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Algorithms for the Public Pension System Reform in Romania – a Necessity Imposed by the Global Economic Crisis

Carina-Elena STEGĂROIU
"Constantin Brâncuşi" University, Târgu Jiu
carinastegaroiu@yahoo.com
Valentin STEGĂROIU
"Titu Maiorescu" University, Bucharest
v.stegaroiu@yahoo.com

Abstract. *This study aims to analyze the public pension schemes in Romania in the light of the challenges presented by global economic crisis and by the Romanian reform inequities and inconsistencies that have been a part of this field since 2001. The contents of this paper examine four types of pension schemes in some Member States (MS) of the European Union (EU) which according to our research can be the basis for a development of Romanian public pension schemes that can be robust, flexible, equal and that can account to all endogenous and exogenous challenges, designed to encourage labor market retention of people of retirement age through a continued active life, at the expense of pensioner benefit. Study findings provide some viable solutions in terms of economic efficiency and equal benefit of retired and the proposal to reform the Romanian public pension scheme is necessary and can provide opportunities for those to whom it is addressed.*

Keywords: social security; public pension; labor market; social insurance; pension scheme.

JEL Codes: F02, F15, F53, F59, H55, O11, O52.
REL Codes: 3D, 10C, 20F.

1. Introduction

The pension problem, considered in light of the demographic and particularly acute financial situation, is one of the most current issues in focus and is seeking various forms of mitigation and mitigation of their effects both in our country and globally.

With the average size of pensions provided by the state at about 60% of the subsistence minimum for the bulk of retirees, the need to ensure a decent living in the post-active phase is becoming increasingly obvious, and the inefficient public system and current pension has become very visible. Taking this into consideration, the global economic crisis overlaps with a particularly acute demographic crisis caused by the accelerated aging of the population in the context of low birth rates and the major phenomenon of the working population exodus abroad and creates a strong pressure on the public pension fund, which, for a considerable time, has not been able to provide a high standard of living for the mass of pensioners.

Regulations introduced by the law of pensions and the pension reform were prepared and forwarded the need for Romanian insurance legislation to implement Community regulations concerning the application of social security systems to employees, independent workers and members of their families moving within the community and establishing procedures for their implementation (Regulation EEC no. 1408/71, Regulation EEC no. 574/72, Stegăroiu, 2007). The reform that began with the adoption of the new pension law has continued to adopt laws on compulsory component – Pillar II and with the optional – Pillar III (Stegăroiu, 2004).

State social insurance pensions are defined as entitlements granted to employees after a specified period of activity and age provided by law or if the total loss or most of the work capacity and survivors of such person (Stegăroiu, 2002). This definition follows the main categories of social security pensions covered by the state: the pension for work and old age, invalidity pension, survivor's pension.

In this respect we can say that Romania urgently needs to harmonize the pension scheme for salaried workers, officials, independent workers, farmers and especially civil servants and the budget sector, which should introduce a single law for the granting of a uniform pension for all these categories, regardless of their work done (Missoc, 2007). Today there should be a thorough reformulation and objective calculation of benefits, which would lead to a stronger link between benefits and contributions, including a system that would grant a "bonus" for financial and delay early withdrawals and changes in the government view over the system of indexation of pensions. The basis change retirement scheme in Romania requires to put the principle of gradual transition from the previous to the reformed scheme. Recommendation of a single pension scheme is a difficult task. Pension depends on the social policies of governors, which may change some parts of the scheme.

2. The current state of the public pension system in Romania

The demographic situation in Romania, as in fact all over Europe, is characterized by the phenomenon of "aging population", as defined by the scale of G. Bojio-Garnier, which shows that if the share of population aged over 60 years the total number of inhabitants is higher than the level of 12%, then there is the phenomenon of "aging population". Thus, in Romania, in 2008 the share of people older than 60 years from the total number of population was 19.3% (Eurostat, 2009). However, the average EU-25 remains lower, around about 16.5% (Eurostat, 2009). Additionally, its proximity to the retirement age of those born during the baby boom years after World War II, the low birthrate and continuous exodus of jobs overseas assets, there are all prerequisites for increasing the rate of aging population to over 30% in 2050 (Eurostat, 2009).

Currently Romania faces major challenges regarding the sustainability of public pension system, both short and long-term. This is, on the one hand, related to short-term recovery issues, and secondly related to the problems caused, inter alia, by the relatively small number of contributors to the system in relation to the number of beneficiaries, by the low employment rate of 41, 4% for older workers, by a high rate of undeclared work (approximately 20-50% of total employment, according to the definitions used) and the yet insufficient resources.

The current public pension system in Romania represents for the first pillar, the majority, a type of intergenerational redistributive system – PAYG (Pay as You Go). The first pillar was brought into discussion as the others, the compulsory private administered one and the voluntary private administered one, are still being developed, with enough time to maturity. Thus, in the first pillar, as is known, the current pension payment occurs following the procedure of redistribution of current revenues collected by the state social insurance budget (BASS), which due to delays in implementation of reform led to a system currently unfair, while it is still supported by a viable multipillar. Therefore, we identified several deficiencies in the substance of the public pension system:

- *Mismanagement of social security funds*, the results of which began to occur with increasing pressure growing on the public pension fund, by increasing the state social security budget deficit, proving, if proof were needed, the weakness of the public pension system to ensure a higher minimum income for most existing pensioners;

