Econometric Models for Explaining the Variation of Public Receipts and Expenditures for Healthcare in the Republic of Moldova

Modele econometrice pentru explicarea variației veniturilor și cheltuielilor publice pentru ocrotirea sănătății în Republica Moldova

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ABSTRACT

The development and validation of econometric models is a complex and energy-consuming process. The objective of this paper is to build econometric models on receipts and expenditures of the healthcare system of the Republic of Moldova, to assess the suitability and quality of the developed models, as well as the identified parameters, in order to use them for forecasts and management of economic policy. The results of the relevant research, following the development and validation of econometric models on receipts and expenditures of the healthcare system from the national public budget of the Republic of Moldova, allow the identification and characterization of the interdependencies that are established between the financial resources related to the used public healthcare system and various economic and social factors that will represent an additional lever for more effective management of phenomena and processes in the healthcare system. The econometric models proposed by the author are a tool that can be used for econometric analysis of receipts and expenditures of the public healthcare system of the Republic of Moldova within the framework of financial management in order to improve it.

Keywords: *econometric model; national public budget; receipts; expenditures; healthcare system; financial management.*

REZUMAT

Elaborarea și validarea modelelor econometrice reprezintă un proces complex și energofag. Sarcina prezentei lucrări este de a construi modele econometrice privind veniturile și cheltuielile sistemului de sănătate din Republica Moldova, de a evalua adecvarea și calitatea modelelor elaborate, precum și a parametrilor identificați, în scopul utilizării acestora pentru previziuni și managementul politicii

economice. Rezultatele cercetării respective, în urma elaborării și validării modelelor econometrice privind veniturile și cheltuielile sistemului de sănătate din bugetul public național al Republicii Moldova, permit identificarea și caracterizarea interdependențelor care se stabilesc între resursele financiare aferente sistemului public de sănătate utilizate și diverși factori de natură economică și socială, ceea ce ar constitui o pârghie în plus pentru o gestiune mai eficientă a fenomenelor și proceselor sistemului de sănătate. Modelele econometrice propuse de autor sunt un instrument de utilizare pentru analize econometrice ale veniturilor și cheltuielilor sistemului public de sănătate din Republica Moldova în cadrul managementului financiar cu scopul perfecționării acestuia.

Cuvinte-cheie: *model econometric; buget public național; venituri; cheltuieli; sistem de sănătate; management financiar.*

Introduction

The last two decades have been marked by the appearance of a fairly large number of studies, dedicated to the elaboration and the development of the healthcare system evaluation methods, capable of allowing the realization of the objective analysis of the interdependencies between the various variables and the identification of some reserves, the exploiting of which would allow the financial management development in the healthcare system.

In order to characterize the dependencies between various outcome variables (endogenous/explained) and factor variables (exogenous/explanatory), researchers resort to multiple econometric modeling methods, the most common of which are multivariate regression analysis methods, among which autoregressive models with the inclusion in the model of variables with delayed effects on the dependent variables can also be observed [1, 2, 3].

The most frequent modeling studies of the phenomena and processes of the healthcare system were dedicated to the identification and analysis of the factors with a significant impact on the health status of the population. Thus, the largest set of the explanatory variables from 18 countries of the world, for the period 1969-1971, was used by A. Cochrane [4], and the results of the study showed that only 7 independent variables, out of about 121 analysed variables, had the greatest impact on the population health indicators, including: the health expenditure, the availability of doctors, the gross national product, the consumption of tobacco products, the alcohol consumption, the population density, the consumption of sugar.

The pursued objective in this research sums up the interdependencies that are established between the receipts and expenditures recorded in the healthcare system, as outcome variables, and the variables that determine the budgetary aspects of the healthcare system.

I mention that the development of econometric models for a comparable assessment of healthcare systems as a territorial perspective, taking into account the regional heterogeneities (geographic, socio-demographic, economic, etc.) remains quite relevant, and can be developed in a subsequent work of the author.

