Public Versus Private Pension System: Albanian Case

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Abstract: In most of the countries, in these last years, pension reforms are a real challenge for the governments. There exist four main criteria classifying and categorizing pension systems around the world: 1- Who manages the system (public / private); 2- How the coverage is decided (Employment-related / Universal and Means-tested); 3- How benefits are calculated (defined contribution / defined benefit); 4- How benefit are financed (PAYG / Fully Funded).
This study focuses in these criteria, by comparing the public and private pension systems in general terms. A special focus is also given to the Albanian case and recommendations for the future reforms take place.

Keywords: Pensions, Private, Public, Albania

1. Introduction

Due to differentiations of countries in their population structure, political and economical approaches there exist different pension systems. Generally, the community divides the pensions into two major groups, private and public ones. The characteristics of these two groups are often explained such as in the following table:

Table1. General Categorization of Public and Private Pensions

Dichotomies:	*Cluster 1*	*Cluster 2*
1. Management:	public	private
2. Finance:	pay-as-you-go	funded
3. Participation:	mandatory	voluntary
4. Entitlement:	defined benefit	defined contribution
5. Source of funding:	payroll tax	individual saving
6. Nature:	redistributive (solidarity)	actuarially fair (insurance)
7. Reaction to demography:	collapsing	resistance
8. Macroeconomic effect:	deficit	healthy growth
9. Risk:	political	market
10. Who takes care:	paternalistic state	self-reliant individual
11. In general:	bad	good

Maria Augusztinovics, Chapter 4: Pension Systems and Reforms in the Transition Economies, Economic Survey of Europe, 1999, No.3

However it must be admitted that this division gives us a general picture of the extremes related to the characteristics of pension systems. The main idea is not to divide the systems into 'yes or no' positions, but to clearly identify the variations between these systems in order to decide for the optimal system for country's condition.

Four main criteria are used while classifying pension systems around the world as below:

1. Who manages the system (public / private)
2. How the coverage is decided (Employment-related / Universal and Means- tested)
3. How benefits are calculated (defined contribution / defined benefit)
4. How benefit are financed (PAYG / Fully Funded)

This study will focus in these criteria, the way the system is managed, the coverage decision, benefits calculations and the benefits management, which have largely been discussed because of the demographic trends this last century through the world.

According to World Bank, **Pay-as-you-go (PAYG or PAYGO)** schemes are defined as "intergenerational solidarity" schemes because the outgoings to pay pensions to today's pensioners are paid for by the contributions of today's workers and employers. These schemes are **unfunded pension schemes**, which mean that the contributors provide retirement benefits to old-age participants in the scheme, but do not save money to meet future obligations. Since this scheme is based on the rate of beneficiaries to contributors, the system can often be face to face to problems relating to demographic trend. In these last decades, this problem is more obvious given that a lot of countries have a tendency toward an aging population which means that the dependency ratio will significantly decrease from 65 in 1950 to 57% in 2050 (Appendix A). In this situation, PAYG scheme become financially unsustainable.

After fall of communism system, Law no. 7703, of 11.05.1993, "Social insurance in the Republic of Albania" was drafted and implemented. The old pension scheme was a type of social help scheme, but the Law tried to replace it with a mandatory public scheme with PAYG benefits. This scheme would be financed through employers and employees' benefits and would guarantee the fulfillment of social-economic rights in the field of life insurance. The Law 7923: "Regarding supplementary pensions and private pension institutions", in 1995, allowed the implementation of the new voluntary column of private supplementary pensions. This column would provide supplementary benefits for the elderly compared to those of public mandatory scheme. The first private institution started its activity in 2006. The occupation percentage of the third pillar remains very low for the Albanian market.

2. Pension Reforms Proposed by World Bank

The traditional pension system, the PAYG system is founded to be the most applied system but after the World Bank's proposal in 1994, a lot of countries passed from unfunded system, i.e. PAYG system, to a fully funded one. Apart these two forms, there are also other two important pension systems. One of them is Provident Pension Fund system applied in around 20 countries, such as Malaysia, Singapore and Hong Kong, (Bateman and Piggott 1997) and the second one is Notional Defined Contribution system applied in Latvia, Sweden, Italy and Poland. Table 2 summarizes the overall classification of pension reforms.

Table 2. Classification of Pension Reforms

Change From	To	Examples (Countries)
PAYG Defined Benefit	Fully funded defined contribution (Individual Accounts)	Chile, Argentina, Bolivia, Colombia, Mexico, Peru, Hungary, Kazakhstan
	Notional defined contribution	Latvia, Poland, Sweden
	Employer-sponsored defined contribution system	OECD countries (e.g. Australia, Denmark, Switzerland)
DC-Provident Funds	PAYG system	Indonesia, Nigeria
No formal pension system	New system	Angora, Guatemala, Mozambique, Oman, Zimbabwe

Source: Based on Schwarz and Demirguc-Kunt(1999)

Based on the forecasted problems of PAYG schemes, World Bank (Holzmann, 1999) has proposed three possible reforms regarding pension system which will be summarized below.

Reform of PAYG

The reforming of PAYG consists on changing the parameters of pensions system such as retirement age, accrual factors, length of assessment period, indexation, etc. in order to increase savings that make possible the balance of system in short-medium term. There does not exist a fixed formula regarding the amplitude of parameter changes, which means that these changes are politically dependent. *Politicians cannot make a convincing commitment that the proposed "parametric" reform is a lasting one (i.e., it puts the scheme on a sound, long-term financial basis) and they have no incentive to change the benefit/contribution structure for political reasons in the future*. (Holzmann, 1999)

There are two main reasons why politicians are unwilling to have such reform. The first reason is that the public will have doubt in the personal benefits of the politicians while setting up a "parametric" reform and the politicians do not want to be "victim" of such accusations. The second reason is that the beneficial effects of reform will appear after a long time and the politicians will find the reform inefficient due to this time inconsistency.

