The impact of spending on health care economics in achieving sustainable development goals: An empirical evidence-case of Algeria during the period 1990-2018

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Abstract:

This study aims to measure the impact of spending on health care in achieving the Sustainable Development Goals: Goal Three, Good Health and Well-Being in Algeria, from an econometric point of view. The data of the study cover a 29-year time horizon, during the period from 1990 to 2018. These data were processed using the technique of multiple regression analysis, so that the estimation was made by the ordinary least squares (OLS) method. In the context of analyzing the data, the results of the study indicated that the variables: the contribution of the state; And the National Social Security Fund in health spending has a positive effect on improving the level of hope in life, while the variable contribution of families to health spending had a negative effect.

Keywords: *health care, health spending, sustainable development, the care economy.*

JEL Classification: H51, I15, I18, Q01.

أثر الإنفاق على اقتصاديات الرعاية الصحية في تحقيق أهداف التنمية المستدامة

دراسة قياسية لحالة الجزائر خلال الفترة 1990–2018

ملخص :

تهدف هذه الدراسة إلى قياس حجم تأثير الإنفاق على الرعاية الصحية في تحقيق أهداف التنمية المستدامة: الهدف الثالث، الصحة الجيدة والرفاه في الجزائر، من وجهة نظر الاقتصاد القياسي. تغطي بيانات الدراسة أفقا زمنيا مدته 29 عاما، خلال الفترة الممتدة من 1990 إلى غاية 2018. تمت معالجة هذه البيانات باستخدام تقنية تحليل الانحدار المتعدد، بحيث تم التقدير بواسطة طريقة المربعات الصغرى العادية (OLS). وفي إطار تحليل البيانات أشارت نتائج الدراسة إلى أن المتغيرات: مساهمة الدولة؛ والصندوق الوطني للضمان الاجتماعي في الإنفاق الصحي تؤثر إيجابياً على تحسين معدل الأمل في الحياة، بينما كان لمتغير مساهمة العائلات (الأسر) في الإنفاق الصحي تأثير سلبي.

الكلمات المفتاحية : *الرعاية الصحية، الإنفاق الصحي، التنمية المستدامة، اقتصاد الرعاية.*

تصنيف JEL : H51، I15، I18، Q01.

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1.Introduction :

the health issue is at the top of the international human rights agenda, which gave the international community a new challenge, considering that human health is one of the most important variables that affect economic and social development. Rather, it is deemed one of the most significant measures of development in many countries. The increase in population, changing consumption patterns, and the emergence of diseases And new intractable epidemics, and the rise in the claim for getting health care services equitable, has led to a boost in health spending. and decisions made on how to finance health care economies are crucial elements to ensure access and effective coverage. Spending on the health sector is one of the prominent aspects of investment in human capital, which Through it, countries aim to increase the state's economic growth rates and to achieve sustainable development. A healthy individual rushes to enlarge productivity to obtain a better wage and this focuses on increasing national income or gross domestic product, which would achieve a high level of well-being For people.

Over the past two decades, progress has been made in coverage and quality of health care services in Algeria, with improving regularly indicators and infectious disease incidence decreasing, according to the Oxford Business Group. As a result, the latest data from the World Health Organization showed that the average life expectancy at birth increased from 68 years in 1995 to 76.4 years in 2018, and its health expenditures witnessed wide development and growth, and financing health expenditures became a real bet, as most services are provided free of charge to citizens in Public hospitals and clinics, and the government pays most of the costs of medicines bought by these citizens. In order to meet their health needs and achieve well-being, and despite the fact that the vast majority of health institutions are still fully supported by the government, this matter has gradually changed with the growth of the private sector. On this basis, the Algerian health system needs financing mechanisms to ensure that its expenses are covered in the long term.

This is what made discussions today continuing about the relationship between the spending on health care economics and sustainable development goals, because defining the nature of this relationship will contribute to making appropriate and effective decisions regarding health spending, in this regard, we formulate the following problem:

How effective was spending on health care economics in achieving sustainable development goals in Algeria during the period 1990-2018?

To answer the study problem, we formulated (03) hypotheses. These hypotheses were formulated from literary studies, and they will be clarified in the literature and hypothesis development section.

This article aims to determine the impact of health spending on achieving the SDGs in Algeria, from an econometric perspective. The scoreboard data (03 funding sources) covers the 29-year horizon, from 1990 to 2018.

2. Background

a. Investing in the economics of healthcare

The health economy emerged at the end of the fifties in the United States of America and Great Britain and the beginning of the seventies in France (Ali Dahmen, 2017, p. 22), to analyze health issues and evaluate their policies, legislations, and systems in terms of their impact on the supply and demand for health care services; for future planning and efficient production and fair distribution, while determining the costs and benefits of any of its options (Abdullah, 2003). At the end of the 1970s, frightening economic restrictions appeared that limited the population's social requirements in the field of medical

consumption; however, during the decade of the 1980s, importance was given to the health economy for practical reasons related to the requirements of running the health sector and the bodies providing treatment (Ali Dahmen, 2017, p. 22).

Health care economics is concerned with the alternative uses of resources in the health services sector and with the efficient utilization of economic resources such as Human resources, material and financial resources (Gashaw, 2008, p. 3). It is not related to saving money but to improving the level of well-being and distributing health to the population according to the available resources (Genius & Wiseman, 2015, p. 28). The concept of health economics is a broad concept that studies health as a final product that expands to include all health production inputs, which includes health services as one of those inputs (Mukhtar, 2013, p. 123). The study of health care economics is important and interesting through the size of the health sector's contribution to the overall economy (Folland, et al., 2013, p. 3). Dealing with increasingly complex health needs calls for a multisectoral approach in which policies aimed at promoting health and prevention are integrated, developing solutions that respond to local communities. Also, the provision of people-centered health services (World Health Organization, 2018).