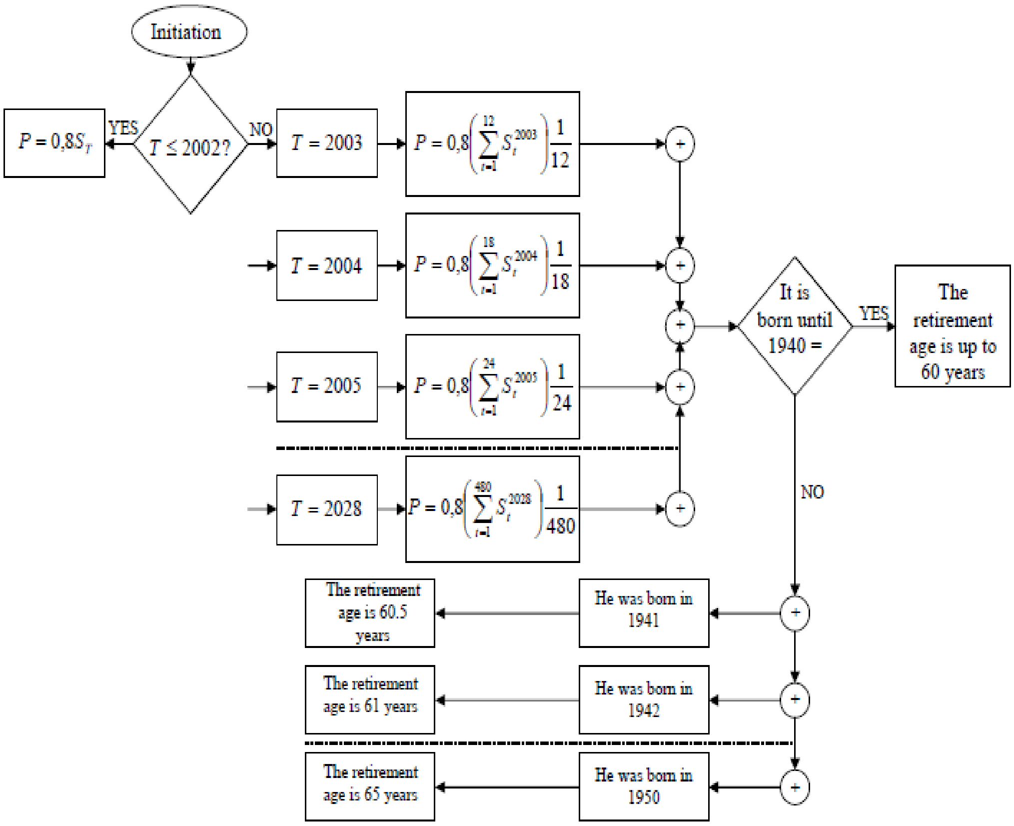
- *Organization of a redistributive type of system in the place of a funded one* – such a type of organization and allocation of assets is unquestionably a self-destruction of the current public pension fund, because it does not involve investing in assets accumulated in social security budget in financial instruments with a higher yield at least the inflation rate. First it deprives the capital market of an important source of cash to develop its direct results, and, on the other hand, creates demands on the entire public pension system, which is unable to cover current pension amount of government spending and even the erosion of pension indexation coverage over time;
- *Inequity in calculating and determining the nature of pension benefits* due to the emergence of pension benefits among the so-called "service pension" it has been knowingly breaching the central principle of pensions law, which was to increase pressure on public fund pension, manifested by strong growth in the pension budget deficit.

3. Analysis of public pension schemes in the EU

Existence of effective social protection system, resulting in social actions of all stakeholders (entrepreneurs, state employees, foundations, church, unions, etc.), to ensure a minimum income to those in difficulty or in some cases of the personal services, maintenance, healthcare, education, transport, etc.

In what follows, we will examine and demonstrate the operation of four public pension schemes, which in our understanding could form the basis of Romanian reform the public pension scheme, considering them to be the perfect present, the public market for such products.

Therefore, we analyze the four types of retirement: the type 1 (Austria), the type 2 (Belgian), type 3 (Swedish), type 4 (English). Pension scheme can be put as an algorithm (Figure 1), where T – the year when the individual retires, P – pension, ST – salary in retirement; St – salary the month t.



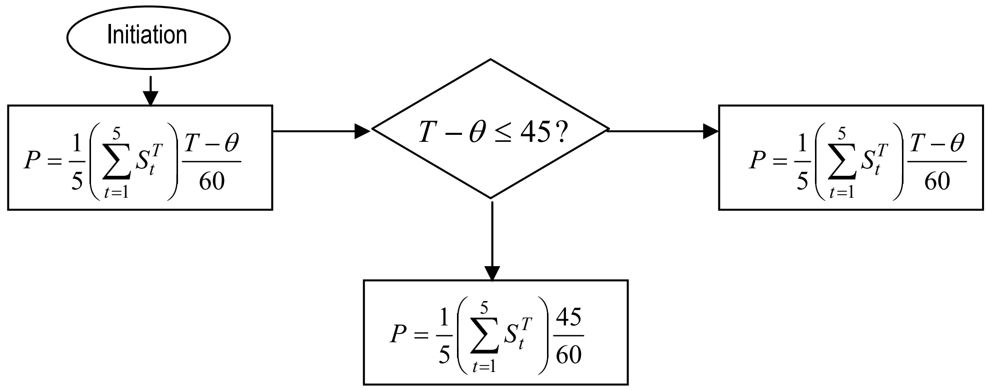
Source: Elaborated by the authors.

Figure 1. *Scheme-block "Retirement type 1 (Austria)"*

The next type of retirement, which proposed several possible alternatives for consideration in determining pension policies in Romania, is the Belgian (Figure 2).

