

Sustainability of the public pensions system in terms of demographic factors. Case Study: Romania

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Abstract— Romania is facing problems regarding the social policies, particularly in the social security pension, due to the deficit of the state social insurance budget. The research aims to achieve the following objectives: to identify the correlation between demographic phenomena and pensions system, to identify a correlation between demographic phenomena and dependency ratio retirees / employees, to identify a correlation between the dependency ratio retirees / employees, GDP and average pension in Romania, to identify limitations of research results and necessary measures to eliminate them. The models and the results obtained, in Romania's case, allow us to highlight some conclusions about the negative impact of the demographic factors on the sustainability of the public pensions system.

Keywords— Demographic phenomena, Dependency ratio retirees/employees, Public pensions, Social security pension.

I. INTRODUCTION

ROMANIA, like other countries is facing problems in the terms of paying the pensions, aspects that reveals debt [20] and problems of the state social insurance budget. In this case, to estimate the deficit in the state pensions system can be important, so according to Bojinca Moise and Constantin Enea: “in an optimistic scenario deficit could fall below 1.5% only after 2015” [18].

Demographic factors like: population number; birth rate and death rate; population structure; the natural growth of population; population migration influence de dependency ratio retirees/employees[2]. Romania has experienced in the 1990-2011 period, significant changes of the main demographic factors: in the number of live births, the deaths, immigrants, emigrants and life expectancy at age 65, which influence the current retirees/employees dependency report

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and implicit the sustainability of the pensions system, in a negative way. The evolution in the demographic plan, together with the economic situation of Romania in this period, but with some questionable decisions of the political factor, accentuate the imbalance of the state social insurance budget and affects the living standards of pensioners, which are seeing a continuous deterioration of the ratio of income before retirement and post-retirement income. And in the future, according to the estimates, demographic phenomenon presents itself as a challenge for our country, is manifested a change of family structure and relationships between parents and children; extended families that traditionally ensured livelihood and care for the elderly, and conditions for the care and raising young generations are steadily falling in relevance.

The demographic situation in Romania is in a profound change, combined with changes in the demographic phenomenon in Europe. The reform process in the social plan, especially in the field of public pensions debated – sometimes with apocalyptic overtones - demographic trends and their impact on social policy in our country. These changes have serious economic and social consequences, manifesting a kind of selfishness in the active younger generation, in analysis of the number of pensioners correlated with number that contributes to the system, mainly represented by people who are employees. In this context, a gratifying phenomenon in any human society - increasing life expectancy at age 65 - is sometimes interpreted as a concern, because pensions have to be paid over a longer period of time. In the current economic conditions and taking into account demographic forecasts developed by the international organizations, the inevitable question is whether the public pension system is sustainable over time. Partial answer to this question was given to both research in the field, and the direction and force lines of the reform of the system: in 20 years, Romania has done two radical adjustments in the public pension system.

In the same context, but judging by a person who has a considerable number of years of contribution to the public pension system we must ask ourselves if public pension system can keep it within limits, the purchase power to provide a decent living for a pensioner, without representing a major correction in relation to the standard that had during the active life. If, due to the evolution of the economic situation, the answer for this question is negative and, consequently, the pension is not enough and it should be increased, we come back to the issue of sustainability of the system.

The research aims to explain the sustainability of the public pensions system by considering the demographic factors. The main objective of this paper is to observe whether the current public pensions system is sustainable in the conditions of a growing number of retirees corroborated with a reduced numbers of employees and in the conditions that the demographic situation in Romania is not helping this system.

To achieve this objective, the work is structured into three parts. The first part present an introduction to problem treated in the paper, part two presents the data, the two models and research methodology used. The third part presents the results of the models and the limitations of the models. The paper ends with conclusions and future research directions identified as a result of this work.

II. METHODOLOGY AND DATA DESCRIPTION

The pension system is mainly designed to ensure income for elderly, and it is extremely important to note that this income from public pension is sufficient to ensure an adequate standard of living. To answer to this question, in Romania, is synonymous with knowing whether the number of employees is large enough to support, from their contributions, the income level for paying pensions for the current retirees.

