The Causes of Export Volatility in Algeria during the Period of 1992-2016

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ABSTRACT

Objective: This paper aims to investigate the main drivers of export volatility in Algeria using a regression model. Methods: The model estimates the impact of export structure and product concentration on the extent of export volatility in Algeria, based on annual time series data from 1992 to 2016.

Results: The results reveal that export volatility in Algeria is high, driven by the growing percentage of consumer and raw material exports. Additionally, the increasing volume of exports is a significant determinant of export volatility in Algeria.

Conclusions: There is a pressing need to reduce Algeria's reliance on primary exports. Policymakers should diversify the export basket to mitigate export volatility.

Keywords: Export volatility, Exports composition, Exports product concentration.

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1. Introduction

International trade is a crucial driver of development in Less Developed Countries (LDCs). Through export earnings, these countries can obtain desirable foreign exchange to finance additional investments, acquire knowledge and skills, adopt the latest technology from developed countries, and import necessary capital goods to expand production possibilities (Ghani, 2006; Kumar Singh, 2005; Riezman et al., 1996; Sloman and Wride, 2009). Leveraging these advantages can lead to significant economic growth. However, the potential of trade to generate economic growth in LDCs has been considerably diminished due to the destabilizing effects of export volatility in these countries.

The issue of export volatility in LDCs is a contentious topic in economic literature. Research on export volatility has primarily focused on two issues: the underlying factors contributing to export volatility and the potential effects of this volatility on economic growth in LDCs.

Regarding the first concern, numerous studies have investigated the major determinants of export volatility in LDCs. These studies suggest that export volatility is largely attributable to the high share of export proceeds from primary products, their concentration in exports, and the lack of diversification in geographic markets. Some studies, however, have struggled to clarify the relationship between these determinants and export volatility due to empirical results that lack solid theoretical grounding (Sebastian, 1990). Export volatility can be particularly problematic for economies heavily reliant on natural resource exports, whose prices are highly volatile in international markets. The low price elasticity of demand and supply for these primary products further explains the high volatility of exports in such countries (Salvatore, 2007).

Given Algeria's heavy dependence on oil exports, which make up the majority of its total exports, this paper investigates the main drivers of export volatility in Algeria from 1992 to 2016. The country's reliance on the oil sector may render it highly vulnerable to export volatility, with excessive fluctuations in export earnings potentially leading to internal instability and adverse effects on economic growth. Thus, this study aims to address the following research question:

- What are the main causes of export volatility in Algeria?

2. Theoretical background

Many economists have investigated the causes of export volatility. Theoretically, export earnings volatility in a given country can be attributed to variability on either the demand side, the supply side, or both (Hector, 1984). This variability, in turn, affects the quantities and prices of exports. Specifically, if the price elasticity of supply for a given product is high, quantities will tend to be relatively more volatile. In contrast, if supply is inelastic, prices will be more variable than quantities. Conversely, if demand elasticity for a product is high, changes in export earnings will primarily result from quantity variations. If demand is inelastic, export volatility will primarily arise from price fluctuations (Khaduli, 1993). Changes in supply factors that affect export volatility are linked to domestic production, while changes in demand factors are related to local demand for exportable goods and foreign demand (Sashana, 2017; Park, 1974).

The composition of exports is also an important factor in explaining export volatility (Yotopoulos and Nugent, 1976). Countries whose export baskets consist of goods with variable demand and/or supply curves are particularly vulnerable to export volatility (Massell, 1970). Less developed countries tend to experience higher export volatility compared to developed countries (Heini and Karl, 1985) because they are often dependent on primary exports, such as food, agricultural products, fuels, minerals, ores, and metals. Primary goods are more susceptible to price, quantity, and revenue volatility than manufactured products (Reynolds, 1970). This is due to the lower short-run price elasticity of supply and demand for primary goods compared to manufactured goods (Macbean, 1966).