Government of Romania has made important steps in order to increase the adequacy of pensions, reforms are needed to direct reference to early retirement, to encourage participation in working life of persons aged 50 to 60 years, thus achieving the so-called "pact between generations". This reform should make an important contribution within the meaning of acceptability and financial sustainability. In addition, promotion of occupational pension schemes could lead to increased, long-term replacement rates would also raise the standard of living of pensioners.

The process of establishing pension scheme such as 2 can be shaped (Figure 2).



where:

S_t^T – monthly salary in retirement;

T – year retirement;

θ – the entry into business.

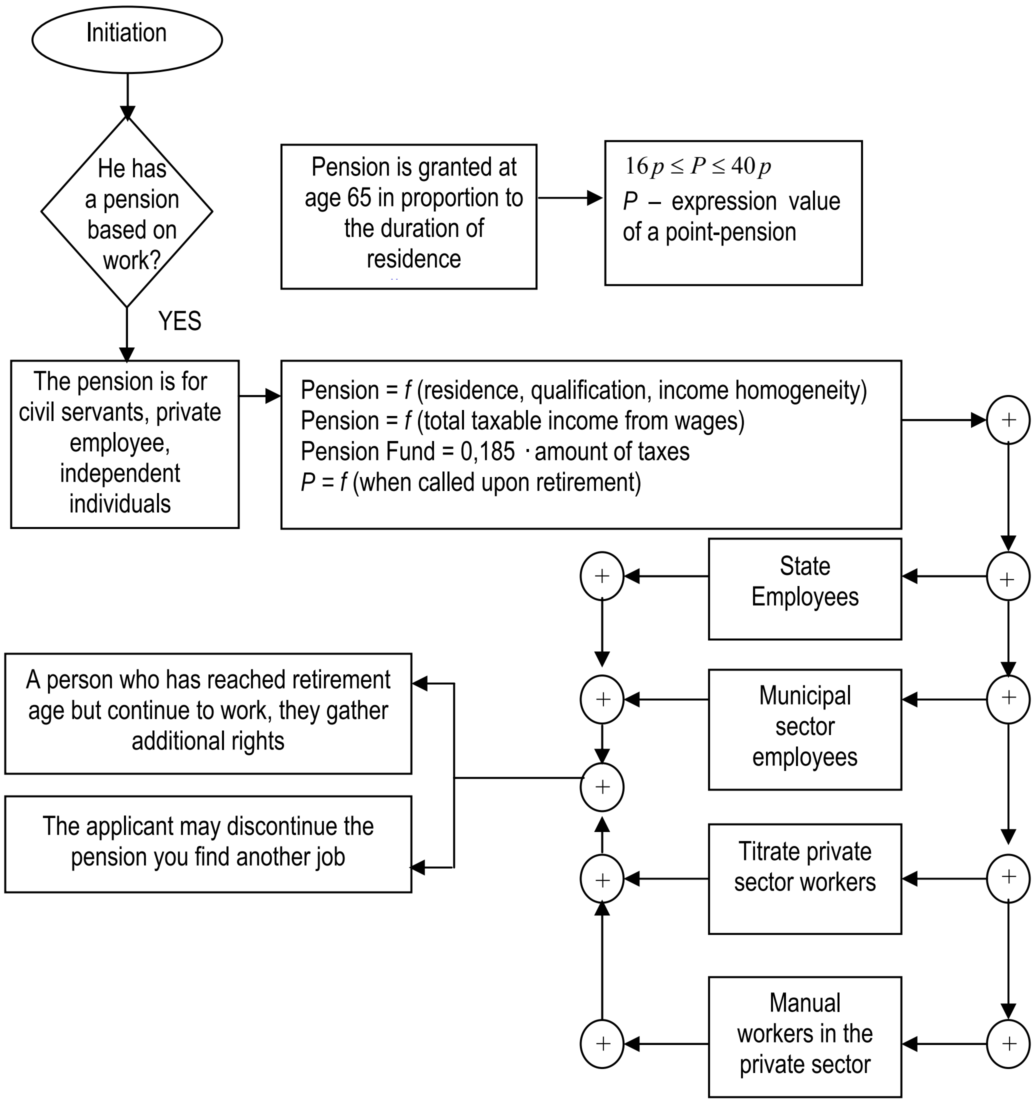
Source: Elaborated by the authors.

Figure 2. *Scheme-block "Retirement type 2 (Belgian)"*

Along with these measures confirmed increased participation in employment of persons aged 50 to 60 years, to ensure financial sustainability strategy should continue to be based on comprehensive management of social security and the reallocation of contributions collected in this regard as well and debt reduction. Savings from debt reduction could be transferred to a reserve fund for future expenses and then redirected to the segment of old age pensions.

A successful retirement scheme, in our view, has developed in Sweden, which managed to create a public pension system which meets the criterion of adequacy and that of financial stability, given that compensates workers scheduled replacement rates decrease by leaving the labor market much later. Sweden also provides financial sustainability of the pension system by expanding the reserve fund created in 1960 (it reached a value of 30% of GDP in 2005). Occupational pensions also made a notable contribution in such circumstances that covered approximately 90% of employees and usually provided an additional income amounting to approximately 10-15% of the total salary of a worker (Ginsburg, 1992). Swedish pension system provides a comprehensive computerization, an example of achieving annual figures and sent to its members a declaration of income accruing to that time and an estimate of the evolution of pension rights. Although the actuarial neutrality of the system and flexible opportunities to withdraw from the labor market should be able to prevent early retirement, there are trends to develop ways to surrender early in the labor market, particularly through medical problems through benefits for disability (Whitehouse, 2007, European Commission, 2006).

