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The Effect of the Financial Policy on the Social Development in Algeria: Econometric Study from 1993 to 2024

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Abstract:

This study analyses the effect of the financial policy on the social development in Algeria from 1993 to 2024 by examining the relation between the financial policy as an independent variable, measured by the ratio of oil revenues OR and the final expenditure on government consumption FEGC, and the social development as a dependent variable, measured by the GDP per capita CGDP. In so doing, we use NARDL model that allows for the analysis of the non-linear and asymmetric effects of the financial shocks, either in revenues or expenditures, on the GDP per capita. Findings show an asymmetric nature for the effect of oil revenues, as the increase in revenues positively influences the social development in the long-run while their decrease has no symmetric significant effect. This variance reflects the rent-based nature of the Algerian economy. In addition, the governmental consumption showed no significant effect, neither in the long nor in the short runs, regardless the trend of the shock (positive or negative). Regarding methodology, NARDL model is suitable for analysing the complicated relations in rent-based economies, as it allows for unveiling the asymmetric interactions and the adaptation dynamics of the traditional linear models. Moreover, the stability of the structural model for three decades of shocks fosters the reliability of its results and makes them a good reference for decision makers.,

Key Words: *Financial Policy; Oil Revenues; Final Expenditure on Government Consumption; Social Development.*

JEL Classification: *A13, B23, E62*

1. Introduction:

Social development is a key dimension of sustainable development, as it aims at achieving economic growth, improving living standards, fostering social justice, limiting poverty and unemployment, and developing the human capital. In this regard, the financial policy affects the economic and social activities, as it helps direct the general expenditure, manage revenues, and redistribute incomes, mainly in the Algerian rent-based economy that highly relies on oil revenues. The financial policy is paramount for supporting the social development, mainly during the sharp fluctuations of oil prices and the structural deficits that affect the state's ability to fund the social programs; what affects the social welfare, income standards, and job opportunities.

Based on what was said, this study tackles the effect of the financial policy on the social development in Algeria, by using modern econometric tools that allow for understanding the dynamic relation between the variables of the financial policy and the level of social development. In addition, the study uses NARDL model that allows for analysing the non-linear and asymmetric effects on the financial shocks, either in revenues or expenditures, on the GDP per capita. Moreover, it analyses the relation between the financial policy as an independent variable, measured by the ratio of FEGC, and the social development as a dependent variable, measured by the GDP per capita.

In so doing, we raise the following problematic, "Is there a cointegration between the financial policy and the social development in Algeria during the study period?"

- Is there a statistically significant effect in the short and long runs between the financial policy through FEGC and the GDP per capita?
- Is there a statistically significant effect in the short and long-runs between the financial policies through oil revenues and the GDP per capita?

2. Literature Review:

The study of Daoudi (2023): It analysed the effect of the financial policy on the economic development in Algeria using SVAR method, and relied on the general expenditure, direct and indirect taxes, and GDP. Findings showed a positive limited effect for the general expenditure on the economic development in Algeria, which manifests in the short-run and, then, turns into a negative effect on the average and long terms. This shows that the normal revenues have very limited influence on the growth of the Algerian economy amid the oil revenues. In this regard, when negative shocks on oil prices take place, the general revenues are directly affected.

The study of Omar Al-Kasasbeh (2022): It aimed at studying the effect of the financial policy and trade liberation on the economic growth in Jordan using the unit root tests of Dickey-Fuller and the unit root test of Kapetanios, with structural breaks in the experimental analysis. Simulation results showed that the government expenditure and the taxes have a positive effect on the economic growth while the general debt has a slight negative effect on the economic growth. The study recommended increasing expenditure on the infrastructure and the human resources by funding taxes instead of external debts, and improving the competitive abilities of local industries.

The study of Tahiri (2022): It aimed at finding out the effect of the financial policy on the economic development in Kosovo. The financial policy is tightly related to the governmental policies that aim at changing the structure of the general revenues and expenditures by managing

the demand to maintain a steady economic growth with a relatively high employment rate without causing inflation or increasing the general debt. Methodologically, the study provided a critical review to find out whether the financial policy in Kosovo achieved its goals, such as limiting the economic variance, achieving environmental development, etc. Findings showed that the financial policy had an important effect on the economy and the variances.

The study of Nuhu Yahaya (2020): It aimed at studying the relation between the financial policy and the economic development in Nigeria using the human development index because it is the most representative of the human and economic development. It used a research design that allows for using the Nigerian time series from 1990 to 2017 in the simple linear regression. Findings showed that the variables of the financial policy, such as the government revenues and expenditures, have a negative effect on the GDP and a positive statistically significant effect on the human development index in Nigeria. Besides, the governmental debts had a positive effect on the GDP and a negative statistically significant effect on the human development index. Moreover, the study revealed interesting results regarding the effect of the financial policy on the economic development in Nigeria, as there was a negative and statistically significant effect on the human development index, and a positive insignificant effect on the GDP. Therefore, the study recommended using the human development index to measure the effect of the financial policy, and adhering to more productive mechanisms to improve revenues and boost the economic development.

The study of (MOHAMMED NOORI ALHAMDANY, 2025): It aimed at finding out the effect of the financial policy on the economic development (such as GDP and inflation) and social development (such as poverty and unemployment) in Iraq during 2004-2023 using ARDL model. Findings showed that the general revenues and expenditures are directly related to GDP, inflation, and the financial policy tools, and a have a reverse relation with inflation. In addition, the relation between the unemployment and the general revenues and the relation between the general expenditure and poverty is inverse. All these correlations are in the short and long runs and agree with the economic theory. Moreover, the relation between the general revenues and poverty was inverse in the short run; what agrees with the economic theory. However, it is direct in the long-run; what contradicts with the economic theory.

