THE PROGNOSIS OF TOTAL PUBLIC EXPENDITURES AND TYPES OF EXPENDITURES IN ROMANIA

ANA-PETRINA STANCIU, PETRE BREZEANU *

ABSTRACT: *The purpose of the paper is to provide a prognosis of total public expenditure and types of expenditures, starting from the evolution in time of total public expenditure and spending on public services, defense, public order and safety, economic affairs, environmental protection, housing and community amenities, health, recreation, culture and religion, education and social protection.*

KEY WORDS: *public expenditure; time; evolution; prognosis.*

JEL CLASSIFICATION: *E60; H50.*

For the analysis to be made, we considered as input time and as output variable each category of public expenditure individually.

To analyze the time evolution of different categories of public expenditure in Romania we took into considered a period of 16 years, between 1995 and 2010.

For forecasting, we used the following data (Table 1), expressed in million EUR, obtained from Eurostat. Since data provided by Eurostat at the time are available only up to 2010, the analysis of the evolution of public expenditure stops at the level of this year, and for the years 2011 and 2012 we are making a prognosis to predict public spending. To ensure international comparability, we used the euro as monetary unit.

Table 1. The volume of total public expenditure and types of expenditures in Romania, 1995-2010

- mil. Euro-

Years	Total public expenditure	Public services	National defense	Public order and national security	Economic affairs
1995	9807.3	1047.4	686.8	385.5	2354.0
1996	9629.8	1095.3	686.6	459.9	1973.1

* *Ph.D. Student, Academy of Economic Studies, Bucharest, Romania, stanciu.anapetrina@yahoo.com*

Prof., Ph.D., Academy of Economic Studies, Bucharest, Romania, brezeanupetre@yahoo.com

1997	10894.7	2132.1	792.8	229.1	1771.0
1998	13277.8	2720.2	294.9	200.3	2044.0
1999	13237.8	3482.8	622.5	551.6	1523.7
2000	15674.1	3212.2	878.0	913.8	2274.6
2001	16424.7	2926.9	858.7	718.7	2218.5
2002	17020.0	2604.7	1080.8	967.6	2133.2
2003	17588.7	2181.9	1331.7	973.8	2579.4
2004	20489.7	2384.7	1340.9	1118.2	3431.2
2005	26808.0	2611.8	2375.5	1682.9	4208.2
2006	34743.9	3211.3	2253.6	2340.8	6760.3
2007	47690.7	5406.7	2237.3	3054.9	10400.4
2008	54906.0	6533.5	2074.3	3139.1	10955.4
2009	48585.6	4959.9	1770.6	2554.4	9087.1
2010	49875.0	5522.1	1828.4	3008.2	8466.8

Table 2. The volume of total public expenditure and types of expenditures in Romania, 1995-2010

-mil. Euro-

Years	Environmental protection	Constructions and arrangements	Health	Recreation, culture and religion	Education	Social protection
1995	51.5	427.9	684.9	179.2	960.6	3029.5
1996	37.5	441.1	671.1	223.9	1053.7	2987.6
1997	78.6	452.2	616.3	346.7	997.6	3478.3
1998	12.0	502.1	975.5	525.6	1502.3	4500.9
1999	10.2	454.1	1274.4	190.7	1059.7	4068.0
2000	90.6	585.2	1699.7	297.3	1293.4	4429.3
2001	120.8	654.8	1855.3	264.1	1752.5	5054.2
2002	115.0	940.4	2002.9	306.6	1950.1	4918.7
2003	104.1	1078.3	1815.6	376.4	1864.4	5283.3
2004	75.1	1264.2	1553.8	415.8	2208.1	6697.8
2005	254.5	1288.5	2147.8	532.1	2869.5	8837.4
2006	344.1	1435.4	2633.4	988.3	4027.1	10749.6
2007	520.8	1938.0	3864.8	1354.6	4914.8	13998.4
2008	678.1	1833.4	4506.3	1583.7	6252.9	17349.3
2009	679.4	1638.7	4530.2	1275.6	4830.9	17258.7
2010	910.2	1624.1	4498.7	1313.7	4160.3	18542.6

Source: http:epp.eurostat.eu.europa.eu

Next, we are making predictions of components involved in the calculation of public expenditure in relation to time.