A. Model 1

To capture the impact of demographic factors on the sustainability of the public pension system in Romania, priority from the perspective of the evolution of number of contributors we have developed, first, the following model:

$$RDPS_t = a + bNV_t + cD_t + dSV65_t + eI_t + fE_t + \varepsilon_t$$

where:

RDPS represents the dependency ratio retirees/employees;

NV represents the number of live births;

D represents the number of deaths;

SV65 represents life expectancy at age 65;

I represents the number of immigrants;

E represents the number of emigrants;

t is the time period considered in the analysis, 1990-2011.

a represents the intercept;

b represents the coefficients of the number of live births;

c represents the coefficients of the number of deaths;

d represents the coefficients of life expectancy at age 65;

e represents the coefficients of number of immigrants;

f represents the coefficients of number of emigrants;

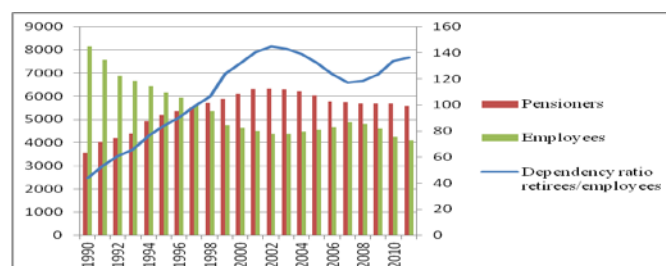
ε represents the residues.

Demographic factors included in the model were chosen due to their relevance, the data series are chosen for 1990-2011 time period, except for the series number of born alive for which, the period of analysis is 1943-1964, as people born during this period influences dependency ratio of retirees/employees in the current period. The relevance of these data sets is given by the analysis of their evolution in the analyzed period.

Dependency ratio retirees/employees is the ratio between the number of pensioners and the number of employees in a given period of time. This report has deteriorated continuously

from 1990 to 2011, from 0.43 retirees/employees to 1.36 retirees/employees, due to increasing number of pensioners while decreasing the number of employees. The number of pensioners has increased significantly from 1990, from 3577 thousands pensioners to 6275 thousands pensioners in 2003 and decreased slightly to 5589 thousands pensioners in 2011. This 75% increase is due to several aspects: inclusion in the pension system of retirees from agriculture, the increase in the number of early retirees, increase retirement due to disability. In the first decade after 1990, the increase for pensioners was 70.81%, because the formula for pension was very generous, pensioners were entitled to a "pension equal to 75% of the average earnings of the five best contribution of the last ten years" and the system provide pension to pensioners who didn't contributed, a important category was considered: farmers, according to Georges The Menil, Eztan Sheshinski, 2002[17]. In this context, for Romania, we believe that the most relevant aspect to be mentioned is the fact that through the pension system were solved specific economic imbalances for years 1990 – 1997, when the solution for people who lose their jobs was, with priority, early retirement or sickness retirement (for women aged 45 years and men aged approximately 55 years). In 2000, in a period of relative stabilization of the economic situation, it was developed a new pension law, European inspired, which corrected some unhealthy practices of the system, but it paved the way for the manifestation of new anomalies: increased revenue by including in the system of about two million people, a new pension formula based on points etc. Conditions were created to reduce system costs by gradually increasing the statutory retirement age and a more strict regulation regarding early retirement. Reform continued by introducing, with difficulty, the Pillar II and III, and know it is structured according with the proposal made by World Bank [7]. In the economic crisis and in an unstable political climate, the pension system was restructured by Law 263/2010 regarding the unitary public pension system. On this occasion, the social security budget had to bear the burden of a major socio-professional categories - military - which didn't had the status of taxpayers of the system. Also, increased retirement age and were boosted restrictions for early retirement.

The number of employees decreased by 49.79% in the period 1990-2011 from 8156 thousands person to 4095 thousands person. This decrease is caused mainly by reducing the number of jobs. At the same time, the influence of the reduce birth rate, of the migration and the growth of the black labor can not be neglected.

