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SCIENTIFIC REVIEW

The Macroeconomic Framework of the Functioning of Public Compulsory Pension Insurance

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ABSTRACT *– Unfavorable demographic trends, economic and political crisis created the need to analyze the current situation in the pension system and created the concept of the modern system. Existing public and private poles are the main causes of the crisis, especially the pension system based on intergenerational solidarity that has become unsustainable. The main problem is that the rate of the elderly population increases, the birth rate decrease, and revenues decreasing number of employees is not sufficient to support consumption ie. pension benefits a large number of pensioners. The sustainability of the system is reflected in the fact that the net income of pension funds should be increased to the same extent as net expenses, in order to maintain a constant net power. Maintaining living standards requires expenditure to finance the deficit of pension funds, which is achieved by budget transfers. Maintaining the balance of revenues and expenditures of pension funds, and the three pension pillars and the state budget is a priority to maintain economic stability, because the lack of purchasing power of pensioners causing social insecurity and unfavorable situation in public finances and the financial markets.*

KEY WORDS: *social insurance, pension system, pension benefits, pension system reform, pension plans, pension models*

Introduction

Pension systems in the period of globalization and transition **are the** priority national **goal,** which is standardized in international agreements and directives and action plans. The system is specific to each country in terms of models, strategies and plans. A comparative analysis of pension systems of more countries can find solutions to existing problems. For directions successful reforms, useful experience to the same extent, developed, developing and transition countries. Pension costs, pension fund deficits, an aging population, the decline in fertility, increase in average age, unemployment, and increased number of

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pensioners are the main causes of unsustainable pension systems. In this respect, the effects of changes depend primarily from the makers of macroeconomic and social policies in terms of taking urgent measures for the development and implementation of the national strategy of the pension system. This is confirmed by the fact that in times of economic crisis **is** expected increase in pension costs and economists around the world interested in the promotion and creation of a new pension system.

In addition to the existing state PAYG system, it is necessary to create other capitalized private pension systems. Realization of pension welfare would affect macroeconomic stability, to increase savings, economic growth, and productivity. The paper will show successful models of reform in certain countries of the capitalized pension system that contributed to the development of capital markets and individual and common welfare. The public "pay as go" pension system is largely represented in all countries and is implemented with the additional "fully funded" forms of pension insurance, because in this way increase pension benefits. The capitalization of the pension system becomes more and more important due to insufficient government funding. Reform and differentiation of pension systems in the European Union is a central question in terms of structural reforms. In the process of the reform Serbia is obliged to, based on the experiences of other countries, the implementation of the most appropriate model for reform of pension system in line with international norms and standards, as well as the norms and standards of the European Union.

The main risks of mandatory pension system

Proper functioning of the compulsory pension insurance is carried out in the macroeconomic framework, including macroeconomic stability. Will the pension system operate without the risk depends on the degree to which **are** present political, financial or social pressures on the mandatory pension system? The pension crisis caused by negative demographic, economic and political factors requires reform of the pension system. Adequate pension reform will effect on the macroeconomic performance such as employment, economic growth, lower inflation, and efficiency of the financial markets.

Table 1. The main demographic risks of mandatory pension system

	Unfunded public PAYG	Private funded - FF
Demographic risks		
Increasing dependency ratios	The worsening financing	There is no direct effect on the level of funding and benefits
Workforce reduction	Reducing salaries and future benefits	Reducing the rate of return on capital and future benefits

Source: Holzmann, R. A ,World Bank Persepctive on Pension Reform, http://pensionreform.ru/files/24691/eng11.pdf

In the first case, the assumption is that the real productivity unchanged, despite the negative demographic trend. It is assumed that t is the generation of two times greater compared to the next-generation t + 1, but the level of productivity is not changed despite the fact that the real earnings per capita were twice greater: $W_{t+1} = 2W_t$. Based on the well-known PAYG system formula, it appears that the $N_t^w W_t b_t = N_t^r P_t$ respectively, despite the reduction replacement ratios $\frac{P_t}{W_t}$ real pension P_t remains the same. In this case, capitalized (fully funded) systems do not have any risks in a situation where a higher level of productivity per capita and when the higher real wages, which requires that the demand of existing employees is the same in financial assets balance of social product, and consequently the existing pensioners have a realistic anticipated retirement.[4]

