Forging a new, solid social security system for Greece: The NTS proposal

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Georgios Symeonidis

Executive Board Member

Hellenic Actuarial Authority

Abstract:

Greece has one of the largest percentages of social security contributions for pensions, amounting to almost 24 percent for special groups of employees. At the same time, its pension system became unsustainable a few decades ago, without any government taking action to bring it back to financial stability.

A detailed proposal of three academics (**Nektarios, Tinios, Symeonidis - NTS**) suggested a way to reform the system through the introduction of a notional defined contribution first pillar, while at the same time reducing social security contributions by 50 percent. The second pillar is to become fully capitalized and an optional third pillar is proposed in order to support occupational funds (IORPs).

This paper aims to analyze and present the basic points of this new system while at the same time elaborate on the actuarial indices that bring out the benefits of contribution reduction.

Contact information:

Email:

g.simeonidis@eaa.gr

george.simeonidis@gmail.com

Address:

Stadiou 29,

Ypourgeio Ergasias, Ethniki Analogistiki Arhi

Athens, 10 110, Greece

1. The NTS proposal

This detailed proposal was first presented in December 2016 by a team of three academics from the University of Piraeus, in the yearly conference of the Hellenic Actuarial Association. Unlike many other proposals, it has been quantified, potential problems have been identified and solutions have been proffered; even the considerable transition problems are likely to be more tractable than the most probable future course of the present, totally non-viable, arrangements.

The current situation in Greece is beyond control in the pension system. Pension expenditure has exceeded 19 per cent of GDP in 2016 and contribution rates vary between 20 and 23,6 per cent for the pension branch, scoring the highest in the EU. Such a burden to the economy nurtures uncertainty for pensioners and undermines competitiveness. Sustainability of the system has been long been lost and pension reforms of the last years have proved unsuccessful in tackling the problem. (Symeonidis, 2015) (Symeonidis, 2016) Except for the continuous legislation changes, horizontal pension cuts have deprived pensioners from more than 50% of their income in some cases. The reforms and cuts were all a result of the necessity of external funding of the Greek economy by the Troika[1], after Greece's prime minister turned to it for help in 2010, under extreme financial conditions and near bankruptcy.

The system layout today presently comprises three pillars. Pillar II accounts for Occupational Schemes (IORPS) and Pillar III for Private Insurance. Neither of the two is very popular though, thus the first Pillar, Social Security, accounts for more than 99% of the whole system. The latter operated as a Defined Benefit Pay-as-you-go system until recently (DB PAYG) and provided three types of benefits: a main pension, a secondary (auxiliary) pension, lump sum amounts and provident grants (EKAS). The main pension funds were about seven in 2016, even though older, merged funds would independently exist under them in terms of financial and actuarial basis. The system used to work on 14-time a year deposits. People would be paid 14 times a year, contributions would be made accordingly and pensions were also paid 14 times a year. Furthermore, it is important for the reader to know that legislation passed in 1992 in Greece broke down the insured in two large cohorts with different pension rights. The ones first insured before 1/1/1993 (so-called the "old" cohort) and the ones insured after 1/1/1993 (so-called the "new" cohort).

The NTS proposal targets all of the abovementioned liabilities and suggests two main ideas. Firstly, a new pension system for younger Generations – those first insured after 1/1/1993 with a three-pillar system that can lead to an expected total replacement of around 75%.

The first pillar will be a single provider for all primary pensions (named EFKA under the Greek Acronym for Uniform Fund for Social Security). The contribution rate for the main pension fund EFKA will be 10% on income flat, previously 20% and in some cases for professions of

[1] Troika is the designation of the triumvirate which comprises the European Commission (EC), the European Central Bank (ECB) and the International Monetary Fund (IMF). In 2015, the left-wing party Syriza won the election and demanded that the triumvirate was referred to as "The Institutions" instead of the Troika.

special nature, 23,6%. EFKA will be working on a Notional Defined Contribution basis financed on Pay-as-you-go principles. Contributions are credited to personal accounts and cumulate with a technical interest rate related to the rate of growth of GDP. The legislated age thresholds will continue to exist as minima (62 with 40 years of work or 67 with at least 15 years of work), but the more someone delays their retirement, the higher their pension amount will be thus providing incentives for later retirement.

The secondary/auxiliary fund is proposed to be a new mandatory funded Supplementary Pension System. Unlike other countries, Greece houses the auxiliary pension funds under the first pillar and since historically people are accustomed to that, it is proposed to remain in the first pillar. Contributions are aimed at 6% at minimum (as currently directed to auxiliary funds) and are proposed to be twice as much for the people who used to contribute more to the main pension funds because of the nature of their profession, aiming at early retirement without loss of replacement. These people – like arduous profession workers, constructions, military etc. need special treatment in their retirement planning or a better social policy on re-training for a new profession.

Pensions in the auxiliary funds will be financed by the build-up of reserves, which are expected to rise to EUR 50 billion in the first ten years and to EUR 378 billion by 2060 (around 50% of GDP). Reserves are utilized to create a new National Fund for Investment. To increase the sense of ownership of accounts, opting out is allowed. This means that other auxiliary funds can be introduced, under special legislation, but without the strict government ownership.