The study of (Marchenko, 2022): It aimed at identifying the effect of the financial policy tools on the social development in Ukraine, considering the digital trends, using the theories of epistemology, synthesis, aggregate, description, comparison, mathematical analysis, graphic representation, theoretical generalization, and classification. Findings confirmed the role of the fiscal policy in the social development. Besides, the study shed light on the aspects of digitalizing the tax administration to improve the performance of tax collection bodies. In addition, the fiscal revenues are vital for local budgets, as they allow for a wide coverage of social expenditures.

The author used graphical representations to illustrate the relation between the revenues and expenditures of the local budgets and the social side. Findings showed that the fiscal revenues have the biggest effect on expenditure on people, public services, mental and physical development, education, and healthcare. The study recommended that the financial policy include measures to achieve some long run goals, including the achievement of the economic growth, high employment rates, and better welfare, and some short run goals, such as filling up

the state and municipal budgets, achieving balance, and boosting investment and innovation programs that allow for the efficient social development.

The study of (Al Kader, 2021): It aimed at identifying the effect of the monetary and financial policies on some indices of internal balance in Algeria. It used the descriptive method to introduce the concepts of monetary and financial policy and the internal balance. In addition, it analysed the financial and monetary state of the Algerian economy during 1990-2018 using ADF test. Findings showed stationary variables at level and at differences. Therefore, we used ARDL model, as bounds test show a long-run relation. Moreover, the monetary policy highly affects the economic development and has no effect on inflation and unemployment. On the other hand, the financial policy has no effect on the economic growth, unlike on inflation and unemployment.

3. The Financial Policy:

3.1 Concept of Financial Policy:

It is a set of tools, measures, and policies to achieve the socioeconomic goals. These policies include public expenditures and public revenues. Besides, it is a set of measures that support and help the financial policies, taxes, fees, credits, finance, and public expenditure achieve the general economic policy (Lazhari, 2018, p. 217).

3.2 The Financial Policy Tools:

They include the government expenditure, aids, and taxes. Any change on these tools affects the overall demand and the economic activity. The taxes' change may indirectly affect the overall demand by affecting the consumption and investment levels, which are two key components of the overall demand. Thus, it affects the GDP, employment, and prices. During recession, the macroeconomic policies focus on GDP, employment increase, and growth. Therefore, states adopt an expansionist financial policy by increasing governmental expenditure and tax collection. This increases demand, employment, GDP, and economic growth (Mohamed, 2022, p. 272).

3.3 The Goals of the Financial Policy:

Financial balance: It is about the optimal use of the state resources, such as granting loans for productive investments, and promoting flexibility of the fiscal system to suit the budget needs and foster fair distribution and tax collection deadlines.

Economic balance: It is achieving the optimal production size by managing the private and public sectors to reach the maximum production. The balance between the two sectors requires the exploitation of the society potentials to reach the optimal production size.

Social balance: It is about achieving the highest social welfare using the available potentials. The financial policy should not stop at production increase; rather, it must find fair ways to distribute it on individuals.

General balance: It is the balance between the public expenditure (individuals' expenditure on investment and consumption, and government expenditures) and the GDP using taxes, credits, aids, fiscal exemptions, private investments, etc.

4. Social development:

4.1 Concept of Social Development:

It is defined as the process of social harmony, the maximum development of individuals' potentials, the satisfaction of social needs of people, the improvement of living standards, and

the directed change that satisfies people's needs. The social development has different definitions. For instance, in politics and economics, it is defined as reaching the minimum living standards (al Salmouni, 2020, p. 184). Moreover, it is a set of actions that target social change by improving the living standards and providing more care programs, taking into account the economic development. It focuses on given points based on planned efforts aiming to achieve positive social change in the society according to a contextual relation with the economy (al Amri, 2019, p. 166).

4.2 The Principles and Pillars of Social Development:

They can be summed up in the following points (Ahmed, 2019, pp. 47-48):

1. Integrating the members of the local environment into thinking about, and executing, development programs.
2. Complementing and coordinating services.
3. Self-aid.
4. Achieving palpable results.
5. Relying on local resources.
6. Identifying needs.

The social development must be based on strategic plans that foster complementarity and balance between the social and economic development, as the planners must be aware that the social development focuses on social change and development of human resources.

***5. Methodology*:**

5.1 The Analytical Frame of the study:

The study relies on the quantitative method to analyse the relation between the financial policy and the social development in Algeria during 1993-2024 using annual data. In addition, it focuses on the long and short runs effects, taking into account the potential non-linear nature of the financial policy in an economy that relies on the natural resources.

5.2 The Choice of NARDL Model:

We chose this model for many methodological reasons, namely:

- Its ability to analyse the non-linear and asymmetric relations between the variables.
- Its ability to study the short and long runs effects in one time.
- Its suitability to the relatively small samples.
- The possibility of its use if the degrees of cointegration between (I(0)), (I(0)), and (I(1)) are different.
- The possibility of dividing the financial variables into positive and negative shocks.

