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FACTORS DRIVING THE INCREASE IN HEALTH EXPENDITURE IN ALGERIA FROM 2000 TO 2020

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ASTRACT:
The aim of the study is to analyze the determinants of total health expenditure in Algeria from 2000 to 2020. An econometric analysis was performed using the error correction model (VECM), which is characterized by a single cointegration relationship. After estimating and validating the model, empirical results show that gross domestic product, population growth rate and aging rate explain total health expenditure at 80.42% with an adjusted R^2 equal to 72.92%. Gross domestic product has a modest effect. By contrast, population growth rate and the rate of aging are major factors behind the increase in total health expenditure. At the same time, we think it would be interesting to introduce other variables such as technical progress, healthcare workers, or to study the source of financing for these expenses.

Key words: Total health expenditure; Determining factors; VECM model**;** Econometric analysis; Algeria.

RESUME :
L'objectif de cet article est d'analyser les déterminants des dépenses totales de santé en Algérie durant la période allant de 2000 à 2020. Pour cela, une analyse économétrique fut effectuée en utilisant le modèle à correction d'erreur (VECM), qui est caractérisé par une seule relation de cointégration. Après avoir estimé et validé le modèle, les résultats empiriques montrent que le produit intérieur brut, le taux d'accroissement de la population et le taux de vieillissement expliquent les dépenses totales de santé à 80.42% avec un R^2 ajusté égale à 72.92%. Le produit intérieur brut a un effet modeste. En revanche, la population et le taux de vieillissement sont les facteurs majeurs de l'augmentation des dépenses totales de santé. Parallèlement, nous pensons qu'il serait intéressant d'introduire comme perspective d'autres variables comme le progrès technique, le personnel médical, ou bien de s'intéresser aux sources de financement de ces dépenses.

Mots clés: Dépenses totales de santé ; Facteurs déterminants ; Modèle VECM ; Analyse économétrique ; Algérie.

* Author corresponding

I. INTRODUCTION

Health is a fundamental universal right (World Health Organization, 2009) and a major resource for social and economic development (Lakrouf & Baghezza, 2019). To protect this right, each country must adopt an adequate health policy, in order to provide all citizens with easy access to the various health services, taking into account the financial and available human resources.

For several years, an increase in health expenditure has been observed in all developed and developing countries, regardless of the health system in place (Mahfoud & Brahmia, 2016). In Algeria, health expenditure reached USD 2,514.94 million in 1990 to USD 11,185.05 million in 2020, a 4.45-fold increase over 28 years (Ziani & Ziani, 2022). This increase is designed to meet the expectations of the population and build a health system that guarantees access to quality care. However, the growth in these expenditures can be attributed to the various factors that we study in this work.

To carry out this research, the following main question was sought: What are the various factors contributing to the increase in total health expenditure in Algeria?

To answer this question, the discussion will be built on the following hypotheses which we will try to verify empirically throughout this work:

H1: Gross domestic product has a significant influence on total health expenditure in Algeria.

H2: Aging and population rate changes have major impacts on total health expenditure in Algeria.

Our study aims to enrich research in the field of health economics, by exploiting new avenues of research in which we analyze the different factors that impact total health expenditure in Algeria from 2000 to 2020.

II. METHODS AND MATERIALS

1. Health Expenditure in Algeria (2000-2020)

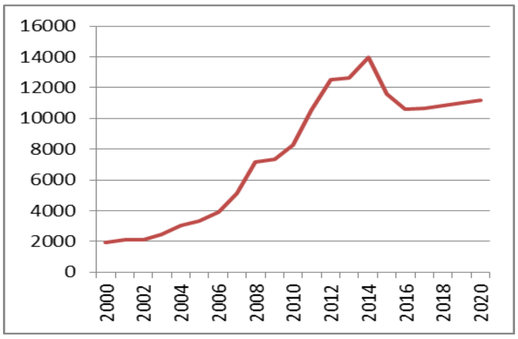
A country's health expenditure refers to two terms, the national health expenditure and the total health expenditure (National health accounts, 2010).