The second Pillar is proposed to be a voluntary occupational pension funds pillar (IORPs). These allow for flexibility across employment sectors inside the European Union and promote saving for the third age within the EU.

One of the main advantages of this proposal is the pension protection as the total of the replacement rate is aimed at 75% and reaches beyond two sources. This makes the system more resilient to the fluctuation of the economy and leaves room for higher returns.

Also, state funding is eliminated towards the end of the projection period so the burden is alleviated from the state budget and the aging effect does not negatively affect the state. Regarding aging, intergenerational solidarity is also promoted as the phenomena of older people claiming higher returns on their pensions and later generations finding themselves short on returns because of the demographic changes will be also eliminated. Furthermore, the responsibility is transferred from the state to the individual and people realize the need to save for the third age.

Finally, and most importantly, this proposal is an impetus for growth. Reducing social insurance contributions promotes competitiveness and exports and creates work incentives. Experience has shown that lower contributions lead to more jobs and growth, exactly what Greece desperately needs at its worse financial moment of the 21st century.

2. Set of assumptions used in the projections valuation for the NTS proposal

2a. Population projections

The population projections used in the present valuation comes from Eurostat. These projections are produced for each member state and make use of certain assumptions provided by each member state. Results are provided every three years and the potential volume and structure of the population for the few decades to come is projected. The previous available projection was the one based on data of January 1st, 2013 (EUROPOP2013). Only a few days, ago, the new projection results were released from Eurostat (based on 2015 data).

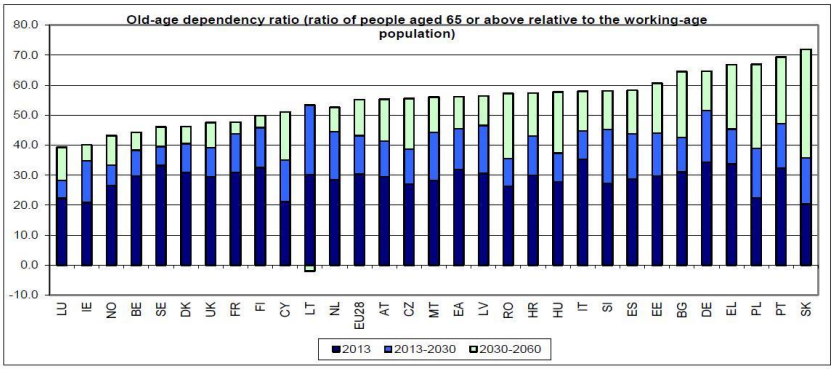
The projection data used in this valuation (EUROPOP2013) covers the period 2013 to 2080, but this paper only makes use of the projection period until 2060, when the macroeconomic data also exist. The same projection data are also used in the Aging Working Group[2] (AWG) projection results with 2015 base year.

The EUROPOP2013 projection helps create a measure of Aging throughout Europe. It is well known and widely accepted that in Europe Aging poses a great threat. A statistical measure of the Aging is calculated by the number of people above 65 (mostly pensioners) to people aged 15 to 64 (mostly people capable of working):

$$\text{Demographic old} - \text{age dependency ratio} = \frac{\text{Population above 65}}{Population\ 15-64} \qquad (2.a.1)$$

Greece is expected to receive the greatest pressure from the demographic dependency. The peak appears at year 2050, when Greece is expected to have a lot of centennials. Overall, Greece is expected to constantly be under greater demographic pressure than most European member states as well as the Euro Area states. It suffers the third greatest demographic pressure in 2013 – following Germany and Italy) while it still belongs to the top four in 2060 (Graph 1).