According to Shin et al. (2014), the variables of the financial policy are dismantled into positive and negative items as follows:

$$OR_t^+ = \sum_{j=1}^{t} \max(\Delta OR_j, 0)$$

$$OR_t^- = \sum_{j=1}^{t} \min(\Delta OR_j, 0)$$

$$FEGC_t^+ = \sum_{j=1}^{t} \max(\Delta FEGC_j, 0)$$

$$FEGC_t^- = \sum_{j=1}^{t} \min(\Delta FEGC_j, 0)$$

6. The General Formula of NARDL model:

The model is estimated as follows:

$$\Delta PGDP_t = \alpha + \sum_{i=1}^{p} \beta_i \Delta PGDP_{t-i} + \sum_{i=0}^{q} \left(\gamma_i^+ \Delta OR_{t-i}^+ + \gamma_i^- \Delta OR_{t-i}^- \right) + \sum_{i=0}^{q} \left(\delta_i^+ \Delta FEGC_{t-i}^+ + \delta_i^- \Delta FEGC_{t-i}^- \right)$$

$$\Delta PGDP_t = \alpha + \sum_{i=1}^{p} \beta_i \Delta PGDP_{t-i} + \sum_{i=0}^{q} \left(\gamma_i^+ \Delta OR_{t-i}^+ + \gamma_i^- \Delta OR_{t-i}^- \right) + \sum_{i=0}^{q} \left(\delta_i^+ \Delta FEGC_{t-i}^+ + \delta_i^- \Delta FEGC_{t-i}^- \right)$$
$$+ \lambda_1 PGDP_{t-1} + \lambda_2 OR_{t-1}^+ + \lambda_3 OR_{t-1}^- \lambda_4 FEGC_{t-1}^+ + \lambda_5 FEGC_{t-1}^- + \varepsilon_t$$

7. Results:

7.1 The Descriptive Study of Data:

The Dynamic and Non-linear Characteristics of the Study Variables:

Table 1. the descriptive statistics of the study variables

	PGDP	OR01	FEGC
Mean	1.05	18.226	16.863
Median	1.75	17.245	17.15
Maximum	5.1	29.5	20.5
Minimum	-6.6	9	12
Std. Dev.	2.388	5.974	2.355
Skewness	-1.355	0.334	-0.492
Kurtosis	5.223	2.141	2.414
Jarque-Bera	16.383	1.580	1.751
Probability	0.000	0.454	0.417

Source: the outputs of the statistical program

The Growth of GDP per capita:

The descriptive statistics show that the growth of GDP per capita reached about 1.05% in the study period, reflecting a relatively low development if compared to the social and development needs. In return, the median (1.75%) exceeds the arithmetic mean, showing extreme negative values that affect the general mean. Besides, the variable shows clear fluctuation, as the values are between 5.1% and 6.6%, what indicates the sensitivity of growth in individual income to the economic shocks, mainly the oil prices and financial crises. Moreover, the high standard deviation (2.388) reflects clear fluctuation in the economic performance in time. In addition, the negative skewness (-1.355) mirrors the values concentration around moderate positive development levels, with a long left tail that reflects recession years. In addition, kurtosis value (5.233) reflects a leptokurtic and the frequency of the maximum shocks. Finally, Jarque-Bera test refuses the hypothesis of natural distribution at significance level 5%, what justifies the use of flexible dynamic models like NARDL.

The Oil Revenues:

The ratio of oil revenues to GDP is 18.23%, reflecting the rent-based nature of the Algerian economy and its big reliance on the hydrocarbons for funding. The median (17.25%) is close the

mean, showing a relatively balanced distribution of values around the mean. This rate is between 9% and 29.5%, confirming the direct effect of the oil prices' fluctuations and the international demand on public revenues. In addition, the high standard deviation (5.974) confirms sharp fluctuations in the financial resources of the state. As for skewness (0.334), it shows the distribution inclination towards the high values in some exceptional periods (oil spike periods). In addition, kurtosis value (2.141) reflects a less sharp distribution than the natural distribution. The results of Jarque-Bera test confirm accepting the natural distribution hypothesis, showing a relative stability in the behaviour of the oil revenues in the long-run despite the periodical fluctuations.

The Final Expenditures of Government Consumption FEGC:

The results show that FEGC reached about 16.86% of the GDP, reflecting a considerable state intervention in the economy through expenditure on public services, mainly education, health, and social support. The median (17.15%) is close to the mean, reflecting a relative symmetry in the values distribution. In addition, the variable is between 20.5% and 12%, indicating a relatively stable expenditure policy compared to the oil revenues. Moreover, the relatively low standard deviation (2.355) confirms the limited fluctuation in FEGC in time. Additionally, skewness is -0.495 and shows that the distribution leans to high values, reflecting the priority of maintaining social expenditure even in periods of financial stress. Finally, kurtosis value is 2.414 and shows a distribution that is close to the natural. Jarque-Bera test results confirm the natural distribution and foster the credibility of this variable in the long-run econometric analysis.

7.2 The Results of the Econometric Study:

7.2.1 Stationarity Test:

The results of ADF at level show that the growth in the GDP per capita is stationary at constant and at none, as the probability values were less than 5%. In addition, the GDP per capita is non-stationary at constant and trend, reflecting a low trend in the time-series. In addition, the oil revenue and FEGC are non-stationary at level in all cases, as probability values exceed 5%, indicating the unit root and the effect of time trends and structural shocks resulting from oil prices fluctuation and financial policy on these two variables.

Table 2. ADF test:

variables	(At level)			(At level)		
	Constant & Trend	Constant	None	Constant & Trend	Constant	None
PGDP	0.089	0.002	0.001	0.000	0.000	0.000
OR01	0.443	0.167	0.497	0.000	0.000	0.000
FEGC	0.572	0.451	0.634	0.005	0.001	0.000

Source: The outputs of the statistical program

At difference, the GDP per capita, the oil revenues, and FEGC are statistically stationary at significance levels 1% and 5%, regardless the equation (constant, constant and trend, and none), meaning that all variables are (I(1)) at most. This confirms the validity of the conditions of applying NARDL model that allows for integrating stationary variables at level (I(0)) and others at first difference (I(1)). In addition, it provides a suitable frame for analysing the dynamic and non-linear relation between the financial policy and the social development in Algeria during the study period.