Another factor contributing to export volatility is the concentration on a few products and destinations (Limprapat, 1979). Specialization in one or two export

products reduces the ability to counterbalance negative changes in exports of specific products with positive changes in other products (Wang, 1989). Export earnings are less volatile when the number of exportable products is larger. A less concentrated export basket allows fluctuations in individual export products to offset each other, thereby reducing overall export volatility (Massell, 1970; Hanom, 2010). Additionally, export volatility can increase if a country depends on a small number of export regions. When a country trades with only one or a few partners, its trade performance is more susceptible to the business cycles of the importing countries. Therefore, diversifying export destinations can make less developed countries less reliant on fluctuations in traditional markets (Mohammed, 1983).

3. Literature review

Given the problems associated with export volatility in less developed countries (LDCs), many studies have attempted to identify its main causes (e.g., Limprapat, 1979; Love, 1983; Macbean, 1966; Massell, 1970). These studies typically use models linking export volatility to various characteristics of the economy, such as product and market concentration of exports, export composition, and other explanatory variables.

3.1. The link between export composition and export volatility

The relationship between export structure and export volatility has yielded varied results in empirical investigations. El Samhouri (1990) examined export volatility in developing countries for the periods 1960-1972 and 1973-1985. Using both linear and exponential indices of instability to measure export volatility, his regression model indicated that the share of raw materials exports is a significant factor explaining export volatility in these countries. The coefficient for raw materials exports was positive, suggesting that an increase in the percentage of raw materials exports is associated with greater export volatility.

Tariq and Najeeb (1995) and Wasim (2003) studied the determinants of export earnings volatility in Pakistan. Tariq and Najeeb used an extended model incorporating commodity and geographic concentration, the percentage of food and raw material exports, and the volatility in the number of exports from 1969-1970 to 1990-1991. Their regression analysis found that export volatility in Pakistan was negatively related to the share of food exports and positively correlated with the share of raw materials exports. They concluded that greater reliance on the export of raw materials contributed to higher export volatility in Pakistan.

In contrast, Wasim (2003) found different results for the period 1973-2001. His findings suggested that semi-manufactured products were the primary contributors to Pakistan's export volatility, followed by primary products, with manufactured products contributing the least.

N. Okonkwo and Douglas (2016) identified oil exports as the major contributor to Nigeria's export volatility. Their measurements of instability indicated that fuel exports accounted for a larger portion of export volatility compared to non-fuel exports. Specifically, a 1% change in the fluctuation of fuel exports led to a 99.5% change in total export volatility, while a 1% variation in non-fuel exports explained only a 1.5% change in total export volatility.

3.2. The link between export concentration and export volatility

Among empirical studies examining the relationship between export volatility and export concentration, researchers have investigated two main aspects: the impact of commodity concentration on export volatility and the effect of geographic concentration on export volatility.

3.2.1. The relationship between commodity concentration of exports and export volatility

Several researchers have explored the link between export volatility and the product concentration of exports, yielding mixed results. Some studies have found a

positive relationship between the two variables. For example, Tariq and Najeeb (1995) suggested that a significant portion of export volatility in Pakistan could be explained by commodity concentration in exports. Their multiple regression results indicated that the product concentration index was a significant determinant of export volatility, with a positive coefficient. Hanom (2010) examined the sources of export volatility in Yemen, using annual data on product concentration, geographic concentration, and export volatility for both oil and agricultural products from 1990 to 2007. His multiple regression models revealed a positive relationship between export volatility and commodity concentration in exports. Hanom concluded that addressing export volatility in Yemen would require diversifying exports towards manufacturing products. Similarly, Sashana (2017) argued that product concentration in Caribbean countries led to unstable export earnings. His panel data analysis indicated that the product concentration index increased export volatility in fifteen Caribbean countries.

Conversely, Koomsup (1978) and Smith (1987) found that commodity diversification did not necessarily reduce export fluctuations. Koomsup (1978) found a negative coefficient for export commodity concentration in Thailand during 1963 to 1974. Although Thailand had diversified its agricultural products, such as sugar, kenaf, and sorghum, the export earnings from these products remained unstable. Smith (1987) reported that the effect of commodity concentration on Brazil's export volatility was significant but negative. He noted that Brazil's export product diversification before the 1970s exacerbated export fluctuations, though this effect was not significant. Other studies have found no significant relationship between export volatility and product concentration. For example, Reynolds (1970) investigated the link between export volatility and commodity concentration in 30 Asian countries from 1954 to 1964. Using a detailed three-digit classification to calculate various product concentration coefficients, neither rank correlation nor regression analyses showed a significant link between these variables. Naya (1973) found that the tendency for commodity concentration to create high export volatility in Asian countries was very weak, with the commodity concentration coefficient being insignificant.