Thus, in order to evaluate the reverse effects, expressed through the impact of the different social and economic factors on the financial management in the healthcare system, represented by its receipts and expenditures, in the given research a series of explanatory variables related to the following groups of specific indicators were identified in the Republic of Moldova: the public resources and texpenditures in the field of healthcare, the results of economic and social activity,

expressed through various expressions of GDP, the demographic indicators, the health status indicators, the economic activity and the occupational status of the population, the specific elements of the household budgets, the indicators of the income inequality.

In the given research, the author will mention, that the pursued objective summarizes in the characterization of the interdependencies that are established between the receipts and expenditures recorded in the healthcare system, as the result variables, and the variables that determine the budgetary aspects of the healthcare system.

Of course, in the design of the present study, other indicators with different levels of the impact on the health status and, respectively, on the receipts and expenditures of the healthcare system budget could be included, but the volume limits do not allow us to expand the series of the studied variables.

Applied methods and procedures

The research is current and of major national importance. The receipts and expenditures realized in the public healthcare system of the Republic of Moldova in the period 2010 - 2021 were studied by the author in the context of a quantitative analysis of the factors that affect the health of the population. The author applied the following research methods: mathematical-statistical for data processing, investigation and interpretation of research results; the econometric modeling of the receipts and expenditures of the healthcare system from the national public budget of the Republic of Moldova, in order to use them for forecasting the receipts and expenditures for health within the financial management, in order to ensure the financial sustainability of the healthcare system.

Results and discussions

The econometric modeling will include the development of three models, by correlating the variables of receipts and expenditures of the healthcare system from the national public budget with various exogenous and endogenous variables.

The specification and validation of the econometric models will start with the listing of the series of endogenous and exogenous variables contained in the quantitative analyses carried out separately by receipt and expenditure categories of the healthcare system in the period 2010 - 2021.

In the given context, the receipts and expenditures of the public healthcare system are determined by combinations of a number of medical, economic, socio-demographic, lifestyle, etc., factors. As following, the econometric approach will be presented through which the factorial models that are established between the budgetary indicators of the healthcare system and the variables with a significant influence on the analysed budgetary situations will be analysed.

Receipts of the healthcare system from the national public budget of the Republic of Moldova. In order to specify the model regarding the interdependence relationship between the receipts of the healthcare system from the national public budget of the Republic of Moldova (v_os) and the factors that ensure the receipt resources, a series of variables were selected, which refer to the fields of indicators that reflect the economic situation, demographics, the relationship of the population with the labor market, the state of health of the population, etc., presented in Table 1.

Table 1
Exogenous variables for the econometric model

Variable code	UM	Name of the variable
Healthcare receipts from the national public budget		
V_os	thousand lei	Healthcare system receipts from the national public budget
Macroeconomic indicators		
pib_pc	thousand lei	GDP, current prices
pib_pers	Lei	GDP per inhabitant, current prices
pci	%	Consumer price indices
The average number of the stable population on the main age groups by Years and Age Groups		
P_ma	thousand pers.	Annual average number of population
P16-56/61	%	The coefficient of the female/male population of working age
The Indicators of the health status of the population		
ex0	Years	Life expectancy at birth
The population aged 15 and over on the relation with the labor market		
Variable code UM	Name of the variable	Source
PA	thousand pers.	The active population from economic point of view
PO	thousand pers.	The busy population
Inequality indicators by Averages, Indicators and Years		
Gini_v		The GINI Coefficient on disposable income

Source: *developed by the author based on [5, 6, 7, 8, 9, 10, 11, 12]*

Following the specification process in the model, which is to be presented, through the manipulations/transformations performed on the variables, including the operations to ensure their stationarity, a limited number of variables were retained and included in the model, which present fairly acceptable descriptive statistics (Table 2).