Another kind of reform to the PAYG system is the Notional Defined Contribution (NDC) system. One of the well-known examples of this system is the case of Chile or so-called the Chilean-style funded scheme. This system tries to look like a funded scheme. Each contribution is recorded in the contributors' account and for each year this account grows based on notional rate of return (according to changes in GDP, wages, demography, etc.). At the retirement age, the accumulated sum is given back based on the interest rates and mortality tables, as it is for the funded system. Even if this system is transparent, the demographic trends toward population aging will enforce the governments to generate a certain fund in order to equilibrate the contributions to benefits.

Rapid and complete shift to mandatory funded system

The second reform proposal of Word Bank was an immediate and a complete shift to fully-funded system. This system is thought to solve the problem of financing as well as the problem of fairness through the generations. But still remain three important issues to be discussed:

1- The repayment of public debts – by increasing other taxes or by decreasing other government spending.
2- The financial infrastructure, the regulatory capacity and political economy harmony – all these three components should be in coordination to each other and should follow strict rules in accordance to the pension reform.
3- The precaution due to risk in financial market fluctuation – this system is supposed to face the same problems of PAYG system such as demography and politics but government should impose strict regulatory framework and supervisory institutions (Vittas, 1996).

Gradual shift to multi-pillar scheme which is a mix between PAYG and funded pensions

The third system proposed by World Bank is the mix between PAYG system and completely fully-funded system, which is called multi-pillar system. Countries such as Australia, Switzerland, Denmark, UK, Hungary and Poland have passed to this system.

The advantages of this merge are supposed to be the followings:

1- It allows a distinction to be made between poverty reduction and income replacement goals;
2- It builds risk diversification into a country's provisions for retirement income support;
3- It minimizes the burden of fiscal transitions while preserving many of the economic gains of the fully-funded approach;
4- It brings to the reform discussion some clear gains for younger workers and those who are facing labor income losses from globalization.(World Bank,1994)

Table 3 shows in details the World Bank's approach toward pension system reform by taking into account the objective, the form and the financing manner of each pillar. Whereas the contribution of each pillar in the mix system is as follows:

1- The public PAYG, 1st pillar is redistributive towards the poor by providing a universal flat benefit, by providing a minimum pension guarantee or by being part of a means tested program for the poor of all ages.
2- The fully-funded, 2nd pillar provides additional capital accumulation which make possible to cope with the demographics trend.
3- Finally, the voluntary fully-funded, 3rd pillar provides supplementary benefits for those who want to have substantial income in the retirement age.

Table3. The World Bank's Approach to Pension Reform

	1st Pillar	2nd Pillar	3rd Pillar
Objectives	Redistribution	Savings	Savings
Form	Min. Pension Guarantee	Pension Savings Plan	Pension Savings or Occupational Plan
Financing	Pay-as-you-go	Fully-funded	Fully-funded

Source: World Bank (1994); Averting the Old Age Crisis; Oxford University Press, New York

As stated above, the primary advantage of a multi-pillar system is risk diversification. As seen in the table above, in the mix-system there are different financing methods, which make the risks toward the political, economical and demographic fluctuations to be minimized. Table 4 shows how the multi-pillar approach balances long-term risks.

Table4. Responsiveness to Main Risks of the Two Methods of Financing

	PAYG System	Fully-funded System
Macroeconomic Risks		
Negative output shocks	Lower revenue, but individual effects can be mitigated	Possible effect on financing and individual effects cannot be mitigated
Unemployment	Lower revenue, but individual effects can be mitigated	No effects on financing, but individual receives lower benefit
Low wage growth	Lower revenue, but individual effects can be mitigated	No effects on financing or current benefit levels
Financial crises	Lower revenue, but individual effects can be mitigated	Accumulated capital reduced or even eliminated in real terms
Low rates of return	No direct effects on financing and benefits	No effects on financing, but individual receives lower benefit
Demographic Risks		
Higher dependency ratio	Deteriorating financing	No effects on financing or current benefit levels
Lower labor force	Higher wages resulting in higher future benefits	Lower returns on capital resulting in lower future benefits
Political Risks		
Response to short-term budget	High response	Low response

Source: Adapted from Holzmann R. (1997); A World Bank Perspective on Pension Reform; presentation at the ILO-OECD Workshop: Development and Reform of Pension Schemes; Paris

While proposing the multi-pillar system, World Bank suggests also the most "preferred" combinations of the three pillars since there are different possibilities in "volume" of each pillar to cover. The most recommended ones are:

1. Second pillar (compulsory and private) is complete. First pillar (PAYG) don't continuous to function over the last generation and all contribution paid in second pillar.
2. Both the second pillar and first pillar function at the same time.

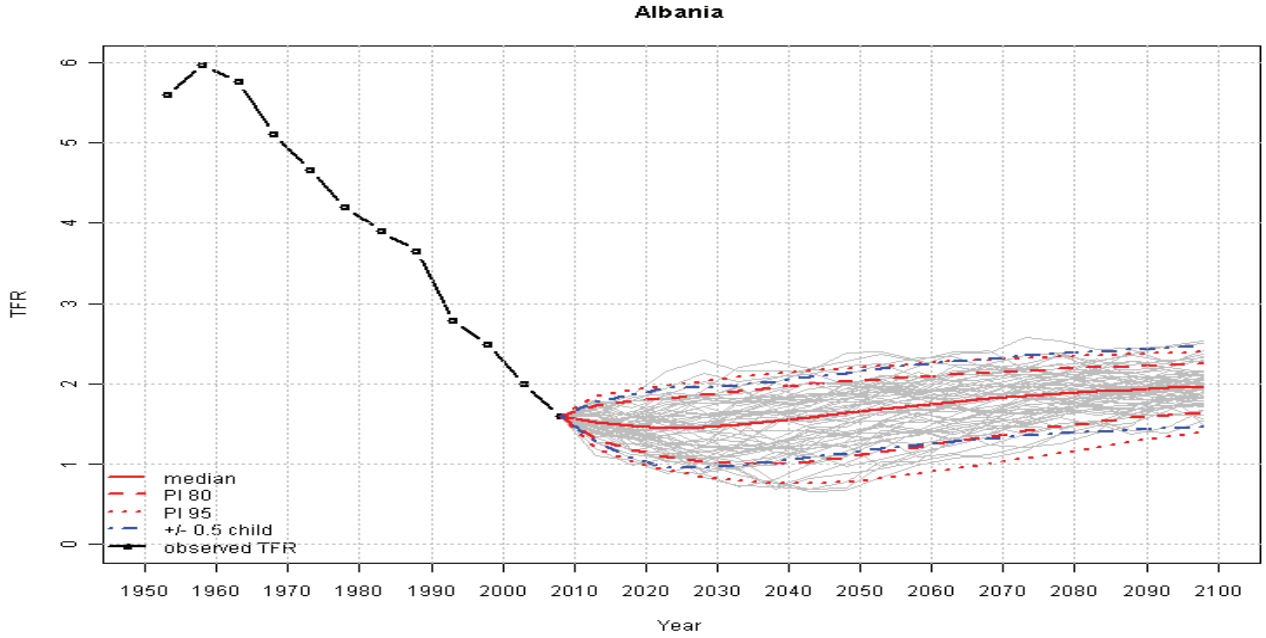
The idea to mix up different pillars is not a proposed reform just for Albania. Some years before the Baltic countries had the same problem. They were trying to pass from the full public pension system (just the first pillar) to a combined system. The combined system of first and second pillar was strongly recommended. Appendix B shows the pre-reform characteristics of public PAYG pension schemes in transition economies.