From the evolution in time of total public expenditure (Figure 1), we notice that it is approximated by a third degree polynomial of the following form:

$$p(x) = p_0 + p_1 \cdot x + p_2 \cdot x^2 + p_3 \cdot x^3 \qquad (1)$$

Polynomial interpolation parameter values above are:

$p_0 = 104347653508.07$; $p_1 = -155861584.35$; $p_2 = 77599.7595$;
$p_3 = -12.877938763$

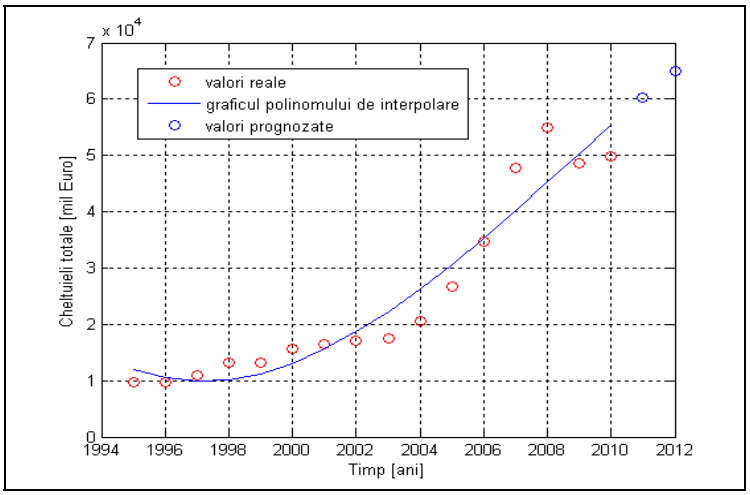

Figure 1. The evolution of total public expenditure in Romania, 1995-2010

Values forecasted for total public expenditure for 2011 and 2012 are given in Table 3.

Table 3. Forecast of total public expenditure for 2011 and 2012

Time [years]	Total expenditure [mil Euro]
2011	60188
2012	64903

Source: Own processing

If we follow the graph given in Figure 1, the increase of total public spending in 2011 and 2012 is obvious.

The evolution in time during the period under consideration of spending on public services is given in Figure 2.

This is well approximated by a polynomial of degree three:

$$p(x) = p_0 + p_1 \cdot x + p_2 \cdot x^2 + p_3 \cdot x^3 \qquad (2)$$

Polynomial interpolation parameter values above are:
$p_0 = -37276233826.59$; $p_1 = 55871678.3$; $p_2 = -27914.556472$;
$p_3 = 4.6488882323$

Values forecasted for expenditure on public services for 2011 and 2012 are given in Table 4. We can observe a similar growing trend for spending on public services, such as in case of total public expenditure.

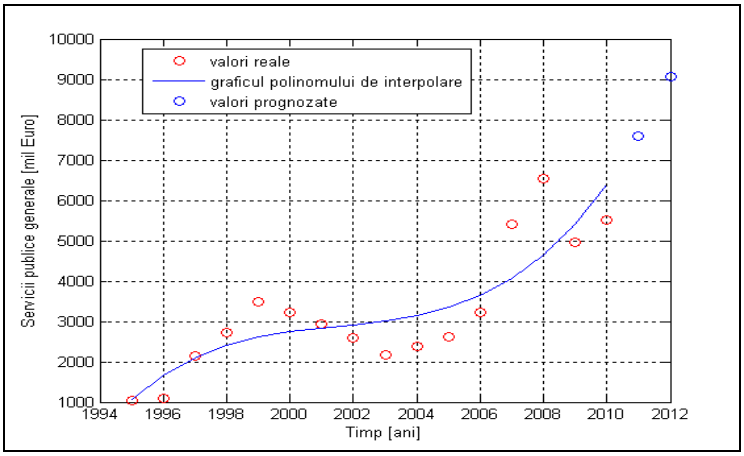

Figure 2. The evolution of spending on public services in Romania, 1995-2010

Table 4. Forecast of expenditure on public services for 2011 and 2012

Time [years]	Public services [mil Euro]
2011	7586.7
2012	9055.3

Source: Own processing

The evolution in time during the period under consideration of spending on national defense is shown in Figure 3, and they can be approximated by a polynomial interpolation of degree five:

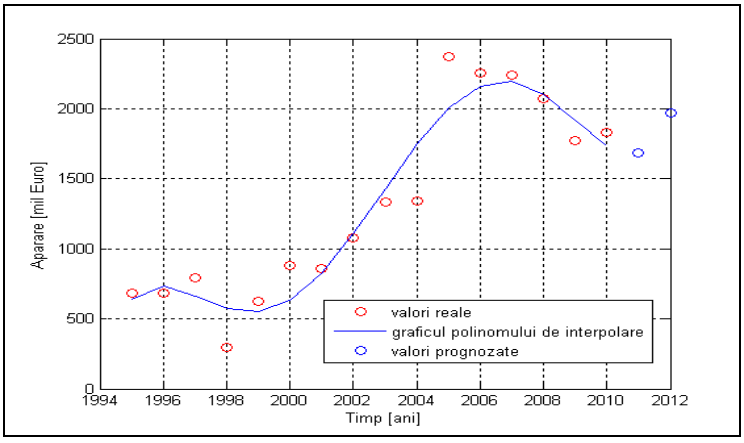

Figure 3. The evolution of spending on national defense in Romania, 1995-2010

$$p(x) = p_0 + p_1 \cdot x + p_2 \cdot x^2 + p_3 \cdot x^3 p_4 \cdot x^4 + + p_5 \cdot x^5 \qquad (3)$$

Polynomial interpolation parameter values above are:

$p_0 = -2445555949363593$; $p_1 = 6104703676093.988$;

$p_2 = -6095513282.404293$ $p_3 = 3043159.374245$; $p_4 = -27914.556472$;

$p_5 = 0.0758489685661$

Values forecasted for expenditure on national defense for 2011 and 2012 are given in Table 5.

Table 5. Forecast of expenditure on national defense for 2011 and 2012

Time [years]	National defense [mil Euro]
2011	1686.5
2012	1971.5

Source: Own processing

If we look at the forecast of expenditure on national defense , we see in Figure 3, that while in 2011, an year when Romania was still affected by the crisis, there were significant decreasing in spending for national defense, for the next year it registered an increase.

Regarding spending on public order and safety in Romania, the evolution in time is given in Figure 4. The interpolation polynomial that approximates these values is degree three:

$$p(x) = p_0 + p_1 \cdot x + p_2 \cdot x^2 + p_3 \cdot x^3 \qquad (4)$$

Polynomial interpolation parameter values above are:

$p_0 = 16213454844.39$; $p_1 = -24266379.0836$; $p_2 = 12106.1945991$;

$p_3 = -2.01318431764$.

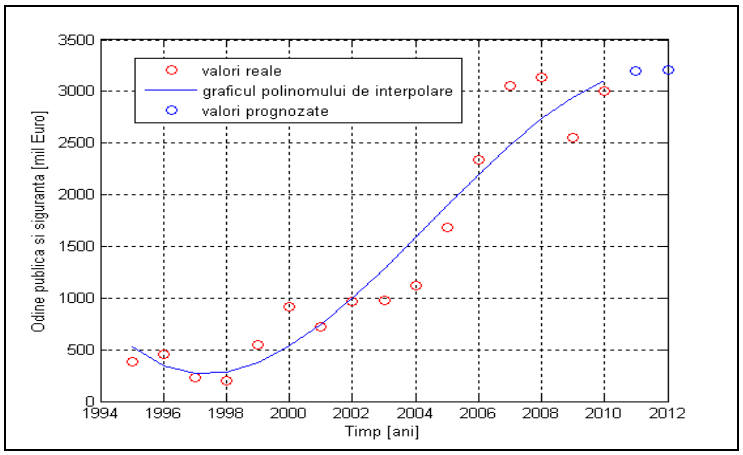

Figure 4. The evolution of spending on public order and national security in Romania, 1995-2010

Values forecasted for expenditure on public order and national security for 2011 and 2012 are given in Table 6.