3.2.2. The association between the geographic concentration in exports and the degree of export volatility

Most empirical studies have failed to substantiate the theory that market concentration of exports contributes to export volatility. For instance, Limprapat (1979) calculated the geographic concentration coefficient for Thailand's exports based on data from 14 of Thailand's main exports for the period from 1961 to 1975. According to Limprapat, the Geographic Concentration Index represents the mean concentration of these products. Using rank correlation and linear regression methods, he found that geographic concentration in exports had no significant impact on Thailand's export volatility. Similarly, Tariq and Najeeb (1995) argued that market diversification of exports does not mitigate fluctuations in export earnings in Pakistan. Their findings indicated that neither geographic concentration nor export market diversification effectively reduces export volatility.

However, some studies have supported the hypothesis that export volatility in a given country is positively related to its concentration in exports by destination. For example, Soutar (1977) found a positive association between export volatility and geographic concentration in 48 underdeveloped countries. He suggested that these countries should reduce geographic concentration to minimize export earnings volatility. Knudsen and Parnes (1975) reached a similar conclusion for 53 countries over the period 1959-1962 (Sashana, 2017).

4. Data and Methodology

To estimate the causes of export volatility in Algeria, a time series regression model is formulated for the period 1992-2016 using annual data. Export volatility (IE) is the dependent variable and is modeled as a function of a set

of explanatory variables: total exports (X), product concentration in exports (PC), geographic concentration in exports (G), and primary exports (RP). The description of the dependent and independent variables, the empirical model, and the method of analysis are detailed in the following subsections.

4.1. The dependent variable

Export volatility (IE) is the dependent variable and is defined as the absolute percentage deviation of the actual value of total commodity export earnings from the estimated values of the same commodities. It is calculated using the following formula:

$$IE_t = \left| \frac{X_t - \hat{X}_t}{\hat{X}_t} \right| * 100$$

Where X_t: is the actual value of total exports in year t. $\hat{X}_t$ refers to the estimated value of the total exports in year t.

The current study uses this index for measuring export volatility for two reasons. First, this index is used to correct the trend and any biases that could appear from the time series. Second, it is used to calculate the export volatility indices for each year within the period of 1992-2016. This index was used in the studies conducted by Tariq and Najeeb (1995), Hanom (2010), Malhotra (2012), and Mulugeta (2015).

4.2. The independent variables

The main determinants of export volatility are described as follows:

a) **Degree of Product and Geographic Concentration**: The degree of product concentration in exports (PC) and geographic concentration in exports (G) are measured using the Gini-Hirschman coefficient. This coefficient is a standard measure of export concentration employed in numerous studies (e.g., Massell, 1970; Love, 1979; McBean and Nguyen, 1980; Asheghian and Saidi, 1999). For Algeria, the Gini-Hirschman coefficients for both product and geographic concentration are calculated based on annual data for sixteen Algerian export products and Algeria's exports directed to seven regions.

b) **Total Exports (XP)**: The effect of total exports is included in the model to assess how the size of exports influences export volatility in Algeria. Massell (1970) argued that the value of exports is a crucial factor in explaining export fluctuations.

c) **Share of Primary Exports (RP)**: The share of primary exports is incorporated into the model to examine how export composition affects export volatility in Algeria. Primary exports include consumer goods and raw material products.