3. Albanian Demographic Characteristics

Due to demographic changes, most of the counties have switched from their traditional pension system to a new one. Generally the most known and used pension system was PAYG system. The World Bank, in 1994, has proposed a three-pillar system composed by: 1- a mandatory, publicly managed and tax-financed pillar for distribution; 2- a mandatory, privately managed and fully-funded pillar for saving; 3- a vulnerary pillar for those who want more protection for their post-retirement life.

The data used in this section are taken from United Nation's projection, World Population Prospects: the 2010 Revision population Database. The demographic data provides the total population of Albania from 1950 to 2100, which is divided according to five different age groups. The data 1950-2010 are estimated whereas the data 2010-2100 are projected. The projected data are calculated in five different variants: constant-fertility variant, high-fertility variant, medium-fertility variant, instant-replacement-fertility variant and low-fertility variant. Total fertility rate in Albania during 2005-2010 was 1.9, ranking Albania as a low-fertility country.[1] Figure 1 shows trajectory of total fertility rate for Albania where the probabilistic projection is performed for years 2010-2100. According to this projection, the fertility rate will decrease until 2020-2030 and then will increase to some extent.

Figure 1: Probabilistic trajectories of projected total fertility (2010-2100) for Albania[2]



Source: United Nations, Department of Economic and Social Affairs, Population Division (2011): World Population Prospects: The 2010 Revision. New York

Figure 2 and 3 show the change of population in five-age groups, 0-19, 20-39, 40-59, 60-69 and 70 and up. Based on the below figures, Albanian population reaches its peak around 2020 and decreases significantly by the time. The decrease

[1] According to United Nations, low-fertility countries are considered the countries with total fertility at or below 2.1 children per woman in 2005-2010, which corresponds to the Albanian case.

[2] NOTE: For clarity, only 80 trajectories from 100,000 are displayed. The median projection is the solid bold red line, and the 80% and 95% projection intervals are displayed as dashed and dotted red lines respectively. The high-low fertility variants in the *2010 Revision* correspond to +/- 0.5 child around the median trajectory displayed as blue dashed lines.

of the population occurs from the decrease of the young generations. The number of old generation, 70 and up, increases until 2075 and then decreases. The total number of population increases during 2020-2045, decreases slightly in 2045-2050, increases again in 2050-2070 and then decreases till 2100. Since the old and the young generations go in opposite direction, the old-age population increases and the young-age population decreases, the demographic old age dependency ratio rises. This rise affects the sustainability of a PAYG pension system.

Figure 2: Total population of Albania during 1950-2100 (according to five-age groups)

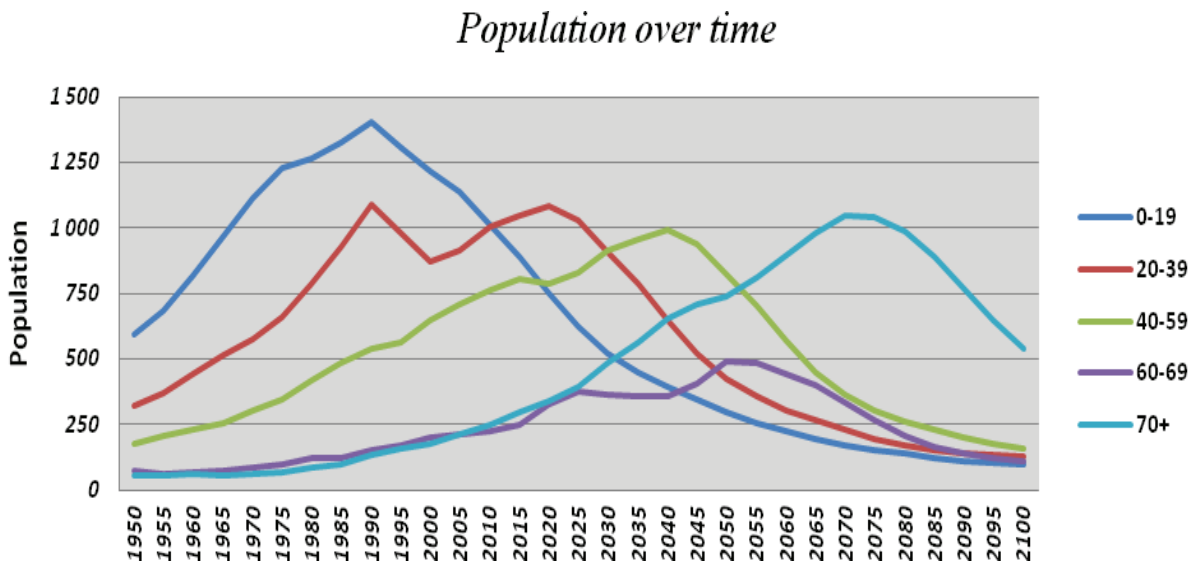
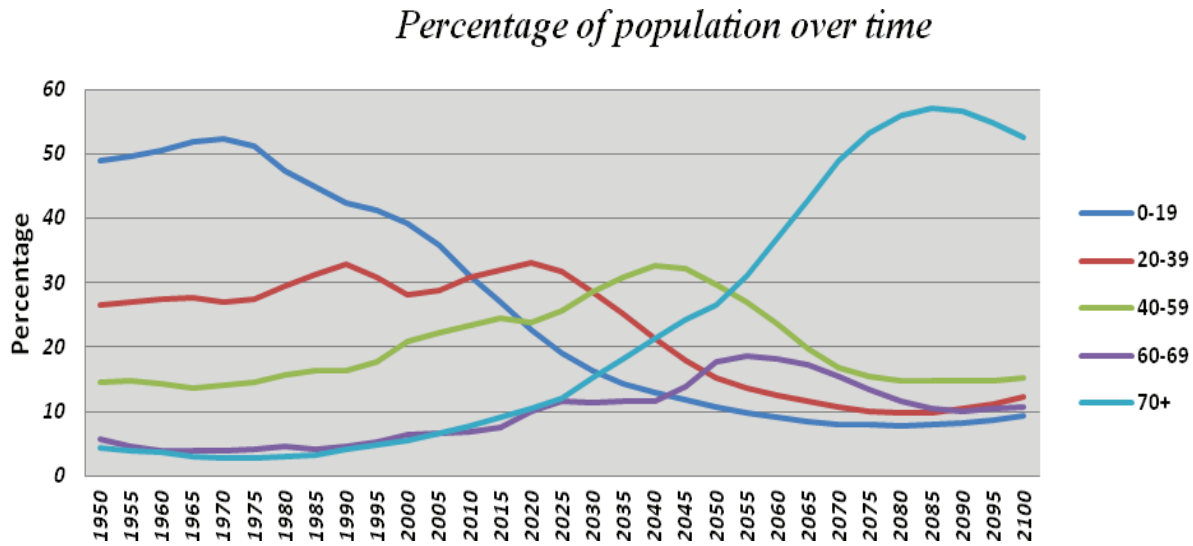