Table 2
Descriptive statistics on variables of the M_1 model

Sample: 2010 - 2031

	LOG(V_OS(-1))	LOG(PIB_PC)	PA	D(PCI(-1))	D(E_EX(-1))
Mean	8.774803	18.90654	983.8979	-0.363000	0.236575
Median	8.776755	18.93526	1018.850	0.100000	0.214489
Maximum	9.209360	19.30477	1038.000	4.600000	1.624803
Minimum	8.357283	18.47403	867.3000	-3.520000	-1.000000
Std. Dev.	0.267323	0.263069	69.83102	2.518187	0.737554
Skewness	0.013694	-0.197922	-0.900294	0.416188	0.192383
Kurtosis	2.063343	1.975804	2.044451	2.626394	2.750158
Jarque-Bera	0.365865	0.502362	1.731330	0.346847	0.087694
Probability	0.832824	0.777882	0.420772	0.840782	0.957100
Sum	87.74803	189.0654	9838.979	-3.630000	2.365752
Sum Sq. Dev.	0.643156	0.622846	43887.34	57.07141	4.895872
Observations	10	10	10	10	10

Source: *developed by the author based on calculations made with the EViews application.*

Thus, exclusively all specified variables are normally distributed, which will hopefully ensure an acceptable quality of the specified model.

The matrix of the partial correlation coefficients, designed to characterize the intensity of the connection betwen the studied variables, highlights a close connection between the receipts of the national public budget of healthcare in the Republic of Moldova, expressed by the logarithm of the values shifted by one level, and the gross domestic product expressed in the current prices [LOG(GDP_PC)], associated with the economically active population [PA], over time the correlation indicators for life expectancy as well as for the consumer price index show a weaker intensity of the link according to the data in Table 3.

Table 3

Matrix of simple linear correlation coefficients regarding the variables of the M_1 model

Covariance Analysis: Ordinary
Sample: 2012 - 2021
Included observations: 10
Balanced sample (listwise missing value deletion)

Correlation Probability	LOG(V_OS(-1))	LOG(PIB_PC)	PA	D(PCI(-1))	D(E_EX(-1))
LOG(V_OS(-1))	1.000000				

LOG(PIB_PC)	0.985761	1.000000			
	0.0000	-----			
PA	-0.833057	-0.782154	1.000000		
	0.0028	0.0075	-----		
D(PCI(-1))	0.429770	-0.074836	0.129523	1.000000	
	0.0949	0.8372	0.7214	-----	
D(E_EX(-1))	0.607684	-0.587784	0.452048	0.082576	1.000000
	0.0624	0.0739	0.1896	0.8206	-----

Source: *developed by the author based on calculations made with the EViews application.*

In the future, the model estimation process will be exclusively based on the least squares method (MCMMP). As a result of specifying the model of the dependence of the receipts of the healthcare system from the national public budget of the Republic of Moldova of the variables presented in Table 7, within a process of transforming and sorting the factorial variables, a relevant model was reached, with four significant factorial variables (Table 4). Thus, the most important positive influence on the logarithmic values and offset by a level of the income of the healthcare system have the logarithms of the gross domestic product values expressed in current prices, and the coefficient related to this variable also having the greatest significance.

Table 4
Results of estimation of model M_1

Dependent Variable: LOG(V_OS(-1))
Method: Least Squares
Sample (adjusted): 2012 - 2021
Included observations: 10 after adjustments

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
LOG(PIB_PC)	0.834335	0.045024	18.53077	0.0000
PA	-0.000699	0.000155	-4.522573	0.0063
D(PCI(-1))	0.012653	0.002681	4.718992	0.0052
D(E_ex(-1))	0.018979	0.011212	-1.692797	0.1053
C	-6.302613	0.967172	-6.516539	0.0013

R-squared	0.996877	Mean dependent var		8.774803
Adjusted R-squared	0.994379	S.D. dependent var		0.267323
S.E. of regression	0.020042	Akaike info criterion		-4.675077
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
Sum squared resid	0.002008	Schwarz criterion		-4.523785
Log likelihood	28.37539	Hannan-Quinn criter.		-4.841045
F-statistic	399.0224	Durbin-Watson stat		2.253181
Prob(F-statistic)	0.000002			

