

Role of Institutional Determinants in Export Diversification in Algeria

دور المحددات المؤسسية في تنوع الصادرات في الجزائر

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Abstract:Export diversification is a key factor in stimulating economic growth and reducing the vulnerability of the Algerian economy to hydrocarbon price volatility. This research paper adopts an empirical approach aimed at analysing the institutional factors underlying export diversification in Algeria. For this purpose, an estimation of the OLS model was used. The latter provided robust arguments on the positive impact of human capital, financial freedom, the quality of government and the fight against corruption. The government is thus called upon to implement strategies to develop the educational and financial systems and to enact institutional reforms.

Keywords:Export diversification, institutional factors, development strategies, Algeria, OLS.

JEL Classification Codes :F10, O17, O21, C3

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1. Introduction

Export diversification is a key aspect of the development process not only for rentier states but for all countries of the world. It helps maintain macroeconomic stability and resilience to financial shocks and supports a transition to sustainable and higher growth.

A great deal of research on export diversification has focused on the relationship between export diversification and economic growth, as well as their institutional and economic determinants at a global or regional level. Yet, studies on the determinants of export diversification of a specific state are rare.

The literature retains several vectors promoting export diversification. These are factors of an economic, geographical, institutional nature, factor endowments and integration into the global economy. The most recent work highlights governance and institutional factors as the timeliest determinants of diversification. Governance ensures the preservation of property rights, facilitates trade and ensures fair competition rules for businesses (Matallah, 2020). The credibility and commitment of institutions that monitor corruption and protect inventors is a prerequisite to facilitate obtaining licenses and operating permits, promoting entrepreneurship and innovation (Olander, 2019).

Algeria, likewise developing countries that focus on raw material exports, has never ceased betting on the diversification of its export base, whether through policies or leased mechanisms prompting private companies to diversify their exports. Despite all these efforts, it has not been able to achieve its expected objective and remains in its rank as a single hydrocarbon-exporting country, accounting on average for 95%.

Notwithstanding the researchers' agreement on the relevance of diversification for economic and sustainable development in general, the discernment of the specific factors that prompt economic diversification is limited.

This research aims to estimate the institutional and political factors of export diversification in Algeria, providing an answer to the following decisive question:

What are the institutional factors that impact export diversification in Algeria?

A sample of data from different sources is used in this research, including UNCTAD's database, the World Bank, the Heritage Foundation, in partnership with the Wall Street Journal and the University of Gothenburg. It runs from 1995 to 2022.

The research paper is structured as follows: Section 2 sets out the theoretical basis on which the choice of study variables is based. Section 3 reveals the evolution of foreign trade and export promotion mechanisms. Section 4 demonstrates the estimation of the impact of institutional factors on export diversification. Finally, Section 5 bears the conclusion and prospects for improvement.

2. The theoretical basis for the choice of study variables

Extensive studies have been conducted by many economists to identify indicators that influence diversification. They developed models combining different economic, geographical and institutional factors of regions or a set of countries in order to analyse and determine the most impactful indicators.

Regarding Gross Domestic Product, taken by a large part of researchers as an index of economic growth, they have found a non-linear U-shaped trend (Imbs & Wacziarg, 2003), with some trends towards respecialisation of exports at higher growth rates. However, (Farazi, 2011)

confirmed that in East Asian countries GDP and DIVI are negatively related. It is noted that GDP has an ambiguous impact, it can have a positive or negative effect on export diversification.

Corruption also has a devastating effect not only on the quality of institutions in countries but also on the business environment. Strong institutions that control corruption, bribery, and expropriation by governments when innovators seek licenses and permits to operate are essential to promote entrepreneurship and innovation (Starosta de Waldemar, 2010). (Espoir, 2020) showed that corruption has a negative effect on diversification in his study of SADC countries, and (Sylvain, 2023) as well suggests that corruption restricts diversification.

Governance is an initial requirement to stimulate export diversification while ensuring the preservation of patents and property rights, simplifying transactions and ensuring a level playing field according to companies. Improving the quality of government is associated with a reduction in conflicts that undermine export diversification, as well as (Sylvain, 2023) demonstrated that the quality of governance, assessed using the democracy index, established according to competitiveness, openness, political participation and mechanisms for appointing leaders, promotes export diversification from an extensive perspective.

The characteristics of human capital, anchored in the theory of endogenous growth, can meet the general requirements of product diversification by providing highly qualified human resources. In this case, a high degree of human capital contributes to the reduction of export concentration (Elhiraka, B, Mbate, & M, 2014) i.e. a positive effect on diversification. This development is explained by the potential of human capital to guide countries' diversification strategies, by encouraging the transformation of their exports from raw (basic) products into manufactured products or services with higher added value.

Financial freedom provides important support to improve the investment capacity, growth, and export of different goods and services (Sylvain, 2023). This financial freedom is linked to the development of the domestic banking sector, which contributes positively to export diversification by increasing the number of small exporters (Mika, 2020). This association occurs because financial services alleviate the credit constraint in financing the fixed cost of export entry. Besides, (Thomas, 2016) certifies that liquidity constraints can fundamentally change exporter behaviour and overall export strategies.

3. Evolution of foreign trade and export promotion mechanisms

Algeria remains a country characterised by an almost absolute preponderance of hydrocarbons, representing 95% of its exports, despite its trade balance surpluses. Excessive dependence on oil exports is a major problem for the Algerian economy, which suffers from an insufficient level of competitiveness compared to the rest of the world. In this context, the priority of promoting non-hydrocarbon exports is essential as one of the solutions to remedy these shortcomings. Indeed, like most countries, Algeria offers various public aids to companies wishing to export.