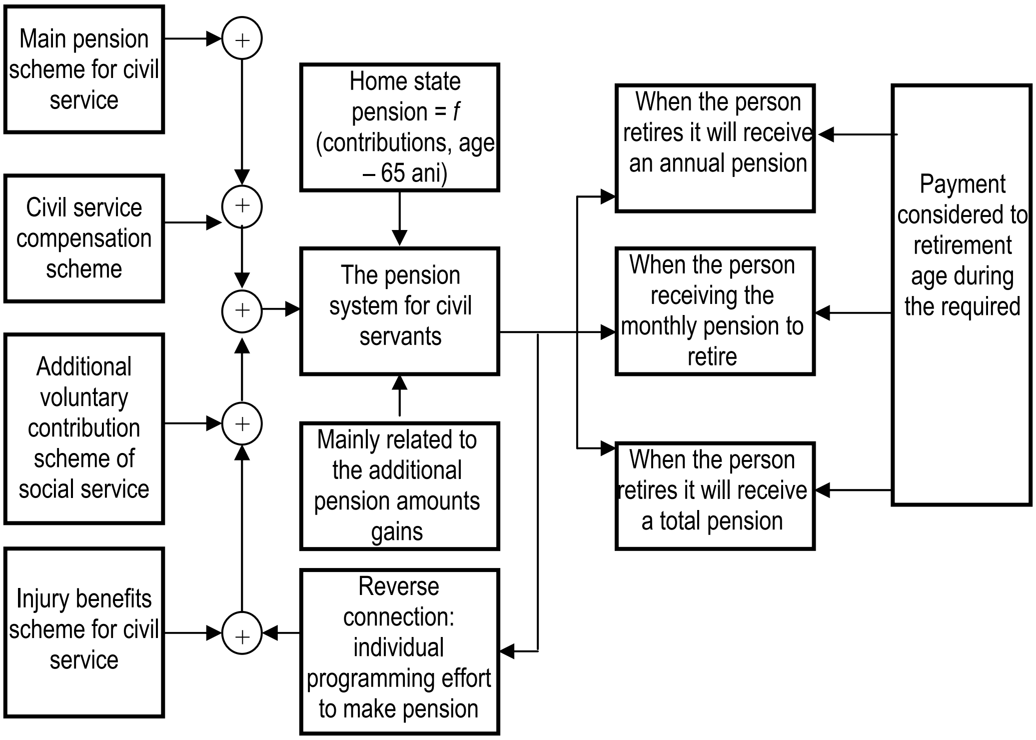
In the Swedish type of working scheme there are no rules relating to nationality or residence other than the pension rights for “child-raising years”. There is no vesting period or terms of insurance for workers in Sweden. Only the pensionable income matters. No matter if that income is earned in a month or 12 months. Pension rights is based on pensionable income. The pension system is coordinated with the tax system. According to the main rules, pension rights are calculated based on taxable income. The scheme is a defined contribution scheme funded by contributions from employers and employees and to some extent overall taxable income. Employers’ contributions are taxed as a charge on the total wages. Employee contributions are calculated as a percentage of taxable income from work. Contributions are collected by state and he is obliged to transfer 18.5% of pensionable income from the pension fund. The pension is calculated based on average lifetime earnings. There is no “maximum qualification” and any rules that have pension amount calculated according to gain income “best years”. Both accrued pension rights and pensions are linked to average earnings. A crucial thing is the aggregate value of pension rights when called upon retirement. No matter if those rights are won for 20 or 50 years (Olson, 1990). In our opinion the system is very flexible. There is no fixed retirement age in the scheme linked to earnings (but guaranteed pension is granted at 65 years regardless of sex). An insured person may apply for pension from the age of 61 years and may postpone for an indefinite period. When it is required that pension affect the amount of pension according to actuarial principles. A person who continues to work after normal retirement age continue to acquire new pension rights. An applicant may choose to eliminate a fraction of accrued pension rights and 1/4, 1/2, 3/4 of a pension. The person may also choose between the two components of the scheme (PAYG component prefinancing component) and to defer payment of the other component. An applicant may discontinue a pension payment to get another job. Swedish-type system can be modeled (Figure 3).



Source: Elaborated by the authors.

Figure 3. *Scheme-block "Retirement type 3 (Swedish)"*

A special recognition from the company to generation, which contributed to increased economic potential is found in a retirement scheme in the UK (Figure 4).



Source: Elaborated by the authors.

Figure 4. *Scheme-block "Retirement type 4 (English)"*

Through recent reforms (European Commission**,** 1995) of state pension Secondary (PSS) and "pension credit" (PA), Great Britain made progress towards pension adequacy. Rates of poverty of pensioners have fallen in recent years and is expected to decline further, given that HP will take effect fully. UK pension schemes are also characterized, for many workers, with significant contributions to the occupational and personal pension schemes, not possible involvement in a pension such a type of PSS (but not the main scheme supported by state pensions).

Subsequently, the process adequacy and sustainability of pensions depends on the extension, more than in other countries, coverage and performance of private pensions. In this respect, at least three goals for the future are born fitness. The first is the impact of DC pension plans to transfer the contributions to occupational pension schemes (Turner, 2005). The second is the possibility of increasing the amount of insurance offered by the state basic pension increases through other sources of income for retirement. The third is how to continue the process of improving incentives for continuing work after a certain age and also for subsequent savings. English government established a Pensions Commission in 2002, which can monitor the adequacy of private pension savings and in particular to assess where there is a need to “move from a voluntary approach”. In the second recent published report, by the Pensions Commission made a number of proposals such as increasing the retirement age, a redirection of income indexed to the state pension system and establishing a national pension savings scheme, with low cost and being centrally organized, in which workers have the opportunity to self-include (but with the option to abandon). The UK Government has opened a new stage in the national pensions debate, with the intention to submit a list containing their proposals for pension reform in the spring of 2006 (Whitehouse, 2007, European Commission, 2006).