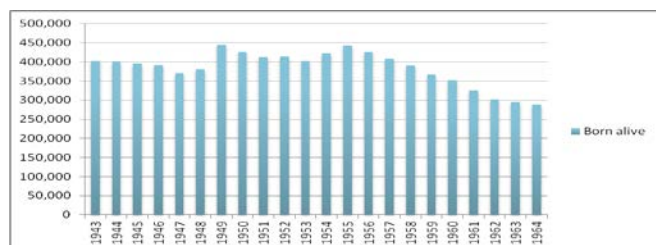


Legend:

— represents the pensioners

— represents the employees
 — represents the dependency ratio retirees/employers
 Source: own processing based on data provided by www.insse.ro and www.worldbank.org
 Fig.1 Dependency ratio retirees/employees in Romania between 1990-2011

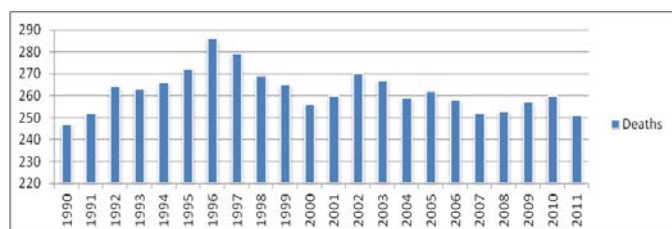
Number of live births indicates a product of conception, completely expelled or extracted from its mother, irrespective of the duration of pregnancy, which, after such separation, has the sign of life. This indicator decreased by 28.78% in the period 1943-1964. This decline was felt until 1947 because of the Second World War, following a period of stabilization in 1948 and containing to decline until 1953. In the years 1954-1955, there is an ultimate "twitch" and then reinstall the downward trend. It can be seen that the number of births recorded levels and oscillations. Thus, for the last period (1956-1964), these movements were determined directly by the legislation on abortion and contraception policy, according to Ghețau Vasile, 1997[11].



Source: own processing based on data from Statistical Yearbook 1971 Romanian Socialist Republic

Fig. 2 Number of live births in Romania between 1943-1964

Number of deaths indicate those who have permanently ceased vital functions a certain time after the birth. This indicator has not changed substantially during the period under review, registering an increase of 1.61%. The main causes of death faced by citizens differs in relation with the level of education, which generate a certain socioeconomic status correlated with life expectancy. Good health in old age and longevity is the result of a healthy lifestyle and genetic structure.



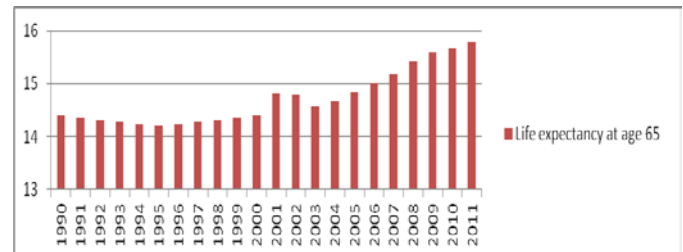
Source: own processing based on data provided by www.insse.ro

Fig. 3 Number of deaths in Romania between 1990-2011

Life expectancy at age 65 is the life of an individual from age 65 to age or number of years of life remaining after the age of 65. This indicator shows a positive trend, life expectancy at

age 65 increased from 14.4 years in 1990 to 15.8 years in 2011. It is also relevant that the life expectancy of women at age 65 is higher than men, because women by retirement at a younger age than men and by staying in the system for a longer period of time, it has pension for a longer period of time.

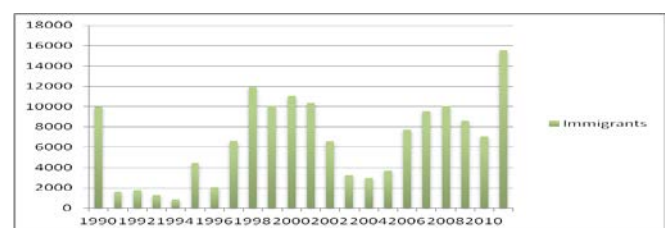
Indicator projections for life expectancy at age 65 in the horizon of 2060 [22] shows that there will be an increase of 6.6 years.