7.2.2 Model Estimation:

Bounds test:

The test shows a long-run balance relation between the study variables. In this regard, calculated F is 6.514 and exceeds the critical higher values at significance levels 1% and 5% in case of constant and restricted trend (case 4) with 03 interpreting variables for a sample of 30 views. Thus, we refuse the null hypothesis and accept the alternative about a cointegration between the variables of the financial policy and the social development, confirming a stable long-run balance relation and the validity of NARDL model estimation and analysis of the dynamics of the short and long runs dynamics.

Table 3. Bounds Test Results

Null hypothesis: No levels relationship
Number of cointegrating variables: 3
Trend type: Rest. trend (Case 4)
Sample size: 30

Test Statistic	Value
F-statistic	6.514

Source: The outputs of the statistical program

Choice of the Best Model:

We traded off 08 different models of ARDL model using statistical information. Each model reflects a series of lags for the dependent variable and the independent ones. Findings show that model 07, ARDL (1,0,1) is the best because it achieved the minimum value of Aaike criterion (4.223), which is the criterion adopted in the study, despite that model 1, ARDL (2,1,1) had the maximum value of LogL (-52.100). However, the increase of Akaike (4.273) and BIC (4.834) reflects an additional punishment due to the increase of the estimated parameters. Thus, the model is less simple and interpretive.

Table 4. Trade-off between the alternative models according to information criteria to choose the best specification of NARDL model

Model	LogL	AIC*	BIC	HQ	Specification
7	-54.352	4.223	4.644	4.358	ARDL(1,0,1)
3	-53.927	4.262	4.729	4.411	ARDL(2,0,1)
1	-52.100	4.273	4.834	4.453	ARDL(2,1,1)
2	-54.394	4.293	4.760	4.442	ARDL(2,1,0)
8	-57.578	4.305	4.632	4.410	ARDL(1,0,0)
6	-55.716	4.314	4.735	4.449	ARDL(1,1,0)
5	-53.747	4.316	4.830	4.481	ARDL(1,1,1)
4	-57.203	4.347	4.720	4.466	ARDL(2,0,0)

Source: The outputs of the statistical program

Specification (1,0,1) shows that the best model includes one lag for the dependent variable (growth of GDP per capita), no lag for the oil revenues, and one lag for FEGC. Thus, the effect of oil revenues appears in a contemporaneous way. In addition, the effect of FEGC on social

development needs one lag, as is the case of the economic nature of the financial policy in Algeria. Moreover, the model balances between the estimation quality through LogL and the models simplicity through AIC, BIC, and HQ. This fosters the credibility of the results and ensures the model's ability to capture the real dynamics of the relation between the study variables without excess in specification.

7.2.3 Estimating the Results of NARDL Model:

The results of ARDL (1,0,1) for 1993-2024 (31 views) show that the dependent variable is the first difference for the growth of GDP per capita, with an unrestricted constant and a restricted trend (case 4) in the equation. The estimation revealed coefficients with important economic significance, as the error correction coefficient is -1.0360 with a standard deviation of 0.1723 and T value of -6.0127 at significance level 1%. This confirms a long-run balance relation and high correction speed, as deviations are corrected with a rate of more than 100% in one period. As for the positive shocks in the oil revenues, the coefficient is positive (0.3081) with t (1.9272) and prob. (0.0676). This shows that the increase in oil revenues positively contributes to the social development.

On the other hand, the negative shock @CUMDN (OR01) was statistically insignificant (0.3507), reflecting a clear asymmetry in the effect. Concerning the governmental expenditures, the positive shocks @DCUMDP(FEGC) and @DCUMDN(FEGC) were insignificant, what raises questions about the efficiency of government expenditure for social development. In addition, @trend is estimated at -1.4635 (Prob= 0.0766) and is negative and significant at significance level 10%, reflecting a general descending trend in the rate of social development during the study period. On the other hand, the constant is estimated at 5.3042 (Prob= 0.0016) and is significant at 1%.

The indicators of GoF reveal an acceptable performance for the model, as R^2 is 0.6745, meaning that the independent variables interpret about 67.45% of changes in the dependent variable; this is a good rate in the context of time data. On the other side, Adjusted R^2 is 0.5505, reflecting reasonable correction of the estimated parameters. Besides, the standard error of regression is 1.7703, and is acceptable based on the standard deviation of the dependent variable (2.6404). Moreover, the sum squared residuals reached a value of 65.8103, and F statistics is 5.4397 with a probability value of 0.0009, confirming the statistical significance of the model and that the independent variables together significantly affect the dependent variable.

Durbin-Watson value is 2.2717 and is close to the optimal value 2, showing the absence of a first degree cointegration in the residuals. Moreover, Akaike is 4.2235, Schwartz is 4.6438, and Hannan-Quinn is 4.3579, reflecting balance between the GoF and the model simplicity. Moreover, the Log likelihood is estimated at -54.3518. These indicators show that the model has a good interpretational capacity and acceptable statistical features, what fosters the reliability of the conclusions on the effect of the financial policy on the social development in Algeria. However, it is necessary to conduct additional extra diagnostic tests to confirm the stability of the model and lack of econometric problems in the residuals.