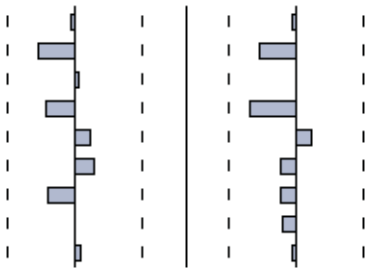
Source: *developed by the author based on calculations made with the EViews application.*

Positive influences on the outcome variable are also exerted by the consumer price index (inflation – PCI) and life expectancy at birth (E_ex, with a probability of achievement within 90%). An adverse situation is the variable that expresses the effective population economically active, the current decrease of which explains a ret-rospective increase of the income related to the healthcare system.

As can be seen from the model validation results, the variation of the variables included in the model determines about 99.7% of the variation of the resulting variable (R2=0.997), and the adjusted value of R2adj denotes an optimal number of factorial variables included in the specified model. Another creditworthiness criterion, which expresses the general reliability of the model, is the Fisher statistic (F-statistic=399.02) with more than sufficient significance. The Durbin-Watson test (DW stat=2.25) denotes a fairly modest positive autocorrelation of the residuals, while the squared chart of the correlation statistics of the residuals shows no deficiencies (Table 5).

Table 5
Chart of squared residuals of model M_1

Sample: 2010 - 2031
Included observations: 10

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	-0.048	-0.048	0.0303	0.862
		2	-0.342	-0.345	1.7823	0.410
		3	0.032	-0.007	1.8000	0.615
		4	-0.270	-0.439	3.2563	0.516
		5	0.143	0.151	3.7475	0.586
		6	0.173	-0.144	4.6439	0.590
		7	-0.252	-0.153	7.1868	0.410
		8	0.005	-0.136	7.1884	0.516
		9	0.058	-0.049	7.5945	0.575

Source: *developed by the author based on calculations made with the EViews application.*

The relationships identified in the specification process are presented as follows:

Estimation Equation:

==========

$$LOG(V\_OS(-1)) = C(1)*LOG(PIB\_PC) + C(2)*PA + C(3)*D(PCI(-1)) + C(4)*D(E\_EX(-1)) + C(5) \quad (1.)$$

Substituted Coefficients:

==========

$$LOG(V\_OS(-1)) = 0.834335115513*LOG(PIB\_PC) - 0.000699144301522*PA + 0.0126533277651*D(PCI(-1)) - 0.0189790520343*D(E\_EX(-1)) - 6.3026134345$$

At the same time, the confidence intervals for the coefficients of the model show sufficiently small ranges of variation both under the conditions of significance of 0.1 and 0.01 according to the data in Table 6.

Table 6
Confidence intervals of the coefficients of the M_1 model

Coefficient Confidence Intervals
Sample: 2010 - 2031
Included observations: 10

		90% CI		95% CI		99% CI	
Variable	Coefficient	Low	High	Low	High	Low	High
LOG(PIB_PC)	0.834335	0.743609	0.925061	0.718596	0.950074	0.652791	1.015880
PA	-0.000699	-0.001011	-0.000388	-0.001097	-0.000302	-0.001322	-7.58E-05
D(PCI(-1))	0.012653	0.007250	0.018056	0.005761	0.019546	0.001842	0.023465
D(E_EX(-1))	0.018979	-0.041571	0.003613	-0.047800	0.009841	-0.064186	0.026228
C	-6.302613	-8.251512	-4.353715	-8.788808	-3.816419	-10.20239	-2.402838

Source: *developed by the author based on calculations made with the EViews application.*

The graphical representation of the actual, adjusted values and the errors obtained from the specification of the M1 model demonstrates an acceptable quality of the model development and validation process, which includes residuals placed within reasonable confidence limits and a lack of error autocorrelation (Figure 1).