Source: own processing based on data provided by www.insse.ro and www.worldbank.org

Fig. 4 Life expectancy at age 65 in Romania between 1990-2011

The number of immigrants are those who are arriving from another country in a time and which took up residence in a village in Romania. The number of immigrants increased considerably from 1990 to 2011 with 55.38% and presents considerable fluctuations. It may be noted that in the past 20 years, Romania has become a very attractive destination for many foreigners, immigrants with different origins, so that immediately after 1990 persons established in Romania have been encouraged by the new attractive legislation to start a business, after 1998 people (the vast majority from the Republic of Moldova) were encouraged to come by the good and affordable education in our country, and by 2006 to 2007 due to the number of Romanian left to work abroad were brought people (Indians, Chinese) to cover labor shortages in certain occupations, according to the Country Report, 2009. Currently, most immigrants came from Republic of Moldova (2847), followed by Italy (1233) and other countries (1078). Interesting to note is that U.S. residents, a highly developed country, immigrating in Romania, their number increased significantly in the period from under 100 people to 500 people.

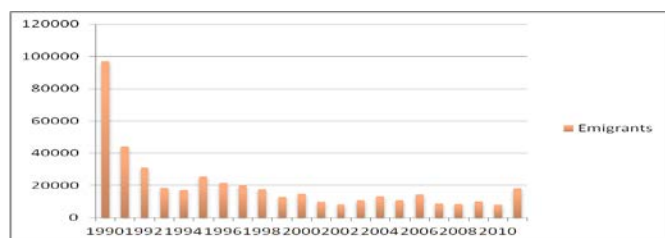


Source: own processing based on data provided by www.insse.ro

Fig. 5 Number of immigrants in Romania between 1990-2011

Number of emigrants indicate the number of people, in a time, moved permanently from Romania. Their number has

decreased considerably from 96929 thousands people in 1990 to 18307 thousands people in 2011, an 81.11% reduction. Certainly, the value from 1990 is notable due to the regime change. Preferred destination countries for our population were generally the developed ones, but in time emigrants options have changed. Thus, in 1990, Italy ranked first in Romanians preferences, with a total of 66121 people emigrated, followed by Hungary (10635 emigrants) and Austria (3459 emigrants), currently they prefer Canada, followed by Germany and USA. In this regard can be outlined more preferably routes of emigrants: the first in 1990-1995 focused on countries like Italy and Hungary, followed by the period until 2001 when most preferences were all geared towards Italy and the U.S., and last track from 2002 to the present in which most emigrants chose Canada or Germany, according to the Country Report, 2009 [25].



Source: own processing based on data provided by www.insse.ro

Fig. 6 Number of emigrants in Romania between 1990-2011

We performed a primary analysis that allows us to detach an important conclusion regarding the correlation between the indicators of the research because statistical tests are almost identical. Thus, the table 1, shows dependency ratio of retirees/employees and the number of live births, number of deaths, life expectancy at age 65, the number of immigrants, emigrants are highly interdependent.

Table 1 Descriptive of Statistical evidence for the indicator used in the Model 1

	NV	D	SV65	I	E
Mean	384,35	262,18	14,71	6683,36	20037,27
Median	397,05	261	14,48	6829,5	14475
Stand. Dev.	45,99	9,39	0,51	4133,07	19209,07
Kurt.	0,01	0,73	-0,35	-0,86	13,01
Skew.	-0,93	0,75	0,96	0,20	3,39

Source: Author's

Average number of live births was 384 thousand people, the number of deaths of 262 thousand people, the number of immigrants 6683 persons and the number of immigrants of 20037 people, while the average life expectancy at age 65 was

14.71 years. Median show that, for all the indicators nearest value was given by the first half period, the one until 2000, and in the case of live births series by year 1944. For all indicators, except for life expectancy at age 65, the standard deviation isn't low, which indicates that the majority values have not taken a form around the mean. Kurtosis is less than 3 when in case of number of live births, the deceased, life expectancy at age 65 and immigrants, aspect that indicate a platykurtic distribution, and in the case of emigrants, with Kurtosis more than 3, shows more values in around the average. Skewness having positive value, the asymmetry is slightly to the left, except indicator number of live births, when asymmetry is slightly to the right.