Investing in healthcare economics reflects a universal desire to obtain maximum value for money by ensuring not just the clinical effectiveness, but also the cost-effectiveness of healthcare provision (Noble & Haycox , 2009, p. 4). There is now a global movement to achieve this goal, and governments are pursuing a variety of models to share health costs more equitably among the population throughout their life (World Health Assembly, 2011, p. 2), which has broadened the discussion on strengthening health systems beyond Providing health care services to encompass the broad public health agenda, social determinants of health, and interaction between the health sector and other sectors of society (World Health Assembly, 2011, p. 3).

More worrying is the neglect of problems in low-income countries and the work on system analysis (performance indicators), health care financing, prevention and health promotion (early childhood development programs), and on the cost-effectiveness of specific interventions in these countries. Furthermore, while ample attention is given to the demand side of the health care market, the extensive literature on health care supply (production and cost functions, labor market, manpower planning, etc.) is not considered (Rutten, et al., 2001, p. 856).

b. sustainable health development

In June 2012, the United Nations Conference on Sustainable Development held in Rio de Janeiro, Brazil, adopted a final document entitled "The future we want", in which it recognized the role that health can play in the core of sustainable development policies as a precondition for its realization (General Assembly, 2012, p. 3). It explained that Human beings are at the center of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature (Schirnding & Mulholland, 2005, p. 3), In May 2016, the Sixty-ninth World Health Assembly adopted health in the 2030 Sustainable Development Plan, and the first report on progress in implementing the resolution was submitted to the Seventy World Health Assembly in 2017 (World Health Assembly, 2019, p. 1); Where has it been recognized that the dependence of health on policies and choices made in other sectors is certainly new. It does demand a fresh look at past and current approaches to intersectoral action, and how well these have worked (Buse & Hawkes, 2015, p. 3).

In July 2018, the Tallinn Charter for Health Systems Health and Wealth was revisited and it was concluded that there is a need to intensify efforts to bring health and finance decision-makers together around shared goals by taking note of public finance objectives and correspondingly demonstrating the economic and social returns of investing in health systems (Boyce & Chris, 2019, p. 5). Participants in the World Conference on Health Care held in Astana, Kazakhstan, on 25 and 26 October 2018, issued the "Astana Declaration", which reaffirms the commitments made in the ambitious and forward-looking Alma-Ata Declaration issued in 1978, seeking to achieve health for all. Emphasize on the necessity of establishing sustainable health care, empowering individuals and societies, and aligning the support of stakeholders with national policies, strategies, and plans, that is, using knowledge, capacity building, the provision of health human resources, the development of technology and the provision of financing (World Health Organization, 2019, p. 3).

The linkages between better health, economy, environmental sustainability, and social progress have become evident facts (General Assembly, 2012, p. 3), Consequently, health has become one of the most important matters in the field of development, as one of the factors that contribute to sustainable development and one of its indicators. Many health failures and poor health significantly affect growth and development. In this context, Dr. Margin Chan, Director-General of the World Health Organization, affirmed that "the healthy development of the individual leads to economic, social, cultural and political development." Good health contributes to economic stability and environmental protection (Bararma & Bohda, 2015, p. 6). Where goal 3 of the Sustainable Development Goals (ensuring healthy lives and well-being for all at all ages) includes all major health priorities and calls for improving reproductive, maternal, and child health; ending communicable diseases; reducing non-communicable diseases and other health hazards; and ensuring universal access to safe, effective, quality and affordable medicines and vaccines as well as health coverage (the Department of economic and Social Affairs, 2017, p. 4).

Hence, the economics of health care is an important input into sustainable development; it helps shape policies to achieve SDG 3 (Acharya, et al., 2018, p. 591). Healthy people are better able to learn, work, and contribute positively to their economies and societies. But only if health is the main criterion for choosing sustainable development policies and plans (The Pan American Health Organization , 2013, p. 2), then the goal of health economics is often to inform decision-makers so that the decisions they make amplify the health benefits of the population, and health economics is not about saving money but for improving the level distribution of health for the population. Estimate the available resources (Genius & Wiseman, 2015, p. 28). therefore, investing in the economics of health care enhances the country's economic output through its effects on educational achievement and skills acquisition, labour productivity and decent employment, increased savings and investment, the demographic transition and impacts on the earth's ecosystem (United Nations, 2014, p. 2), where the investment issue plays into Health systems have an increasingly important role in driving inclusive and sustainable development through responsible practices in the areas of employment and the purchasing of goods and services (Boyce & Chris, 2019, p. 6).

3. Literature and hypotheses development :

Strengthening investment in the economics of health care is essential to achieving the Sustainable Development Goals related to health and universal health coverage. This will contribute to achieving other goals that go beyond the scope of the goal of good health and well-being (World Health Organization, 2018). However, countries begin to achieve the goals at an appropriate pace,

given the availability of resources, through setting national targets and calculating costs (world health organization, 2015, p. 7), so the estimates related to the investment needs to implement the goals Sustainable development in developing countries ranges between $ 3.3 trillion and $ 4.5 trillion per year, and thus easy access to financing opportunities, especially for the poor and most vulnerable countries, is extremely important for promoting inclusive growth and reducing inequality (United Nations Development Programme, 2018, p. 8).