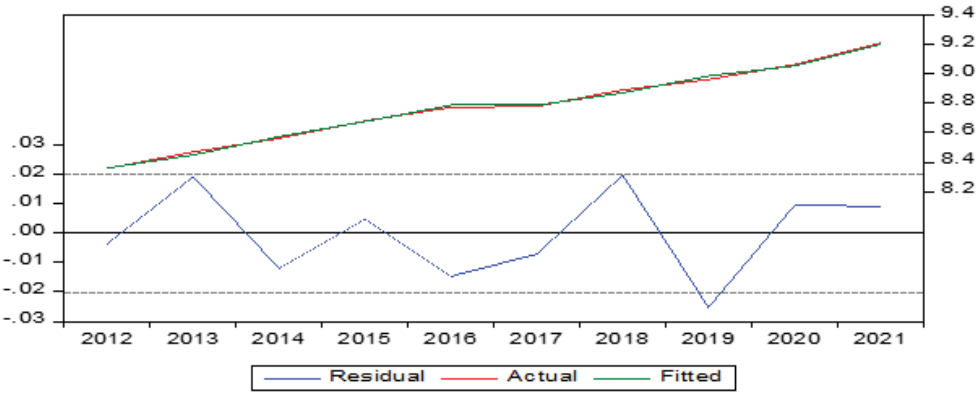


Figure 1. ***Empirical values, those estimated based on the M_1 model of incomes of the healthcare system and the waste landfill***

Source: *developed by the author based on calculations made with the EViews application.*

In addition, the model errors are homoscedastic, a situation demonstrated by the Breusch-Pagan-Godfrey heteroscedasticity test, the test results being presented in Table 7. Thus, in the result of the heteroscedasticity test, the lack of interdependence between the square of the residuals and the factorial variables can be noticed, which motivates the rejection of the heteroscedasticity test.

Table 7

Heteroscedasticity test of model M_1 errors

Heteroskedasticity Test: Breusch-Pagan-Godfrey				
F-statistic	0.345967	Prob. F(4,5)		0.8371
Obs*R-squared	2.167758	Prob. Chi-Square(4)		0.7049
Scaled explained SS	0.250199	Prob. Chi-Square(4)		0.9928
Test Equation:				
Dependent Variable: RESID^2				
Method: Least Squares				
Sample: 2012 2021				
Included observations: 10				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.008400	0.011656	-0.720653	0.5034
LOG(PIB_PC)	0.000401	0.000543	0.739031	0.4931
PA	1.02E-06	1.86E-06	0.547543	0.6075
D(PCI(-1))	-2.96E-05	3.23E-05	-0.915678	0.4018
D(E_EX(-1))	1.96E-05	0.000135	0.144997	0.8904
R-squared	0.216776	Mean dependent var		0.000201
Adjusted R-squared	-0.409804	S.D. dependent var		0.000203
S.E. of regression	0.000242	Akaike info criterion		-13.51212
Sum squared resid	2.92E-07	Schwarz criterion		-13.36083
Log likelihood	72.56059	Hannan-Quinn criter.		-13.67809
F-statistic	0.345967	Durbin-Watson stat		3.345988
Prob(F-statistic)	0.837110			

Source: *developed by the author based on calculations made with the EViews application.*

In the final phase of the M_1 model validation process, the partial correlations of the dependence between the adjusted income values and the selected and validated factorial variables will be presented. The chart of the correlation statistics show quite suggestively, through the clouds of points concentrated around the regression line, the interdependence between the receipts of the healthcare system from the national public budget of the Republic of Moldova and the respective factor variables (Figure 2).

