0.042954
S.E. of regression	0.010023	Akaike info criterion	-6.072221
Sum squared resid	0.001105	Schwarz criterion	-5.674562
Log likelihood	65.68610	Hannan-Quinn criter.	-6.004921
F-statistic	45.65063	Durbin-Watson stat	2.127012
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

Source: Prepared by the researcher based on the outputs of EViews software.

The results elucidated in the table 7 reveal that the Fisher's statistic (F- statistic) equals 45.65, signifying significance at the 5% level. Hence, the model is deemed acceptable. Additionally, the R-squared coefficient of 0.96 implies that this model explains for 96% of the variations in the export diversification index.

- **Results of "bound test" for cointegration:** The bound test primarily relies on the F-statistic, as outlined by Narayan, P.K (2005), under the null hypothesis of the absence of cointegration.

Table (08): Results of bound test

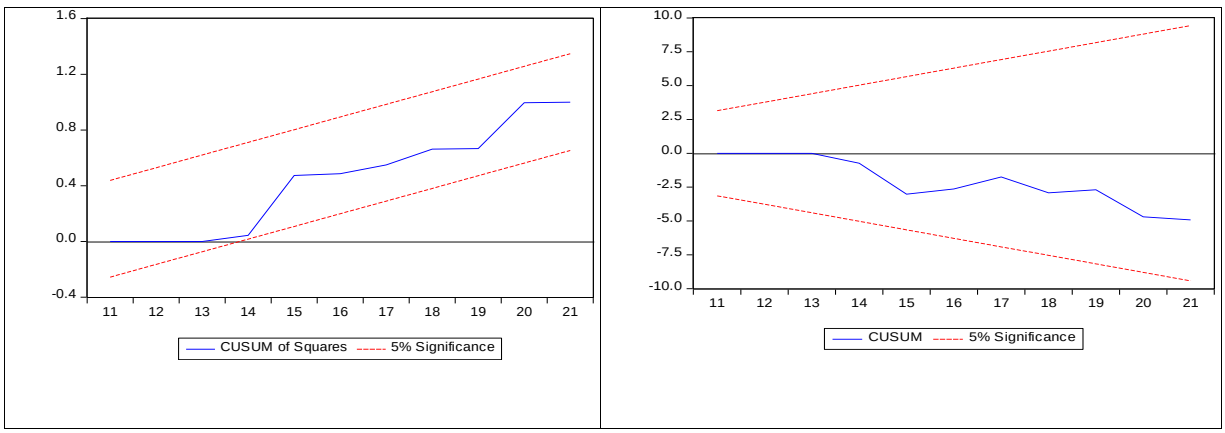
F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	10.86772	10%	2.63	3.35
k	2	5%	3.1	3.87
		2.5%	3.55	4.38
		1%	4.13	5
Actual Sample Size	19	Finite Sample: n=35		
		10%	2.845	3.623
		5%	3.478	4.335
		1%	4.948	6.028
		Finite Sample: n=30		
		10%	2.915	3.695
		5%	3.538	4.428
		1%	5.155	6.265

Source: Prepared by the researcher based on the outputs of EViews software.

The outcomes of conducting the "bound test" in Table 08 reveal a long-term relationship between the variables. This is evident because the F-statistic (10.86772) surpasses the upper limit for various significance levels. Consequently, the null hypothesis of no cointegration among the variables is rejected.

- **CUSUM Test:** To ensure the absence of any structural changes over time in the data utilized for the study, we employ CUSUM Test and CUSUM of Squares Test. The figure 03 illustrates the test results.

Figure (03): Results of CUSUM Test and CUSUM of Squares Test



Source: Prepared by the researcher based on the outputs of EViews software.

From the depiction in Figure 03, we deduce that both the CUSUM Test and CUSUM of Squares Test form a central trajectory that falls within the boundaries of the critical region. This indicates structural stability between the long-term and short-term.