The national expenditure on health is the operating and investment expenditure involved in the implementation of the State's policy on population health (Boulahrik, 2016). The national health expenditure includes expenditure on activities to restore, improve and maintain the health of a nation and of individuals for a specified period of time. This includes all costs related to disease prevention, diagnosis, treatment and management, as well as health care services (Bouziane, 2018-2019).

1.1. Total Health Expenditure in Algeria (2000-2020)

Figure 1 shows the evolution of total health expenditure in Algeria in Million Dollars (USD) over the period 2000-2020. According to the latter, it can be seen that total health expenditure has undergone two periods of change. Health expenditures increased from USD 1,912 million in 2000 to USD 13,999 million in 2014. From 2015 onwards, total health expenditure decreased to USD 11185 million in 2020 (World Bank, 2023). This increase is mainly due to economic, socio-demographic and technological factors.

Figure N°1: Total Health Expenditure in Algeria in Million USD (2000-2022)

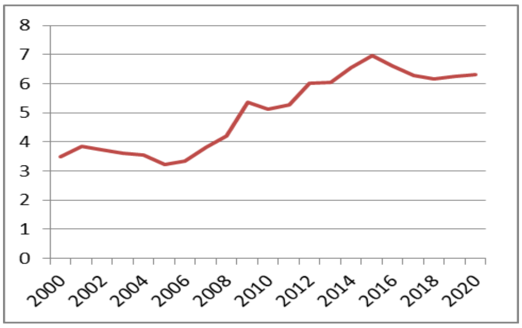


Source: Drawn by the authors using data from (World Bank, 2023)

1.2. Total Health Expenditure as % of GPD in Algeria

Generally, total health expenditure is estimated as a percentage of gross domestic product (GDP). This expenditure increased in a non-irregular manner during this period from 3.49% of GDP in 2000 to 6.54% of GDP in 2014. The highest value is recorded in the latter. Health expenditure decreased from 2014 onwards, reaching 6.32% of GDP in 2020 as shown in Figure 2.

Figure N°2: Total Health Expenditure as % of GDP (2000-2020)

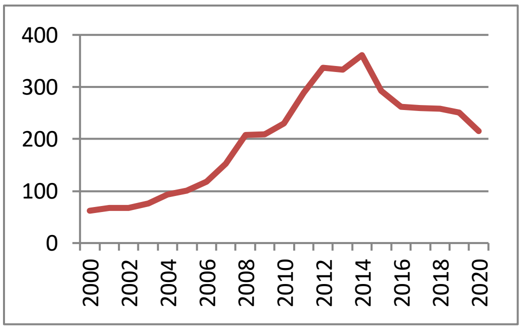


Source: Drawn by the authors using data from (World Bank, 2023)

1.3. Total Health Expenditure per capita in Algeria

During the 2000s, per capita health expenditure grew steadily, rising sharply to USD 361.59 in 2014 as displayed in Figure 3. By contrast, from 2015, per capita health-care expenditure dropped to USD 214.85 in 2020. The evolution of these expenditures is due to the Algerian government's assumption of more than 80% of health care expenses, better social security coverage by social security organizations and the improvement of the third-party paying system that has allowed better access to drug consumption, especially for people with chronic diseases (Mahfoud & Brahmia, 2016).

Figure N°3: Health expenditure per capita (2000-2020)



Source: Drawn by the authors using data from (World Bank, 2023)

2. Data Analysis and Processing

We used Microsoft Excel Software (Ver. 2010) for data processing and for performing the charts. The work related to econometric processing was carried out using Eviews Software (Version 12) based on data collected from the Ministry of Health, Population and Hospital Reform and the World Bank.

2.1. Understanding Variables

To carry out this work, justifying the choice of variables is a necessary step for understanding the approach of our study. To do this, we have chosen three variables that help to explain total health-care expenditure in Algeria (Table 1).