Figure 3: Percentage of Albanian population during 1950-2100 (according to five-age groups)



4. Albanian Pension System Challenges

Pensions in Albania represent a key element of social protection. Pensioners maintain about 17% of overall number of population. The actual scheme provides three types of pensions: old age pension, disability pension, survivors' pension. The conditions to benefit from full old age pension are to have reached retirement age (60 for women and 65 for men) and to have completed 35 years of insurance. The pension calculation formula is as follows:

$$Pp = Mpb + Sh$$

Pp: Full monthly pension age
Mpb: Measure of the basic pension provided to all insured persons must provide a minimum standard of living. This component is corrected each year by the price index of some selected goods, as provided in the rules of the ISS and determined each year by the Council of Ministers. Currently, it is 8240 ALL per month. The monthly pension does not reach the subsistence minimum so this has been a factor that recently the government has used specific policies for the minimum income allowance.
Sh: Additional basic pension. This is individual and is calculated on the size and length of contributory period and 1% for each year multiplied by proving measurable average basis (salary on which contributors were paid). Council of Ministers approves annual indexation coefficient database using measurable growth rate of average individual contributions of the respective year with the previous year.
Actually there exist two upper limits of pension amount: 1- 75% of the indexed average net wage of the best three successive years in the ten last years of employment and 2- double basic pension.

Table5. Main parameters of pension values (2000-2020)

	2000	2001	2002	2003	2004	2005	2010	2015	2020
Replacement Coefficient* (%)									
Urban	35.00	35.40	35.80	36.20	36.50	37.20	37.60	37.90	38.20
Rural	13.30	13.20	13.10	13.00	12.90	12.80	12.20	10.90	10.00
Coverage Rate (%)**	35.40	36.73	38.31	39.77	41.51	42.14	50.27	54.49	57.56
Dependency Ratio* (%)**	1.04	1.01	0.99	0.96	0.94	0.93	0.81	0.82	0.82
Urban	1.10	1.06	1.02	0.99	0.95	0.93	0.82	0.83	0.85
Rural	0.94	0.94	0.93	0.92	0.92	0.93	0.77	0.80	0.78
Contributors/Population (%)	14.30	15.00	15.70	16.40	17.00	17.80	21.50	23.10	24.60
Beneficiary/Population (%)	15.00	15.00	16.00	16.00	16.00	17.00	17.00	19.00	20.00

Source: Social Insurance Institute
*Replacement coefficient: the ratio between the size of average pension to average wage
**Coverage rate: ratio of the number of contributors to the real number of the workforce able to work
***Dependency ratio: the ratio of beneficiaries/ contributors

Based on the data of social insurance institute, the replacement coefficient shows significant differences between urban and rural areas. While it grows from 35% in 2000 to 38.2% in 2020, showing a slight improvement for the old age pensions in the urban zone, in the village it shows a deterioration tendency, this ratio decreases from 13.3% in 2000 to 10% in 2020. This indicator mention the correlation between pension and wage, which in this case it does not denote a significant improvement. Obviously there are two problems, the first one, the divergence of the urban and rural pensions and the second one, the low levels of pension.

The progress of coverage rate, from 35.4% in 2000 to 57.6% in 2020 may be explained as a result of economic growth and employment enhancement and reduction of evasion in the collection of contributions for the social insurances.

Although the dependency ratio has improved through the time, it has decreased from 1.04% in 2000 to 0.82% in 2020, it still continues to stay at critical levels. This ratio is affected by the increase of old-age population, from the emigration and evasion. The ratios of contributor / population and beneficiary / population present the same conclusions. The first one matches an increase 5% from 2000 to 2020 and the second one 10.3%.

The Ministry of Labor, Social Affairs and Equal Opportunities, in the regional seminar on pension, held in Zagreb, in 2009, mentioned the major handicaps issues on Albanian pension system such as below:

- Low pensions, decrease of replacement rate;
- System is not producing anything that would incite and encourage people to join the scheme; maximum pension is twice minimum pension, while maximum wage is five times minimum wage;
- High evasion rate of contributors; low-leveled coverage rate;

- Those who are not paying contributions today, will not receive benefits tomorrow, thus maintaining a social burden for the future ;
- Fiscal risk stemming from the increase of number of pensioners in the current period, whose majority are getting full pensions today;
- Deficit in the system, average being 0.8% e GDP ;
- Forecasts indicate that Albania will face an aging of population in the long run, which would bring about changes in indicators of social insurance scheme.