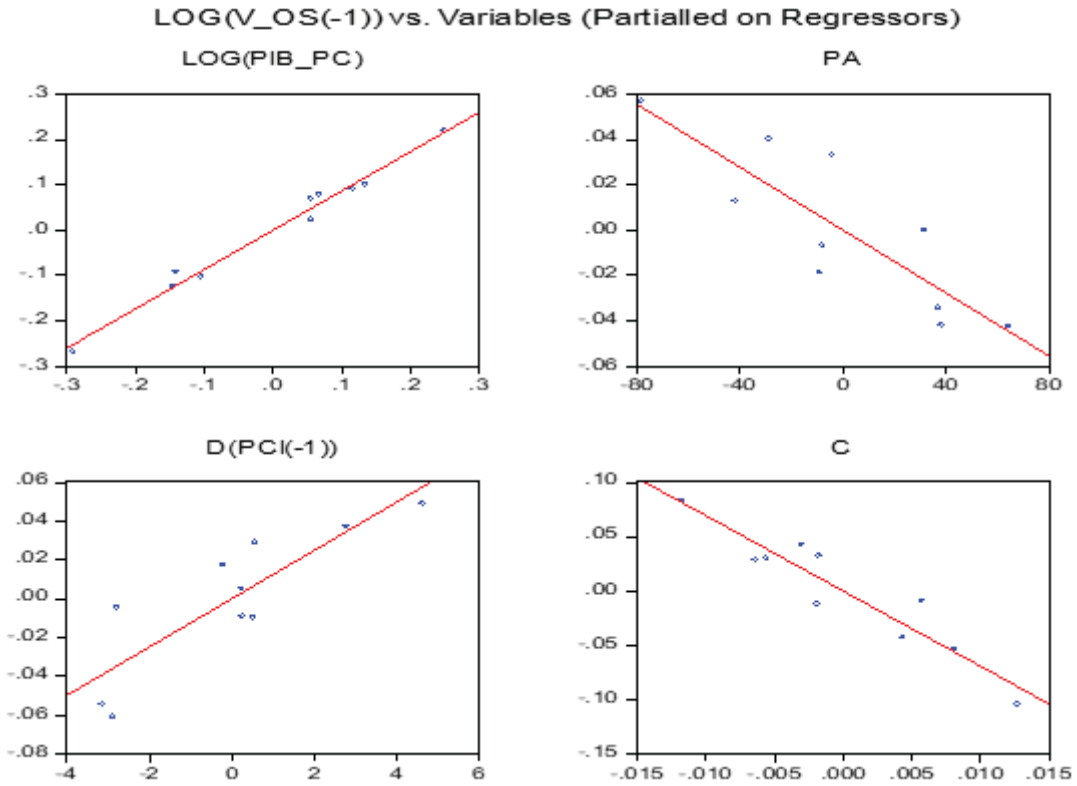


Figure 2. ***Charts of partial regression specific to the M_1 model***

Source: *developed by the author based on calculations made with the EViews application.*

Taking into account the fact that in the specification phase a series of variables were eliminated which, according to the statements made in the theoretical phase of arguing the interdependencies, in order to provide additional arguments for a possible forecast stage, it will be insisted on the development of a dependence model between the receipts of the healthcare system from the national public budget and three significant factorial variables, which, in our opinion, contribute strongly (in terms of resources) to the formation of the resulting variable. The results of specifying the M_2 model seem to be much more pragmatic, and lend themselves to more genuine economic interpretations (Table 8).

Table 8
Results of the estimation of the M_2 model

Dependent Variable: LOG(VAS)
Method: Least Squares
Sample (adjusted): 2011 2021
Included observations: 11 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(PIB_PERS)	1.437903	0.219883	6.539411	0.0003
LOG(P_MA)	2.197350	0.706751	3.109087	0.0171
C	-26.30010	7.961829	-3.303274	0.0131
D(GINI_V)	6.605272	3.242273	2.037235	0.0810

R-squared	0.963313	Mean dependent var	6.889802
Adjusted R-squared	0.947589	S.D. dependent var	0.355468
S.E. of regression	0.081378	Akaike info criterion	-1.904124
Sum squared resid	0.046357	Schwarz criterion	-1.759435
Log likelihood	14.47268	Hannan-Quinn criter.	-1.995330
F-statistic	61.26713	Durbin-Watson stat	1.731602
Prob(F-statistic)	0.000022		

Source: *developed by the author based on calculations made with the EViews application.*

Thus, all the coefficients of the M_2 model can be accepted to be significant within the limits of an approximate probability of 99%, with the exception of the differences of the first order of the GINI coefficient (p=91.9%), which expresses the inequality of the health-care system's income from the Republic of Moldova. The M_2 model is also characterized by a general level of significance, given by a consistent determination ratio (R2=0.96), a significant Fisher statistic, and an acceptable error autocorrelation test.