Table N°1: Understanding the Used Variables

Variable	Abbreviation	Unit	Type
Total Health Expenditure	THE	USD	Variable to explain
Gross Domestic Product	GPD	USD	Explanatory variables
Population Growth Rate	PGR	Individuals	
Aging Rate	AR	% (Individuals)	

Source: The authors

In this study, we analyze the relationship between total health expenditure as a variable to be explained with gross domestic product, the increase of the population rate and aging rate using a well-defined methodological procedure. More specifically, the stationarity of the selected time series must be studied first. To do this, we will use unit root tests: the Augmented Dickey-Fuller (ADF) test.

Then, we will determine, secondly, the number of delays p of the autoregressive vector model (VAR). Third, we will check the co-integration of our variables using the trace test. If one or more cointegration relationships are present, an error-correcting vector model is adopted. Finally, we will estimate and validate the VECM model (Bourbonnais, 2015).

2.2. The Model Used

With respect to the model used, we will try to explain THE in the period from 2000 to 2020 using a model written as follows:

$$\text{THE} = f(\text{GPD}, \text{PGR}, \text{AR}) \dots\dots\dots\dots..(1)$$

$$\text{THE} = \beta 0 + \beta 1\ \text{GPD}\tau + \beta 2\ \text{PGR}\tau + \beta 3\ \text{AR}\tau + e\tau \dots\dots\dots(2)$$

In addition, the introduction of the logarithm function on the series to eliminate the effect of the variance, to minimize the influence of time effects on the series and to reduce the number of steps to arrive at a stationary series, in addition to avoid losing information on the first values in the series. The econometric model in logarithmic form is written as follows:

$$\text{LTHE} = \beta 0 + \beta 1\ \text{LGPD}\tau + \beta 2\ \text{LPGR}\tau + \beta 3\ \text{LAR}\tau + e\tau \dots\dots\dots(3)$$

III. RESULTS AND DISCUSSION

In this section, the results of the stationarity and co-integration test, and the VECM model estimation results will be presented and discussed.

1. Study of the Stationarity of the Variables

As is the case in economic studies, the stationarity of the series studied is necessary in order to avoid a spurious regression by which the results could be significant (Bourbonnais, 2010).

1.1. Graphical Analysis of Series

In general, any study of a time series begins by looking at the series graph. The aim is to have an idea of the stationarity of the series, this is what we used a stationarity test (Maachi, 2023).

The series graphs show that there is an upward trend for all variables, and this leads us to conclude that the series are non-stationary (See annex 1).

1.2. Simple and Partial Autocorrelation Function

Analysis of the simple and partial autocorrelation function of the series shows that all autocorrelations are significantly different from zero, and that the first partial autocorrelation is different from zero. There are peaks outside the confidence interval. This represents a strong indication that the series are non-stationary (See annex 2).

1.3. Unit Root Tests

Before doing the ADF test, the number of delays in each series must be determined. The number of delays that minimize the Akaike (AIC) and Schwarz (SC) information criteria will be selected. For an order "P" ranging from 0 to 4. The results obtained are summarized in table 2.

Table N°2: The Number of Delays in Each Series

Series	LTHE	LGPD	LPGR	LAR
Lag (P)	0	0	1	1

Source: By the authors using Eviews Software (Ver.12)

1.4. Augmented Dickey-Fuller (ADF)

The results mentioned in Table 3 shows that our four series are not stationary in level; this can be explained by the statistical value of each series which is greater than the critical value at a 5% threshold.

Table N°3: The Results of the ADF Test at Series Level.