The financing of the Algerian health system is currently known to be limited in the use of additional financial resources to ensure the sponsorship of the growing demand, which is mainly caused by the demographic and satisfactory transformations that our country is familiar with. It is known that there are three main sources of financing health expenditures: financing through the state, financing through social security, financing through the family (Ali Dahmen, 2017, p. 179).

a. State contribution (government health spending)

The pursuit of better results for the economy and society goes hand in hand with the daily pressures that policymakers face to contain public spending and achieve better results. This is not evident anywhere more than in the health sector (Boyce & Chris, 2019). However, the study conducted by Shukre & Al Aliawi (2020) found that spending on the health sector in Iraq has a direct impact on sustainable development during (2003-2018), as most of the public spending on health goes To operating expenses such as salaries and wages. Investment expenditures do not take anything but a little that could not keep pace with advanced medical technology, which is reflected in the decline in health indicators, which in turn are reflected in human development in Iraq and a decrease in life expectancy (shukre & Al Aliawi, 2020). From it, we will formulate the first hypothesis as follows:

H1 : The state's contribution to health spending has a positive effect on improving the hope of life in Algeria.

b. Contribution of the National Social Security Fund

A study conducted by Mahmoudi & Ghedjati (2020) found that the Algerian social security sector relies mainly on deductions from the believers as a source of financing to maintain the financial balance of the bodies and institutions of this sector, and that Algeria's reliance on free treatment has negatively affected the financial balances of the sector (mahmoudi & ghedjati, 2020). Accordingly, we will formulate the following hypothesis:

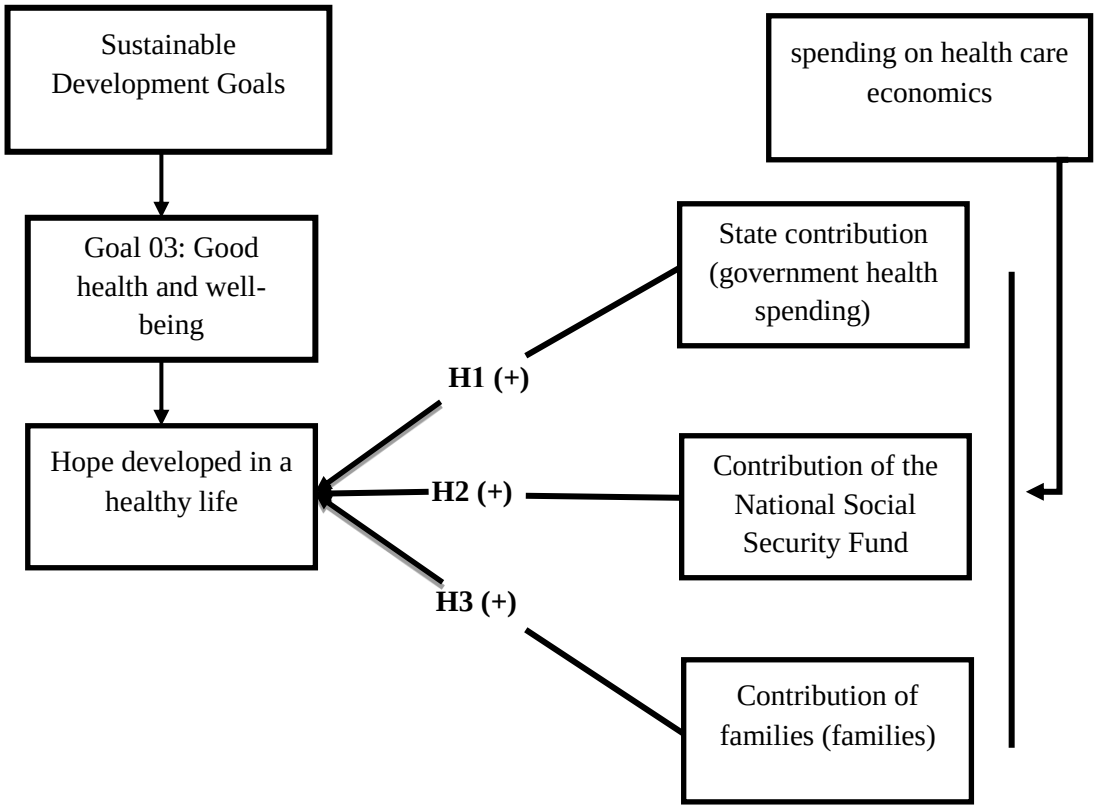
H2: The contribution of the National Social Security Fund to health spending has a positive effect on improving the hope of life in Algeria.

c. Contribution of families

Globally, the proportion of people spending more than 10 percent of their household budgets to pay for health services increased from 9.4 percent to 12.7 percent (927 million people) between 2000 and 2015. It is estimated that close to 90 million people were pushed into poverty. It is estimated that nearly a billion people will spend at least 10 percent of their household budgets on health care in 2020, most of them in lower-middle-income countries. The loss of income as a result of the lockdown measures due to the COVID-19 pandemic is likely to exacerbate this situation (the Department of Economic and Social Affairs, 2020, p. 31). The results of a study conducted by Rashad (2017) on the impact of these expenditures on the economic situation in Arab countries indicated that the direct payment of spending on care and medicine from private funds is still the cause of one-third of the new poverty cases recorded annually in some regions (Rashad, 2017). The last hypothesis is as follows:

H3: The contribution of families (families) to health spending has a positive effect on improving the hope of life in Algeria.

Figure (1) shows the theoretical model of the study



Source: Prepared by the researchers

Figure (1): Theoretical model of the study

4. Materials and methods

a. Type and scope of the search

In this study, we will examine the existence of a potential relationship between spending on healthcare economics and achieving sustainable development goals in Algeria. To measure this relationship and test the study hypotheses, we use the average hope for a healthy life annually as a dependent variable.