Table 6. Forecast of expenditure on public order and national security 2011 and 2012

Time [years]	Public order and national security [mil Euro]
2011	3193.0
2012	3204.3

Source: Own processing

It can be seen that for the two years for which the forecast was made, expenditure on public order and national security registered a slight increase from previous years.

The evolution of spending on economic affairs for the period under consideration is given in Figure 5. The interpolation polynomial that approximates these values is degree three:

$$p(x) = p_0 + p_1 \cdot x + p_2 \cdot x^2 + p_3 \cdot x^3 \qquad (5)$$

Polynomial interpolation parameter values above are:

$p_3 = -8.102572158966$; $p_2 = 48734.84694$; $p_1 = -97708054.551$;

$p_0 = 16213454844.394$

Values forecasted for expenditure on economic affairs for the two years taken into consideration are given in Table 7.

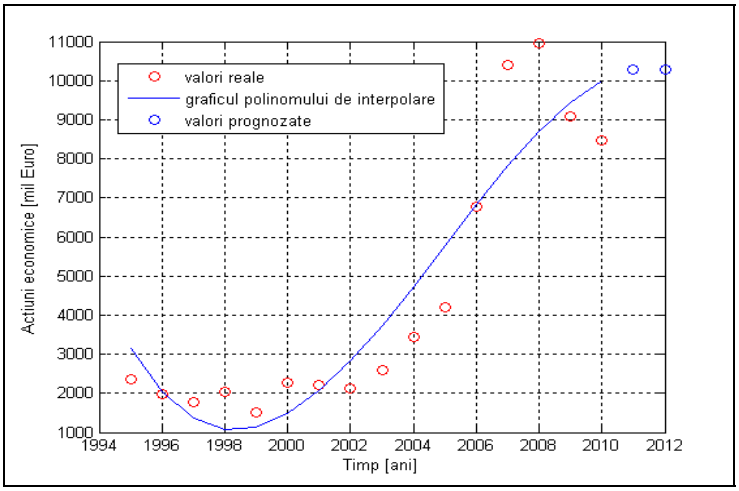

Figure 5. The evolution of spending on economic affairs expenditure in Romania, 1995-2010

Table 7. Forecast of expenditure on economic affairs for 2011 and 2012

Time [years]	Economic affairs [mil Euro]
2011	10282
2012	10279

Source: Own processing

Another category is spending on environmental protection. As shown in Figure 6, it appears that this sector was not affected by the economic crisis, and therefore, the values for expenditure on environmental protection are increasing for 2011 and 2012.

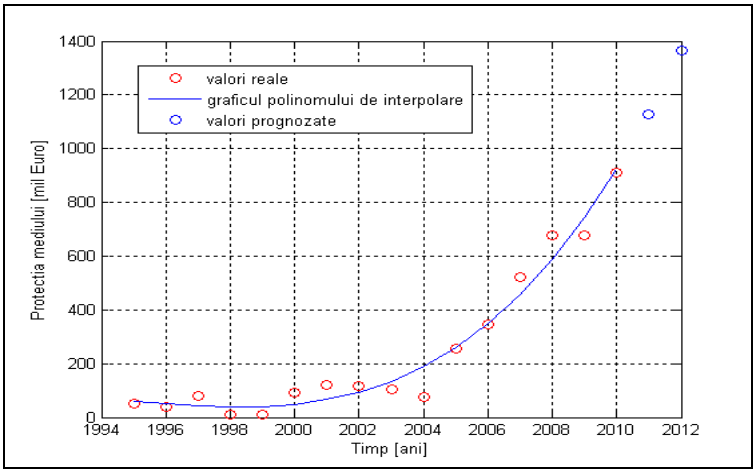

Figure 6. The evolution of spending on environmental protection in Romania, 1995-2010