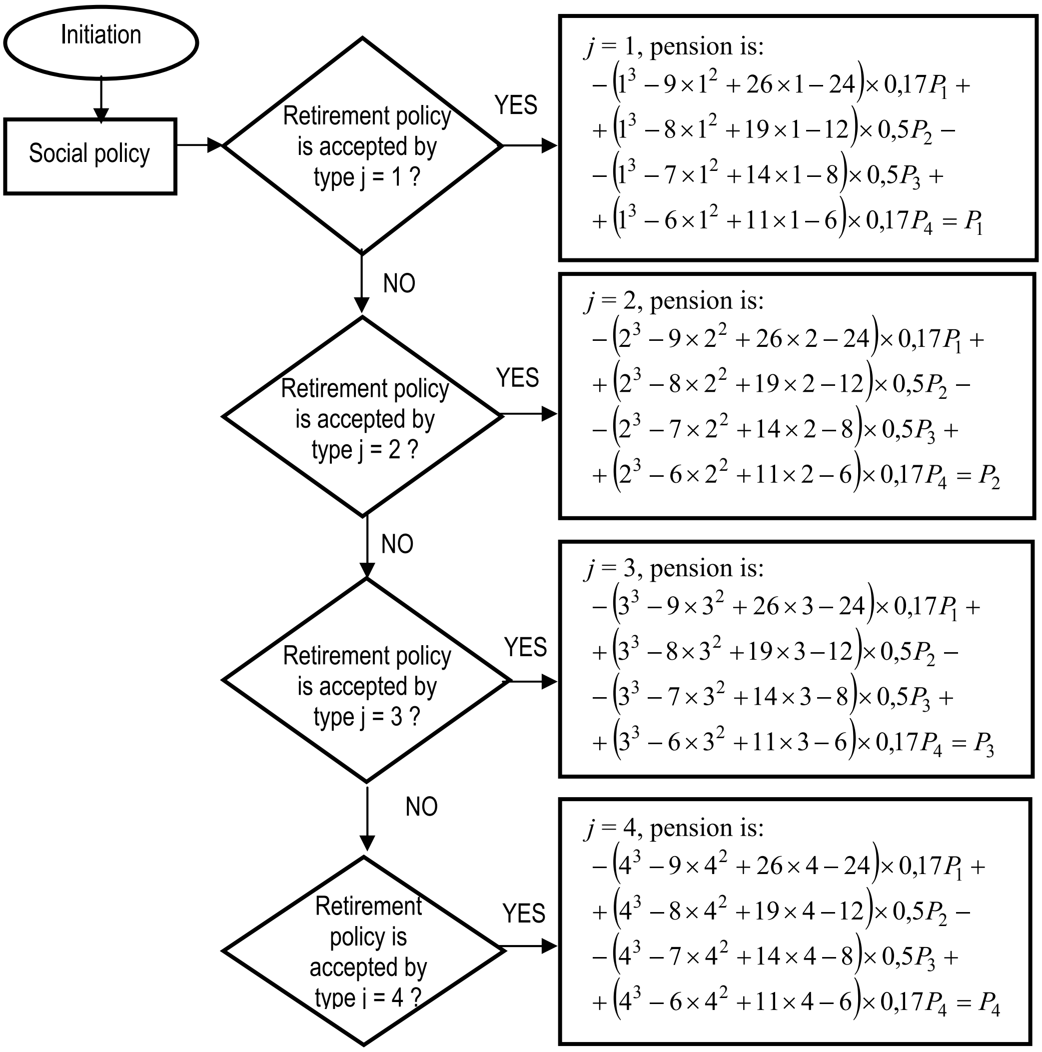
In the UK pension system for civil servants includes several elements: Main scheme of civil service pensions (SPPSC), Compensation Scheme for Civil Service (SCSC), additional voluntary contributions scheme of Social Service (SCVSSS) and Scheme Benefits for the injuries of Social Service (SPVSS). All these elements are statutory scheme of the Act of 1972. SPPSC is occupational pension scheme for civil service providing retirement benefits. SCSC includes cases of early retirement and need. SCVSSS provide officials to make additional contributions through a money purchase arrangement to provide a supplementary pension and benefits for life. SPVSS ensure income civil servants who are injured or die during service. Membership in these schemes include all civil servants (European Commision, 2007). In addition, State pension provides Main State (SLS), PSS and Guaranteed Income (VMG). PPS is given to those who have paid enough national insurance contributions during their working lives. Be paid from age 65 for men and 60 for women although women’s retirement age will rise to 65 years between 2010-2020. PSS provides a basic pension and supplementary pension is linked to earnings. The rules for calculating the classical scheme is as follows: when a person retires, it will receive an annual pension and a lump sum. The amount of these benefits depends on the payment considered retirement age and duration required. Age part-time is taken into account based on hours worked and paid full-time retirement. However, in the past there were various restrictions on persons entitled to participate in the scheme based on hours worked.

The maximum retirement age should be requested at 40 years. A person can accumulate seniority if they are working after retirement age but not more than 45 years. When the person is old enough to receive state pension, the main pension is paid in addition to traditional pensions only if the person has paid the necessary contributions. The rules of calculation can be expressed by diagram block (Figure 4).