In the second case, the problem occurs when there is productivity growth, which does not offset the negative demographic trend. The assumption is that the $N_t = 2N_t + 1$ and productivity remains unchanged $W_t = W_{t+1}$. On the basis of the above payg system formulas can be noted that every future retiree has a halved retirement $P_{t+1} = \frac{P_t}{2}$, or the contribution rate is twice as high $b_{t+1} = 2b_t$ to maintain pension at the same level $P_{t+1}A = P_t$. Neither option is not viable in the long term. The problem can not be solved using transition PAYG (**in** fully funded) system, because then there would **not** be sufficient funding for the older generation demand**,** due to the much smaller working population. Future real pensions in the capitalized system are lower than expected, due to higher prices and lower interest rates **and** due to the size of the workforce. On this basis, it is concluded that the problem is not demographic but the fiscal.

To what extent a country is economically stable, may be determined based on a number of indicators such as real GDP growth, inflation, fiscal deficit, public debt and the share of state financial support for economic development, as a percentage of the state budget. Without a real GDP, compulsory pension systems are influenced by multiple macroeconomic shocks (and risks). One of the most important factors to mitigate macroeconomic shocks is employment. Uncertainty about the level of employment in the future and creates dissatisfaction among employees with retirees, because changing the level of their income. According to Barr, N. (2000), the main determinant of macroeconomic stability, the effect of productivity at the national level, is a positive balance in the state budget (GDP). Dealing with macroeconomic shocks implies political activities such as: first, an increase in labor productivity of each worker, and secondly, increasing the number of employees. In order to increase productivity it is necessary to provide: investment capital, improve the work quality and corresponding investment and using the appropriate human capital.

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[4] Barr, N. (2000). „Reforming Pensions: myths, truths and policy choices“, IMF Working Pepers, 139, IMF, Fiscal Affairs Department, p. 33.

In order to increase productivity it is necessary to provide: the capital investment, increase the quality of the work with the appropriate investments and using the appropriate human capital. In order to increase the number of employees policy measures are required to increase labor force: favorable conditions for child care, tax policy which does not preclude employment with limited hours, raising the retirement age, the direct import of labor force. Achieving macro stability is possible by the strengthening economic growth, in the same extent and to enhance long-term sustainability and financing pay system (Barr, N., 2000).

Another factor affecting economic stability and uncertainty of income of employees and pensioners is inflation. Uncertainty of income of employees and pensioners increases due to inflation and unstable prices. Inflation risk is defined as the risk that can affect the accumulated pension assets and the purchasing power of pensioners in the conditions of unstable price. Private mandatory pension funds are at greater risk of PAYG system, because they use the accumulated capital for granting a pension. PAYG systems financed by the working population are protected to some extent from inflation risks, because the state guarantees for pension indexation. When funded funds, individuals can protect themselves from risk if they buy a certain guaranteed state funds, and inflation-indexed annuities. Longevity risk is not represented in PAYG systems, as opposed to funded systems. In funded systems, individuals pay annuities, on the other hand there are certain disadvantages related to increased life of the elderly population. Insurance companies have information, when nude anuitet individuals, about the average age of the previous and current generations, but do not take into account the possibility of longevity.