The independent variables will also be listed based on government health spending (state contribution, National Social Security Fund contribution, and families' contribution).

b. Sample: Choice and justification

In our study, we relied on data from the Ministry of Health, Population and Hospital Reform (MHPHR) at the national level, as well as data from the World Bank (WB) through World Development Indicators for the period from 1990 to 2018, and these data include 29 views, these observations are the contribution of health spending For the state (government), the National Social Security Fund, and families.

c. Data collection

After diagnosing the data of the Ministry of Health, Population and Hospital Reform (MSPRH) and the World Bank (WB), it became clear that all the data in our possession spanning the period 1990-2018 include sufficient information, i.e. there are no missing

values, and therefore no observation has been deleted. From this point of view, we will adopt On a sample of 29 views, we will also use the statistical program Stata Edition 15 to perform the statistical analysis of this sample.

d. Measurement of variables

This study includes two dimensions, for a total of 04 variables, the first dimension includes one dependent variable, and the second dimension includes 03 independent variables. these variables will be measured on a quantitative scale, Table No. (01) illustrates that. This table includes the variables that measure each dimension, in addition to the name and coding of the variables used to measure these dimensions.

i. Dependent variable

In this model, we will use life expectancy at birth (number of years) to measure hope in life. These basic data are taken from the World Bank (WB) through the World Development Indicators database (world bank, 2020).

ii. Independent variables

We will also use the Algerian dinar to express the value of health spending for each of the state's contribution (government health spending: that is, financial appropriations for the health sector in the state's general budget). Contribution of the National Social Security Fund; So is the contribution of families. All these basic data are taken from the Algerian Ministry of Health, Population, and Hospital Reform (MHPHR), citing: (khalassi, 2018, pp. 191-192).

Table (1) shows the summary of measures and sources of dependent and independent variables.

Table (1): Summary of measures and sources of dependent and independent variables

Dimensions	Variable	Symbol	Data Source	Measure
Good health and well-being	Hope developed in a healthy life	HDHL	World Development Indicators database (world bank, 2020)	Quantitative (number of years)
Spending on the economics of health care	State contribution (government health spending)	SC	Ministry of Health, Population and Hospital Reform, citing: (khalassi, 2018, pp. 191-192)	Quantitative (digital DA)
	National Social Security Fund contribution	NSSFC	Ministry of Health, Population and Hospital Reform, citing: (khalassi, 2018, pp. 191-192)	Quantitative (digital DA)
	families Contribution	FC	Ministry of Health, Population and Hospital Reform, citing: (khalassi, 2018, pp. 191-192)	Quantitative (digital DA)

Source: Prepared by the researchers.

e. Empirical model

Our analysis will depend on a multivariate model to explain the impact of spending on health care in achieving the third sustainable development goal (good health and well-being) represented by the rate of hope in life. We have formulated a preliminary mathematical equation that allows us to estimate the values of the dependent variable (Hope developed in a healthy life) using independent variables (the state's contribution: that is, the financial appropriations for the health sector in the state's general budget; the contribution of the National Social Security Fund; as well as the contribution of families). We'll be using the logarithmic formula to narrow the gap between big and small values. In this regard, Benoit indicated that "Logarithmically transforming variables in a regression

model is a very common way to handle situations where a non-linear relationship exists between the independent and dependent variables. Using the logarithm of one or more variables instead of the un-logged form makes the effective relationship non-linear, while still preserving the linear model" (Benoit, 2011).

From above, we can define the study model in the form of a regression equation as follows:

$$\log \mathrm{HDHL} = \beta_0 + \beta_1 \log \mathrm{SC} + \beta_2 \log \mathrm{NSSFC} + \beta_3 \log \mathrm{FC} + \varepsilon$$

The equation can be written more simply:

$$\mathrm{LHDHL} = \beta_0 + \beta_1 \mathrm{LSC} + \beta_2 \mathrm{LNSSFC} + \beta_3 \mathrm{LFC} + \varepsilon$$

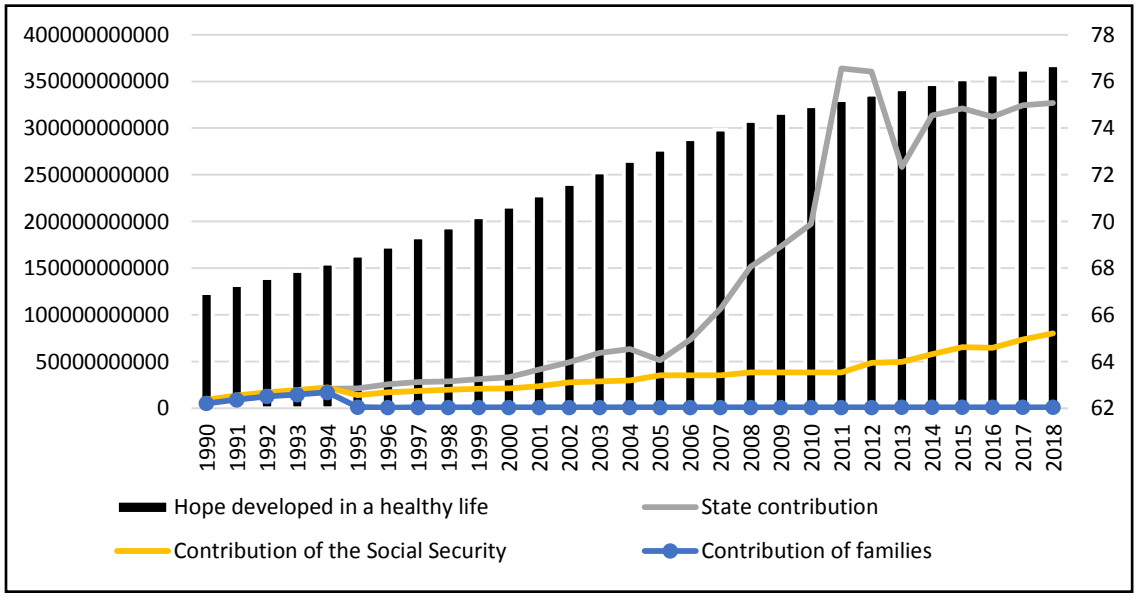
The above formula helps us in analyzing the data by relying on non-standard parameters of the independent variables. It also helps us to identify the independent variables that explain the dependent variable and the variables that do not explain it.