Interpolation polynomial which approximates the time evolution of spending on environmental protection is:

$$p(x) = p_0 + p_1 \cdot x + p_2 \cdot x^2 + p_3 \cdot x^3 \qquad (6)$$

Polynomial interpolation parameter values above are:

$p_0 = 16213454844.394$; $p_1 = 3652798.9142$; $p_2 = -1830.80491$;

$p_3 = 0.30586944768$

Table 8. Forecast of expenditure on environmental protection for 2011 and 2012

Time [years]	Environmental protection [mil Euro]
2011	1128.7
2012	1364.2

Source: Own processing

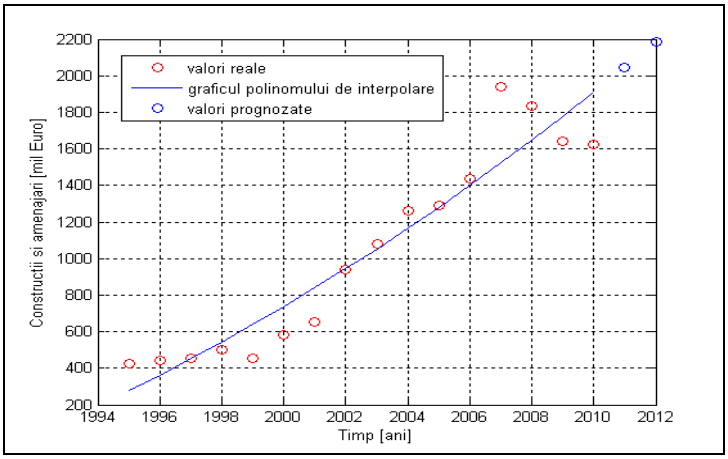

Figure 7. The evolution of spending on constructions and arrangements in Romania, 1995-2010

Figure 7 presents the evolution in time of spending on constructions and arrangements. The interpolation polynomial that approximates these values is degree two:

$$p(x) = p_0 + p_1 \cdot x + p_2 \cdot x^2 \qquad (7)$$

Polynomial interpolation parameter values above are:

$p_0 = 6565750.38764$; $p_1 = -6665.34955$; $p_2 = 1.69142156872$

Table 9. Forecast of expenditure on constructions and arrangements for 2011-2012

Time [years]	Constructions and arrangements [mil Euro]
2011	2045.9
2012	2185.1

Source: Own processing

Values forecasted for expenditure on constructions and arrangements for 2011 and 2012 are given in Table 9. We can notice that although the sector has been affected by the crisis, there is still an increase in this category.

Figure 8 presents the evolution in time of spending on health. Data series considered are approximated by a polynomial of degree four:

$$p(x) = p_0 + p_1 \cdot x + p_2 \cdot x^2 + p_3 \cdot x^3 + p_4 \cdot x^4 \qquad (8)$$

Polynomial interpolation parameter values above are:

$p_0 = -6148938754394.371$; $p_1 = 12278736736.05201$; $p_2 = -9194681.7287$;

$p_3 = 3060.09853$; $p_4 = -0.38191225308$

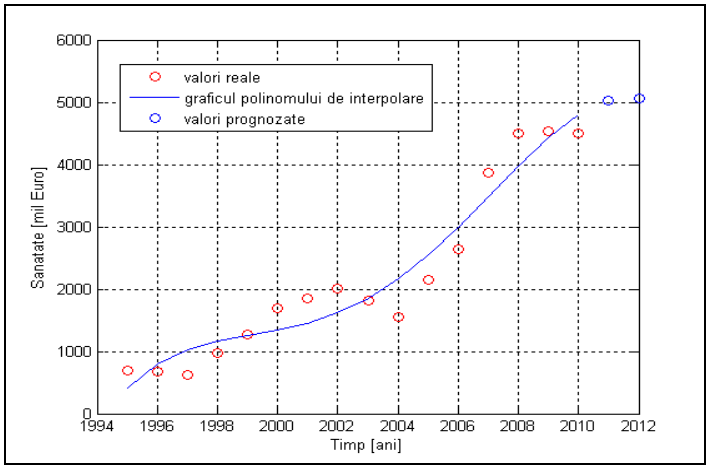

Figure 8. The evolution of spending on health in Romania, 1995-2010

Predicted values for this category have a growing trend in comparison with the years affected by the economic crisis.