Table 9
Heteroscedasticity test of model M_2 errors

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.443120	Prob. F(3,7)	0.7296
Obs*R-squared	1.755592	Prob. Chi-Square(3)	0.6246
Scaled explained SS	0.708963	Prob. Chi-Square(3)	0.8711

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Sample: 2011 - 2021
Included observations: 11

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.142489	0.669157	0.212937	0.8374
LOG(PIB_PERS)	-0.005166	0.018480	-0.279533	0.7879
LOG(P_MA)	-0.010309	0.059399	-0.173562	0.8671
D(GINI_V)	0.310263	0.272499	1.138583	0.2923

R-squared	0.159599	Mean dependent var	0.004214
Adjusted R-squared	-0.200573	S.D. dependent var	0.006242
S.E. of regression	0.006840	Akaike info criterion	-6.856915
Sum squared resid	0.000327	Schwarz criterion	-6.712226
Log likelihood	41.71303	Hannan-Quinn criter.	-6.948121
F-statistic	0.443120	Durbin-Watson stat	2.899939
Prob(F-statistic)	0.729607		

Source: *developed by the author based on calculations made with the EViews application.*

Likewise, the model has homoscedastic residuals, a fact demonstrated by the Breusch-Pagan-Godfrey heteroscedasticity test, which shows an insignificant relationship between the residuals and the factorial variables (Table 9).

Under these conditions, the relationships by which the M_2 model was estimated are presented as follows:

Estimation Equation:

$$LOG(VAS) = C(1)*LOG(PIB\_PERS) + C(2)*LOG(P\_MA) + C(3) + C(4)*D(GINI\_V) \quad (2.)$$

Substituted Coefficients:

$$LOG(VAS) = 1.43790321131*LOG(PIB\_PERS) + 2.19734997127*LOG(P\_MA) - 26.3001002568 + 6.60527249226*D(GINI\_V)$$

Therefore, a 1% increase in the value of the gross domestic product causes an increase of approx. 1.43% in the receipts of the healthcare system budget in the Republic of Moldova, while the change by one per soup of the average annual population in the republic ensures a change in the same meaning with approx. 2.2%. The model also reports that the difference in the increase in inequality (the Gini coefficient) in the incomes of the population causes an increase in the incomes of the healthcare system by about 0.66%.

Healthcare expenditures from the national public budget of the Republic of Moldova are identical in terms of values to income from the point of view of the factors that ensure consumption. Among them, the variables related to the costs incurred in the healthcare system of the Republic of Moldova according to Table 10 will be specified in the first place.

Table 10

Variables regarding the number of doctors and beds in the healthcare system

Variable code	UM	Name of the variable
Med_tot	People	Total doctors in the country
Med_MS	People	Doctors Ministry of Health - total
Med_10m	People	Doctors per 10,000 inhabitants
Pat_tot	Unities	Number of beds, total
Pat_MS	Unities	Ministry of Health - total
Pat_10m	Unities	Per 10,000 inhabitants

Source: *developed by the author based on [13, 14, 15, 16, 17]*

In the model specification phase regarding the dependence between the national public healthcare budget of the Republic of Moldova and the assumed factorial variables, only the relative indicators regarding the number of doctors and beds were retained in the model, the others being eliminated as heterogeneous to the estimated model. Thus, as a result of the specification and validation procedures, the M_3 model is characterized by the elements presented in Table 11.

We want to mention that the M_3 model presents reliable characteristics from the point of view of the criteria adopted in the previous phases of model specification and validation, namely: the estimators of the model parameters have a high significance of at least 99%; the determination ratio is sufficiently high (R2=0.86) explaining about 86% of the variation of the resulting variable; the Fisher statistics, determined as the ratio of the variation explained by the regression to the residual variation is significant; the Durbin-Watson statistics approaches a level associated with no autocorrelation of errors.