The amount of pension $P_j, \quad j = 1, 2, 3, 4$ depends on social policy that can support one of the types discussed:

$$P_j = \left(j^3 - 6j^2 + 11 \times j - 6\right) \times 0{,}17P_4 - \left(j^3 - 7j^2 + 14 \times j - 8\right) \times 0{,}5P_3 +$$
$$+ \left(j^3 - 8j^2 + 19 \times j - 12\right) \times 0{,}5P_2 + \left(j^3 - 9j^2 + 26 \times j - 24\right) \times 0{,}17P_1 \tag{1}$$

Calculation of pension schemes is carried out after 1, 2, 3, 4, social policy directs the amount of pension (Figure 5).



Source: Elaborated by the authors.

Figure 5. *Scheme-block "pension depends on social policy"*

4. Analysis of public pension schemes in Romania

The public system of the social security pension amount for the retirement entry is determined by multiplying the annual average score achieved by the insured during the period of contribution to the value of a pension point of retirement months.

The basical theoretical calculation of the pension formula can be (IER, 2004):

$$Cp = \sum \left\{ \left[\frac{(Vba_i / Vbm_i)}{Sc} \right] \times A \times E \right\} \times Vpp \tag{2}$$

where:

Cp = amount of pension;

Vba_i = average gross income of the insured in "i";

i = year in which the subject worked;

Vbm_i = gross average income in the year "i" published in CNS;

Sc = the complete contribution;

A = coefficient of access (by type of pension like "survivor's" pension, the level of disability, etc.);

E = coefficient of elasticity (0.3% weighting for additional months worked after retirement age, so the additional 3.6% per year worked);

Vpp = value of the pension point.

For a comprehensive treatment of the pension system in Romania, one starts to analyze the amount of pension that depends on a number of factors: the average income of the insured in each year, which for reasons known from year to year changes, the average income of an individual insured at the economy, the number of years of contribution to stage what is required, the type of activity, for certain favors, called elasticity, the level of economic development at the time of retirement. An original treatment of the problem of calculating the pension can be found in IER 2004. Developing the formula, as it was originally treated, we note by $x_t, \overline{x}_t$ – average income of the insured, an insured in the national economy (or in the branch considered), $t = 1, 2, ..., T$, where T – number of years needed to achieve the complete contribution. With the report $\frac{x_t}{\overline{x}_t}$ one obtains the share of income against the average insured in the economy in t, $t = 1, 2, ..., T$. To make different in different years this report will be different, less than or greater than 1. We call these "parties" points. During $(0, T)$ policyholder will accumulate a total $\frac{x_1}{\overline{x}_1} + \frac{x_2}{\overline{x}_2} + ... + \frac{x_t}{\overline{x}_t} + ... + \frac{x_T}{\overline{x}_T} = \sum_{t=1}^{T} \frac{x_t}{\overline{x}_t}$ points, the arithmetic mean being:

$$\frac{1}{T}\left(\sum_{t=1}^{T}\frac{x_t}{\overline{x}_t}\right) \text{ points} \tag{3}$$

Access to retirement is a vector $(\overline{A})$. Policyholder may be entitled to a pension as the survivor, the level of disability, etc. Mean $\overline{A} = (A_1, A_2, ..., A_i, ..., A_\alpha)$. Depending on the specific work and of importance to society, their being put on the insured, etc., the pension may be increased under a law (elasticity pension). And elasticity of the pension is thus a vector $E = (E_1, E_2, ..., E_j, ..., E_\beta)$. To include all options possible in terms of "access to retirement", "elasticity pension", we elaborate matrix of coefficients multiplying $\gamma_{ij} = A_i \times E_j, \quad i = 1, 2,..., \alpha; \quad j = 1, 2,..., \beta$ (Table 1).

Table 1

Coefficients matrix-multiplying

Elasticity / Access	E_1	E_2	...	E_j	...	E_β
A_1	γ_{11}	γ_{12}	...	γ_{1j}	...	$\gamma_{1\beta}$
A_2	γ_{21}	γ_{22}	...	γ_{2j}	...	$\gamma_{2\beta}$
$\vdots$	$\vdots$	$\vdots$	...	$\vdots$	...	$\vdots$
A_i	γ_{i1}	γ_{i2}	...	γ_{ij}	...	$\gamma_{i\beta}$
$\vdots$	$\vdots$	$\vdots$	...	$\vdots$	...	$\vdots$
A_α	$\gamma_{\alpha 1}$	$\gamma_{\alpha 2}$	...	$\gamma_{\alpha j}$	...	$\gamma_{\alpha\beta}$

Source: Elaborated by the authors.

So policyholders, through coefficients $\gamma_{ij}, \quad i = 1, 2,..., \alpha; \quad j = 1, 2,..., \beta$, will be disadvantaged by the number of points accumulated during the interval to ensure $(0; T)$. Pension points can be expressed:

$$P_{ij} = \frac{\gamma_{ij}}{T}\left(\sum_{t=1}^{T}\frac{x_t}{\overline{x}_t}\right) \text{ points} \tag{4}$$

A point expressed value in retirement year is estimated at $V\dfrac{lei}{\text{point}}$. So pension expressed in RON will be:

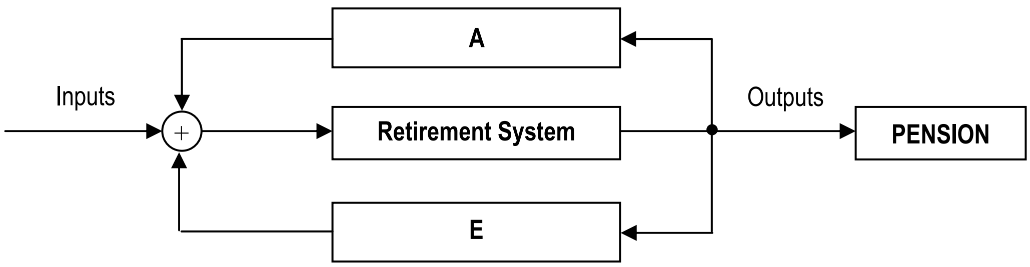
$$P_{ij} = \frac{\gamma_{ij} \times V}{T}\left(\sum_{t=1}^{T}\frac{x_t}{\overline{x}_t}\right) \text{ RON} \tag{5}$$