Variable	ADF Level Test			
	ADF_C	ADF_T (5%)	*P-value*	Results
LTHE	-2.4851	-3.0403	-0.1413	Non-stationary
LGPD	-2.1408	-3.0206	0.3221	Non-stationary
LPGR	3.5000	-1.9601	0.9995	Non-stationary
LAR	2.7872	-3.0206	1.0000	Non-stationary

Source: By the authors using Eviews Software (Ver.12)

After the first differentiation, for all the variables, we note that the statistical value is under the critical value at a 5% threshold (thus for the probability). This leads us to accept the hypothesis of the absence of a unitary root, i.e., the series are stationary in the first place. It is concluded that the series are I (1).

Table N°4: The Results of the ADF Test as the First Difference in the Series.

Variable	ADF Test First Difference				
	ADF_C	ADF_T	*P-value*	Model	Integration Order
DLTHE	-2.0567	-1.960	0.0409	None	I(1)
DLGPD	-4.3080	-3.6761	0.0154	Trend and intercept	I(1)
DLPGR	-3.2566	-3.0403	0.0331	Intercept	I(1)
DLAR	-5.5567	-3.7332	0.0022	Trend and intercept	I(1)

Source: By the authors using Eviews Software (Ver.12)

2. Determination of the Number of Delays of the Model and the Cointegration Test

Before estimating the model, the number of delays "P" in the VAR model is determined. In Table 5, we note that most information criteria accept a maximum delay of P=1.

Table N°5: Determining the number of delays of the VAR model

Lag	AIC	SC
1	-17.22483*	-16.22909*

Source: By the authors using Eviews Software (Ver.12)

The results obtained on the stationarity test indicate that all the variables are stationary at the first difference I (1). Thus, there is a risk of long-term relationships between them, so there is a possibility of cointegration relationships between these variables; the Johansen cointegration test leads us to determine the number of existing cointegration relationships.

Table N°6: Johansen test.

Hypothesis	Eigenvalue	Trace statistique	Critical value (5%)	Probability
None	0.974	112.665	69.818	0.0001
1st relation	0.703	46.771	47.856	0.0630
2nd relation	0.563	24.894	29.797	0.1652
3rd relation	0.403	9.953	15.494	0.2843

Source: By the authors using Eviews Software (Ver.12)

From this test, it is noted that the value of the trace statistic equal to 112.6651 is greater than the critical value at a 5% threshold (69.81889) for the first cointegration value with a significant probability of 0.0001, which is lower than 0.05. Unlike the other statistics. Therefore, we accept the hypothesis of the existence of a cointegration relationship for a threshold of 5% (Table 6), which allows us to perform VECM modeling.

3. Data Analysis and Processing Estimation of VECM Model

VECM is characterized by modeling adjustments that are used to establish long-term equilibrium (Benkeddas et al, 2021). It allows for the integration of long-term and short-term changes in variables (Valérie, 2002).

Table N°7: VECM Model Estimation Results.

	Coefficient	T_statistic	Probability
C(1)	-0.434975	-4.915057	0.0003
C (2) : DLTHE	-0.353920	-1.255777	0.2313
C (3) : DLPOP	-1.930306	-2.482692	0.0275
C(4) : DLAR	-19.59410	-5.836638	0.0001
C(5) : DLGPD	0.259704	2.170545	0.2628
C(6)	0.463312	6.308952	0.0000
R-squared	0.804296	**Prob (F-statistic)**	0.0003
Adjusted R-squared	0.729025	**Mean dependent var**	0.088008
S.E. of regression	0.067039	**S.D. dependent var**	0.128784
Sum squared resid	0.0584425	**Akaike info criterion**	-2.315003
Sum squared resid	27.99252	**Schwarz criterion**	-2.016759
F-statistic	10.68538	**Durbin-Watson stat**	2.167923

Source: By the authors using Eviews Software (Ver.12)

This model measures the impact of each explanatory variable on total health expenditure. The model consists of two parts, which relate to two types of dynamics, the first part provides information on long-term dynamics, while the second part provides information on short-term dynamics (Aboulkacem & Maaradj, 2020). Written as:

D(LTHE) = - 0.435*(LTHE (-1) - 0.068*LGPD (-1) - 3.766*LPGR (-1) - 2.825*LAR (-1) + 58.47)
(-0.45897) **(-3.65460)** **(0.70924)**

-0.354*D (LTHE (-1)) +0.259*D (LGPD (-1))-1.930*D(LPGR(-1)) -19.594*D(LAR(-1)) + 0.4633.
(-1.25578) **(1.17054)** **(-2.48269)** **(-5.83664)** **(-4.91506)**

With: R^2=80.42%, 2 Adjusted=72.90%, prob (F-statistic) =0.003, (.) represents the t-statistical value for each coefficient. It is noted that the coefficient of determination (R^2) is 80.42%, so the Fisher probability is significant, this indicates that the quality of the results obtained is acceptable .Before interpreting the results, the stability of the model and the residue tests must be tested.

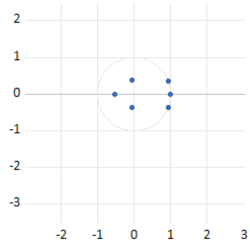
3.1. Validation of the Model

To be able to validate the model, the test on the unit roots and tests on the residues will be applied.

A. Unit Root Test

Based on Figure 4, it can be seen that all inverse roots are within the circle, i.e., all eigenvalues are lower than 1, so the VECM is stationary.

Figure N°4: Reverse Circle of Unit Roots



Source: By the authors using Eviews Software (Ver.12)

B. Residual Autocorrelation

The results of the autocorrelation of the residuals test (See annex 3) indicate that there is no residue autocorrelation, as the associated probabilities are above the 5% threshold. This confirms the hypothesis of no autocorrelation of the residuals.

C. Heteroscedasticity Test

We note from the analysis of the result table of the heteroscedasticity of errors test (See annex 4) that the associated probability chi-squared (χ^2) is greater than the risk of 5%. This confirms the null hypothesis of heteroscedasticity of residues, i.e., the errors are not heteroscedastic.

Table N°8: Results of the Heteroscedasticity Test.

Chi-sq	Df	Prob
106.78522	106.7852	0.302816

Source: By the authors using Eviews Software (Ver.12)

D. Normality Test

The results of the test allow us to validate the hypothesis of normality of the residues since the p-value associated with the Jarque-Bera statistic equal to (0.64) is ≥5%. (See annex 6).

With regard to these econometric tests, it appears that our model is well specified with an absence of autocorrelation and heteroscedasticity of the residues as well as the normality of the residues, which confirms once again the validation of our model.

3.2. Interpretation of the Results

Here, we will be able to interpret the results of the model estimation as follows:

A. Statistical Interpretation

According to Table 7, the parameter (C (1) = -0.434975) must be negative since it indicates the speed of adjustment of total health expenditure to return to equilibrium following an impact, this coefficient constituting a force of return to equilibrium. However, the coefficient C (6) represents the constant and the coefficients C (3), C (4), C (5) represents the short-term dynamics. The coefficients C (3) and C (4) are significant because their probabilities are greater than 5%, whereas C (5) is not significant.

In the long term, it is noted that the coefficients of the long-term relationship assigned to each variable are significantly different from zero (0), since the T-student value of these coefficients is greater than the critical value at the threshold of 5% which is equal to (1.96) (See Annex 5). Moreover, the results of the estimate indicate that the evolution of total health expenditure in Algeria during the period (2000-2020) is explained to 80.42% by the gross domestic product, the population rate and the aging rate with an adjusted R^2 equal to 72.92%. In addition, the error correction term is non-zero at the 5 % threshold and negative. Finally, we can say that our model is globally significant.