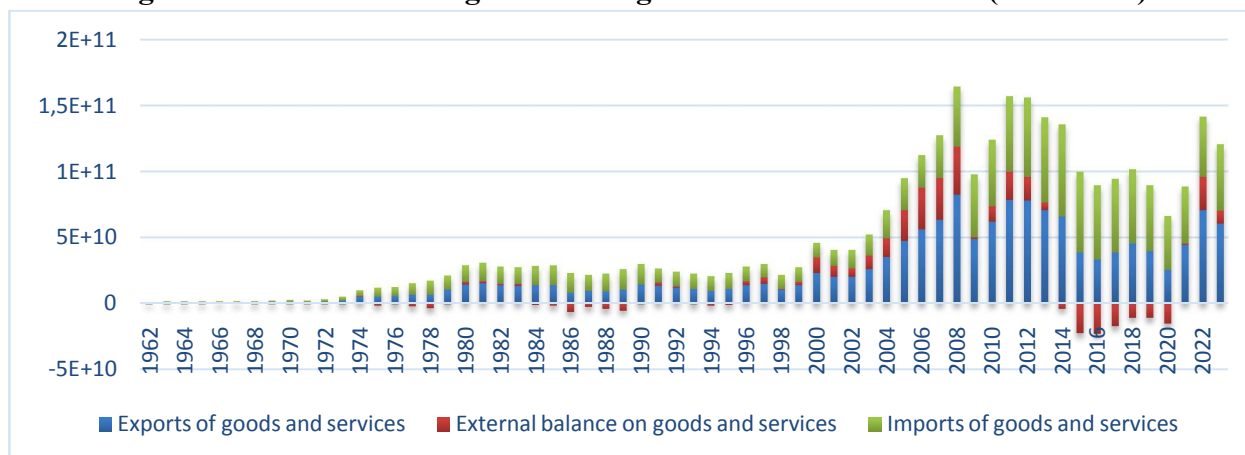
In this section, the evolution of trade policy will be briefly presented, focusing on the mechanisms and measures aimed at the devitrification of exports in Algeria.

3.1. Evolution of foreign trade

Since independence, imports and exports have experienced sustained growth with divergent rates.

3.1.1. Evolution of Algeria's trade balance : The trade balance of goods and services represents the difference between exports and imports of goods and services which can be positive (trade surplus) or negative (trade deficit).

Figure 01. Evolution of Algeria's Foreign Trade in current USD (1962-2023)

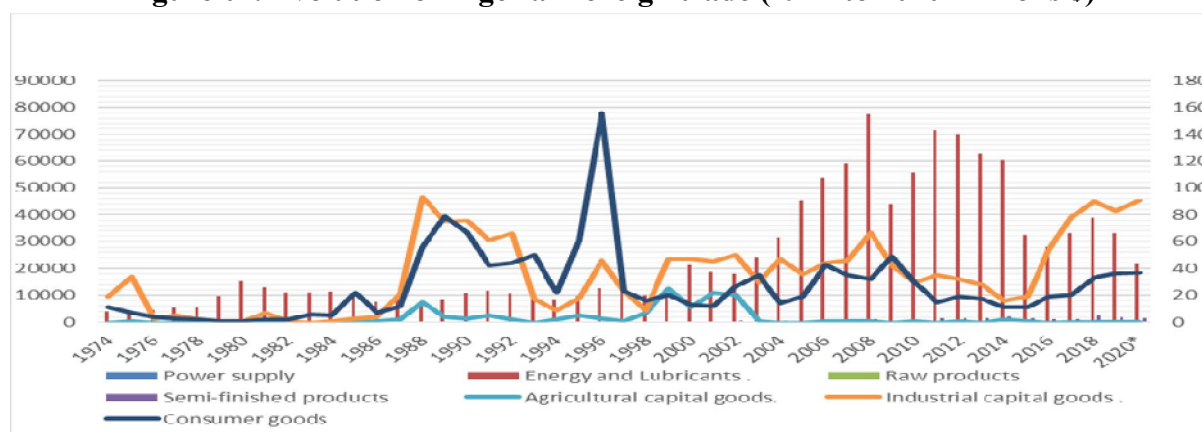


Source: Prepared by the authors based on World Bank 2024 database

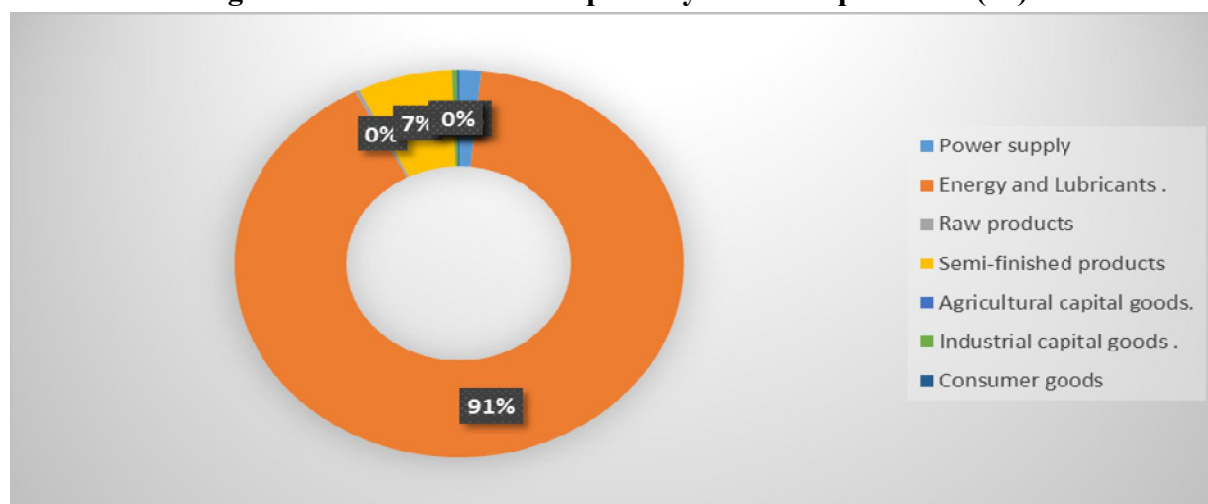
Due to the disastrous economic conditions caused by French colonialism, Algeria's foreign trade volume was extremely low since the early years of independence. It generated a deficit trade balance until 1966, when it marked its first surplus, thanks to the construction of the oil harbour of Arzew. Starting from this year, the export of hydrocarbons dominates 90% of exports. The trade balance has experienced a succession of surpluses and deficits proliferated by the volatility of oil prices generated by the financial and economic crises, oil shocks, wars (Gulf, Ukraine...) and the health crisis (Covid-19).