B. Model 2

In order to analyze the sustainability of the public pension system, based on the first model, we have developed the second model, where dependency ratio retirees/employees, is the independent variable:

$$PM_t = a + bRDSP_t + cPIB_t + \varepsilon_t$$

where:

PM represents average pension

RDPS represents the dependency ratio retirees/employees;

PIB represents the gross domestic product

t is the time period considered in the analysis, 1990-2011.

a represents the intercept;

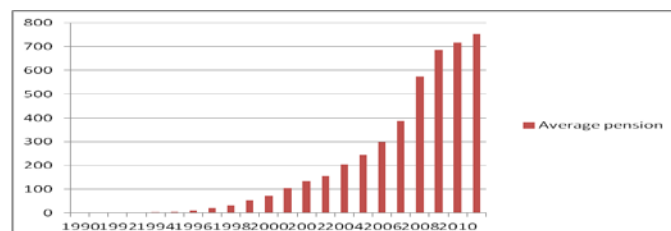
b represents the coefficients of the dependency ratio retiree/employees;

c represents the coefficients of the gross domestic product;

ε represents the residues.

The indicators included in the model were chosen due to their relevance, the data series are chosen for 1990-2011 time period. The relevance of these data sets is given by the analysis of their evolution in the analyzed period.

The average pension has a positive evolution, evolution that took into account the national average wage, the inflation rate and not least the country's economic situation. It is worth mentioning that the biggest increases in average pension took place near the general elections so that populist pre-election decisions before each election period led to increases in pension point [21].



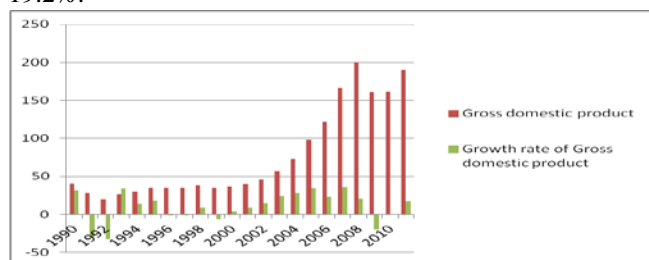
Source: own processing based on data provided by www.insse.ro

Fig. 7 Average pension in Romania between 1990-2011

GDP in Romania, during the analyzed period recorded significant fluctuations, fluctuations due to the evolution of

different sectors of the economy [1]. 2007 was a peak year of the economy during the period under review, registering a growth of 37%. The growth rates of GDP had fluctuated significantly, presenting both positive developments and negative developments (both in the period before 2000 and 2009, the first year after the financial crisis). Thus, in the pre-crisis period (2000-2008), Romania have recorded the highest growth rates [15].

The analyze of GDP growth can fall into four main stages. First, it represents years of decline (1990-1992), when it decreased by 51.96%, from \$ 40.8 billion to \$ 19.6 billion. The second stage is the period of stagnation or slight increase (1993-1999), in most years the GDP was approximately \$ 35 billion. Next period the third was the growing years (2000-2008), the country's GDP increased from \$ 37 billion to \$ 200 billion increase of 440%. Last round, the fourth, is the recession years (2009-2011) in which GDP decreased by 19.2%.



Source: own processing based on data provided by www.insse.ro

Fig. 8 Gross domestic product and growth rate of the gross domestic product in Romania between 1990-2011

We performed a primary analysis that allows us to detach an important conclusion regarding the correlation between the indicators of the research because statistical tests are almost identical. Thus, the table 2, shows that the average pension, the dependency ratio of retirees/employees and the gross domestic product are highly interdependent.

Table 2 Descriptive of Statistical evidence for the indicator used in the Model 2

	RDPS	PIB
Mean	108,55	76,23
Median	120,90	40,45
Stand. Dev.	31,81	60,54
Kurt.	-0,77	-0,54
Skew.	-0,74	1,03

Source: Author's

Average dependency ratio retirees/employees was 180,55% and the average of gross domestic product was \$76,23 billion.

Median show that, for both indicators nearest value was given by the first half of the period, the one until 2002. For both indicators, the standard deviation is low, which indicates that the majority values have taken a form around the mean. Kurtosis is less than 3 in both case, aspect that indicate a platykurtic distribution. Skewness having positive value, the asymmetry is slightly to the left, except indicator dependency ratio retirees/employees, when asymmetry is slightly to the right.