Establishing a pension in this way has a number of reasons: it is taken into account the whole range of activity of the insured, the insured income, average incomes in the national economy each year, in a way the country's economic crisis periods, inflation years of crisis affecting the interests of future pensioners, to ensure a certain social equity by establishing a single value of a pension point. Part low: coefficients γ_{ij}, $i = 1, 2,..., \alpha$; $j = 1, 2,..., \beta$, are constant in time. In our view, both and multiplying factors and the expression value of pension points must evolve over time, that is, they should be replaced with:

$$\gamma_{ij}^{(t)}, \quad i = 1, 2,..., \alpha; \quad j = 1, 2,..., \beta; \quad t = 1, 2,..., T$$

$$V^{(t)}, \quad t = 1, 2,..., T$$

Coefficients "access" (A) and "Elasticity" (E) can also be used by authorities as a "rules-stimulant" (Figure 6).



Source: Elaborated by the authors.

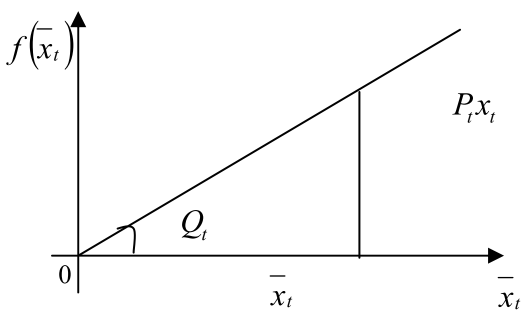
Figure 6. *Block diagram A – E*

As a "regular" retirement system, called the system tuned, serve: governments, by setting the value $V^{(t)}$ a point of pension; policyholders, with vectors A and E.

Pension can be expressed in value as calculated using the formula:

$$P_{ij}^{(t)} = \frac{\gamma_{ij}^{(t)} \times V^{(t)}}{T} \times tgQ_t \qquad (6)$$

where angle Q_t is the slope function $x_t = f(\bar{x}_t)$ (Figure 7).



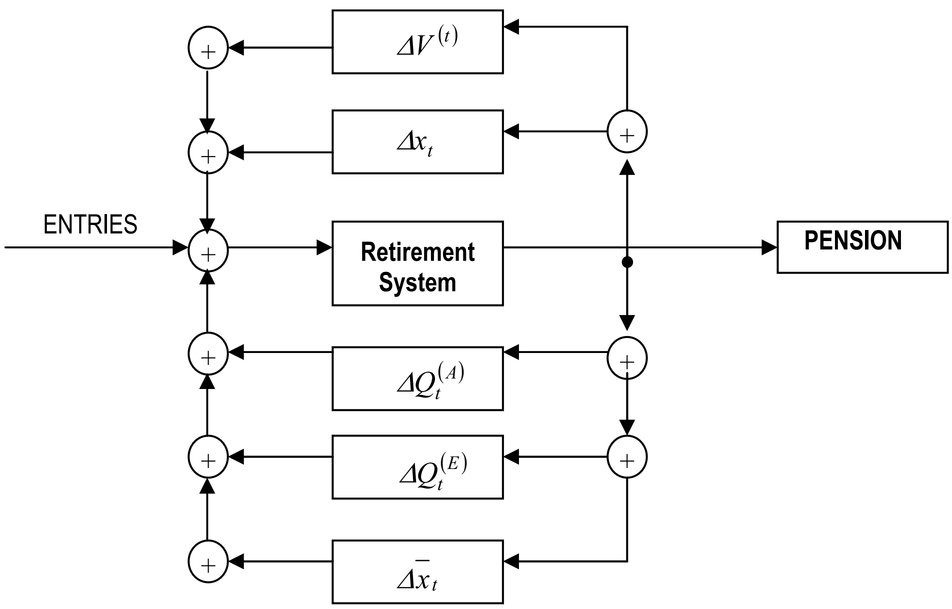
Source: Elaborated by the authors.

Figure 7. *Graphic interpretation of the points in year t*

$\frac{x_t}{\bar{x}_t} = P_t$ – points made by the insured in year *t*. $x_t = P_t \times \bar{x}_t$.

The increase or decrease of the angle Q_t depends on the a policyholder effort to earn more (Δx_t), on the government authorities who may, if their economic development allow, them increase expression of the pension point value, on the insured's effort to benefit of the coefficient *A* to increase the angle Q_t with $\Delta Q_t^{(A)}$, on the coefficient *E* to increase $\Delta Q_t^{(E)}$, of the national economic development through the media $\bar{x}_t$ may have an increase of $\Delta \bar{x}_t$. Increasing the pension point value is a consequence of GDP growth, and hence the average growth $\bar{x}_t$.

Consequently, the pension may increase, remain constant or even reduce (Figure 8).



Source: Elaborated by the authors.

Figure 8. *Adjustment system "PENSION"*

As such, public pension for full length is calculated for the entire contributory period according to three basic components: gross monthly salary of the insurers which formed the basis for calculating the individual contribution of social security achieved; gross average wage in the economy of each month contributory period and a pension point value which is set annually by law approving the budget of social security being a percentage between 30% and 50% of the gross average salary used to substantiate the state social insurance budget.