5. Results

The statistical analysis of the data includes the following: an analysis of the reality of health spending in Algeria and its impact on the level of Hope rate in life, through commenting on the graph of the study variables, a descriptive analysis of the model variables; And a statistical analysis by multiple regression.

a. The reality of health spending in Algeria and its impact on the Hope developed in a healthy life

Figure (2) below includes a graphic representation of the dependent variable (Hope developed in a healthy life) and the independent variables (the contribution of the state "health government spending", the contribution of the National Social Security Fund, the contribution of "families"), in Algeria during the period 1990-2018. Figure (2) below gives an overview of the state's contribution to health spending compared to the rest of the other contributors (the contribution of the National Social Security Fund and the contribution of families), which finds justification for it at the social level due to the development of social awareness and population density (Rubin, et al., 2016, p. 4), as government health spending A significant decrease was recorded in 2013, due to the decline in oil revenues in Algeria, but it quickly returned to the increase in the following year. in general, the period (2000-2018) witnessed a significant rise in government health spending due to the calm, security and political situation and the high fuel prices. The figure also notes a continuous increase in the contributions of the National Social Security Fund from year to year, reaching its peak in 2018, due to the rapid increase in the drug compensation bill, the rise in work accidents, in addition to the high costs of repair and maintenance (mahmoudi & ghedjati, 2020, p. 346), in addition to the continuous growing The contribution of families to health throughout the study period, and its peak was known during the first years of the black decade due to the absence of universal health coverage, the migration of many competencies in health, as well as the accompanying closure of many neighboring health structures in the countryside and remote areas affected by the security crisis.



Source: Prepared by the researchers.

Figure (2): Representing study variables during the period 1990-2018

The same figure also indicates that the development of the rate of hope in life grows at a steady pace during the study period, compared to the various sources of funding, as Algeria ranked first at the African and Arab levels, and the 53rd globally in the global ranking in the field of implementing the sustainable development goals, according to a report of "Sustainable Development 2019" (Anon., 2020). It indicated that Algeria is on the right path to achieving the third sustainable development goal (good health and well-being), and over the past two decades has made progress in coverage and quality of health care services in Algeria, with improved health indicators thanks to strategic government planning and the widespread health coverage enjoyed by citizens. The private sector's opportunities for growth and investment are strong, especially in the field of the pharmaceutical industry, as part of the 2009-2025 health plan, which stipulated that investments be worth 20 billion euros to build new health facilities and develop existing hospitals (North Africa Health, 2020, p. 9). As a result, the most recent data from the World Health Organization showed that the average life expectancy at birth increased from 68 years in 1995 to 76.4 years in 2018. The percentage of patients traveling abroad for treatment has decreased by 90% since 2000, reflecting significant improvements that have occurred in the system. the local. So it can be said that the Algerian state attaches great importance to the sustainability of the health sector, and what confirms this is the huge financial appropriations allocated to the health sector, which are increasing from year to year.

b. Data and descriptive

Although the main method of data analysis is a statistical analysis using multiple regression to test hypotheses, descriptive statistical analysis is useful as it will allow us to know the statistical aspects of the sample, giving a more accurate picture to know the shape of the distribution of the model variables.

Table (2) describes the minimum, and maximum values, mean, standard deviation of each variable and the observation number for each variable.

Table (2): Descriptive statistics of the variables model

Variable	Obs	Minimum	Maximum	Mean	Mean Std. Deviation	Skewness	Kurtosis
HDHL	29	66.98	76.693	72.234	3.239	-0.1856186	1.60275
SC	29	8.61e+09	3.64e+11	1.31e+11	1.30e+09	0.7276437	1.837974
NSSFC	29	9.08e+10	8.00e+10	3.45e+10	1.90e+09	0.88408070	2.868867
FC	29	7.00e+08	1.70e+10	275e+09	4.51e+09	2.223286	6.444057

Source: Prepared by the researchers. Stata outputs Version (15.0).

It appears from the above table that the variables of the state's contribution to health spending "SC" are; the National Social Security Fund Contribution "NSSFC"; families contribution "FC" is the most volatile variables. Their coefficient of variance exceeds or approaches 100% in these variables. This is due to the large range between minimum and maximum variables observed, but the variable "HDHL" appears to be relatively stable from year to year. However, as shown in Table (2), the number of observations for this study is 29.

The study of the distribution of variables in the model is based on the normal distribution test. The shape of the distribution is measured by "skewness and kurtosis".

The skewness coefficient explains asymmetric data about the mean. According to Table (2), the value of skewness for all variables is close to the value of zero (0), except for the FC variables, and from this we conclude that the distribution is symmetric about the mean, according to Karl Pearson.

The kurtosis coefficient is used to measure the peak or stability of a curve. It must be within the valid values in the range [-3,3]. When kurtosis is equal to 3, the distribution is Mesokurtic and corresponds to the normal distribution of data according to Karl Pearson, according to Table (2). The kurtosis value for all variables is close to the value of 3, that is, close to the kurtosis of a normal distribution according to Karl Pearson, except of the families contribution variables "FC". Therefore, we will use the logarithmic form when estimating the model.

c. Main results

The use of multiple regression (the logarithmic formula) in Table (3) allows calculating the explanatory power of the model. Estimation using the regular least squares (OLS) method, by the multiple regression model. The model test includes all variants (LSC, LNSSFC, LFC). These variants have 29 views, throughout the year. Twenty-nine years were represented in the sample period (1990-2018).