The second risk relates to the individuals with forecast the lower life expectancy than the average age, so that they are not interested in annuities that are based on the average age. Insurance companies are forced, because of the expected longevity projected for the projected period, to raise the price of annuities. For individuals who have the probability for high life expectancy, compared to the projected longevity, insurance companies adjust and raise once again the cost of annuities, which creates additional risk willingness of individuals to accept that offer of insurance companies. Under the political risks are implied political action that substantially alters the amount of future pension benefits. The assumption is that the in PAYG systems are higher risks, due to frequent changes of government and political goals and decisions about frequent changes in legal regulations. These risks are less represented in the funded ("fully funded") systems, as in developed countries pensioners have guaranteed property rights. The state or political authority directs mandatory pension systems. The government has realized the parametric reforms by political measures (Political measures are implemented parametric reforms) to eliminate the risks and mitigate the burden on the state budget pension costs, such as:

- an increase incontribution rates, which falls on the employer and employees. This causes uncertainty for employees, because it affects the reduction of their salaries and for the employer creates uncertainty regarding the cost of production and profitability;
- decrease of the net replacement rates, so reducing the share of average pension benefits in the average net earnings employees. Reducing pension benefits creates uncertainty for current employees and future retirees;
- a combination of the options listed by the state that leads policy mitigating the effects of demographic aging.

In this situation, despite the applied policy choices of different combinations of parameters, in order to reduce the cost of the state budget and pension fund, adverse effects related to revenues still have employees and retirees. (Börsch-Supan and Reil-Held, 1998). Regarding funded system Barr, N. (2013) argues that in the "pure form" of this system, there are annuity risks due to fluctuations in the financial market. The risks are allocated to the individual, but can be extended distribution of risk on the government, which is the guarantor of the insured. In this system, employees set aside a certain amount of their earnings to accumulate financial resources and based on them receiving certain annuities. In addition, the risk borne by the individual at the time when he retired, because faced with different prices when purchasing an annuity. Risks are expanded and because of return future rates on accumulated funds and due to demographic risks such as projecting mortality rates. At the moment when an individual buys an annuity from an annuity seller, the risk falls on the seller, ie. annuity provider (Barr, N., 2013).

Barr, N. (2013) examined the distribution of risk in different pension systems. In "pure" PAYG system, which is financed from the Social Insurance Fund, the allocation of funding is intergenerational. The risk is distributed between generations of employees, with height adjustment contributions. Present and future contributions vary depending on the amount of expenditures of the pension system, ie. the height of the debt. Risk refers to the employee's income which may vary, and this result in a change in the amount of contribution. It relieves successful if there is a capital that has accumulated in the past. In systems that are funded partly from social insurance funds and partly from general state taxes, the risks are distributed to taxpayers, borrowing from government funds, distribution of risk to current and future generations. PAYG system in practice is not entirely clear, because in different countries at the same time are combined the distribution of risk in the form of contributions and pension benefits of the employees and retirees (Barr, N., 2013).

The responsibility of public PAYG system has the state, because of inability to pay appropriate pension benefits, due to the deficit of public budget in the short term perspective. Another political risk is when the amount of a pension benefits depends on the behavior of the government. State increases public taxes and reduce pensioners income to reduce the deficit of the state budget.

The behavior of the government can cause long-term risks, when for personal use in order to gain votes in political elections, promises to retirees a pension increase, which in reality do not have long-term character.

Recommended by the World Bank, certain elements of risk management in the process of reforming the pension system, such as: credibility, partnership, knowledge transfer, building and strengthening of appropriate reform capacity, flexibility, respect for property rights, implementation experiences and criteria of reforms in other countries, but with adaptation to the specifics of the pension systems. World Bank approach is that it is necessary to engage in constructive dialogue in order to be accepted without confrontation guidelines of various international institutions and donors of bilateral agreements. Dialogues should take into account the guidelines of the International Labor Organization (ILO), which has traditionally had opposing views on strengthening funded at the expense of underfunded mandatory pension systems. Exchange of opinions includes the implementation of the most recent consensus in the field of social security. Risk management and reform pension systems, entail certain financial means, and the necessity of foreign partnerships with corresponding international bank in the financial market.