B. Economic Interpretation

The model measures the impact of each explanatory variable on total health expenditure. The long-term dynamic model is written as follows:

$$e\tau = \mathrm{LTHE}(-1) - 0.068 * \mathrm{LGPD}\,(-1) - 3.766 * \mathrm{LPGR}\,(-1) - 2.825 * \mathrm{LAR}\,(-1) + 58.47 \ldots\ldots\ldots (4)$$

$$\mathrm{LTHE}(-1) = 0.068 * \mathrm{LGPD}\,(-1) - 3.766 * \mathrm{LPGR}\,(-1) - 2.825 * \mathrm{LAR}\,(-1) + 58.47 + e\tau \ldots\ldots\ldots\ldots (5)$$

In the long term, all the variables studied in the model have positive coefficients, indicating a positive impact on total health expenditure. Therefore, estimates of all coefficients are consistent with prior theoretical expectations, meaning that each variable has a positive impact on total health care expenditure. Indeed, the relationship between total health expenditure and the explanatory variables used in the modeling can be interpreted as follows:

- An increase of 1% in the gross domestic product, population rate and aging rate leads to an increase of 0.0068%, 3.766% and 2.825% respectively in health expenditure.

- In the short term, the results obtained from the estimation can be explained as follows:
- The relationship between GDP and total health expenditure is not interpretable in the short term since t-statistics are below (1.96) the 5% threshold. This could mean that other factors have a greater influence on total health expenditure in the short term;
- Then, a population rate increase of 1% leads to an increase of 1.93% in total health expenditure;
- Finally, an increase of 1% in the aging rate leads to an increase of 19.59% in total health expenditure.

IV. CONCLUSIONS

The objective of this study was to analyze the factors that contribute to the evolution of total health expenditure in Algeria during the period from 2000 to 2020. The VECM model was adopted because it allows for the modeling of adjustments that lead to long-term equilibrium. This model incorporates both short-term and long-term changes in the variables. The application of the latter has led us to the following conclusions:

- To confirm the first hypothesis of our study, that there is a positive relationship between gross domestic product and total health expenditure over the long term. This means that gross domestic product has a significant influence on total health expenditure in Algeria;
- To confirm the second hypothesis, which indicates that the increase in the population rate and the aging rate have a major impact on the evolution of total health expenditure in the short and long term.

In terms of recommendations and future research directions that could contribute to a deeper understanding of the factors influencing health expenditure, we propose eventually:

- Comparing the health systems of developed and under developing countries in order to better understand the differences in their health policies.
- Analyzing the impact of new medical technology on healthcare expenditure.

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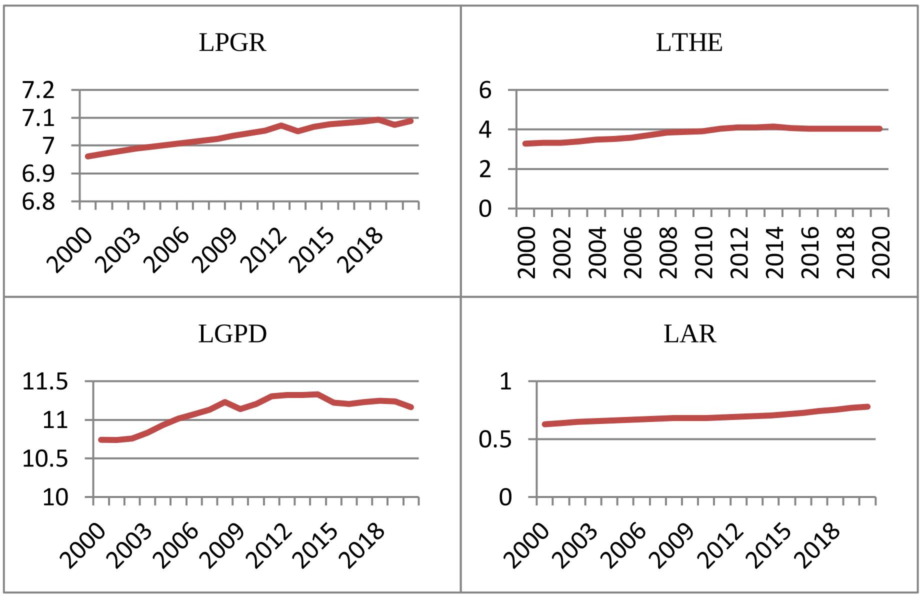
VI. APPENDICES

Annex N°1: The series graphs used



Source: Drawn by the authors using data from (World Bank, 2023).