Table (3): Regression analysis summary and regression variance analysis

Regression analysis summary			Regression variance analysis		
r	R^2	$\bar{R}^2$	df	F	Sig F
0.9909	0.9820	0.9798	(3, 25)	454.53	0.0000

Model: (Constant), LHDHL, LSC, LNSSFC, LFC.

Source: Prepared by the researchers. Stata outputs Version (15.0).

Now, let's test the incorporeal significance of the regression model. The explanatory strength of the model or the variance ratio demonstrated R^2 is 98.2%. It is interesting to note that the statistical value of Fisher for the model is F = 454.53. This difference represents a very significant variance "F (3, 25) = 454.53, Sig F = 0.0000 <0.05". The relationship between the coefficients (r) of the model is very strong and is equal to (0.9909). Therefore, it was concluded that the regression model is highly significant, as the set of independent variables reliably predicts the dependent variable, and the sample used in the regression analysis is homogeneous, and the variance of the data distributed over twenty-nine years has no effect on the consistency of the data.

Table No. (4) shows the results of the regression analysis. From these results, we can determine the significance of the independent variables based on the test (Sig t-Student, |P>| t). As the standard beta value, which can rank the strength of the influence of these variables (significance) on the dependent variable.

Table (4): Regression analysis result

Model	Coef.	Std. Err.	t	P>|t|
Constant	3.135485	0.0950288	33.00	0.000
LNSSFC	0.0333884	0.0069877	4.78	0.000
LSC	0.0190482	0.0034095	5.59	0.000
LFC	-0.0065437	0.0015278	- 4.28	0.000

Source: Prepared by the researcher. Stata outputs Version (15.0).

Now, let's check the significance of the parameters of the variables. We can point out that most of the variables are statistically significant at the level: P-Value <0.05.

The results of the multiple logarithmic regression model are shown:

The coefficient of "LSC" (0.0190482) differs significantly from (0) using the significance level of 0.05 because its value of (p) is equal to (0.0000), which is smaller than 0.05 (P> | t | = 0.000 <0.05). Which means that the variable of the state's contribution to health spending "LSC" positively affects the level of hope in life, and the strength of this effect is 1.9%. In other words, whenever the size of the state's contribution to health spending changes by one unit (Algerian dinars), the average hope for life will increase by (0.0190482) units (one year).

The "LNSSFC" coefficient (0.0333884) differs significantly from (0) using the significance level of 0.05 because its value of (p) is equal to (0.0000), which is smaller than 0.05 (P> | t | = 0.000 <0.05). this means that the variable contribution of the National Social Security Fund " LNSSFC " positively affects the rate of hope in life, and the strength of this effect is 3%. That is, whenever the size of the National Social Security Fund's contribution changes in one unit (Algerian dinars), the hope for life will increase by (0.0333884) units (a year).

As for the "LFC" parameter (-0.0065437), it differs significantly from (0) using the significance level of 0.05, because its value of (p) is equal to (0.0000), which is less than 0.05 (P> | t | = 0.000 <0.05). this means that the family contribution variable "LFC" negatively affects the rate of hope in life, and the strength of this effect is 0.6%. That is, whenever the size of the families 'contribution to one unit (Algerian dinar) changes, the average hope for life will decrease by (0.0065437) unit (one year).

d. Additional tests

Based on the results of the multiple logarithmic regression analysis, we will analyze the variables indicating the 5% confidence level (the state's contribution to health spending "LSC"; the contribution of the National Social Security Fund "LNSSFC",families contribution "FC"); On the dependent variable (the rate of hope in life) according to the model, indicating the direction of the effect (negative or positive) as shown in Table (5). We will also present in this part the experimental regression model that was presented in the following experimental equation:

$$\text{LHDHL (Hope developed in a healthy life)} = 3.135485 + 0.0190482\,\text{LSC} + 0.0333884\,\text{LNSSFC} - 0.0065437\,\text{LFC} + \varepsilon$$

Table (5): Study results summary

Hypothesis	Variable	P>|t|	Decision	Expected direction of the relationship	Direction of relationship according to the results	Test result of the hypothesis
H1	LSC	0.000	Significant	+	+	Supported
H2	LNSSFC	0.000	Significant	+	+	Supported
H3	LFC	0.000	Significant	+	-	Not supported

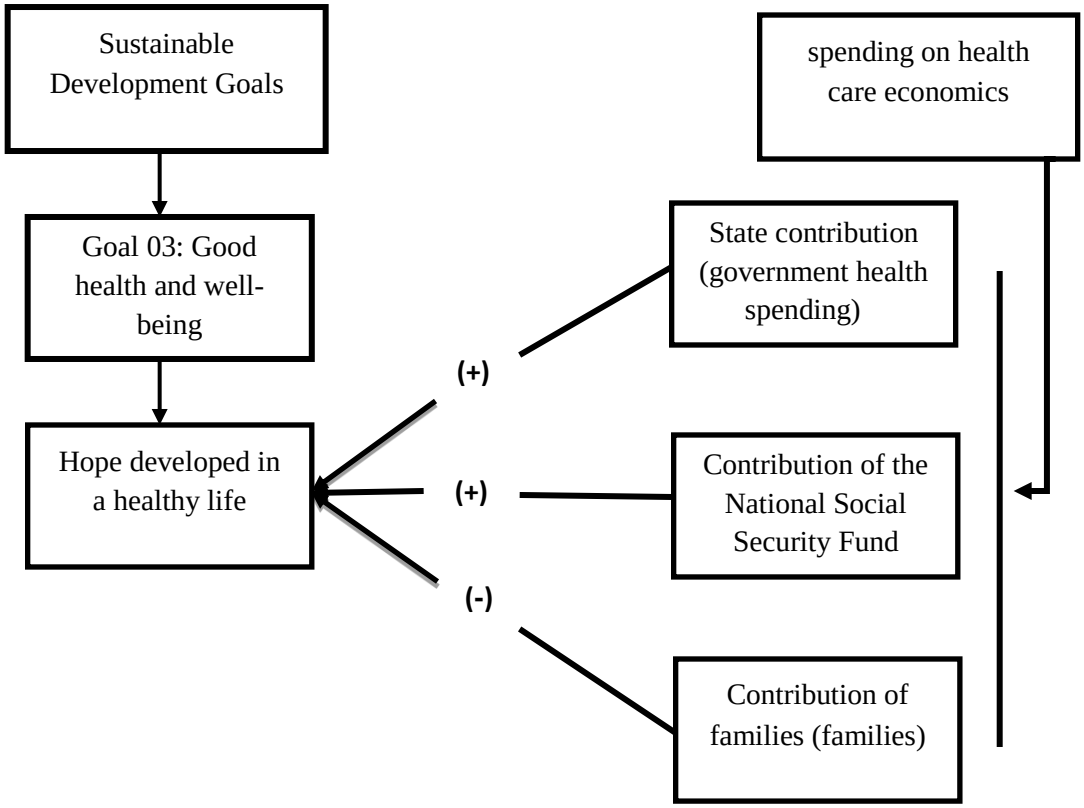
Source: Prepared by the researcher. Stata outputs Version (15.0).