4.3. The model

Based on previous studies, specialization in primary goods, concentration on a limited range of products, and geographic concentration in exports are identified as significant causes of export volatility in underdeveloped countries (see El Samhouri, 1990; Macbean, 1966; Soutar, 1977; and Tariq and Najeeb, 1995). Therefore, the export volatility of Algeria can be modeled as a function of these determinants and other independent variables as follows:

$$IE_t = f(X_t, PC_t, G_t, RP_t)$$

In this study, the annual time series is used to estimate the following multiple regression model:

$$IE_t = B_0 + B_1 XP_t + B_2 PC_t + B_3 G_t + B_4 RP_t + V_t$$

IE represents the index of export volatility, PC and G are measures of export concentration, RP denotes the exports of primary products in Algeria, and XP is the share of exports in GDP. V represents the white noise error term. All variables are expressed in logarithms to measure the percentage change in RGDP due to percentage changes in the regressors. The data used in this study is annual and covers the period from 1992 to 2016. Data on total nominal exports and their ratio to GDP are extracted from the annual World Bank publications. Data on exports by product groups and regions are obtained from the World Integrated Trade Solution (WITS) provided by the World Bank.

Before estimating the model, unit root tests such as ADF,

PP, and KPSS are performed to evaluate the time series properties and identify the order of integration for each variable (Bakari and Mebrouki, 2017). Correlation between explanatory variables and the Variance Inflation Factor (VIF) are used to check for multicollinearity. The Johansen Cointegration test is utilized to assess the existence of a long-run association in the model. Various criteria are employed to select the optimal lag structure for the model. The DOLSE method is used to estimate the causes of export volatility in Algeria from 1992 to 2016, and the Jarque-Bera test is employed to check for the normality of residuals.

4.3.1. Unit Root Test

Macroeconomic time series are typically non-stationary and can lead to spurious regression results. Therefore, unit root tests are necessary to check the stationarity of all variables under investigation (Oladipo, 2017). Various testing methods have been developed to address these challenges (Tahir, 2012). This study checks the stationarity of the time series using three forms of unit root tests: the Augmented Dickey-Fuller (ADF) test, the Phillips-Perron (PP) test, and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test. The results of the ADF, PP, and KPSS tests for the model variables are presented in Tables 1 and 2 below.

Table 1. The ADF and PP Unit Root Tests

variable	ADF test ((the null hypothesis time series have unit root))						Perron test (the null hypothesis time series have unit root)						Description of results
	in level			in First difference			in level			in First difference			
	ADFr t-statistic		Test critical values	ADF t-statistic		Test critical values	Adj. t-Stat		Test critical values	Adj. t-Stat		Test critical values	
IE	with constant	-3.84	-2.992	with constant	-6.57	-2.998	with constant	-3.855	-2.992	with constant	-9.681	-2.998	IE is stationary at level with ADF test and stationary at first difference with PP test
XP	with constant	-1.27	-2.992	with constant	-6.57	-2.998	with constant	-1.213	-2.992	with constant	-4.874	-2.998	XP is stationary at first difference
PC	with constant	-2.26	-2.992	with constant	0.03	-3.04	with constant	-2.164	-2.992	with constant	-6.257	-2.998	PC is stationary at first difference
G	with constant	-1.93	-2.992	with constant	-5.02	-2.998	with constant	-1.905	-2.992	with constant	-5.025	-2.998	G is stationary at first difference
RP	with constant	-1.3	-2.992	with constant	-4.32	-2.998	with constant	-1.905	-2.992	with constant	-5.025	-2.998	RP is stationary at first difference

Source: Prepared by the researcher

Table 2. The KPSS Unit Root Test

	KPSS unit root test (the null hypothesis time series are stationary)						Description of results
variable	**in level**			**in First difference**			
	LM-Stat.		**Test critical values**	**LM-Stat.**		**Test critical values**	
IE	with constant	0.0801	0.463	with constant	0.279413	0.463	IE is stationary at level
XP	with constant	0.26027	0.463	with constant	0.366648	0.463	XP is stationary at level
PC	with constant	0.33565	0.463	with constant	0.5	0.463	PC is stationary at level
G	with constant	0.47334	0.463	with constant	0.091386	0.463	G is stationary at first difference
RP	with constant	0.607950	0.463000	with constant	0.287521	0.463000	RP is stationary at first difference

Source: Prepared by the researcher

All tests indicate that IE is stationary at the level. Both the ADF and PP tests show that XP, G, and RP are stationary at the first difference. The results for PC are mixed: it is stationary at the level according to the KPSS test, but stationary at the first difference when using the PP test. Based on the unit root test results, XP, PC, and G are integrated of order one (I(1)), while IE is considered an I(0) variable.