Annex N°2: The Functions of Simple and Partial Autocorrelations

LPGR

	AC	PAC	Q-Stat	Prob
1	0.847	0.847	17.322	0.000
2	0.736	0.065	31.083	0.000
3	0.591	-0.166	40.455	0.000
4	0.450	-0.102	46.219	0.000
5	0.317	-0.060	49.260	0.000
6	0.193	-0.060	50.462	0.000
7	0.057	-0.147	50.574	0.000
8	-0.041	-0.001	50.637	0.000
9	-0.174	-0.200	51.855	0.000
10	-0.268	-0.052	55.005	0.000
11	-0.338	-0.001	60.507	0.000
12	-0.385	-0.032	68.477	0.000

LTHE

	AC	PAC	Q-Stat	Prob
1	0.886	0.886	18.964	0.000
2	0.756	-0.138	33.476	0.000
3	0.604	-0.168	43.274	0.000
4	0.446	-0.117	48.932	0.000
5	0.293	-0.075	51.531	0.000
6	0.134	-0.150	52.110	0.000
7	-0.030	-0.169	52.141	0.000
8	-0.164	-0.008	53.139	0.000
9	-0.258	0.040	55.824	0.000
10	-0.340	-0.110	60.901	0.000
11	-0.396	-0.048	68.468	0.000
12	-0.414	0.055	77.664	0.000

LGPD

	AC	PAC	Q-Stat	Prob
1	0.859	0.859	17.821	0.000
2	0.682	-0.212	29.660	0.000
3	0.496	-0.131	36.252	0.000
4	0.317	-0.085	39.112	0.000
5	0.173	-0.004	40.013	0.000
6	0.054	-0.051	40.105	0.000
7	-0.075	-0.185	40.301	0.000
8	-0.185	-0.058	41.574	0.000
9	-0.245	0.068	43.985	0.000
10	-0.337	-0.290	48.968	0.000
11	-0.377	0.077	55.846	0.000
12	-0.365	0.082	62.996	0.000

LAR

	AC	PAC	Q-Stat	Prob
1	0.839	0.839	16.983	0.000
2	0.682	-0.072	28.800	0.000
3	0.534	-0.062	36.459	0.000
4	0.397	-0.059	40.944	0.000
5	0.273	-0.056	43.186	0.000
6	0.161	-0.052	44.022	0.000
7	0.063	-0.051	44.158	0.000
8	-0.024	-0.055	44.180	0.000
9	-0.102	-0.063	44.599	0.000
10	-0.173	-0.069	45.906	0.000
11	-0.236	-0.073	48.601	0.000
12	-0.293	-0.075	53.197	0.000

Source: By the authors using Eviews Software (Ver.12)

Annex N°3: Autocorrelation of the Residuals test

Lag	LRE*stat	Df	Prob	RaoFstat	df	Prob
1	16.74328	16	0.4024	1.073518	(16, 19.0)	0.4366
2	20.33882	16	0.2053	1.408993	(16, 19.0)	0.2359
3	15.59051	16	0.4819	0.975429	(16, 19.0)	0.5149
4	19.76526	16	0.2310	1.352319	(16, 19.0)	0.2627
5	21.00873	16	0.1782	1.476795	(16, 19.0)	0.2072
6	24.47246	16	0.0797	1.856676	(16, 19.0)	0.0993
7	17.42945	16	0.3583	1.134006	(16, 19.0)	0.3927
8	11.60203	16	0.7709	0.667760	(16, 19.0)	0.7905
9	20.86505	16	0.1838	1.462105	(16, 19.0)	0.2131
10	15.03168	16	0.5223	0.929423	(16, 19.0)	0.5543