3.1.2. Structure of exports by use groups: The composition of Algerian non-hydrocarbon exports remains largely dominated by the export of energy and lubrication throughout the period. It reached an annuity of USD 77,361 million in 2008 and accounts for a 91% share of exports in 2020 as shown in Figure 03. Followed by semi-finished products that experienced a contained increase, or it scored the highest value of USD 2,336 million in 2018 and a 7% portion in 2020. Food products with a share of 1.86% and other products have a value of less than 1%.

Figure 02. Evolution of Algerian foreign trade (1974 to 2020 Millions \$)



Source: Prepared by the authors on the basis of the reports of the Foreign Trade Statistics

Figure 03. Distribution of exports by Use Groups in 2020(%)

Source: Prepared by the authors on the basis of the reports of the Foreign Trade Statistics of Algeria 2020

3.2. Export promotion mechanisms in Algeria

Very concerned about the small number of non-hydrocarbon exporting companies, the Algerian government has not ceased to recommend the strengthening of coordination between various agencies to offer quality support to companies encouraging them to export their products. In order to realise this concern, it mobilised two management structures, one is institutional and the other is financial.

3.1.2. Institutional coordination structures : In terms of institutional management, several business support instruments have been created:

A- The National Agency for the Promotion of Foreign Trade (ALGEX) (Ministry of Trade, 2004) designed on June 12, 2004, its mission is to participate in the promotion of the Algerian product and the diversification of exports, by providing support to exporters (customs facilitation), studies and analyses of export potential (analysis of Algerian foreign trade and trade agreements) and economic intelligence (access to markets, stock market listing, and analysis of global market capacities).

B- The National Association of Algerian Exporters (ANEXAL) designed on June 10, 2001, has set many objectives to modernise the production tool in order to increase the rate of exports. It also provided for the ratification of several agreements at the national level with (ANDPME, ALGEX, FINALEP SPA) and internationally, through the conclusion of numerous partnership protocols for instance:

- On 07/05/2003, it signed with North Africa Enterprise Development (NAED), which is a support program developed and led by the International Finance Corporation (IFC), a subsidiary of the World Bank Group;
- On 05/06/2003 with the Tunis Exporters Club (CET);
- On 25/07/2003 and 17/05/2012 with the Moroccan Export Association (ASMEX);
- On 01/03/2004 with the European Program Euro Development PME (EDPME);
- June 30, 2006 with the Export Club 66 of Perpignan – France (association bringing together exporting companies from the Pyrénées-Orientales) of a Twinning Charter.

C- The Algerian Chamber of Trade and Industry (CACI) designed on March 03, 1996, its mission is the initiation of any action intended to promote and develop the various branches of the national economy and their emergence on foreign markets.

D- The Algerian Export Insurance and Guarantee Company (CAGEX) is supervised by Article 4 of Ordinance 96/06 of 10/01/1996. This article stipulates that export credit insurance is delegated to a company whose mission is to insure for its benefit and under state control, political risks, as well as commercial, non-transfer and natural disaster risks. It also encourages and supports Algerian exports, outside the hydrocarbons sector and is responsible for guaranteeing credit sales for the benefit of economic operators active on the national territory.

E- The Algerian Company of Fairs and Exports (SAFEX) is a state body created from the mutation of the National Office of Fairs and Exhibitions (ONAFEX), founded in 1971. Its fundamental mission is the organisation of specialised fairs and specific exhibitions, fairs (on the national, regional and international territory), as well as the operation and development of the infrastructure of the Exhibitions Place.

4. Estimating the impact of institutional factors on diversification

4.1. Method and choice of model variable

Numerous methodologies and measurement tools have been developed to assess export diversification, and multiple diversification coefficients are therefore available. In this paper, the use of Herfindahl-Hirschman index is tested. It is often employed to measure the degree of diversification or concentration of trade and products (Mac & Nguyen, 1980). The choice of this index is explained by its availability, ease of use, and its ability to adapt to the different types of export diversification by (product or geographical area). In addition, it meets most of the criteria for a good concentration index. The Herfindahl-Hirschman index is calculated as follows:

$$H1 = \sqrt{\sum_{i=1}^N \left(\frac{x_i}{X}\right)^2}$$

Whereas x_i the export value of a product i ;

X symbolising total exports;

And N , number of products groups.

Here too, the greater the value of H_1 , the more concentrated exports are.