III. EMPIRICAL RESULTS

A. Model 1

After testing its validity and estimating the parameters, the model can be written as:

$$RDPS = 0 + 0,313NV - 0,973D + 17,262SV65 + 0,002I - 0,001E$$

This regression model allowed us to establish a number of aspects regarding the relationship between the variables, the most important being that between them there is a significant direct relationship. The most relevant results are:

✚ An increase by one of the number of births will lead to an increase of 0.31 units of the dependency ratio pensioners/employees. This increase is due to the fact that, as the number of people increases the number of pensioners will increase (currently 1 of 7 Romanian has over the legal retirement age and the future show that in 2030 1 in 5 will be over 65 years and the 2060 report will degrade in 1 of 3). On the same logic, we can say that will increase the number of employees due to increasing population, but given the current economic conditions and forecasts made, and equally the data we used, showed a continuous decline in the number of employees, we can say that no looming in the future to cover the number of employees who retired (by the year 2060 for every employee will be 1.5 retirees).

✚ A decrease with one unit of the number of deaths will lead to a decrease of 0.97 units dependency ratio retirees/employees. It is clear that when the number of deaths decrease it decreases the number of pensioners also. The same principle can express a decrease in the number of employees, but it is shown that deaths among people aged over 60 years are higher than that of people aged up to 60 years. Important point, is that we do not know whether the deaths are recorded among pensioners or among employees, so we can say that this is a limit for this model.

✚ A unit increase in life expectancy at age 65 will result in an increase of 17.26 units dependency ratio retirees/employees. This is the indicator that shows the greatest influence on the dependency ratio, because the life expectancy of persons aged 65 increases, the dependency ratio impair, in the sense that the same number of employees will have to maintain the same number of retirees, but for a longer period of time. On the other hand, should be taken into account that, if we have the same number of retirees (or even more than one that is

growing), but they live longer, they will be maintained by a number of employees who have shown that they been steadily declining and modifying downwards, leading to a deterioration of the ratio retirees/employees. If life expectancy at age 65 increases, the number of pensioners in the system remain for a period of time, while in the system, enter a new number of retirees from staff who hasn't been replaced by a number of employees, because the decrease in the birth rate, aspect which reveals an increase in the dependency ratio retirees/employees.

✚ An increase by one of the number of immigrants will lead to an increase of 0.002 units dependency ratio retirees / employees. The number of immigrants will increase the dependency ratio, as the number of people moving to our country and who may or may not be employed at some point will become pensioners. Consider also that the number of immigrants is very low, Romania is a country of origin and not a destination one, which shows that Romania's population isn't numerically modified by the number of immigrants and, by consequence, the influence of this indicator on the dependency ratio retirees/employees is very low (0.002).

✚ A decrease with one unit by the number of emigrants will lead to a decrease in the dependency ratio with 0.001 units. The number of emigrants influence in a negative way the dependency ratio, because since they left the country, they are no longer employed in our country but it should be noted that this indicator has a very low influence of 0.001.

A. Model 2

After testing its validity and estimating the parameters, the model can be written as:

$$PM = 0 - 0,756RDPS + 3,916PIB$$

This regression model allowed us to establish some aspects regarding the relationship between the average pension, dependency ratio retirees/employees and gross domestic product, the most important being that between them there is a significant direct relationship. The most relevant results are:

✚ A decrease with one unit of the dependency ratio retirees/employees will lead to a decrease of 0.75 units of the average pension. Dependency ratio shows synthetic sustainability of the pension system. It change reflected by the report of this two indicators - number of pensioners and number of employees, showed that the number of retirees is growing faster than the number of employees, which shows a negative effect on the dependency ratio retirees/employees and also a negative economic status, aspects that lead to a lower average pension. Knowing that the number of pensioners is high and the revenue of the social security buget are getting smaller, thanks to a decreased in the number of employees, we can appreciate that the pressure falls on the pension budget is growing.

✚ An increase by one unit of GDP will lead to an increase of 3,916 units of the average pension. GDP provides effective sustainability of the pension system. This is the indicator that shows the greatest influence on the average pension, as economic growth should lead automatically to an increase in the average pension. We believe that it is relevant to note the

elasticity of the average pension relative to GDP. Thus, we could observe during the period we analyzed, an elasticity higher than one, which indicates that in most years the average pension increased when the GDP increased. The exception to this, are the years in which GDP declines, but the average pension increased.