Table 5. The results of NARDL estimation of the relation between the financial policy and the social development in Algeria (1993-2024)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PGDP(-1)*	-1.0360	0.1723	-6.0127	0.0000
@CUMDP(OR01)**	0.3081	0.1599	1.9272	0.0676
@CUMDN(OR01)	-0.1137	0.1191	-0.9545	0.3507
@CUMDP(FEGC(-1))	0.5933	0.6261	0.9477	0.3541
@CUMDN(FEGC(-1))	-0.4447	0.9136	-0.4868	0.6314
@TREND	-1.4635	0.7859	-1.8622	0.0766
@DCUMDP(FEGC)	-0.6396	0.5989	-1.0679	0.2977
@DCUMDN(FEGC)	0.1766	0.7952	0.2222	0.8263
C	5.3042	1.4626	3.6266	0.0016

R-squared	0.6745	Mean dependent var	0.1667
Adjusted R-squared	0.5505	S.D. dependent var	2.6404
S.E. of regression	1.7703	Akaike info criterion	4.2235
Sum squared resid	65.8103	Schwarz criterion	4.6438
Log likelihood	-54.3518	Hannan-Quinn criter.	4.3579
F-statistic	5.4397	Durbin-Watson stat	2.2717
Prob(F-statistic)	0.0009		

Source: The outputs of the statistical program

7.2.4 Symmetry test:

Symmetry tests examine the null hypothesis about the symmetry of the effect of the positive and negative shocks on the dependent variable and the alternative about the opposite. The results of the long-run test show a clear variance between the variable of financial policy, as the results of FEGC confirm the symmetry hypothesis because F statistics is 0.507 with a probabilistic value of 0.484, and Chi-square is 0.507 with a probabilistic value of 0.476. Both probabilistic values are greater than significance level 5%, reflecting the absence of a statistically significant effect between the effect of increase and decrease of government expenditure on the social growth in the long-run. This reflects the limited efficiency of the expenditure policy in general, regardless the trend of the shock. In return, the results of oil revenues (OR01) show asymmetry in the long-run, as F statistics is 0.983 with a probabilistic value of 0.059 and is significant at 10%, while Chi-square is 0.983 with a probabilistic value of 0.046, and is significant at 5%. This confirms

that the effect of the increase in oil revenues completely differs than the effect of the decrease and fosters the validity of NARDL model that takes into account this asymmetric relation.

Table 6. Symmetry tests in the short and long terms

Coefficient symmetry tests
Null hypothesis: Coefficient is symmetric
Degrees of freedom (simple tests): F(1,21), Chi-square(1)
Degrees of freedom (joint tests): F(2,21), Chi-square(2)
Equation:

Variable	Statistic	Value	Probability
Long-run			
FEGC	F-statistic	0.507172054	0.484203311
	Chi-square	0.507172054	0.476365621
OR01	F-statistic	3.983169593	0.059089730
	Chi-square	3.983169593	0.045957007
Short-run			
FEGC	F-statistic	0.411907322	0.527947127
	Chi-square	0.411907322	0.521003007
OR01	F-statistic		
	Chi-square		
Joint (Long-Run and Short-Run)			
FEGC	F-statistic	1.4839079142	0.2495765498
	Chi-square	2.9678158284	0.2267498357
OR01	F-statistic		
	Chi-square		

Source: The outputs of the statistical program

In the short-term, FEGC maintains symmetry, as F statistics is 0.412 with a probability of 0.528 and Chi-square is 0.412 with a probability of 0.521; both are greater than 5% and confirm the absence of a significant difference between the effects of the positive and negative shocks of the government expenditure in the short-term. This goes with the results of the long-run and confirms that the government expenditure in Algeria does not show any palpable asymmetric effects on social development. As for oil revenues in the short-term, we find no values for F-statistics and Chi-square in the table, meaning that the contemporaneous effect (with no lags) of oil revenues does not allow for making symmetry test in the short-term, or that the chosen model does not include short-run items.

As for the joint test that examines the symmetry in the short and long terms, FEGC achieves cointegration, as F-statistics is 1.484 with a probability of 0.250 and Chi-square is 2.968 with a probability of 0.227. This confirms symmetry at both levels. In total, these tests show that asymmetry in the effect is basically limited to oil revenues in the long-term, as the increases in oil revenues are more efficient than the decreases for supporting social development. This reflects the rent-based nature of the Algerian economy and its limited ability to adapt with the shocks of oil resources decrease. In addition, the effect of government expenditure is symmetric, but has a limited efficiency in general; therefore, it is necessary to review the mechanisms of allocating and managing the public expenditures to foster the developmental effect.