Source: By the authors using Eviews Software (Ver.12)

Annex N°4: Results of the Heteroscedasticity Test

Chi-sq	Df	Prob
106.78522	106.7852	0.302816

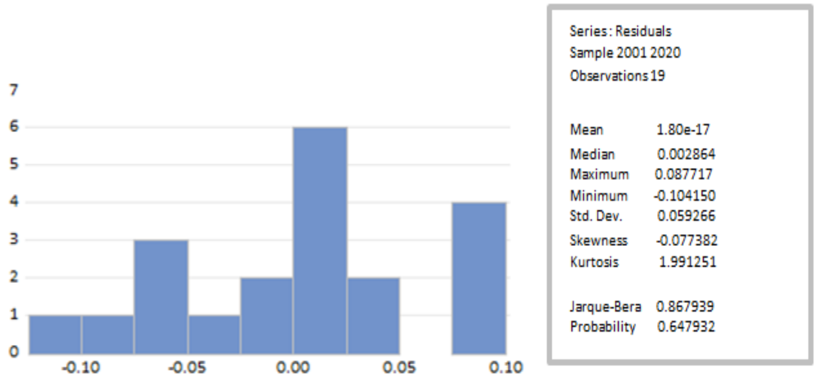
Source: By the authors using Eviews Software (Ver.12)

Annex N°5: The VECM model estimation results

CointegratingEq	CointEq 1			
LTHE (-1)	1.000000			
LGPD (-1)	-0.068022 (0.14821) -2.45897			
LPGR (-1)	-3.765587 (1.03037) -3.65460			
LAR(-1)	-3.765587 (1.03037) -3.65460			
C	58.47660			
Error correction	**D (LTHE (-1))**	**D (LGPD (-1))**	**D (LPGR (-1))**	**D (LAR (-1))**
CointEq 1	-0.434975 (0.08850) -4.91506	-0.536995 (0.12582) -4.26788	0.00480 (0.02908) 0.14030	0.013954 (0.00180) 7.75972
D (LTHE (-1))	0.353920 (0.28183) -1.25578	-0.957118 (0.40070) -2.38864	-0.041295 (0.09260) -0.44595	-0.0114448 (0.00573) -2.52296
D (LGPD (-1))	0.259704 (0.22187) 1.17054	0.347804 (0.13544) 1.10261	0.035094 (0.07290) 0.48141	0.009328 (0.00451) 2.06919
D (LPOP (-1))	1.93306 (0.77751) -2.48269	0.097410 (1.10542) 0.08812	-0.512979 (0.25546) -2.00807	0.044060 (0.01580) 2.78888
D (LAR (-1))	19.59410 (3.35709) -5.83664	-22.81492 (4.77293) -4.788007	-0.955110 (1.10301) -0.86591	1.214980 (0.06821) 17.8111
C	0.463312 (0.07344) 6.30895	0.503939 (0.10441) 4.82658	0.039116 (0.02413) 1.62114	-0.003163 (0.00149) -2.11962
R-squared	0.804296	0.692507	0.299273	0.984676
Adj R-squared	0.729025	0.574241	0.029763	0.978782
Sum sq.resids	0.058425	0.118097	0.006307	2.41E-05
S.E. equation	0.067039	0.095312	0.022026	0.001362
F-statistic	10.68538	5.855484	1.110434	167.0686
Log likelihood	27.99252	21.30668	49.14011	102.0197
Akaike AIC	-2.315003	-1.611230	-4.541064	-10.10734
Schwarz SC	-2.016759	-1.312986	-4.242820	-9.809096
Mean dependent	0.088008	0.051535	0.014231	0.017253
S.D. dependent	0.128784	0.146072	0.022362	0.009352

Source: By the authors using Eviews Software (Ver.12)

Annex N°6: Results of the Normality Test (Jarque-Bera)



Source: By the authors using Eviews Software (Ver.12)