Table 10. Forecast of expenditure on health for 2011 and 2012

Time [years]	Health [mil. Euro]
2011	5034.4
2012	5060.6

Source: Own processing

The evolution in time of spending on recreation, culture and religion is presented in figure 9.

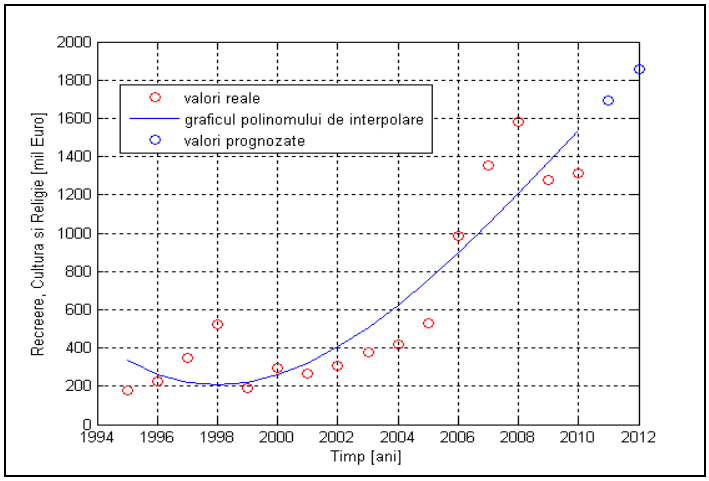

Figure 9. The evolution of spending on recreation, culture and religion in Romania, 1995-2010

Although expenditure on recreation, culture and religion has been affected by the economic crisis, in years 2011 and 2012 more funds were allocated for this sector.

Polynomial interpolation resulted from approximating the data series is:

$$p(x) = p_0 + p_1 \cdot x + p_2 \cdot x^2 + p_3 \cdot x^3 \qquad (9)$$

Polynomial interpolation parameter values above are:

$p_0 = 3226285332.7476$; $p_1 = -4816438.7658$; $p_2 = 2396.69912$;

$p_3 = -0.397525504947$.

Table 11. Forecast of expenditure on recreation, culture and religion for 2011 and 2012

Time [years]	Recreation, culture and religion [mil Euro]
2011	1695.1
2012	1854.5

Source: Own processing

For the period taken into considered, spending on education has the following evolution (figure 10):

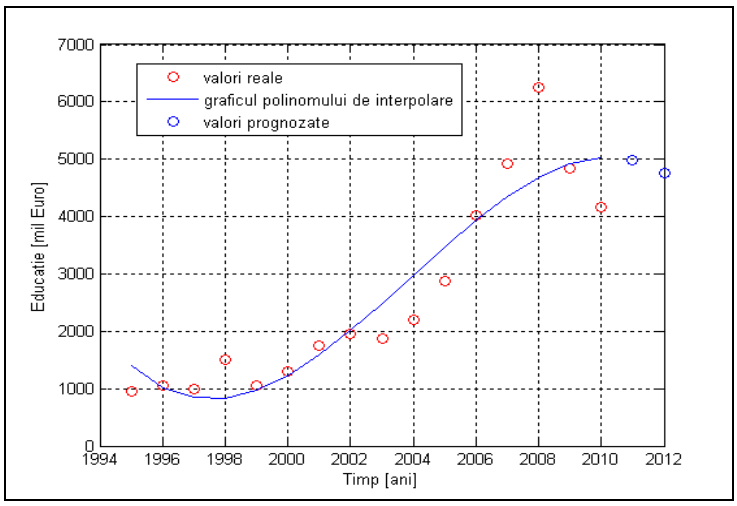

Figure 10. The evolution of spending on education in Romania, 1995-2010

The polynomial interpolation is degree three:

$$p(x) = p_0 + p_1 \cdot x + p_2 \cdot x^2 + p_3 \cdot x^3 \qquad (10)$$

Polynomial interpolation parameter values above are:

$p_0 = 33270444518.294$; $p_1 = -49809928.484$; $p_2 = 24856.9405$;

$p_3 = -4.134793560825$.