The Albanian Social Insurance Legislation, through the years, has done a lot of changes based according to the standards of the European Code and ILO Convention on Social Insurance. But of course there are other measurements to be undertaken in the future. According to the World Bank, the forecast reform for actual pension system should include:

1. Amendment of pension formula. - Monthly P = 1.3 % for every year of insurance multiplying the assessment base. (Instead of 1%). This formula lower very much the replacement rate for the employees with minimum wage, so is decided a minimum amount about 85 euro.
2. Amendment of upper limits of pension amount. So the maximum pension = 3 x minimum pension. (Instead of 2 x minimum pension).

According to the World Bank this reformation results in improvement of replacement rate but also in the worsening of financing balance system compared to 'without reformed PAYGO'.

Actually Albania is using the 1st and the 3rd pillar but it can be said that the vulnerary private scheme is not functioning in a proper way because the percentage of people using it is almost insignificant. Even if Albania has done some steps toward the proposed model of the World Bank, the economic consequences are doubtful. The reason to this performance can be problem of not totally passing from PAYG system to the mixed one.

The Albanian labor market is facing a lot of problems even there are two long decades in the free market economy. The unemployment rate is increased from year to year. In the first quarter of 2010 the unemployment rate was founded to be 13.38% (INSTAT). Actually the unemployment rate can be even higher if we take into the consideration the number of people which are not registered in the employment office, migration share and the informal economy. Another problem in the Albanian labor market is the high number of beneficiaries and lower number of contributors relative to the real data.

Regarding the saving rates and capital accumulation we can say that Albania didn't experience a good "relationship" to these indicators. The level of saving rates and capital accumulation are pretty low. As an explanation of these critical trends it can be given the pyramid schemes in Albania in 1996-1997, weak employment capacities, low living standards, high level emigration, etc.

5. Conclusions

To sum up, as all systems need revision and modification by the time, the pension system also remains in top of numerous discussions for its improvement. Pension system it is not just the problem of Albania but the effectiveness of it has been revised and still it is being revised in general from all the countries. Even through the time before the financial crises there were just some nuances given to the pension systems, the period after the crisis highlighted some other problems not visible before. The main problem for the pension system seems to be the interest rates used in the pension formula calculation.

Other problems are things to be revised can be the following ones:

- The movement from a wage-oriented, defined-benefit model to a defined-contribution model;
- The combination of the pay–as-you-go method of financing with other methods, developing self-supporting schemes;
- The enhancement of redistributive elements, in order to create a fairer distribution in relation to contributor interests;
- The prevention of different informalities and evasion;
- The minimization of risks (as our suggestion stated the minimum usage of interest rate) and if there exist any risk the share of it between the state, employees, and employee.

As a second point to be mention, the integrated social security systems are best for all. The more integrated a system is the more benefits or less losses it has. But of course it should be drawn attention to what system we have to integrate because not always the same system is the optimal for all the countries. This integration intend to promote access to stable employment and to support adequate living standards in the national level and global one in order to guarantee pension rights to Albanian emigrants, and to all those Albanians who will work abroad in the future.

Lastly but not the least, the financial crises "tremble" in general all the theories proved and supported as the best ones. The new era brought as an immediate need the solution of different problems. One of them is pension system which is being in ambiguity because of its correlation with the interest rate. Interest rates are founded to be "frightening" for the system when they are in high rates and also in low rates. The zero-interest policy seems to be the solution to this problem. But the way how this policy is going to take place is an important issue to be discussed which covers not just the Albanian pension system but the global pension system.

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Appendix

Appendix A: Dependency ratios %, 1950-2050

	World			More developed regions			Less developed regions		
Year	**Total**	**Child**	**Elderly**	**Total**	**Child**	**Elderly**	**Total**	**Child**	**Elderly**
1950	65	57	9	54	42	12	71	64	7
1955	69	60	9	55	42	13	76	69	7
1960	73	64	9	58	44	13	80	73	7
1965	75	66	9	58	43	14	84	77	7
1970	75	65	10	56	41	15	83	76	7
1975	74	64	10	54	37	17	82	75	7
1980	70	60	10	52	34	18	76	69	7
1985	65	55	10	49	32	17	70	63	7
1990	63	53	10	49	31	19	67	60	7

1995	61	51	11	50	29	20	65	57	8
2000	59	48	11	48	27	21	62	53	8
2005	55	44	11	48	25	23	57	49	9
2010	53	41	12	47	24	23	54	45	9
2015	52	40	13	50	24	26	53	43	10
2020	53	39	14	54	24	29	53	41	11
2025	53	37	16	58	25	33	52	39	13
2030	54	36	18	62	25	37	52	37	15
2035	54	34	20	65	25	39	53	36	17
2040	55	33	22	67	26	42	53	34	19
2045	56	32	23	69	26	43	54	33	20
2050	56	31	25	71	27	44	54	32	22

Source: Population Division of the Dept. of Economic and Social Affairs of the United Nations Secretariat, World Population Prospects: The 2002 Revision and World Urbanization Prospects.