The world has largely focus attention on the pension system, because of the increasing need to cover pension benefits of socially excluded groups and provide all conditions to enable older population, economic independence and the necessary conditions for living standards. Worldwide, 25% of the population covered by adequate social protection, and half has no social protection. The level of social protection depends on the level of GDP, employment rates in the relevant sectors of the economy, the share of self-employed in the labor market. In order to overcome the problem of social protection recommended modification of the contribution rate to social security, to be available to many socially disadvantaged, ie. pension insurance are recommended and structural reforms in the macroeconomic environment in order to create conditions for the functioning of the pension system.

Risk management has two moments - before and after the occurrence of the risk. Efficiency of management is in the functioning of a risk, to prevent the occurrence of social risk. Preferred is a variant remove risk ex ante than ex post mitigate the negative effects of the formation of social risk. Preventive strategy reduces the possibility of undesirable effects of risk and increases the expected income of the individual and reduces its incongruity i.e. uncertainty. This strategy is applied in the context of social security, macroeconomic policy, employment policy, fiscal, investment policy, and others.

Table 2. The main macroeconomic risks of mandatory pension system

Macroeconomic risks	Public unfunded - PAYG	Private funded – FF
The negative consequences of negative shocks	Lower individual income (but the effects can be mitigated))	Possible negative effects on financing (which cannot be mitigated)
Unemployment	Lower individual income (but the effects can be mitigated)	No effects on financing, but certain individual income in the future will have less profit
Low wage growth	Lower individual income, but that can be mitigated	No effects on financing or lower benefits
The financial crisis (depression, war, high inflation, natural disasters)	Possible lower revenues, but the effects can be mitigated	Accumulated funds (share capital) is reduced or eliminated
Low rate of return	No direct effects on the financing and individual income (benefits)	No effects on financing or lower benefits

Source: Holzmann, R. A ,World Bank Persepctive on Pension Reform, http://pensionreform.ru/files/24691/eng11.pdf

Social policy measures are mainly related to the reduction of risks in the labor market due to the high level of unemployment, low salaries, and pensions. Management of various risks is possible by using different strategies:

- Migration strategy is applied preventive and for mitigating the demographic risks.
- The appropriate population policy has a preventive action to prevent risks and consequently the actions to reduce migration trends.
- Protective strategies are formulated in order to mitigate the effects of risk: when individuals do not save, do not have sufficient income to repay the loan, when borrow money, or when they rely only on the income from the state. Spending most minimal revenue has resulted in poverty and the inability to cover basic needs.
- Interventions in the labor market.

Probably one of the most important instruments of preventive risk prevention and economic and social polarization is the labor market management. Interventions in the labor market provide access to useful work and support age population. Stable consumption, as a rule, provides savings and formal social (pension, health insurance for, etc.) and informal security (family, marriage). Interventions in the labor market imply the possibility of the existence of private savings and health insurance, an active policy for retraining the unemployed and for social benefits for the unemployed work force, defining minimal earnings.

The concept of the World Bank (2005) proposed the pension system with the five pillars. Zero pillar is designed with the goal that social pensions provide social security to the poor and pensioners who did not participate with their work in the formal sector. Multipillar system protects individuals from a variety of demographic, economic, social and political risks. The sustainability of macroeconomic stability in the context of the sustainability of the pension system largely depends on the political actors, because the government needs to provide effective regulatory measures to control pension systems, financial and annuity market with the implementation of certain legal regulations and "rules that are uniform, fair, swift and predictable".

Characteristics of the pension system in Serbia

Effects of insurance on economic growth is reflected in: 1. increasing the financial security of individuals, companies and countries, 2. stimulating trade, exchange and entrepreneurship, such as economic and trade companies from providing risk 3. What financial relieves the public and state funds, 4. accumulation of capital, and increase the channeling of savings to investment and economic development, 5. creating conditions for a quality standard of living and social security. The inflow of foreign direct investment depends on the business environment, market conditions and institutional environment that is very unfavorable in Serbia. There are numerous barriers to business entrepreneurs and attracting foreign investment. They are manifested in the following areas: obtaining non-specific permits for land, lack of employment of workers, registration of property, enforcement of contracts in court, paying taxes, and other conditions of business, based on the report "Doing Business 2016" shows that Serbia did not meet the criteria of business which refers to the transfer of ownership, due to the complicated and lengthy procedures in 2015. World Bank (2016) has published in its report that Serbia is on the 139th place for the issuance of building permits to foreign investors, in respect of which it takes 18 procedures and 272 days. Serbia is, as far as international trade and the fulfillment of the contract, is on the 96th, regarding starting a business on the 65th and obtaining a loan on the 55th place.[5]