6. Conclusion

6. 1. Discussion of the results

It can be said that Algeria attaches great importance to the health sector, as it is among the developed countries in the Arab world in the field of public spending on health, where the latter is estimated to be about 80 percent of total public spending, which is an important percentage that ranks Algeria in the fifth place in the Arab world, but this sector faces Several challenges, perhaps the most important of which is the need to raise the efficiency of spending on health, to improve the quality of government services, and to improve the conditions of workers in the health sector who represent the first line of defense in such circumstances as we live in today.

to address the problem of the study, which focused on the following question: "How effective is an investment in health care economics to achieve sustainable development goals in Algeria during the period 1990-2018?", And in the context of verifying the theoretical model of the study by testing hypotheses, it was found that the state's contribution to health spending "LSC", as well as the contribution of the National Social Security Fund to health spending "LCNSS" "LHDHL" has a positive impact on the level of hope in life "LHDHL" in Algeria during the period from 1990 to 2018. As for the families' contribution to health spending, "LCF" has a negative impact on the level of hope in life "LHDHL" in Algeria during the same period And we will present the reasons in detail during the discussion of the results, and Figure 3 next shows the experimental model reached in the study.



Source: Prepared by the researchers.

Figure (3): Empirical model of the study

In the context of testing the three hypotheses of the study, we found that the first hypothesis that indicates the positive impact of the state's contribution to health spending "LSC" on the rate of hope in life "LHDHL" in Algeria during the period from 1990 to 2018. The results of the study showed that there is a positive relationship Statistical significance between the state's contribution to health spending and the rate of hope in life and the strength of this effect (0.0190482). That is when it changes, that is, whenever the size of the state's contribution to health spending changes in one unit ((Algerian dinars), the average hope in life will increase by (0.0190482) units (a year). Accordingly, the first hypothesis is that "the state's contribution to health spending has a positive effect. On improving hope in life in Algeria, "is acceptable according to the results of the study. This is because the continuing high expenditures of families on health, due to the absence of universal health coverage, lead to high expenditures that lead to poverty, destitution, lack of social protection, and a decrease in the level of individual income, especially among the poor and middle groups, noting that the number of Algerians living below the poverty line has jumped to 15 million, i.e. About 38 percent of Algerians have deteriorated social status and are unable to acquire the necessities of life, with the continued high rate of maternal mortality and children under the age of five, which despite its decline in recent years, is still one of the largest in the world.

As for the second hypothesis, it refers to the positive effect of the contribution of the National Social Security Fund in the health spending "LNSSFC" on the rate of hope in life

"LHDHL" in Algeria during the period from 1990 to 2018. The results of the study showed that there is a positive statistically significant relationship between the contribution of The National Social Security Fund in health spending and the rate of hope in life and the strength of this effect (0.0333884). That is when it changes, that is, whenever the size of the National Social Security Fund's contribution to health spending changes in one unit ((Algerian dinars), the average hope for life will increase by (0.0333884) units (a year). Accordingly, the second assumption that the contribution of the National Insurance Fund Social health in health spending has a positive effect on improving hope in life in Algeria, "Acceptable according to the results of the study". This is because the more society develops and the number of individuals in Algeria increases, the greater their need for protection and insurance against danger, and thus the contribution of the National Social Security Fund to health spending increases to enable individuals and families to better protect their health, as participants in policies that enhance the protection of health and well-being.

As for the third hypothesis, which indicates that there is a positive effect of the families 'contribution to the LFC health spending on the LHDHL rate in Algeria during the period from 1990 to 2018. The results of the study showed that there is a negative statistically significant relationship between the families' contribution. And the rate of hope in life, and the strength of this effect (0.0065437-). That is when it changes, that is, whenever the size of the families 'contribution to health spending changes in one unit (Algerian dinars), the average hope in life will decrease by (0.0065437) unit (a year). Health spending has a positive effect on improving hope in life in Algeria, "rejected according to the results of the study. This is because the continuing high expenditures of families on health, due to the absence of universal health coverage, lead to high expenditures that lead to poverty, destitution, lack of social protection, and a decrease in the level of individual income, especially among the poor and middle groups, noting that the number of Algerians living below the poverty line has jumped to 15 million, i.e. About 38 percent of Algerians have deteriorated social status and are unable to acquire the necessities of life, with the continued high rate of maternal mortality and children under the age of five, which despite its decline in recent years, is still one of the largest in the world.