However, the standardised Herfindahl-Hirschman index turns out to be a proportional measure of export diversification. It takes values between 0 and 1 as follows:

$$NHHi = \frac{\sqrt{\sum_{i=1}^n P_i^2 - \frac{1}{\sqrt{n}}}}{1 - \frac{1}{\sqrt{n}}}$$

Whereas:

$$P_i = \frac{x_i}{X}$$

x_i : is the value of exports of products i ;

$$X = \sum_{i=1}^n x_i;$$

N: the number of products.

The closer the NHH index is to 1, the higher the concentration and vice versa. The NHHI can be used to compare the distribution of exports from two countries. Estimates near 1 correspond to a high level of diversification. Conversely, a low value of this index indicates a moderately diversified economy.

In order to analyse the effect of institutional indicators on diversification in Algeria, we are working with data from the UNCTAD, World Bank, Heritage Foundation database, in partnership with the Wall Street Journal and University of Gothenburg. The variables were chosen on the basis of the literature.

-Export Diversification Index (DIVI): presents the endogenous variable of the model calculated as the difference between 1 and the Herfindahl-Hirschman concentration index. It has been standardised so that it takes values apprehended between 0 and 1. A value of the index close to 1 reveals that the exports of this country are widely diversified, and values close to 0 reveal a high concentration of exports. The values of this index are extracted from UNCTAD data.

-Quality of Government Indicator (QoG): It offers monthly statistics and forecasts on economic, political, financial and composite risks. Government instability, internal conflicts, the threat of asset expropriations, payment and transfer delays, and even terrorism and corruption are among the risks taken into account by this index. The QoG is scaled from 0 to 1. Higher values indicate better quality of government. Data for this index comes from the University of Gothenburg (Teorell, et al., 2024).

-Financial Freedom (FF): measures the degree of government intervention in the financial field. A degree close to 100 means that the government intervenes little in the latter: the independence of the banks is therefore extended. States are limited to ensuring compliance with contracts or preventing fraud. This indicator was developed by Heritage Foundation, in partnership with the Wall Street Journal.

-Gross Domestic Product 2015 constant US dollar(GDP): is the sum of the gross value added of all resident producers in the economy, plus taxes on products and minus subsidies not included in the value of products. It is considered the most relevant index that evaluates the production of goods and services of a country over a year. It reveals why a country's economic activity is important. When it is formulated in constant dollars, it then takes inflation or deflation into account. The data are expressed in US dollars at constant 2015 prices. Statistics are extracted from the World Bank database and OECD files.

-Human Capital Index (HCI): The Human Capital Index in the PWT 9.0 database is based on average years of schooling and an expected rate of return on education, derived from the Mincer equation. This index is obtained by combining data from Barro and Lee (Barro & Lee, 2013) using heuristic principles to determine the most appropriate data set for each country. The index is calculated by a formula establishing various rates of return taking into account the number of years of schooling, with decreasing rates for higher education (Feenstra, Inklaar, & Marcel, 2015).

-Bayesian Corruption Index (BCI): is a composite index of the overall level of perceived corruption. The dataset contains 69 variables from 18 sources. It is measured by the merging of opinions on the degree of corruption of citizens, companies operating in the country, NGOs and staff working within governmental and supra-governmental organisations. This is a substitution

for the main perceived indexes of corruption, namely the Global Governance Indicators (IGM) published by the World Bank and the Corruption Perceptions Index (CPI) published by Transparency International. The IBC indicator makes it possible to predict the level of corruption with greater accuracy and extends the covered period. The ability to correct common measurement errors of some corruption indicators further enhances the credibility of the estimates and proves to be the most suitable model for corruption data. A high score for BCI means there is little corruption (Standaert, 2015).

The basic model equation reads as follows:

$$DIVI_t = \alpha_0 + \alpha_1 HCI_t + \alpha_2 QOG_t + \alpha_3 FF_t + \alpha_4 BCI_t + \alpha_5 GDP_t + \varepsilon_t \text{ for } t = 1, \dots, n \text{ with:}$$

$DIVI_t$: variable to be explained (endogenous) at time t ;

$HCI_t, QOG_t, FF_t, BCI_t, GDP_t$: explanatory variables (exogenous) at time t ;

$\alpha_0, \alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5$: coefficients (model parameters);

ε_t = model specification error.