4.3.2. Multicollinearity test

To assess multicollinearity among the independent variables, two methods are used. The first method involves calculating the pairwise correlations between the independent variables. If any correlation exceeds 0.80, it indicates the presence of harmful multicollinearity. The second method uses the Variance Inflation Factor (VIF). A common rule of thumb is that if any VIF value exceeds 5 or 10, the associated regression coefficients may be poorly estimated due to multicollinearity (Joshi, 2012). The correlation matrix is provided in the following table.

Table 3. The Correlation between the Explanatory Variables of the Model

	XP	**PC**	**G**	**RP**
XP	1	0.726997	-0.61709	0.698837
PC	0.726997	1	-0.53913	0.623773
G	-0.61709	-0.53913	1	-0.81696
RP	0.698837	0.623773	-0.81696	1

Source: Prepared by the researcher

Table 3 shows that the correlation coefficients between all explanatory variables are below 0.8, except for the correlation between RP and G, which is approximately 0.82. To assess multicollinearity between G and RP, G is regressed against XP, PC, and RP, and the Variance Inflation Factor (VIF) is calculated. The results presented in Table 4 indicate that G and RP are not collinear, with the VIF value of 3.5, which is well below the threshold of 10.

Table 4. The regression of G on RP and the other Explanatory Variables

Dependent Variable: G				
Method: Least Squares				
Sample: 1992 2016				
Included observations: 25				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	5.4793	4.013932	1.36507	0.1867
XP	-0.01996	0.047487	-0.42027	0.6786
PC	-0.03556	0.907033	-0.0392	0.9691
RP	-0.05933	0.014188	-4.1816	0.0004
R-squared	0.671611	Mean dependent var		4.238008
Adjusted R-squared	0.624698	S.D. dependent var		0.067261
S.E. of regression	0.041205	Akaike info criterion		-3.39486
Sum squared resid	0.035655	Schwarz criterion		-3.19984
Log likelihood	46.43575	Hannan-Quinn criter.		-3.34077
F-statistic	14.31616	Durbin-Watson stat		1.280336
Prob(F-statistic)	0.000026	VIF		3.5

Source: Prepared by the researcher

4.3.3. Lag Selection

The results presented in Table 5 show that, based on the SC, HQ, AIC, and FPE criteria, the optimal number of lags for the model is 1.

Table 5. The Lag Structure of the Model

VAR Lag Order Selection Criteria						
Endogenous variables: IE						
Exogenous variables: C XP PC G RP						
Sample: 1992 2016						
Included observations: 23						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-45.8726	NA*	4.917869*	4.423702*	4.670549*	4.485783*
1	-45.6019	0.400183	5.267653	4.487119	4.783334	4.561616
2	-45.4353	0.231761	5.706615	4.55959	4.905175	4.646504
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Source: Prepared by the researcher

4.3.4. Cointegration Test

Johansen's test is employed to check for the presence of cointegration, or a long-run relationship, between variables. The results of the Johansen cointegration test are presented in Table 6. The null hypothesis of "no cointegration" is rejected. The trace test indicates the presence of three cointegrating equations in the model.

Table 6. The Results of Cointegration Test

Sample (adjusted): 1994 2016				
Included observations: 23 after adjustments				
Trend assumption: Linear deterministic trend				
Series: IE XP PC G RP				
Lags interval (in first differences): 1 to 1				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	**Eigenvalue**	**Trace Statistic**	**0.05 Critical Value**	**Prob.****
None *	0.910064	115.9376	69.81889	0
At most 1 *	0.684075	60.53856	47.85613	0.0021
At most 2 *	0.565724	34.03677	29.79707	0.0153
At most 3	0.335849	14.85306	15.49471	0.0623
At most 4 *	0.210646	5.440422	3.841466	0.0197
Trace test indicates 3 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				

Source: Prepared by the researcher

5. Empirical results and discussion

Given the presence of cointegration in the model, the study employs the DOLSE method to estimate the long-run relationship between export volatility and its explanatory variables. This method provides efficient estimators for cointegration vectors that account for deterministic components, different orders of integration, and potential simultaneity among variables (Irffi et al., 2020). The results of the DOLSE estimation of the model are presented in Table 7 below.