The report concluded that it is necessary that the Republic of Serbia improve regulatory practices, particularly in terms of cost for the building permit, as the highest in Europe and Central Asia (26% of the value of the object that is being built). For business and foreign investments, the situation is very unfavorable. The problem for foreign investors, paying taxes, 39.7% of the total profit, where investors need to pay 61.87 per year. No fewer than 635 days of entry into force of foreign investors,

[5]A World Bank Group Flagship Report. (2016). „Doing Business 2016: measuring regulatory quality and efficiency“, The World Bank, p. 231.

legal certainty for investors is listed with 11 (0-18). Serbia is ranked 81st in respect of investors, out of 189 countries in the world, which is the highest and worst ranking compared to other countries in Europe. Indicators of business conditions show characteristics of the business environment. They are based on the measurement and analysis indicates the necessary reforms, to be held regular jobs and all investment activities, licensing, property registration. This would enable business conditions, necessary to start a new trade, especially export contracts, in order to create a suitable business environment for economic growth, financial market development, increasing national income.

Table 3. Global age index (Global Index AgeWatch) for the observed countries (2015)

Country	Rate in the world	Index	Environmental	Ability	Health	Pension income (the social pensions)
United Kingdom	10	79,2	76,78	65,68	70,06	76,29
Germany	4	84,31	78,64	68,45	75,59	80,93
Chile	21	66,27	66,02	49,52	74,37	70,82
Mexico	33	56,26	66,67	28,67	64,55	73,38
Hungary	39	52,18	63,15	35,83	47,45	73,17
Croatia	61	43,97	58,88	29,98	55,28	50,5
Serbia	**66**	**41,7**	**60,2**	**21,2**	**45,32**	**65,83**

Source: http://countryeconomy.com

The main role and responsibility in the creation of favorable conditions for attracting greenfield and brownfield investments a country, the host country government. At the macro, national level this implies: macroeconomic stability, the quality of laws, regulation of foreign debt, cooperation with the European Union and other international partners, the low level of potential risk and implementation of promotional policies and strategies at the micro (local) level: developed infrastructure, a wider offer of building land, efficient administration, the reliability of the local government, good location and financial benefits. It should also be greater cooperation and greater inflow from Russia, especially because of the current political and economic relations. In addition to Russia, which has a "strong investment and economic power," countries that do not invest in Serbia are Switzerland, Japan and China.

The right choice of SDI and related economic structures, are necessary conditions to achieve the positive impact of investments. Economic growth could be achieved by attracting greenfield investments, and to change their structure in favor of the industry, ie. production and exports. The only thing would be to "achieve a level of positive impact of FDI to GDP, exports, employment, and the economy as a whole." In contrast to countries where there has been a dynamic and stimulating growth, Serbia has had negative tendencies in the process of transition and privatization, in terms of attracting FDI, which had an adverse impact on the increase in unemployment and a reduction of GDP.

Empirical evidence suggests that there is a positive relationship between financial sector development, economic growth, sustainability of the pension system and reducing poverty. Improving the performance of the financial sector, such as, for example, increased savings by individuals, and insured employed in pension funds, have a positive effect on the national saving, increase of GDP, increasing growth, and consequently to reduce poverty. And vice versa - Poverty reduction has a beneficial effect on the financial activities and economic growth, while "virtuous cycle" closes.[6]

It is estimated that in Serbia there are currently no conditions for the introduction of the second pillar, as the financial market is underdeveloped and there are no developed companies. Within the first pillar of changes were made in how the indexing of pensions, expanded the base for payment of contributions, extended retirement age.