Appendix B: Pre-reform characteristics of public PAYG pension schemes in transition economies

Retirement age: generally 60 for men and 55 for women (except Poland, where it is 65 and 60, respectively). High unemployment induced new regulations allowing earlier retirement. Hence actual average retirement ages are much lower than statutory ages.
Qualifying conditions: typically 25 years of service for men and 20 for women, although there are many exceptions, e.g. for unhealthy or hazardous working conditions, or for mothers, depending on the number of children.
Benefit formulas: usually use a fixed percentage of reference income for a minimum number of years, plus an increment –in some countries a descending increment – for additional years of service.
Reference income: usually an average over several years, in some countries with a ceiling and/or a descending series of increasing income bands.
Upper-lower limits: pensions are generally subject to minimum and maximum provisions. Minimum pensions were originally linked to the minimum wage, but the link has been severed (e.g. the minimum pension has overtaken the minimum wage in Russia but fallen behind in Hungary). Result: actual, individual replacement rates are a decreasing function of income and the number of years served, at the time of retiring.
Administration: old age, survivors' and disability pensions – often other cash benefits and social assistance schemes – are included in the same scheme, financed from the same sources and administered by the same authority. Relation with the government budget is unclear. Result: transparency is minimal or non-existent (except in Hungary from 1991 and the Czech Republic since 1993, where separate old age pension agencies were established).
Legacy: old age pension systems have existed for a long time but they were designed to work in a completely different economic and social environment than the present one. They were not prepared for 1) a severe contraction of national income and employment; 2) high inflation rates; and 3) dramatically increasing earnings differentiation.
Transition effect: to protect the lowest benefits from an extreme deterioration due to inflation, ad hoc, often flat rate, adjustments were made, distorting benefit structures and reducing the differential between the minimum and maximum pension, thereby further severing the originally weak link between contribution and benefit (e.g. in Latvia and Lithuania earnings-related pensions have in effect degenerated into flat-rate schemes).

Source: M. Cichon, K. Hagemejer and M. Ruck, Social Protection and Pension Systems in Central and Eastern Europe, International Labour Office – Central and Eastern European Team (ILO-CEET), Working Paper, No. 21 (Budapest), 1997.

Economic, Social and Political Impact of E-Government: Correlation Analysis

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Abstract *Technologies of e-Government are used in about two hundred countries of the world and the assessment of socio-economical effectiveness of e-Government is of great importance. E-Government effects are usually associated with the public service effectiveness and with development rates of information society. However e-Government has some less obvious, indirect effects on economic, political and social spheres of public sector. In this case, the development of e-Government technologies can affect the public wealth and quality of life (because it redounds to citizens' expenses decrease and to increase of effectiveness of interaction between them and government), human capital developing, level of corruption, innovations and so on.This paper presents the results of correlation analysis of United Nations e-Government development index with Corruption Perceptions Index, Global Innovation Index and Human Development Index, which make possible to make a conclusion about the effects, which e-Government brings to society.*

Nowadays the technologies of e-Government are being rapidly implemented all over the world. It has become evident that the electronic format is the only acceptable way of future development for governmental bodies.

Technologies of e-Government are used in about two hundred countries of the world and the assessment of socio-economical effectiveness of e-Government is of great importance. It is absolutely necessary to analyze the effects which it brings to society.

E-Government effects are usually associated with the public service effectiveness and with development rates of information society. However e-Government has some less obvious, indirect effects on economic, political and social spheres of public sector. In this case, the development of e-Government technologies can affect the public wealth and quality of life (because it redounds to citizens' expenses decrease and to increase of effectiveness of interaction between them and government), human capital developing, level of corruption, innovations and so on.

These effects seemed to be difficult for evaluation, because the above-mentioned spheres are non-substantial and don't usually have quantitative interpretation. The analysis of these spheres is normally conducted through experts' estimation, on which basis the rank relations are determined and ratings are composed. Particularly, the following ratings of social, economic and other indices exist: Corruption Perceptions Index, Global Innovation Index, Human Development Index and so on.

The choice of these indices was not done accidentally. It is expected that technologies of e-Government play crucial role for the fighting corruption and that they are a result of higher-temped innovation process of the country or region. E-Government technologies implementing also should give an impact for human development and citizens' life quality.

Ratings in this case usually demonstrate not a percentage of a country's achievements in some absolute maximum (because expert analysis is always subjective and relational), but its position relative to other countries. That is why the analysis of rating position dependence on some or other factors (in this particular case – on e-Government technologies development) would not have any economic substance.

Interesting results can be gained from the correlation analysis of these ratings with e-Government development rating. Correlation may be positive, or may be negative, or valueless. Having performed such an analysis it would be possible to make a conclusion about the effects, which e-Government brings to society. The United Nations e-Government development index (EGDI) is appropriate for the purposes of this analysis.

Correlation is a statistical technique that measures strength or degree of a supposed linear association between two random variables or two sets of data. This association is not necessary explained by causative-consecutive interrelations. It means that one variable changing is usually accompanied with other variable changing.

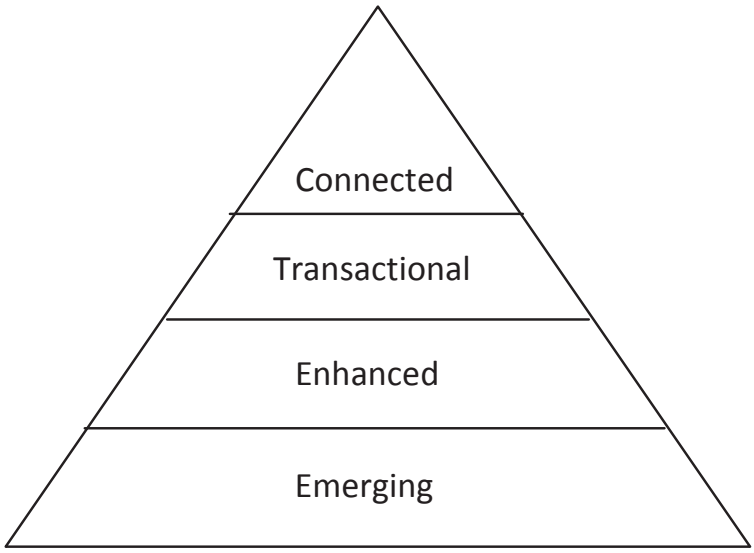
There are several types of correlation coefficients. For the purposes of the abovementioned analysis, Spearman's rank correlation coefficient is of the main interest, because given sets of data (e-Government development rating and other ratings) are already ranged and have rank within them.

At this analysis it is expected that EGDI will have a significant positive correlation with the three above-mentioned indices.

1. United Nations e-Government development index

The United Nations e-Government development index (EGDI) [4] is a composite index consisting of the online service index, the telecommunication index and the human capital index. Each of these indices is itself a composite measure that can be extracted and analyzed independently. Mathematically, the EGDI is a weighted average of these three indices.
The online service index is based on four-stage model of online service development and the goal of this index is to define at which stage one or another government is.