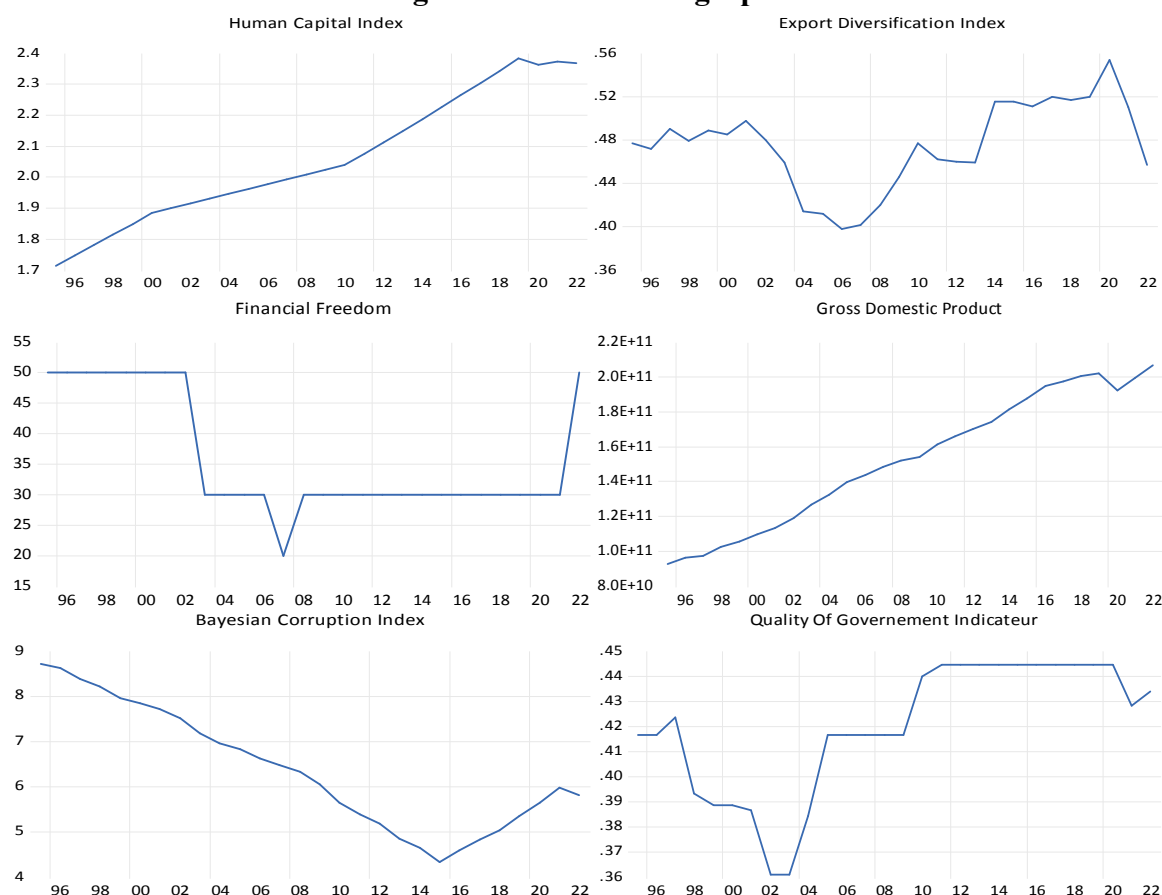
The statistical characteristics of the variables are illustrated in the following table:

Table 01. Descriptive Statistics

	DIV	FF	GDP	HCI	QOG	BCI
Mean	0.474929	36.07143	1.52E+11	2.058189	0.419684	6.386433
Median	0.478000	30.00000	1.53E+11	2.015882	0.420139	6.191643
Maximum	0.554000	50.00000	2.07E+11	2.383965	0.444444	8.718412
Minimum	0.398000	20.00000	9.27E+10	1.714343	0.361111	4.346599
Std. Dev.	0.039874	9.940298	3.78E+10	0.207042	0.026309	1.342651
Skewness	-0.319699	0.619793	-0.118224	0.192161	-0.819339	0.241201
Kurtosis	2.463165	1.691279	1.643246	1.868329	2.610100	1.813551
Jarque-Bera	0.813192	3.790880	2.212806	1.666445	3.310167	1.913771
Probability	0.665913	0.150252	0.330747	0.434646	0.191076	0.384087
Sum	13.29800	1010.000	4.27E+12	57.62929	11.75116	178.8201
Sum Sq. Dev.	0.042928	2667.857	3.87E+22	1.157396	0.018688	48.67325
Observations	28	28	28	28	28	28

Source: Prepared by the authors on Eviews 12

Based on the table, all series show a high level of consistency since their medians and averages fit between the minimum and maximum value. It is noted that the values of the variables are normally distributed, as Jacques Bera's P-value is greater than 5%. As a result, H_0 (the null hypothesis) is rejected for all series. The graphs of the time series are shown in Figure 04.

Figure 04. Time series graphs

Source: Prepared by the authors on Eviews 12

The degree of diversification from 1995 to 2001 was regularly below 0.49. From 2002 until 2006, diversification declined. The indicator took the lowest degree of the study period (0.39) in 2006, because, the proportion of hydrocarbons in total exports reached its highest level, caused by the rise in oil prices. From 2007 to 2010, diversification increased under the effect of the decrease in oil exports, following the oil counter-shock (the 2008 financial crisis). The index relapsed following the rise in oil prices between 2011 and 2014. The decline in oil prices in 2014 caused the index to stagnate between 0.51 and 0.52 during the period (2014-2019) to reach 0.54 which is the highest point in 2020 generated by the Covid 19 crisis, and it dropped again to 0.45 in 2022 by the increase in hydrocarbon prices caused by the Ukrainian war.

The Human Capital Index (HCI) is continuously increasing during the period from 1995 to 2022, following the policies of encouragement and free studies in Algeria.

The evolution of Gross Domestic Product (GDP) is also continuously increasing from 1995 to 2019, thanks to the fiscal stimulus proliferated by the implementation of government spending plans. Finally, in 2020 and 2021, GDP declined following the Covid-19 health crisis and resumed its growth in 2022.

The Financial Freedom Index (FF), experienced a stability of (50) during the years 1995 to 2002. Following the creation of twelve (12) private banks, including one with mixed capital and the development of their activities, a competitive environment between banks has emerged (Bank of Algeria, 2002). In 2003, the degree of financial freedom decreased to 30 caused by the entry into force of Ordinance No.03/11 of 26/08/2003 bearing money and credit. This ordinance, while maintaining the freedom of the banking sector, imposes stricter conditions for the installation

and supervision of banks and financial institutions. Similarly, the Bank of Algeria has set up more refined surveillance, monitoring and alert systems, and has ordered the liquidation of two banks (Bank of Algeria, 2003). The index is stabilised at 30 until 2007 fell to 20 where the Bank of Algeria has perfected the surveillance, monitoring and alert systems of the banking system as a whole and it has introduced monitoring of banks in the form of resistance tests activities. Finally, it resumed its 30 levelled position from 2008 to 2022.