However, because pensioners are vulnerable and disadvantaged groups, in 2014 7.9% of the poor in the age group of 46-64 years, and 7.4% of the poor in the group of 65 years and more, it is necessary to introduce new reforms to order to improve their position. It is necessary to:

- increase the contribution rate for the Pension and Disability Insurance (PIO Fund)
- paid from the state budget expenditures for health insurance pensioners for care and assistance and physical damage (instead of the Pension Fund), and
- changing the way pension indexation and the indexation of previous earnings with the indicator "net replacement rate" because pensioners unfairly denied the benefits of economic progress in the future.[7]

The reform of the pension system, economic development and financial restructuring is impossible without the development of incentives. These incentives can provide development banks. In the world there are more models of development banks, and one of them could be applied in Serbia depends on the assessment of experts. National development bank would be in their work: to follow the successful examples from Europe and the world; which does not represent the interests of the group, already has the motive "to create equal opportunities for all"; which includes financial democracy.

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[6] Tejerina,L.,Bouillon, C. Demaestri, E.G. (2006). „Access to Financial Services and Poverty Reduction in Latin America and Caribbean, u: Tejerina, L., Bouillon, C., Demaestri, E.G., eds., Financial Services and Poverty Reduction in Latin America and Caribbean, Inter-American Development Bank (IDB),Washington, p. 9-10.

[7] Mijatović, B. (2015). „Siromaštvo u Srbiji u 2014“, Tim za socijalno uključivanje i smanjenje siromaštvaVlade RS, Beograd, str. 11.

Conlusion

Interconnection security and economic growth has been demonstrated, as through private pension funds encourages savings and loans for economic investments. Pension funds pay out benefits only after many years, so use long-term investments insured until the time of their retirement. In this way, the accumulated capital is used for investment capital investments, encouraging exports and economic growth, which has a positive impact on national competitiveness. Theoretically and empirically it was shown that countries with developed financial markets, long speaking, have a stable economy and dynamic growth. In developed countries, the insurance had a impact on economic growth. In contrast, countries that are in transition and less developed countries, should encourage non-life insurance to a greater extent, because it has shown that it affects economic growth alike, and in developed and developing countries.

In countries in transition, such as the Republic of Serbia, there is an economic crisis, the collapse of a large number of companies in the privatization process and the process of integration and the European Union. Member States and the candidate countries have an obligation to respect the directives and programs of the European Union in terms of economic restructuring, reforms of pension systems and social inclusion. In Serbia, there was a crisis in the pension system due to the rich of factors such as the high mortality rate, aging population, the decline in fertility and birth rates, unemployment, inadequate economic structure, lack of competitiveness of the economy, foreign trade deficit, the deficit in the gross domestic product, as well as public debt. Appropriate economic policies, the choice of suitable foreign partners, the correct choice of greenfield foreign direct investment, would create the conditions for industrial development, increase exports, employment, and an increase in GDP, which would have a positive impact on the rate increase in net earnings, adequacy of pension compensation and sustainability of the pension system.

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References

A World Bank Group Flagship Report. 2016. „Doing Business 2016: measuring regulatory quality and efficiency." The World Bank.

Barr, N. 2000. „Reforming Pensions: Myths, Truths and Policy Choices." IMF Working Pepers, 139, IMF, Fiscal Affairs Department.

Holzmann, R. A. World Bank Persepctive on Pension Reform, http://pensionreform.ru/files/24691/eng11.pdf.

Mijatović, B. 2015. *Siromaštvo u Srbiji u 2014.* Beograd: Tim za socijalno uključivanje i smanjenje siromaštvaVlade RS.

Tejerina, L., Bouillon, C. Demaestri, E.G. 2006. „Access to Financial Services and Poverty Reduction in Latin America and Caribbean." In *Financial Services and Poverty Reduction in Latin America and Caribbean*, eds. Tejerina, L., Bouillon, C. Demaestri, E. G. Washington: Inter-American Development Bank (IDB).

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