7.2.5 Analysing the Cumulative Dynamic Multipliers of the Independent Variables on Social *Development:*

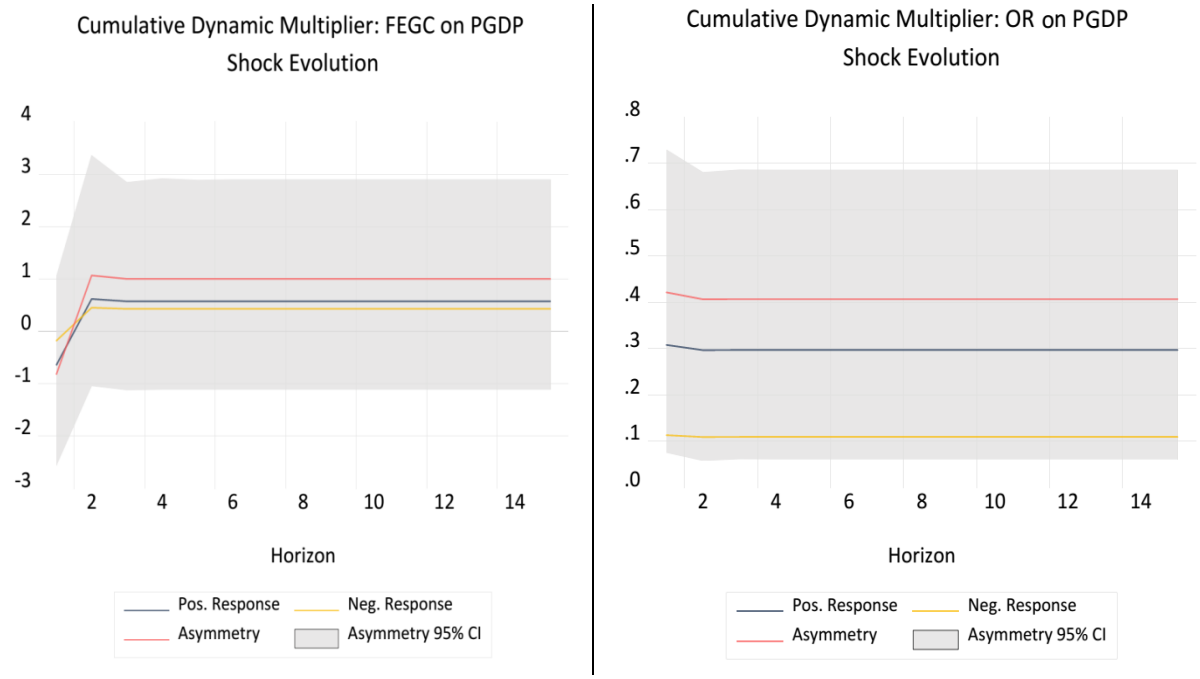
The study of the cumulative dynamic multipliers is an advanced analytical tool in NARDL model and allows for monitoring the path of the dependent variable response to the positive and negative shocks in the independent variables in an extended time horizon. It provides a clear view of the nature of the dynamic relation and the size of the cumulative effects in the short and long terms. Unlike the traditional analysis that supposes the symmetry of the response, this method allows for revealing asymmetry in reactions, i.e., if the increase or decrease in the variables of the financial policy has different effects regarding size, trend, and continuity. Asymmetry is measured with the difference between the positive and negative multipliers, which is statistically significant if the confidence intervals cross the zero axis. In this study, the analysis of the dynamic multipliers can provide exact answers on the efficiency of each tool of the financial policy (oil revenues and government expenditures) in supporting social development in Algeria, and show if the effects are symmetric or differ with the nature of the shock. This helps the decision makers design more efficient financial policies that suit the specifications of analysing the cumulative dynamic multiplier of oil revenues on social development.

The graph of the cumulative dynamic multiplier shows the temporal development of the effect of the positive and negative shocks in the oil revenues on the GDP per capita in 15 lags. Findings show a clear asymmetry between the response of the social development to positive shocks (blue line) and to the negative shocks (red line), as the positive shocks in oil revenues show an increasing and continuous positive effect that starts with a positive value that is low in lag one (about 0.1) and that gradually increases to reach 0.6 to 0.7 starting from lag eight. Thus, any increase in oil revenues with one unit leads to a cumulative improvement in social development with about 0.6 to 0.7 unit in the long-term. On the other hand, the negative shocks (the decrease of the oil revenues) show a very limited negative response that starts close to 00 and remains in a narrow range that does not exceed -01 to 0.0 in all lags, with a gradual inclination towards 00 with time. This shows that the decrease of oil revenues has a relatively limited negative effect on social development compared to the strong positive effect of the increase.

The green line represents the asymmetry between the two multipliers, which starts positive and low and sharply increases to reach high values of about 0.6-0.7 after lag 08. This is a statistically significant difference (where the confidence lag 95% does not cross the zero axis in all lags) and confirms that asymmetry is real, not casual. These results show that the increase in the oil revenues is more efficient in supporting social development than the economy is able to absorb or alleviate the effects of their decrease. Thus, the Algerian economic structure is not flexible

and cannot adapt with negative shocks due to the adopted mechanisms of social protection, reliance on reserves and credits to fund expenditures when revenues decrease, or ratchet effect.

Figure 1. The cumulative dynamic multiplier of the effect of the positive and negative shocks on oil revenues on social development