Picture 1. The four stages of online service development [4]



The first stage is called Emerging information services. At this stage governmental websites provide online information on public policy, governance, laws, regulations, relevant documents and types of public services provided. They have links to ministries, departments and other branches of government. Citizens are easily able to obtain information on what is new in the national government and ministries and can follow links to archived information. This stage is characterized by one-way communication "from government to citizens" (G2C).

At the second stage, or Enhanced information services, governmental web-portals deliver enhanced one-way or simple two-way e-communication between government and citizens, for example citizens can find downloadable forms for governmental services (tax returns, etc.) and applications. The sites have audio and video capabilities and are multi-lingual. Some limited e-services enable citizens to submit requests for non-electronic forms or personal information, which will be mailed to their house.

At the third stage - Transactional services - there is two-way electronic interaction between government and citizens, including requesting and receiving inputs on government policies, programs, regulations and so on. Some form of electronic authentication of the citizen's identity is required to successfully complete exchange. Government web-portals process non-financial transactions, such as e-voting, downloading and uploading forms, filing taxes online or applying for certificates, licenses and permits. They are also capable to perform some simple financial transactions.

The most complex and advanced stage is Connected services. This stage is characterized by G2C, G2G and C2G interactions. Governmental websites are proactive in requesting information and opinions from citizens using Web 2.0 and other interactive tools – departments and ministries are in the common information space with the common information and communication format. There are no time lags and costs for information transfer. Information, data and knowledge it transferred from government agencies through integrated applications. There was made a shift from a government-centric to citizen-centric approach; governments create an environment that allows citizens to be in a great measure involved into the government activities and to have a voice in decision-making.

Thus, the survey has four sections corresponding to the four abovementioned stages of e-Government development. Almost all questions at these sections call for binary response of "yes" or "no" (one point is given for "yes" and zero for

"no"). Exceptions include a small number of questions designed for capture data on the number of forms and e-services available (up to ten points each). The resulting value of index normalizes by taking the highest and lowest results.

The second index composing the EGDI – is the Telecommunication infrastructure index, which is a composite of five indicators with equal weight: number of personal computers per 100 persons, number of the Internet users per 100 persons, number of telephone lines per 100 persons, number of mobile cellular subscriptions per 100 persons and number of fixed broad-band subscribers per 100 persons. The index is also normalized by taking the highest and lowest values.

The third index - Human capital index consists of adult literacy rate (weight in index 0.6667) and the combined primary, secondary, and tertiary gross enrollment ratio (0.3333 weight in index).

Within the framework of this research there is also a supplementary e-participation index, which helps to expand the survey by emphasizing quality in the connected presence stage of e-Government. The questions at this index focus on the use of the Internet to facilitate provision of information by governments to citizens ("e-information sharing"), interaction with citizens ("e-consulting") and engagement in decision-making processes ("e-decision making"). The purpose of this measure is not to prescribe any particular practice, but rather to offer insight into how different countries are using online tools to promote interaction between citizens and government.

2. Corruption Perceptions Index

Corruption Perceptions Index (CPI) [3] of Transparency International is an aggregate indicator that ranks countries in term of the degree to which corruption is perceived to exist among public officials and politicians. This index reflects the perceptible level of public authorities' corruption in 178 countries of the world.

The CPI aggregates data from 13 different surveys or assessments produced by the following ten organizations: Africa Development Bank, Asian Development Bank, Bertelsmann Foundation, Economist Intelligence Unit, Freedom House, Global Insights (formerly World Markets Research Centre), Institute for Management Development, Political and Economic Risk Consultancy, World Economic Forum and World Bank.

The above-mentioned sources are miscellaneous, not all of them rank all countries of the index. Seeing that, the number of sources from which each country's score is derived is not the same for all countries. To be included into CPI rating the country should be covered by no less than three sources.

The calculation of Corruption Perceptions Index is performed with the following steps:

1. As each of the sources has its own scaling system, it is necessary to standardize them, in other words, to transform their results to the single scale before entering into index. For this purpose, first, the "matching percentiles" method is used. Under this method the estimated countries are ranged within the each source. It helps to rescale the miscellaneous data to the single measuring system – rank scale. On the one hand, though such method simplifies the results to some measure and brings certain information losses, it makes possible the subsequent analysis.
2. The second step is also rescaling one: the results provided at previous step are beta-transformed. The beta-transformation increases the standard deviation of these values and helps to range countries with the similar assessments more clearly.
3. The final CPI score for a country is the average of these transformed values for all sources where it appears.

The Transparency International researches consider it necessary to pay attention to the fact that each abovementioned source is a noisy measure of the corruption phenomenon. Because of that, in conjunction with the CPI value the 90% confidence interval is set up. This confidential interval demonstrates the range where 90% CPI values lies. There is a 5% probability that the value would be lower this range and a 5% probability that the value would be higher.

The result CPI table displays the value of Corruption Perceptions Index for the countries, their ranks, minimum and maximum scores and also the 90% confidence interval.

3. The Human Development Index

The Human Development Index (HDI) [2] of Human Development Report Office (United Nations Development Program) is a summary measure of human development. It measures the average achievements in a country in three basic dimensions of human development: a long and healthy life, access to knowledge and a decent standard of living. The HDI is the geometric mean of normalized indices measuring achievements in each dimension.

HDI was introduced in 1990 as an alternative to conventional measures of national development, such as level of income and the rate of economic growth. It was created to emphasize that people and their capabilities should be ultimate criteria for assessing the development of a country, not only economic growth alone.

Whereas gross national income (GNI) per capita reflects only average national income and tells nothing of how that income is spent, the HDI focuses on health, education and other expenditures which form the notions of human development and quality of life. It can also be used to question national policy choices, asking how two countries with the same level of GNI per capita can end up with such different human development outcomes. For example, the Bahamas and New Zealand have similar levels of income per person, but life expectancy and expected years of schooling differ greatly between the two countries, resulting in New Zealand having a much higher HDI value than the Bahamas. There are also examples, when a country with higher GNI per capita has a lower level of HDI (i.e. Kuwait and Barbados).