4.4. Diagnostic Tests for the Model:

- **ARCH Heteroskedasticity Test:** The calculated Fisher value (0.512) with a probability of (0.4845) exceeds the 5% significance level. This leads us to conclude the stabilityof variance in the estimated model's error term, as illustrated in the following table:

Table (09): Results of ARCH Test

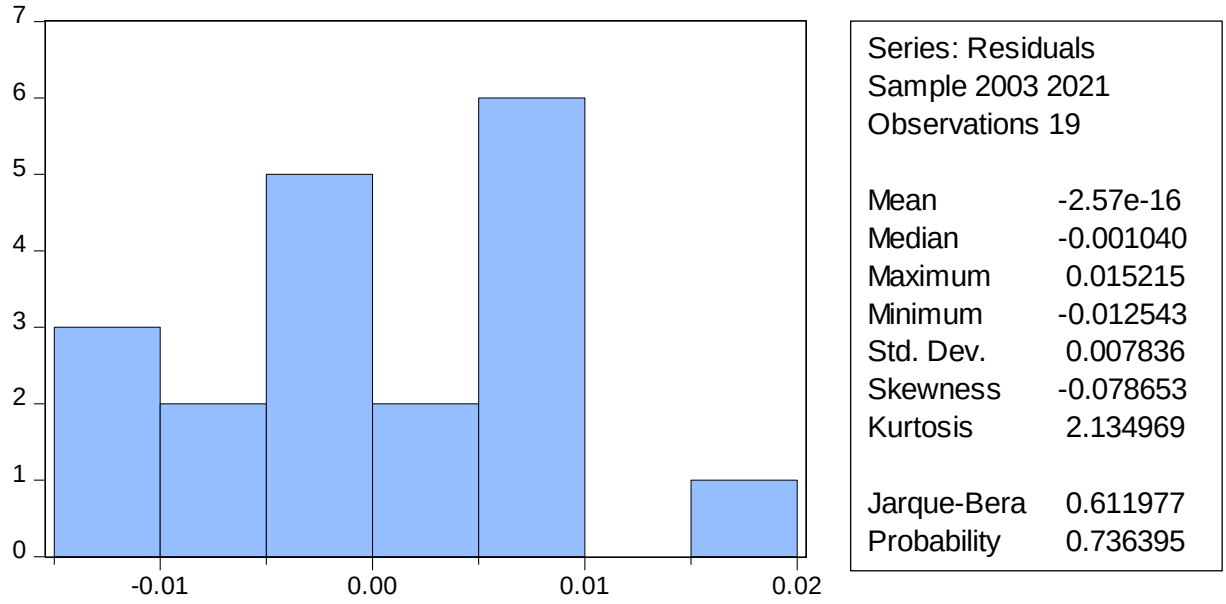
Heteroskedasticity Test: ARCH

F-statistic	0.512093	Prob. F(1,16)	0.4845
Obs*R-squared	0.558237	Prob. Chi-Square(1)	0.4550

Source: Prepared by the researcher based on the outputs of EViews software.

- **Normality Test:** Figure (04) illustrates the results of the normal distribution test for the residuals.

Figure 04: Results of Normality Test



Source: Prepared by the researcher based on the outputs of EViews software.

The JARQUE-BERA statistic value is 0.6119 with a corresponding probability value of 0.7336, which exceeds the 5% significance level. This suggests that the random errors follow a normal distribution.

- **Autocorrelation test for errors:** the results of the Breusch-Godfrey Serial Correlation LM Test are presented in the table below.

Table (10): Results of Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.404903	Prob. F(2,9)	0.6786
Obs*R-squared	1.568463	Prob. Chi-Square(2)	0.4565

Source: Prepared by the researcher based on the outputs of EViews software.

The obtained results lead us to conclude that the probability value exceeds 5%, indicating the absence of errors autocorrelation.

4.5. Estimating the long and short term relationship of the impact of small and medium enterprises on export diversification: Since the results confirmed the existence of cointegration between the variables, this requires estimating the long-run and short-run equilibrium relationship. We refer to the table 11 that explains the model.