Source: The outputs of the statistical program

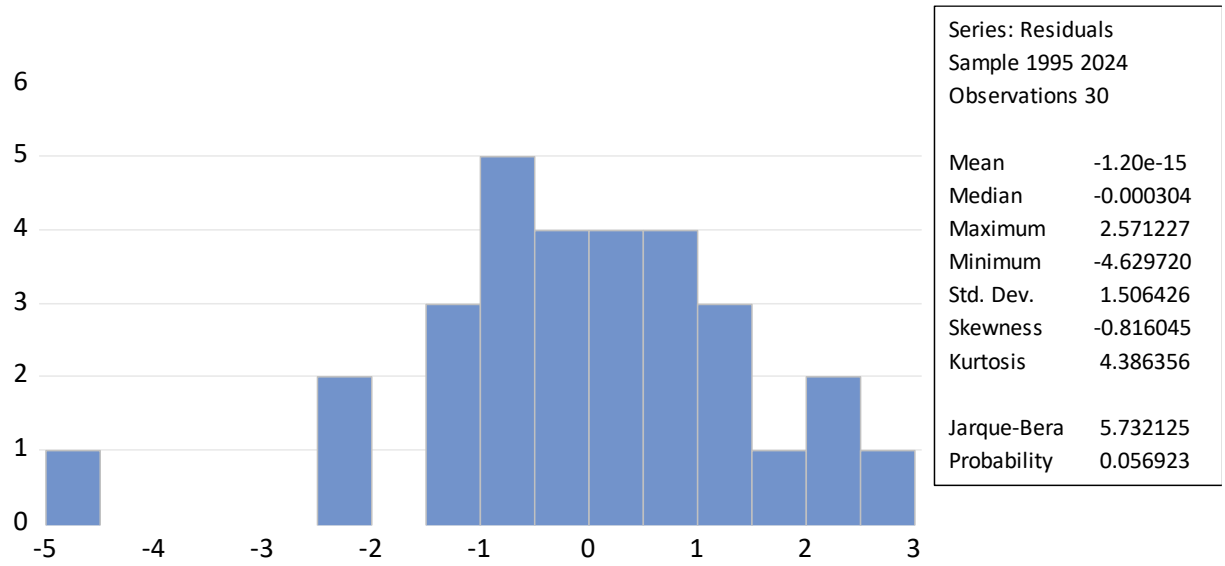
The figure shows the cumulative dynamic multiplier of the effect of the positive and negative shocks on oil revenues on social development in the same time horizon (15 lags) and shows a completely different image than that of oil revenues. In this regard, all the positive shocks (blue line) and negative shocks (red line) show a fluctuating path close to 00 throughout the analysis period, with clear fluctuations between the positive and negative values without clear stationarity at a given level. The positive shocks in the government expenditure start with a slight negative effect in the first lags (about -0.5 to -1.0) and then gradually turn into positive in the average lags (about +0.2 to +0.1) before they fluctuate around zero in the long-run. Besides, the negative effects show an opposite trend, as they start with a low positive effect and, then, turn into negative before fluctuating. In this regard, the green line that represents asymmetry is very close to zero axis all along the time horizon and fluctuates between -2.0 and +2.0, with a clear recurrent intersection between confidence interval 95% and zero axis. This shows that the asymmetry between the effects of the positive and negative shocks is statistically insignificant in all lags, confirms the lack of asymmetry in the effect of government expenditures on social development, and goes with the results of statistical symmetry test. These results raise questions about the limited efficiency of the policy of the government expenditure in Algeria, as the increases in the public expenditure show no strong and sustainable positive effect on social welfare, and the decreases in expenditure have no clear negative effect due to the weak efficiency of public expenditures, the bad allocation, the weak governance and transparency in managing public resources, the financial leaks, and the insufficient direction of expenditure towards the sectors that have a direct effect on social welfare, such as education, health, and infrastructure. Thus, it is necessary to launch deep structural reforms in public expenditure to foster its developmental

effect and turn the financial resources into palpable and sustainable improvements in the living standards in Algeria.

Natural Distribution:

Jarque-Bera test shows that the natural distribution is acceptable, as the Jarque-bera values is 5.732 with a probabilistic value of 0.057, which is greater than 5% and confirms the null hypothesis about the natural distribution. This confirms the bell-shaped histogram distribution of residuals. In addition, the values concentrate around zero, as the mean is very close to zero (1.2e-15) and the median is -0.0003; they indicate the residuals' concentration around the zero.

The results of the natural distribution



Source: The outputs of the statistical program

Moreover, skewness is -0.816 and shows a slight inclination towards the left while kurtosis is 4.386 and is a bit higher than the standard value of the natural distribution (3). Thus, there are tails that are a bit heavier than leptokurtic, as known in the time-series economic data due to extreme values or exceptional shocks. In addition, the residuals are between -4.630 and 2.571 with a standard deviation of 1.506, reflecting a logical and accepted dispersion around the mean. In total, these results confirm the statistical estimations of the model and the validity of conclusions, as the natural distribution of residuals is one of the main conditions for the validity of the statistical tests, mainly in the relatively small samples as in this study (30 views).

Serial Correlation:

Table 7. Serial correlation

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	0.64069075	Prob. F(2,19)	0.53793850
Obs*R-squared	1.8954056	Prob. Chi-Square(2)	0.38763045

Source: The outputs of the statistical program

Breusch-Godfrey test for serial correlation reveals the self-correlation in the model residuals at a specific number of lags. In this case, we examined the serial correlation until 02 lags and found out that F-statistics is 0.6407 with a probability of 0.538, and that Obs*R-squared is 1.8954 with a probability of 0.388. Both are greater than 0.05 and deny the existence of a statistical proof to

refuse the null hypothesis. Thus, there is no serial correlation in the model residuals until 02 lags.

Table 8. Heteroskedasticity test

Heteroskedasticity Test: ARCH			
F-statistic	0.03912777	Prob. F(1,27)	0.8446774
Obs*R-squared	0.04196531	Prob. Chi-Square(1)	0.8376859

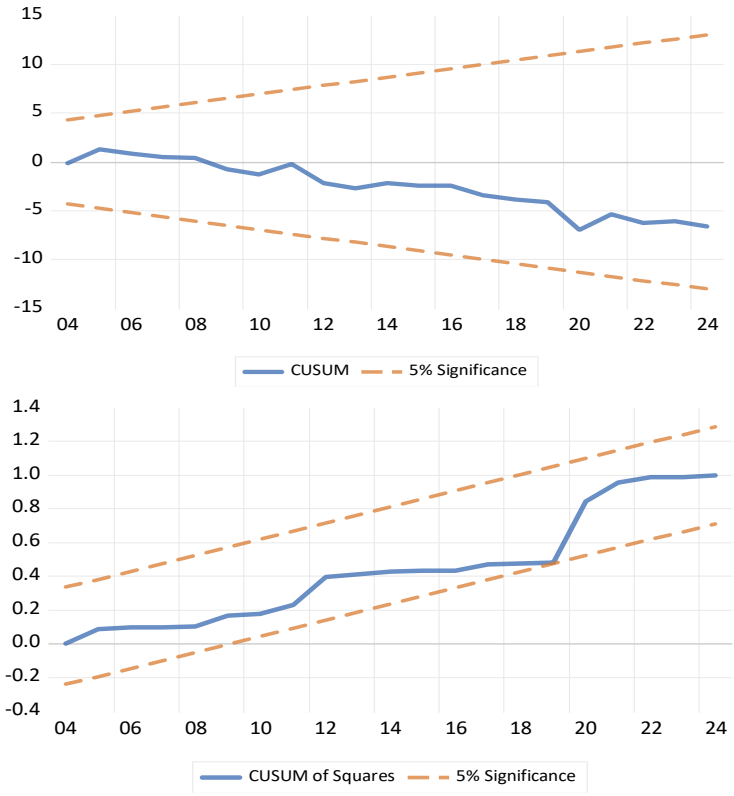
Source: The outputs of the statistical program