Table 7. Model Estimation

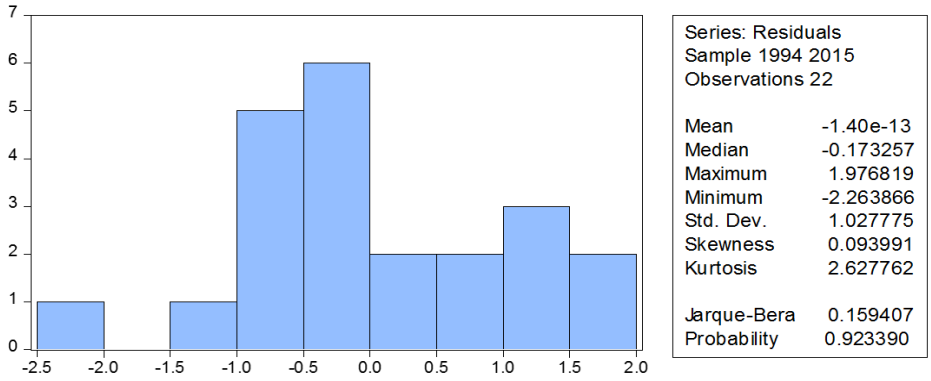
Dependent Variable: IE				
Method: Dynamic Least Squares (DOLS)				
Sample (adjusted): 1994 2015				
Included observations: 22 after adjustments				
Cointegrating equation deterministics: C				
Fixed leads and lags specification (lead=1, lag=1)				
Long-run variance estimate (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
XP	9.906031	4.012321	2.468903	0.0356
PC	-494.927	92.3947	-5.35666	0.0005

RP	5.631669	1.048656	5.37037	0.0005
C	2139.385	399.7992	5.35115	0.0005
R-squared	0.702969	Mean dependent var		2.364335
Adjusted R-squared	0.306928	S.D. dependent var		1.885807
S.E. of regression	1.569952	Sum squared resid		22.18275
Long-run variance	0.936172			

Source: Prepared by the researcher

5.1. The Goodness of the Fit

The results of the model estimation presented in Table 7 indicate that the explanatory variables account for approximately 70% of the variability in export volatility (IE), suggesting a good fit of the data. Furthermore, the Jarque-Bera test, as shown in Figure 1, confirms that the residuals of the model are normally distributed.



Source: Prepared by the researcher

Figure 1. Normality Test

5.2. Results of the model's estimation and discussion

5.2.1. The impact of primary and non-primary exports on export volatility in Algeria

The effect of primary exports (RP) on export volatility (IE) is detailed in Table 7. The results show that RP has a positive impact, with a 1% change in RP leading to a 5.63% change in IE. This effect is statistically significant at the 5% level.

These findings suggest that primary exports contribute to fluctuations in Algeria's export performance. This is consistent with the theory that primary exports are a major source of export volatility and aligns with previous studies by Smith (1987) and El Samhouri (1990), which also found that raw material exports positively influence export volatility.

Analyzing the structure of Algeria's exports reveals that primary products dominate, accounting for 97.3% of total exports during the period from 1992 to 2016. Of this, consumer products make up 51.7%, while raw materials constitute 45.6%. In contrast, non-primary exports, such as intermediate and capital goods, represent only 2.5% and 0.2%, respectively. This distribution highlights a lack of export sophistication in Algeria (Jewell et al., 2014). Such a concentration on primary products exacerbates volatility in export earnings.