Table 11
Results of estimation of model M_3

Dependent Variable: LOG(CH_OS)
Method: Least Squares
Sample (adjusted): 2011 - 2021
Included observations: 11 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MED_10M)	-0.246019	0.074507	-3.301967	0.0108
LOG(PAT_10M)	-4.732451	1.019841	-4.640380	0.0017
C	28.99691	4.312463	6.723979	0.0001

R-squared	0.855391	Mean dependent var	8.841868
Adjusted R-squared	0.819238	S.D. dependent var	0.337327
S.E. of regression	0.143418	Akaike info criterion	-0.819105
Sum squared resid	0.164550	Schwarz criterion	-0.710588
Log likelihood	7.505079	Hannan-Quinn criter.	-0.887510
F-statistic	23.66075	Durbin-Watson stat	1.768559
Prob(F-statistic)	0.000437		

Source: developed by the author based on calculations made with the EViews application.

The relation by which the M_3 model was estimated has the form of relation 3:

Estimation Equation:
==========
LOG(CH_OS) = C(1)*D(MED_10M) + C(2)*LOG(PAT_10M) + C(3) (3.)

Substituted Coefficients:
==========
LOG(CH_OS) = -0.246019059151*D(MED_10M) - 4.73245067544*LOG(PAT_10M) + 28.9969121169

In the conditions of the rejection of the heteroscedasticity test - Breusch-Pagan-Godfrey (Table 17), the model can be considered validated, and the results of the model can be used for the management of the factors that configure healthcare expenditures from the national public budget. Therefore, the increase in the difference in the relative number of doctors by one unit will

cause the reduction of medical costs by about 0.24%, while the increase in the relative value of the number of beds per 10 thousand inhabitants by 1% will cause a reduction in the costs of medical services by about 4.7%.

Through the results of the validation of the econometric models M_1 - M_3, multiple hypotheses exposed at the substantiation stage of the quantitative approach to the interdependencies that are established between various variables with an impact on financial management in the healthcare system are confirmed.

Conclusions

As a result of the elaboration and validation of the econometric models on receipts and expenditures of the healthcare system from the national public budget of the Republic of Moldova, the author concluded the following:

1. Most of the explanatory variables, included in the specified and validated models, have different levels of impact on the budget of the healthcare system, expressed in terms of receipts and expenditures, related to healthcare from the national public budget. Dimensioning the intensity of influence of each factor, taken in the validated models, makes it possible to identify the reserves in the shadow of some unexplored variables, the exploiting of which would lead to an increase in the efficiency of financial management in the public healthcare system, by adopting financial decisions justified by the quantitative relationships that establish between the cause variables and those that reflect the effect;

2. From the analysis of the influence of endogenous and exogenous variables on the receipts and expenditures of the national public healthcare budget based on econometric modeling, the following results:

- for a 1% increase in the value of the gross domestic product causes an increase of approx. 1.43% in the receipts of the healthcare system budget of the Republic of Moldova, while a one percent change in the average annual population in the republic ensures a change in the same direction by about 2.2%. The model also reports that the difference in the increase in inequality (the Gini coefficient) in the incomes of the population causes an increase in the receipts of the healthcare system by about 0.66%;

- increasing the difference in the relative number of doctors by one unit will cause the reduction of medical costs by approx. 0.24%, while the increase in the relative value of the number of beds per 10 thousand inhabitants by 1% will cause a reduction in the costs of medical services by approx. 4.7%.3.

3. The judicious management of economic and social phenomena and processes at the national level, among others, the aspects related to the receipts and expenditures of the financial management of the healthcare system can be kept under control.

4. The econometric models regarding the receipts and expenditures of the healthcare system from the national public budget of the Republic of Moldova, developed by the author in this research, are a tool for their use for the econometric analysis of the receipts and the public expenditures of the healthcare system in the framework of financial management with the aim of improving this one.

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