The Bayesian Corruption Index (BCI) was down maintained from 1995 to 2017 from 8.71 to 4.84 which means that corruption was high, due to the political instability of Algeria. A decade of civil war from 1990 to 1999 that is marked by violence, bureaucracy and the absence of anti-corruption institutions. The conflict ended with the election of President Bouteflika in 1999, which brought the country back to some political stability, but corruption still persists. In 2018, the index increased to 5.03 following political instability (several calls were made for the impeachment of President Bouteflika). The index continued to increase after the election of Abdelmadjid Tebboune in 2019, the return of political stability and the triggering of judicial sanctions against the corrupt, as well as the establishment of the High Authority for Transparency, Prevention and Fight against Corruption as an agent of constitutional control by Article 204 of the Constitution of November 1, 2020 (MOUKHNACHE, 2022).

The Quality of Government indicator (QoG) has a downward trend during the period from 1995 to 2002 and 2003 where it reached the lowest level of the index 0.36. This is due to the black decade of civil war in the 1990s and the black spring of Kabylie in 2001. Politically, the country remains authoritarian, but with a democratic facade that includes multi-party politics, periodic elections, and relatively free media (Gianni, 2017). In 2004 the index began to grow as a result of structural changes within the government as it prepared for President Bouteflika's second mandate. From 2005 to 2010, the QoG stabilised at 0.41, the same level reached in 95/96. In 2011 to 2020 it became stable at 0.44 the highest level of the study period which remains below the average.

4.2. Estimation of the study model and confirmation of the results

While drawing ideas from the research dealing with the determining criteria of export diversification, and after describing the descriptive analysis, the link between diversification and its determinants will be estimated, and the main statistical tests will be carried out.

4.2.1. Estimating the multiple regression of variables

Table 02. Results of Estimating Multiple Regression of Variables

Dependent Variable: IDIV Method: Least Squares Date: 11/11/24 Time: 00:33 Sample: 1995 2022 Included observations: 28				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ICH	0.634172	0.167826	3.778741	0.0010
IQG	0.568566	0.255623	2.224234	0.0367
LF	0.002751	0.000904	3.041993	0.0060
ICB	-0.028962	0.009775	-2.962773	0.0072
PIB	-3.74E-12	1.29E-12	-2.891586	0.0085
C	-0.410875	0.197746	-2.077789	0.0496
R-squared	0.799799	Mean dependent var		0.474929
Adjusted R-squared	0.754299	S.D. dependent var		0.039874
S.E. of regression	0.019765	Akaike info criterion		-4.822423
Sum squared resid	0.008594	Schwarz criterion		-4.536951
Log likelihood	73.51392	Hannan-Quinn criter.		-4.735151
F-statistic	17.57790	Durbin-Watson stat		1.600633
Prob(F-statistic)	0.000000			

Source: Prepared by the authors on Eviews 12

The coefficient of determination (R-squared (R^2)) indicates that 79% of the Export Diversification Index (DIVI) is explained by the linear composition of exogenous variables. Similarly, the statistics are greater than its tabulated value of 2,048 at 5% degree of significance, which means that the coefficients attached to the explanatory variables are indeed significant.

The Durbin Watson (DW) statistic obtained the value of 1.60. It is positioned between ($d_1=1.03$ and $d_2=1.85$) in the table of (DW) at $n=28$ and $k=5$, placed in an area of uncertainty, which does not allow trenching on autocorrelation. While the value is close to the acceptance zone of H_0 (the null hypothesis), it can be concluded that there is no autocorrelation of the residues according to (Bourbonnais, 2015). To attest to the absence of autocorrelation, another Breusch-Godfrey autocorrelation test is performed, focusing on the specificity of non-autocorrelation of residues. H_0 means there is no autocorrelation, on the other hand, H_1 (the alternative hypothesis) means there is autocorrelation (see the results in Table 02).

It is noted that the DIVI, according to this estimate, depends positively on the Human Capital Index (HCI), Quality of Government indicator (QoG), Financial Freedom (FF) and negatively on the Bayesian Corruption Index (BCI) and constant Gross Domestic Product (GDP). Estimating the multiple regression model gives the following equation:

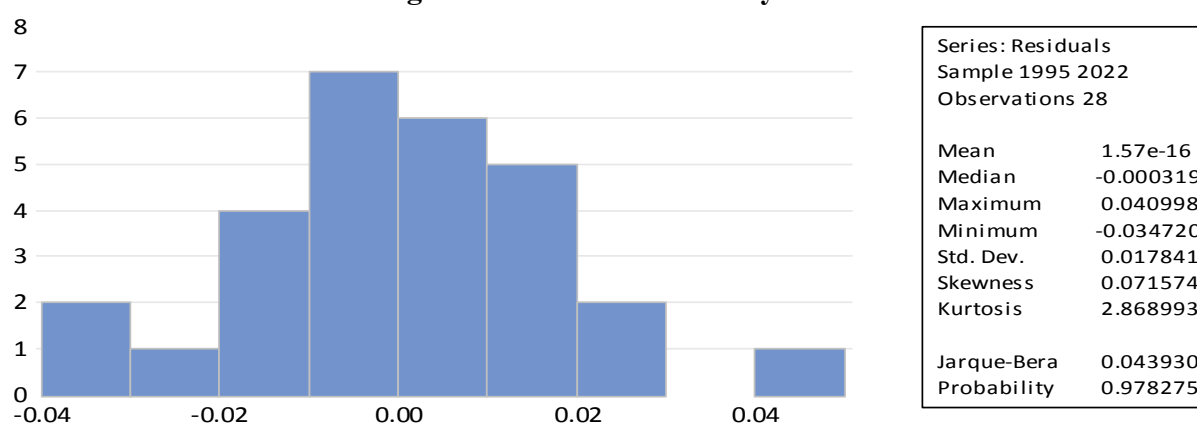
$$\text{DIVI} = 0.63417222427 * \text{HCI} + 0.568566230744 * \text{QoG} + 0.00275132815565 * \text{FF} - 0.0289624771249 * \text{BCI} - 3.74043250712e-12 * \text{GDP} - 0.410875365517$$