Finally, I will present in Table (6), the summary of the study results that checking all the five previous hypotheses.

Table (6): Summary of the results of checking the study hypotheses

N° hypothesis	Formulate the hypothesis	Test result
H1	The state's contribution to health spending has a positive effect on improving the hope of life in Algeria	Achieved
H2	The contribution of the National Social Security Fund to health spending has a positive effect on improving the hope of life in Algeria	Achieved
H3	The contribution of families (families) to health spending has a positive effect on improving the hope of life in Algeria	Not achieved

Source: Prepared by the researchers.

6. 2. Recommendations

Attention should be paid to the involvement of all relevant parties in the process of planning and building a health system and developing programs to improve the health level

of Algerians because this sector is the first provider of health care services to achieve high levels of growth.

Focusing more on increasing scientific research by research centers in the field of providing health care services and developing the health sector, due to its importance in the field of investment in human capital and because it affects the rates of economic development.

References :

- Abdullah, M., 2003. Riyadh(Department of Economics): King Saud University.
- Acharya, S., Lin, V. & Dhingraa, N., 2018. The role of health in achieving the sustainable development goals. ***Bull World Health Organ***, pp. 591-591A.
- Ali Dahmen, M., 2017. telemcen(Faculty of Economic Sciences, Management Sciences and Commercial Sciences): Abu Bakr Belkaid University.
- Anon., 2020. ***Sustainable Development Goals Report: Algeria is first in the Arab world and Africa and 53 in the world***. [En ligne] Available at: https://www.radioalgerie.dz/news/ar/article/20200426/192827.html Available at: https://arabdevelopmentportal.com/ar/node/253287
- Bararma , R. & Bohda, M., 2015. Mechanisms to activate the health sector for sustainable health. ***Policies to control health spending in Algeria***, 24 November.
- Benoit, . K., 2011. Linear regression models with logarithmic transformations. ***London School of Economics***, 22(01), pp. 23-36.
- Boyce, T. & Chris, . B., 2019. ***economic and sociaL impacts and benefits of heaLth systems***, Copenhagen: world health organization.
- Buse, K. & Hawkes, S., 2015. Health in the Sustainable Development Goals: ready for a paradigm shift?. ***Globalization and Health***, 11(13).
- Folland, S., Goodman, A. C. & Stano, M., 2013. ***The Economics of Health and Health Care***. seventh edition éd. New Jersey: Pearson Education.
- Gashaw, . A., 2008. s.l.:United States Agency for International Development.
- General Assembly, 2012. Global Health and Foreign Policy. 18 september.
- Genius, L. & Wiseman, V., 2015. ***Introduction to health economics***. First edition éd. s.l.:Arab Center for Authorship and Translation of Health Sciences.
- khalassi, a.-e., 2018. ***The relationship between health expenditures and sources of financing in Algeria, a standard analytical study*** *(1990-2018).* Tlemcen(College of Economics, Management and Business Sciences): Abu Bakr Belkaid University.
- mahmoudi, h. & ghedjati, i., 2020. The Reality of Social Protection in Algeria, Case Study the National Social Security Fund for Remunerated Employees, Agency of Sétif. ***Al-Bashaer Economic***, 16 04, 6(1), pp. 334-350.
- Mukhtar, M. A.-F., 2013. The economics of health care services in developing countries and their impact on development. ***AMARABAC***, 4(10), pp. 121-138.
- Noble, . E. & Haycox , A., 2009. ***What is health economics?***. 2 e éd. Liverpool(Health Economics and Management): Hayward Group Ltd.
- North Africa Health, 2020. ***North African healthcare market statistics in 2020***. Cairo: Informa Markets.
- Rashad, A., 2017. ***Direct personal spending on health and its impact on poverty in Arab countries***. [En ligne]
- Rubin, j. et al., 2016. ***Are better health outcomes related to social expenditure ?.*** Cambridge: the RAND Corporation.

- Rutten, F. et al., 2001. Handbook of Health Economics. ***Journal of Health Economics***, 6 june, Volume 1, pp. 855-879.
- Schirnding, Y. v. . & Mulholland, C., 2005. ***Health and Sustainable Development-Key Health Trends***, Geneva: World Health Organization.
- shukre, A. A. . A. A. & Al Aliawi, H. A. E., 2020. Spending on the health sector and its impact on sustainable development in Iraq Duration (2003-2018) challenges - and treatments. ***The Journal of Sustainable Studies***, 2(8).
- the Department of economic and Social Affairs, 2017. ***The Sustainable Development Goals Report 2017***, new york: United Nations.
- the Department of Economic and Social Affairs, 2020. ***The Sustainable Development Goals Report 2020***, New York: United Nations.
- The Pan American Health Organization , 2013. ***Health, Environment and Sustainable Development: Towards the Future We Want.*** Washington: world health organization.
- United Nations Development Programme, 2018. UNDP support to implement SDG 10. ***Reducing inequality within and between countries*.**
- United Nations, 2014. *TST issues brief: HEALTH AND SUSTAINABLE DEVELOPMENT*. the Department of Economic and Social Affairs : s.n.
- world bank, 2020. *Algeria.* [En ligne] Available at: https://data.albankaldawli.org/country/algeria?view=chart
- World Health Assembly, 2011. Strengthening health systems-Current trends and challenges. 7 April .
- World Health Assembly, 2019. Implementing the 2030 Agenda for Sustainable Development. 16 may.
- world health organization, 2015. Health in the 2030 Agenda for Sustainable Development. 11 December .
- World Health Organization, 2018. ***Primary health care***. [En ligne] Available at: https://www.who.int/ar/news-room/fact-sheets/detail/primary-health-care
- World Health Organization, 2019. Primary Health Care Implementation Review. ***Evaluation: update information and proposed action plan for the period 2020-2021***, 25 november.