HDI is calculated for 187 countries of the world. Data is provided from the following sources:

- Life expectancy at birth – by the UN Department of Economic and Social Affairs
- Mean years of schooling – by the Human Development Report Office updates based on UNESCO data
- Expected years of schooling – by the UNESCO Institute for Statistics
- GNI per capita – by the World Bank and the International Monetary Fund.

HDI consists of three dimension indices which reflect four main indicators of human development in following connections: Life expectancy index – Life expectancy at birth; Education index – Mean years of schooling and Expected years of schooling; GNI Index – GNI per capita.

There are two steps to calculating the HDI.

The first step is creating the dimension indices. All the indicators within the HDI have their own scales, so it is necessary to rescale them and to transform into indices between 0 and 1. For this purpose the determination of minimum and maximum values is required. The maximums at this methodology are the highest observed values in the time series (1980-2011). The minimums values are set at 20 years for life expectancy, at 0 years for both education variables and at $100 for per capita GNI. The sub-indices are calculated as follows:

$$\textbf{Dimension index} = \frac{\textbf{actual value} - \min \textbf{value}}{\max \textbf{value} - \min \textbf{value}}$$

For the income index is used modified formula, because it is assumed that income transformation function is likely to be concave and at this case for income the natural logarithm of the actual, minimum and maximum values is used.

The second step is aggregating the sub-indices to produce the Human Development Index. The HDI is the geometric mean of the three dimension indices:

$$\left(I_{\text{Life}}^{1/3} \times I_{\text{Education}}^{1/3} \times I_{\text{Income}}^{1/3}\right)$$

4. The Global Innovation Index

The Global Innovation Index (GII) [1] of the INSEAD eLab recognizes the key role of innovation as a driver of economic growth and prosperity. The GII ranks 125 countries (economies) across the world in terms of their innovation capabilities and results. The report highlights those countries that achieve more innovation outputs overcoming weaknesses from the input side – the efficient innovators – and those that lag behind in fulfillment their innovation potential. So, the innovation performances are analyzed in reference to the income and regional groups.

The main problem for such index was to find a way, how to measure and evaluate such phenomenon as innovation. The researches give the following definition of innovation: new or significantly improved product, processes and methods in the provision of services. It can arise in business and organizational models, in low-tech industries; through creative imitation and technological catch-up; at the public level or at the level of society etc.

The GII relies on seven pillars: Institutions, Human capital and research, Infrastructure, market sophistication, Business sophistication, Scientific outputs and Creative outputs. Each pillar is divided into three sub-pillars, except for pillar 7, which has only two sub-pillars. Each sub-pillar score is calculated as the weighted average of individual indicators (there are total 80 indicators).

The GII includes four index measures:

- The Innovation Input Sub-Index – simple average of the first five pillar scores.
- The Innovation Output Sub-Index – simple average of the last two pillars.
- The Global Innovation Index – simple average of the Input and Output Sub-Indices.

- The Innovation Efficiency Index – ratio of the Output Sub-Index over the Input Sub-Index.

The Innovation Output Sub-Index variables provide information on elements that are the result of innovation within the economy. The Innovation Input Sub-Index variables provide information on indicators that measure elements that must be in place to foster innovation in an economy. When the Input and output Sub-Indices are plotted against each other, the data seem to confirm that efforts made on enabling environments are rewarded with increased innovation outputs. The Innovation Efficiency Index is calculated as the ratio of the Output over the Input Sub-Indices further explored this relationship. And the overall GII scores provide a composite picture of the state of each country's innovation performance.

5. Correlation analysis

As have been told earlier, for the purposes of e-Government effects analysis in this paper the Spearman's rank correlation coefficient is used. Before the coefficient calculation, it was necessary to transform the analyzed miscellaneous indices (the Corruption Perceptions Index, the Global Innovation Index and the Human Development Index) to the single scale. After that the coefficients' values were calculated and the analysis of the measure of the correlation was made. If value of the Spearman's rank correlation coefficient's value is lower than 0,3, the connection between the ranges is low, or insignificant; if the value between 0,3 and 0,7, the statistical dependence between the ranges is medium; and the values higher than 0,7 means high connection between the variables.
Table 1 presents the results of the Spearman's rank correlation coefficient calculation for the E-Government development index and three above-mentioned indices.

Table 1. Values of the correlation coefficients

	Corruption Perceptions Index	Human Development Index	Global Innovation Index
E-Government development index	0,7318	0,9312	0,8996

As it can be seen from the Table 1, all the three values of the correlation coefficients are positive and extremely high. It means that the hypothesis of this paper - that e-Government has significant effects on such phenomena as corruption in public service, innovation activities in country/region and citizens' quality of life, is confirmed.

The highest value of correlation coefficient with e-Government development index has Human Development Index, which presents the citizens life-quality within the countries of the world. This result is unsurprising. Governments, who take care of their citizens' life quality, pay significant attention to public services quality and effectiveness raise.

The Global Innovation Index also has an extremely high correlation coefficient with e-Government development index. Implementation of e-Government technologies implicates with grand innovation activities in public service sphere. Firstly, it is necessary to develop the new mechanisms of G2C, G2B and G2G interactions and new ways of public services provision. Secondly, the activities for technical and moral preparations of public servants and citizens' for the new technologies should be occurred. And thirdly, a problem of technical implementation of these technologies should be solved. So, the e-Government technologies have a high measure of dependence on innovation process in country, and rate of innovation activities depend on e-Government development too.

Corruption Perceptions Index has lower value of correlation coefficient with e-Government development index than the other two indices, but it still high. As known, one of the goals of e-Government is to fight corruption in governmental bodies through raising its transparency and openness. So, it could be expected, that this correlation coefficient should be higher. It can be concluded, at first, that technologies of e-Government in most regions are still developing and not fulfilling its tasks at the moment. And, at the second, that government with higher e-Government ratings and low CPI index rating should redesign their e-Government system with paying more attention to anti-corruption aspect.

This paper demonstrated that e-Government has significant effects on social and economical spheres of public sector. It means that development of e-Government technologies helps to promote public welfare and to solve different social problems. In this case, e-Government is a unique tool for social and economic development of the country.

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