IV. CONCLUSION

The results showed that all variables included in the first model contributed to deteriorating of the dependency ratio retirees/employees. The positive trend in the number of live births that have reached retirement age in the analyzed period significantly influenced this report, as proven by the output of model. Positive significance of live births was not neutralized by the evolution of the number of deaths and considering that the number of deaths is higher among elderly individuals, we conclude that this indicator has reduced dependency ratio retirees/employees.

Indicator which showed the greatest influence on the model, life expectancy at age 65, shows a direct influence on the dependency ratio retirees/employees. Influence observed by the fact that the period for which the pension is paid is growing, the report damages, in the sense that are not enough income, the number of pensioners is higher than the number of taxpayers, the tendency will be to increase contribution rates, to support the number of retirees for a longer period of time. The results obtained by estimating the model confirms the influence of life expectancy at age 65 on dependency ratio retirees/employees.

Another result obtained, it is true to lesser influence, represent the number of immigrants and emigrants. These two parameters influence different the dependency ratio, because Romania is a country of destination. Thus, the number of immigrants was very small, and the influence on the report as well. Number of emigrants was higher (Romania experiencing negative migration trend) but its influence was not very high.

Romania is facing problems regarding the public pension system. Due to the demographics changes, this research comes to identify if these problems are amplified by the demographic factor and if the system sustainability is affected due to these factors or not.

A limit of this research, for the sustainability of Romanian pension system, is that it is not known whether the deaths (indicator used in estimating the model) are recorded among pensioners or among employees, which is why the influence of deaths on the accuracy of the assessment dependency ratio pensioners/employees is reduced.

The results for the second model showed that the dependency retirees / employees and GDP have influenced the average pension. Thus, a decrease in the dependency ratio shows a decrease in the number of retirees while maintaining or increasing the number of employees. Another option would be, keeping the number of retirees while increasing the number of employees to reduce ratio. In either of the two variants have referred, we estimate that the average pension will only increase if we consider an economic growth of our country, a growing GDP, aspects that are translated into sufficient revenue to the state social insurance budget. In another case,

we can't appreciate that the average pension will decrease with decreasing ratio but we estimate that it will not increase enough to cover the level of income required for a decent living.

Indicator which showed a high influence on the model of the average pension is the GDP. The model proves that a GDP growth leads to an increase in the average pension, highly relevant issue, given that GDP measures the economy's performance. Thus, economic growth measured by GDP should automatically also lead to an increase in the pension, but this assessment must take into account other aspects such as: the collection of contributions, influence policy makers, etc.

In determining the average pension growth we must take into account, not only economic factors but also institutional and social. In this sense, the model shows that can be taken into account other indicators, such as unemployment or average salary, aspect that indicates a limits for this model and, in the same time, the possibility of future research.