The predominance of primary products makes Algeria particularly vulnerable to fluctuations in the global economic environment, complicating the management of export prices and volumes (Karungu and Khamfula, 2004). The volatility in primary commodity prices and earnings is often due to unpredictable changes in demand and supply, combined with low price elasticity (Soutar, 1977). On the supply side, variability in consumer product supply—such as food products—can be attributed to domestic production factors, including farming hazards (Vincent, 1974), cobweb supply effects, weather variability, and natural events like diseases and pest attacks. On the demand side, export volatility in Algeria is influenced by factors affecting the demand for raw material products, such as changes in consumer preferences, cyclical income fluctuations in importing countries (Love, 1985), and shifts in the prices of competing products (Massell, 1970).

5.2.2. The effect of the product concentration of exports on export volatility in Algeria

The results of the model's estimation presented in Table 7 indicate that the coefficient for product concentration (PC) is negative and significant. This finding aligns with the results of Koomsup (1978) and Smith (1987). Both studies found a negative and significant relationship between export volatility and the product concentration of exports. Koomsup (1978) observed that despite Thailand's diversification of agricultural products, such as sugar, Kenaf, and Sorghum, during the period from 1963 to 1974, the earnings from these products remained volatile. Smith (1987) similarly noted that Brazil's diversification of export products before the 1970s did not significantly mitigate fluctuations in export earnings.

The results from this study contradict the theory suggesting that high commodity concentration generally leads to greater export volatility. This theory posits that countries with a high concentration of exports tend to experience increased volatility in export earnings.

5.2.3. The effect of exports of goods and services on export volatility in Algeria

The results presented in Table 8 indicate that the share of exports of goods and services (XP) has a positive and significant impact on export volatility (IE). During the period from 1992 to 2016, the export sector represented almost 31.5% of Algeria's GDP. This substantial percentage underscores the importance of export promotion strategies for Algeria. The positive coefficient of XP suggests that as the size of the export sector in Algeria increases, export earnings become more volatile.

6. Conclusion and recommendations

This paper identifies the main causes of export volatility in Algeria. Analyzing annual time series data from 1992 to 2016, the study concludes that key factors contributing to export volatility in Algeria include the high proportion of consumer goods and raw materials in exports and the increasing share of goods and services exports in GDP.

Based on these findings, the following policy recommendations are made to reduce export volatility in Algeria:

1. **Reduce Reliance on Primary Exports:** Algeria should decrease its dependence on the exports of consumer goods and raw materials. Instead, it should focus on promoting non-primary exports, such as capital goods and intermediate products, which contributed less to export volatility between 1992 and 2016. Although Algeria is working to improve its industrial performance, diversifying the economy and advancing the manufacturing sector are still significant challenges for policymakers.

2. **Diversify the Export Basket:** Diversification of the export basket appears to be a viable strategy for stabilizing export earnings. However, as Benmoumen (1990) suggests, simply diversifying is not enough. For effective reduction in export volatility, diversification should focus on increasing the share of exports that contribute less to overall export volatility. Thus, Algeria should aim to shift towards more manufactured and sophisticated products to better stabilize export earnings.

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أسباب تذبذب الصادرات في الجزائر للفترة 1992–2016

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ملخص

تهدف هذه الورقة إلى دراسة أسباب تذبذب الصادرات في الجزائر من خلال نموذج الانحدار. في هذا النموذج، يتم استخدام السلاسل الزمنية السنوية للفترة 1992–2016 لتقدير أثر هيكل الصادرات وتركيز الصادرات السلعي على مدى تذبذب الصادرات في الجزائر. تكشف النتائج أن التذبذبات المرتفعة في صادرات الجزائر ترجع الى ارتفاع حصة صادرات السلع الاستهلاكية والمواد الخام. حجم الصادرات المتزايد هو أيضا من أحد محددات تذبذب الصادرات المهمة في الجزائر. تستنتج هذه الورقة أن هناك حاجة لتقليل الاعتماد على الصادرات الأولية في الجزائر. يجب على صانعي السياسات تنويع سلة الصادرات للتقليل من درجة تذبذب الصادرات في الجزائر.

الكلمات الدالة: تذبذب الصادرات؛ هيكل الصادرات؛ تركيز الصادرات السلعي.

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