Conclusions

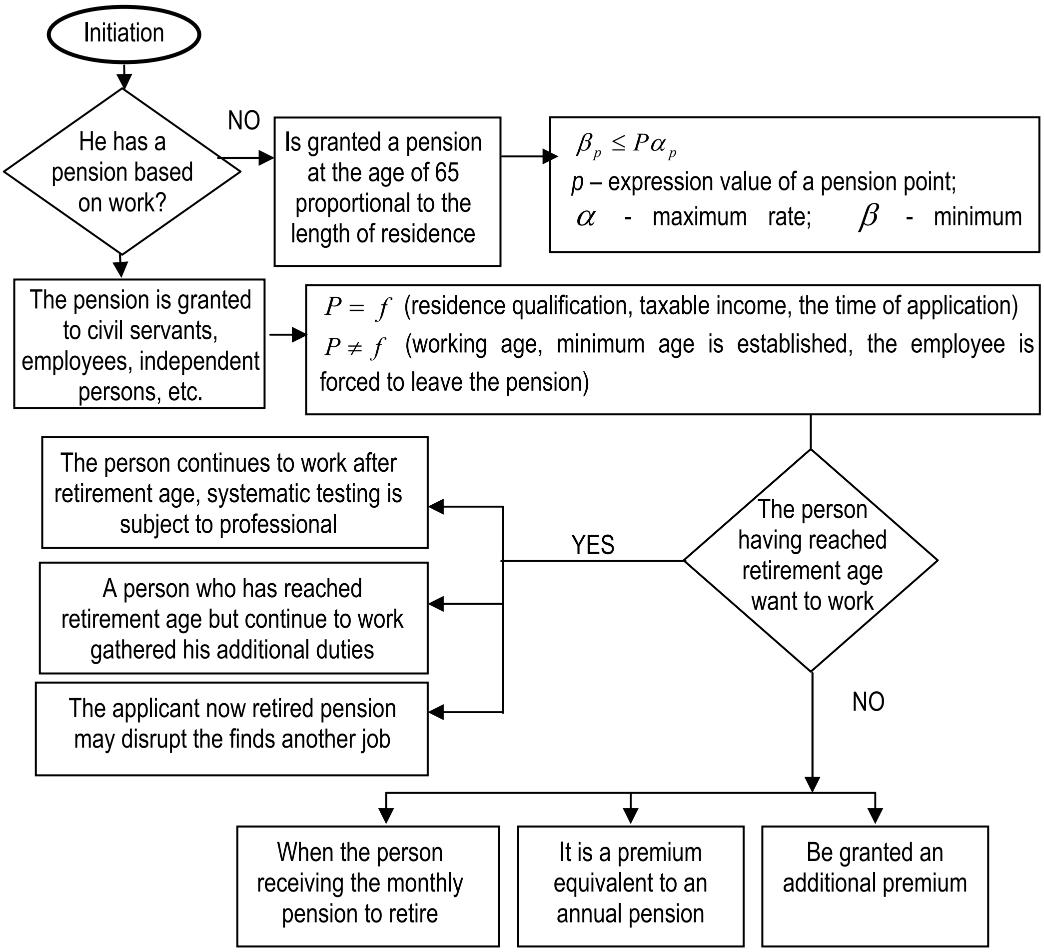
Romania, based on the economic and social factors, must prepare its retirement schemes. The basis of these elaborations can be the schemes of type 1, 2, 3, 4, which are discussed above. The current system of retirement in our country is not adequate for solving economic and social problems. According to our calculations, 27% of the active work force emigrated from Romania. The methods of pension determination in Romania along with some priorities (excluding the impact of inflation) do not always reflect the applicant contribution during his active work. Pension is determined by the formula:

$$P_{ij} = \frac{\gamma_{ij} \times V}{T}\left(\sum_{t=1}^{T}\frac{X_t}{\overline{X}_t}\right) \tag{7}$$

In the national economy the salary of some categories of specialists increases under the impact of external factors (eg, workers in the banking, insurance of goods etc.). In this case, the amount of report $\frac{X_t}{\overline{X}_t}$ reduced: some experts in the economy will be unduly disadvantaged when they apply for grant of pension (due to increased average value $\overline{X}$).

Another issue. The specialist is formed in 2/3 of his active life and only 1/3 is used for creative purposes. This asks for a review of the active period of employment, the age limit should, in our view, be flexible. In our opinion, we believe that man may receive any age pension, pension for the time being active, the contribution paid. Schematically, retirement can be represented as below (Figure 9).

Insurance schemes across from major structural changes, characterized by a multitude of principles that differ according to the difficulties to be covered by the evolution of society as a whole; a number of major trends appear aimed at studying various problems facing social security and pension schemes, social security protection of the unemployed and not least the whole system of financing social protection efforts of most European countries differ from one state to another, countries that fully reformed insurance system radical social change leading to the basic pension schemes, countries have statutory schemes further institutional reform, countries have begun to reform itself to social security pension, countries that are at the stage of negotiations and research with social partners finding a common point in starting the reform process.



Source: Elaborated by the authors.

Figure 9. *Scheme-block "Romanian pension system type"*

The basic principle of the reform of social security systems is to reduce pressure on state intervention which has direct consequences in increasing the efficiency of European social policies.

Along with the redistributive pension reform another phenomenon takes place: finding new methods and programs that promote the maintenance of working life of people in trouble and the people who are partially incapacitated for work. Long-term evolution of demographic indicators will have a number of negative effects both on revenue and expenditure of public pension insurance, but also on other public social expenditure, such as labor market itself, with indirect implications on capital market. The principle governing the redistributive pension systems makes a group active in the labor market steadily decreasing to balance a group of people withdrawn from the labor market which is still growing.

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