REFERENCES

- [1] Anghelache, C., Anghelache, G., Anghel, M., „Evoluția Produsului Intern Brut și a Investițiilor Străine Directe în ultimul deceniu”, Revista Română de Statistică, triml, 2012-supliment
- [2] Tučková Z., Fialová Š., “Assessing the Economic Factors of Healthcare Services”, Recent Researches in Economics and Management Transformation, ISBN: 978-1-61804-053-4. Pg. 43-48, <http://www.wseas.us/e-library/conferences/2011/Angers/EMT/EMT-06.pdf>
- [3] Aaron, H. J. , ‘The Social Insurance Paradox’, *Canadian Journal of Economics and Political Science*, 32(3), 371-4; reprinted in N. Barr (ed.) (2001), *Economic Theory and the Welfare State*, Edward Elgar Library in Critical Writings in Economics, Vol. II, 1966, pp.79-82
- [4] Barr, N., P. Diamond, „Reforming pensions: Principles, analytical errors and policy directions”, *International Social Security Review*, 62(2), 2009, pp.5-29
- [5] Barr, N., P. Diamond, “The economics of pensions.” *Oxford Review of Economic Policy*, 22(1), 2006, pp.15-39
- [6] Belea, S., Pânzaru C., „Factorii de influență asupra deficitului sistemelor de asigurări sociale”, Revista Română de Statistică, nr.10, 2012
- [7] Cristea M., Marcu N., Dracea R., “Causality Relation between the Assets of Privately Managed Pension Funds and their Performance. Statistical Study in Romania”, *Recent Researches in Tourism and Economic Development*, ISBN: 978-1-61804-043-5, pg. 130-135, <http://www.wseas.us/e-library/conferences/2011/Drobeta/TED/TED-21.pdf>
- [8] Croitoru E.L. Alexandru F., Toader S.A., „The particularities of the demographic factors impact on the sustainability of the public pensions system in Romania”, *Recent Researches in Law Science and Finances, Business and Economics Series*, no. 11, ISBN: 978-960-474-327-8, 4th International Conference on Finance, Accounting and Law (ICFA'13), Chania, Crete Island, Greece, 2013, pg. 196202, <http://www.wseas.us/e-library/conferences/2013/Chania/ICFA/ICFA-29.pdf>
- [9] Croitoru E.L., „Analisis of pension reforms in EU member states”, *Annals of the University of Petroșani, Economics*, 12(2), 2012, pp.117-126
- [10] Croitoru E.L., Baranga L., Predescu I., Pricopi A., „The public pension system in Romania – analysis before and after 1999”, *EuroEconomica*, Issue 4(30)/2011, ISSN 1582-8859, Danubius University of Galati, 2011, pp.55-59
- [11] Ghețău V., „Evoluția fertilității în România, de la transversal la longitudinal”, *Revista de Cercetări Sociale*, 1/1997
- [12] Heijdra, B.J., Romp, W.E., “Retirement, pensions and ageing”, *Journal of Public Economics*, Elsevier, vol. 93(3-4), 2008
- [13] Holzmann, R., Guven, U., “Adequacy of retirement income after pension reforms in Central, Eastern, and Southern Europe: eight country studies”, *World Bank*, 2009
- [14] Jimeno, J. F., Rojas, J. A. and Puente, S., Modelling the impact of aging on social security expenditures. *Economic Modelling*, 25(2), 2008
- [15] Krueger A.O., „International Trade and the New World Order”, Athens, Greece, 2008
- [16] Martin, P., *Economic integration and migration: The Mexico-US case* (No. 2003/35). WIDER Discussion Papers/World Institute for Development Economics (UNU-WIDER), 2003
- [17] Menil, G., Sheshinski E., „Romania's Pension System: From Crisis to Reform”, University of Chicago Press, National Bureau of Economic Research, 2002
- [18] Moise B., Enea C., “Fiscal policy measures of economic and social development policies in the European Union member”, *Recent Researches in Law Science and Finances*, ISBN: 978-960-474-327-8, pg. 228-235, <http://www.wseas.us/e-library/conferences/2013/Chania/ICFA/ICFA-34.pdf>
- [19] Rubenstein, E. S., *Social Security and Immigration*, The Social Contract, Volume 21, Number 2, 2011
- [20] Šimurina J., Turkalj D., “Sustainability of Public Debt in Croatia”, *Development, Energy, Environment, Economics* ISBN: 978-960-474-253-0, pg. 241-244, <http://www.wseas.us/e-library/conferences/2010/Tenerife/DEEE/DEEE-38.pdf>
- [21] Cartea Albă a pensiilor- „Cine va mai plăti pensiile de creșterea în 2030?”, București, 2012
- [22] Ageing Report- Underlying assumption and projection methodologies, European Commission, Brussels, 2011
- [23] Demography report – Older, more numerous and diverse Europeans, European Commission, Brussels, 2010
- [24] Green Paper – towards adequate, sustainable and safe European pension system, European Commission, Brussels, 2010
- [25] Country report-Romania, Meridium, Multilingualism in Europe as a resource for immigration, 2009
- [26] Legea nr.263/2010 privind sistemul unitar de pensii publice, publicată în Monitorul Oficial, Partea I, nr. 852 din 20 decembrie 2010
- [27] www.ec.europa.eu
- [28] www.worldbank.org
- [29] www.insse.ro