Table 11: Error Correction Model for ARDL Model

ARDL Error Correction Regression
Dependent Variable: D(Y)
Selected Model: ARDL(1, 0, 4)
Case 2: Restricted Constant and No Trend
Date: 09/03/23 Time: 16:07
Sample: 1999 2021
Included observations: 19

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(X2)	-1.85E-08	2.81E-08	-0.657400	0.5244
D(X2(-1))	1.73E-07	3.44E-08	5.026522	0.0004
D(X2(-2))	6.62E-08	3.44E-08	1.921826	0.0809
D(X2(-3))	1.51E-07	3.43E-08	4.395888	0.0011
CointEq(-1)*	-0.363667	0.048892	-7.438183	0.0000

R-squared	0.816129	Mean dependent var	-0.006842
Adjusted R-squared	0.763595	S.D. dependent var	0.018273
S.E. of regression	0.008885	Akaike info criterion	-6.388010
Sum squared resid	0.001105	Schwarz criterion	-6.139474
Log likelihood	65.68610	Hannan-Quinn criter.	-6.345948
Durbin-Watson stat	2.127012		

* p-value incompatible with t-Bounds distribution.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X1	-0.000132	0.000133	-0.992797	0.3421
X2	-3.34E-07	1.15E-07	-2.904609	0.0143
C	1.153164	0.121656	9.478898	0.0000

EC = Y - (-0.0001*X1 -0.0000*X2 + 1.1532)

Source: Prepared by the researcher based on the outputs of EViews software.

The results of the bound test reveal a cointegration between the number of small and medium-sized enterprises (public and private) and the export diversification index, as shown in Table 11, composed of two parts. The first part pertains to the error correction model and the estimation of the short-term equilibrium relationship. The second part relates to the long-term equilibrium relationship for the impact of small and medium-sized enterprises on export diversification, represented by the following equation:

$$Y = 1{,}15 - 0{,}000132\,X1 - 0{,}000000334\,X2 + U_t$$

The coefficient of error correction has emerged negative (-0.3636) and significant at 5%. This reaffirms the accuracy and validity of the equilibrium relationship, with this parameter quantifying the speed of return to equilibrium conditions, meaning that 0.3636 of short-term errors are corrected within the year.

6.4. Economic tests for the estimated model: it appears from the estimated model, especially the long-run relationship, that:

- There is an inverse relationship between the number of public small and medium-sized enterprises and export diversification index in the long-term. an increase of one unit in the number of these enterprises leads to a decrease in the value of the export diversification index by 0.000132 units, signifying an increase in export diversification.
- There is an inverse relationship between the number of private small and medium-sized enterprises and export diversification index in the long-term. An increase of one unit in the number of these enterprises leads to a decrease in the value of the export diversification index by 0.000000334 units, indicating an increase in export diversification.

These aforementioned relationships hold economic validity, as the growth of both public and private small and medium-sized enterprise sectors positively contributes to raising economic growth rates and stimulating real productive sectors such as agriculture, industry, and tourism. This subsequently results in lower local product prices due to increased supply. Moreover, within the context of an effective export development strategy, a positive impact on export diversification outside of oil is reflected by a decrease in the value of the export diversification index, aligning with theoretically and previous empirical studies.

5. Conclusion:

The burgeoning interest in the small and medium-sized enterprise sector, relying upon it as a strategic option for achieving economic diversification and, consequently, increasing exports, has become a necessity for various nations and governments suffering with export sector monoculture.

In Algeria, export diversification is considered a strategic goal to create wealth and construct a balanced economy capable of withstanding the price fluctuations in international markets. But by returning to the reality of export diversification, we find it is primarily concentrated in the oil sector, which is evident in the low diversification export measured by the Herfindahl-Hirschman Index for the period from 1999 to 2021. This means that Algeria has not been able to get out of the circle of the economy dependent on oil revenues and into a diversified economy.

Despite the econometric study confirming the validity of the adopted hypothesis, that an increase in the number of small and medium-sized enterprises in Algeria positively influences export diversification, their current number remains insufficient to attain the desired levels of diversification.

Based on the obtained results, several recommendations can be put forth to facilitate export diversification Through interest in developing small and medium-sized enterprise sector:

- Articulate a clear strategy to incentivize investments in the small and medium-sized enterprise sector, particularly towards industries contributing to export diversification.
- Provide support and guidance to small and medium-sized enterprises to aid in their establishment, help them achieve their objectives, and internationalize their activities.
- Endeavor to reform the general investment climate in Algeria, ensuring stability across all aspects: social, political, and economic.

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