Table 12. Forecast of expenditure on education for 2011 and 2012

Time [years]	Education [mil Euro]
2011	4974.1
2012	4751.7

Source: Own processing

Estimated data in Table 12 show that the education budget is still very small, but slightly increasing.

Expenditure on social protection in Romania for the period 1995-2010 has the following evolution (figure 11):

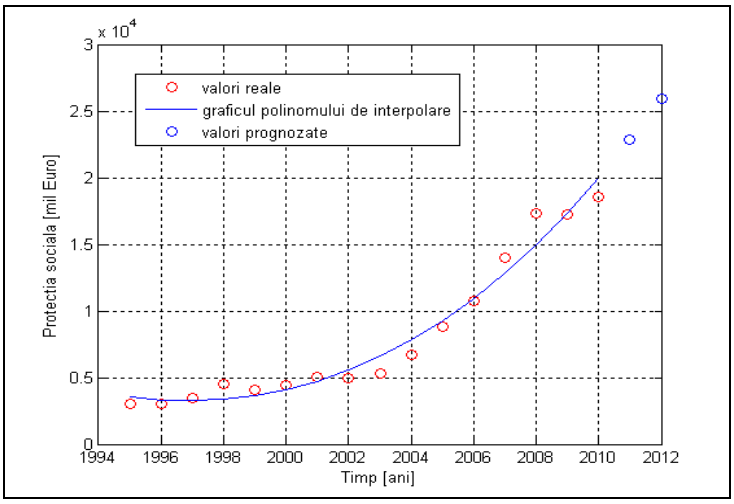

Figure 11. The evolution of spending on social protection in Romania, 1995-2010

$$p(x) = p_0 + p_1 \cdot x + p_2 \cdot x^2 + p_3 \cdot x^3 \qquad (11)$$

Polynomial interpolation parameter values above are:

$p_0 = -8659575252.2007$; $p_1 = 13174167.4593$; $p_2 = -6679.75558$;

$p_3 = 1.128783346282$

Table 13. Forecast of expenditure on social protection for 2011 and 2012

Time [years]	Social protection [mil Euro]
2011	22829
2012	25960

Source: Own processing

It may be noted that expenditure on social protection is increasing in comparison with previous years, the share in GDP is significant compared to other sectors.

Because of the global financial crisis, that occurred in August 9, 2007, mainly due to unrest in the American market which was reflected on the Stock Exchange, many economies were adversely affected, including our country that has been severely tested over the last years.

CONCLUSION

As shown in graphical representations of the evolution in time of total public expenditure and by category, in 2009, 2010 and 2011 curves that approximate the data are affected by their low values, except those for environmental and social protection. However, predictions made in the years 2011 and 2012 show a slight increase of public expenditure values overall and by category.

REFERENCES:

[1]. Ilie, A.G.; Dumitru, D.; Zaharia R.M.; Colibaşanu O.A. (2009) *Public Expenditure on Higher Education. Case Study: Romanian Universities*, International Review of Business Research Papers, Vol.5, No.1

[2]. Moşteanu, T. (coord.) (2008) *Finanţe publice*, Editura Universitară, Bucureşti

[3]. Obreja Braşoveanu, L. (2010) *The impact of defense expenditure on economic growth*, Romanian Journal of Economic Forecasting, Volume 13, No. 4

[4]. Văcărel, I. (coord.) (2007) *Finanţe publice*, Editura Didactică şi Pedagogică, Bucureşti

[5]. Eurostat - European statistics