Based on this estimate, it can be deduced that:

- A 1% increase in the Human Capital Index (HCI) leads to a 0.6% increase in DIVI. This result is consistent with theory.
- A 1% increase in the Quality of Government indicator (QoG) leads to a 0.5% increase in DIVI. This result is demonstrated by the theory.
- A 1% increase in the Financial Freedom Index (FF) leads to a 0.002% increase in the DIVI, which corresponds to the results of the theory.
- A 1% increase in Bayesian Corruption Index (BCI) leads to a 0.02% decrease in DIVI, which is consistent with theory.
- A 1% increase in Gross Domestic Product (GDP) leads to a $3.74E-12\%$ decrease in DIVI. This result is attested by (Acemoglu & Zilibotti, 1997) which justifies the low degree of diversification at the initial stage of growth due to the scarcity of capital and the indivisibility of investment projects, two characteristics specific to the Algerian economy.

4.2.2. Study sample residue normality test

Figure 05. Residue normality test



Source: Prepared by the authors on Eviews 12

The probability attached to the Jarque-Bera statistic at 0.97 is greater than 5%. The normality of the residues is therefore confirmed.

4.2.3. Breush-Godfrey residue autocorrelation test : With this test, the errors are checked if they are not auto-correlated. Breusch-Godfrey test helps to test the autocorrelation of an order greater than 1 and remains valid in the presence of the shifted dependent variable as an explanatory one according to (Bourbonnais, 2015). The results of Breush-Godfrey test are as follows:

Table 03. Breush-Godfrey test results

Breusch-Godfrey Serial Correlation LM Test:

Null hypothesis: No serial correlation at up to 2 lags

F-statistic	0.685143	Prob. F(2,20)	0.5155
Obs*R-squared	1.795390	Prob. Chi-Square(2)	0.4075

Source: Prepared by the authors on Eviews 12

The results confirm the absence of autocorrelation of the residues, because the probability of H0 is considerably greater than 0.05.

Table 04. White's Heteroskedasticity Test Results

Heteroskedasticity Test: White

Null hypothesis: Homoskedasticity

F-statistic	0.676196	Prob. F(20,7)	0.7691
Obs*R-squared	18.45017	Prob. Chi-Square(20)	0.5578
Scaled explained SS	10.64406	Prob. Chi-Square(20)	0.9549