The test is used to check the existence of a variance in the model residuals with time. Findings show that F-statistics is 0.0391 with a probability of 0.845 and that Obs*R-squared is 0.0420 with a probability of 0.838. Both are greater than 0.05 and deny the existence of a statistical proof to refuse the null hypothesis, confirming heteroskedasticity.

The Structural Stability:

It is one of the main diagnostic tests that aim at evaluating the steadiness of the parameters of the econometric model in time, mainly in the studies that rely on time series that reflect lags with major economic shocks or structural changes. In this study, we used CUSUM and CUSUMQ to examine the stability of the relation between the financial policy and the social development in Algeria from 1993 to 2024. These tests examine the accumulation of the standard deviations of the residuals in time, as accumulation curves are drawn and compared to the statistical confidence limits (usually at 5%). If the tests curves are within these limits, the parameters are stable with no radical structural change in the estimated relation.

Figure 3. CUSUM and CUSUMQ tests:



Source: The outputs of the statistical program

The figure shows that the accumulation curves are within the limits of statistical confidence (the two crossing red lines) during the study period without any clear or continuous violation of these limits, showing a strong structural stability of the model and that the dynamic relation between the variables of the financial policy (oil revenues and government expenditures) and social development indicator (GDP per capita) did not witness any radical or maximum changes from 1993 to 2024 despite the major internal and external shocks, such as the oil prices fluctuations and Covid-19. This stability is attributed to the rent-based nature of the Algerian economy that maintains the steady role of the oil revenues in funding the financial policy, and to the relative continuity of the governmental social policies even in financial stress periods. These results confirm the reliability of the model and its validity for economic reasoning, and foster the credibility of the results on the asymmetric effects of the oil revenues and the relative weakness of the effect of the government expenditures on social development in the short and long runs.

7.2.7 Results Discussion:

This study provides an advanced econometric analysis of the dynamic and non-linear relation between the financial policy and the social development in Algeria during 1993-2024. Findings show the asymmetric effect of oil revenues, as the increases in revenues positively contribute to social development in the long-run while the decrease has no similar significant effect, confirming the rent-based nature of the Algerian economy, as the additional resources resulting from oil spikes are partially devoted for welfare, and the adaptation with the decrease shocks is slow and less-efficient, confirming the limited structural flexibility of developmental model.

In return, FEGC did not witness any significant effect in the short and long runs regardless the trend of the shock (positive or negative), confirming that the increase in expenditure on services does not ensure a sustainable social development if its quality and efficiency are not improved. Besides, the asymmetry in the expenditure effect confirms that the issue of the efficiency of the financial policy in Algeria is structural, not periodical. The model results and the time analysis show that the highest social development lags are related to the increase of oil revenues (as in the first decade of the millennium) while the recession lags take place with the negative shocks on oil prices. However, the continuity of weakness despite the relatively high government expenditure in some periods (as in post-2015) raises questions about the efficiency of transforming the financial resources into real welfare and indicates structural restrictions that hinder the trickle-down of the oil wealth towards a wider social basis.

In the end, the stability of the structural model in time (as shown by CUSUM and CUSUMQ tests) shows that the relation between the financial policy and the social development in Algeria maintains its general nature despite the frequent shocks. This steadiness is not necessarily a positive index, as it may reflect stagnation in the economic policies and the inability of the financial and social systems to radically develop and achieve a real development. Thus, we conclude that reliance on the rent-based traditional financial policy and the current expenditure is not enough to achieve a sustainable and solid social development in the future.

8. Conclusion:

Our findings show that the relation between the financial policy and the social development in Algeria from 1993 to 2024 is non-liner and asymmetric, as the significant positive effect in the long run concentrates around the increases in oil revenues only while the effect of the expenditure on government consumption is limited and insignificant. This confirms the rent-

based nature of the Algerian developmental model that links social welfare to oil resources without efficient adaptation mechanisms or alternative development strategies. In addition, the study raises deep questions about the efficiency and quality of expenditure in Algeria, as the increase in government expenditures alone is not key for a sustainable social development. Therefore, we need a radical review of the financial policy priorities and a shift from the compensating expenditure and public subsidy to focus on productive investment in education, health, infrastructure, and innovation, with a major focus on governance and transparent allocation of resources.

Methodologically speaking, NARDL model showed its suitability for analysing the complicated relations in the rent-based economies, as it allows for revealing the asymmetric interactions and the dynamics of adaptation that the traditional linear models hide. Besides, the stability of the structural model throughout three decades of shocks fosters the results of the model and makes them a good reference for decision makers. In the end, the study provided quantitative proofs on the need for a structural reform that exceeds the traditional financial policies. In addition, the future financial policies must target the diversification of revenues, directing the public expenditure towards investments, and building institutions that ensure a fair and efficient distribution of resources by breaking the rent-based nature and building a productive and diverse economy that allows for the achievement of a real social development that can resist external and internal fluctuations.

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