Source: Prepared by the authors on Eviews 12

Table 05. The Correlogram of the model

Date: 11/11/24 Time: 02:49

Sample: 1995 2022

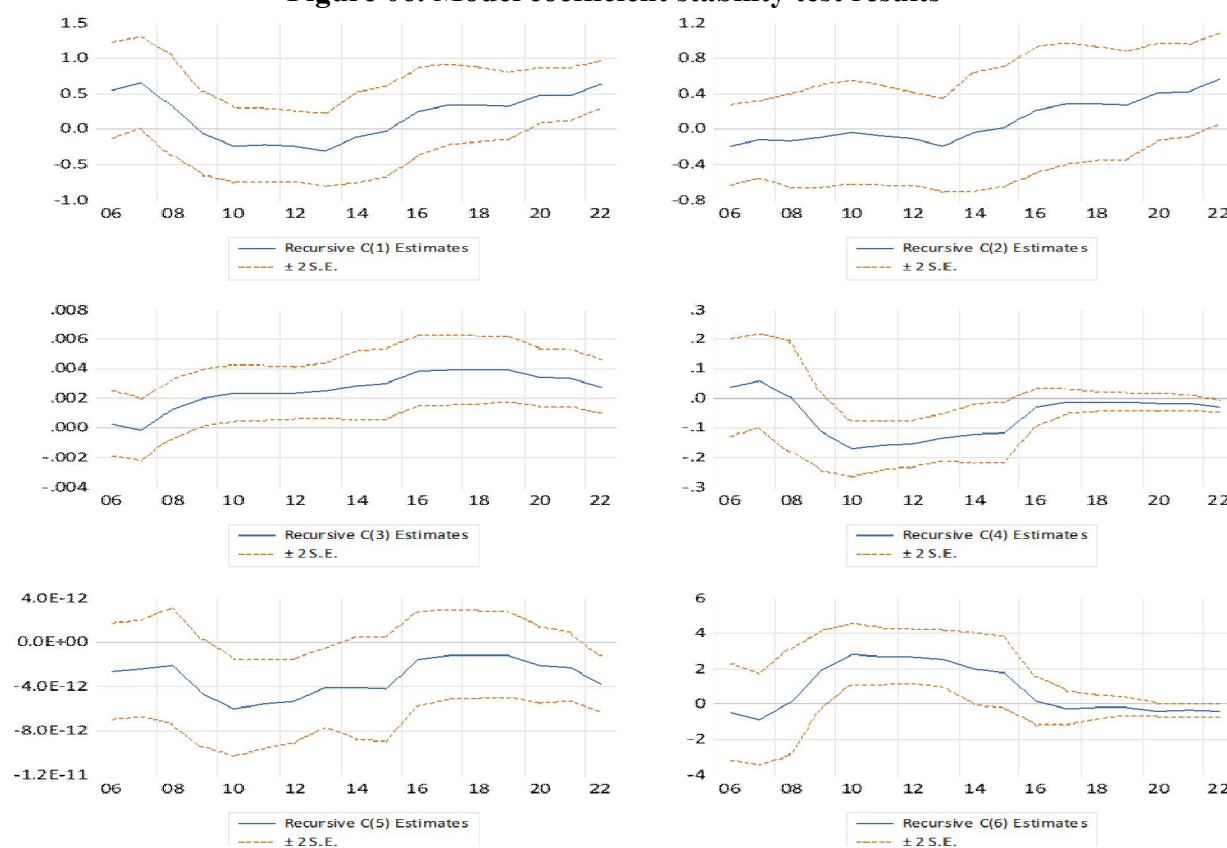
Included observations: 28

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
		1 0.134	0.134	0.5591	0.455
		2 -0.166	-0.187	1.4488	0.485
		3 -0.374	-0.340	6.1497	0.105
		4 -0.118	-0.070	6.6360	0.156
		5 -0.099	-0.227	6.9924	0.221
		6 0.167	0.040	8.0565	0.234
		7 0.390	0.324	14.140	0.049
		8 0.033	-0.126	14.186	0.077
		9 -0.153	0.020	15.219	0.085
		10 -0.340	-0.162	20.604	0.024
		11 -0.057	-0.039	20.767	0.036
		12 -0.066	-0.117	20.992	0.050

Source: Prepared by the authors on Eviews 12

The correlogram of this series of residues states that it is stationary, since, the probability of the Ljung-box Q statistic for the delay $h=5$ is 0.221 greater than 0.05. Moreover, the terms of the autocorrelation have no particular structure. Therefore, the null hypothesis of white noise is accepted.

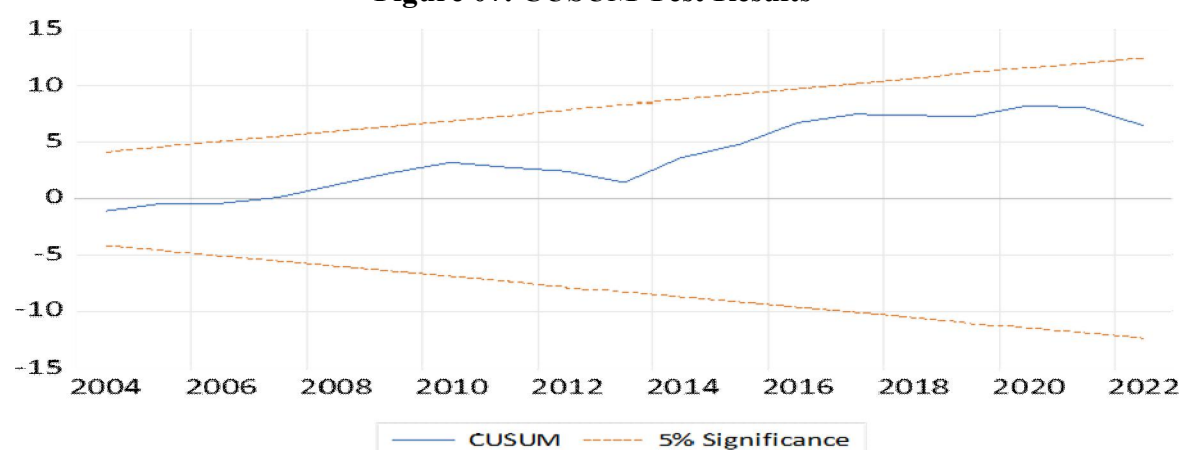
Figure 06. Model coefficient stability test results



Source: Prepared by the authors on Eviews 12

The six coefficients are within the confidence interval, which means that the parameters are stable.

Figure 07. CUSUM Test Results



Source: Prepared by the authors on Eviews 12

The CUSUM statistic fluctuates within the confidence interval, so the absence of structural change is considered.

5. CONCLUSION

This work has highlighted the positive effect of the quality of government, the degree of financial freedom, and human capital on diversification in Algeria from 1995 to 2022. The quality of government promotes good economic governance by reducing the political, economic, and financial risks that are a solid foundation of any developed economy to incentivise domestic or foreign private companies to invest in new products for domestic or foreign consumption. This emphasises the crucial role of effective and credible governance for the design and implementation of bold economic policies and a good business climate. Besides, financial freedom dictates that the state is limited to guaranteeing compliance with contracts or preventing fraud, giving banks more autonomy in their credit-granting strategies to support the financing of exporting companies. The human capital, combined with an increase in the average length of years of schooling, makes it possible to increase the skills and knowledge essential for entrepreneurship and the valorisation of research and development. Policymakers need to improve the education system to enable the workforce to acquire labour market-relevant, innovation-driven, and entrepreneurial skills.

Gross Domestic Product and corruption have a negative effect on export diversification. It is due to the misuse of increases in gross domestic product in creative investments of new products for export. However, a high level of corruption discourages the competitive advantages of companies and their insistence on diversifying their production, investment, and exports. In addition, this corruption drives away foreign direct investors who lead to export diversification if they are focused on non-hydrocarbon sectors. The Algerian government should make more effort to address corruption and improve the quality of government, financial freedom, and human capital to promote exports.

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