Graph 1: Demographic Dependency, EU 2013- 2060

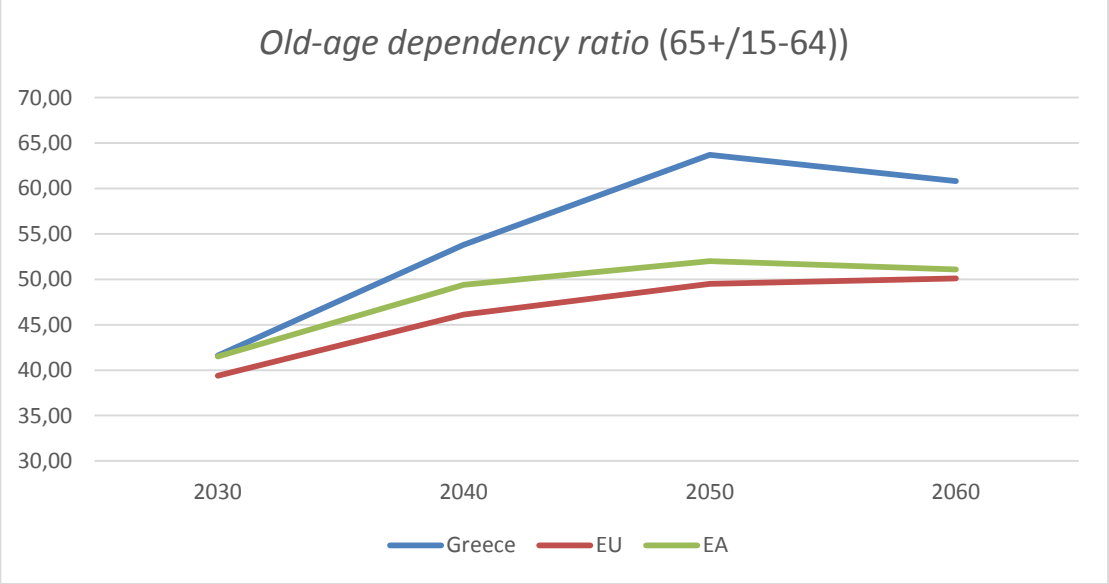


[2] The EPC's Working Group on Aging Populations and Sustainability (AWG) is constituted to contribute to improving the quantitative assessment of the long-term sustainability of public finances and economic consequences of Aging populations of the EU Member States, so as to assist policy formation.

Source: Economic Policy Committee (EPC 2015c)

Looking at the old-age dependency ratio for the whole projection period, the more acute increase seems to appear between years 2030 and 2040. During this decade, it will be crucially important for new policies to be drafted so that the demographic effect will not drive the system to further insolvency (Graph 2).

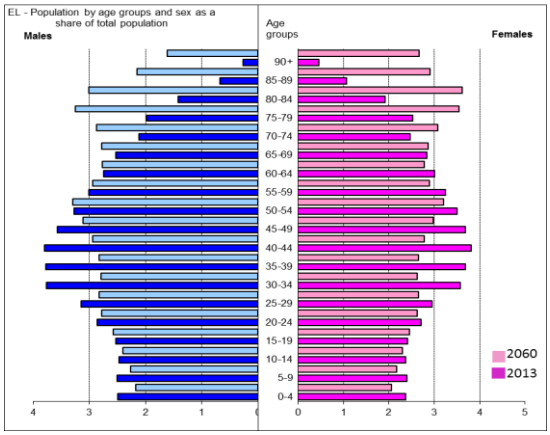
Graph 2: Old-age dependency for Greece, the EU and the Euro Area, years 2030 - 2060



Source: (EPC 2015b), (Symeonidis 2015)

The demographics in Greece are highly unpleasant as the dominant age groups will constantly be the ones higher in the pyramid, while the ones for younger ages will continue to have their population decreased. The double pyramid below (Graph 3) drafts a population shift from 2013 to 2060. The dominant age group for men and women will be the one of ages 75-79 while in 2013 it was the one of ages 40-44 for both genders.

Graph 3: Demographic pyramids by gender for the Greek Population, years 2013 and 2060



Source: Eurostat

The Greek population declines from 11,05 million in 2013 to 8,56 million in 2060. The respective dependency ratio increases from 31,2 to 60,8 for the abovementioned period.

The life expectancy at birth increases from 78,0 to 84,9 for men and from 83,3 to 89,0 for women. The life expectancy at 65, basic driver of the expected age threshold for retirement, increases for men from 18,0 to 22,7 while for women from 20,8 to 25,4. This means that pensions are expected to be paid for 4-5 years more than they used to. The increased life expectancy for years above 65 years of age is a crucial factor in this valuation, as legislation voted in 2010 links the age threshold to life expectancy increase at age 65.

On migration, the net amounts are expected to be negative until 2030, which is one of the main reasons that total population declines.

These assumptions can be found in Table 1 below along with their projection.

Table 1: Selected Demographic variables and their projection for period 2013-2060 for Greece

	2013	2020	2030	2040	2050	2060
Population (thousand)	11045	10673	10062	9572	9109	8560
Population growth rate	-0,4	-0,6	-0,6	-0,5	-0,5	-0,7
Old-age dependency ratio (pop65/pop15-64)	31,2	34,6	41,6	53,8	63,7	60,8
Aging of the aged (pop80+/pop65+)	28,7	31,9	31,5	32,9	38,1	46,5
Men - Life expectancy at birth	78	79,2	80,8	82,2	83,6	84,9
Men - Life expectancy at 65	18	18,8	19,8	20,8	21,8	22,7
Women - Life expectancy at birth	83,3	84,2	85,5	86,7	87,9	89
Women - Life expectancy at 65	20,8	21,5	22,6	23,6	24,5	25,4
Men - Survivor rate at 65+	84,3	86	88,1	89,9	91,4	92,7
Men - Survivor rate at 80+	55,3	59,1	64,1	68,6	72,7	76,3
Women - Survivor rate at 65+	92,9	93,6	94,5	95,2	95,9	96,4
Women - Survivor rate at 80+	74	76,6	79,8	82,7	85,2	87,3
Net migration	-15,9	-22,3	-10	1,3	7,3	4,7
Net migration over population change	0,3	0,4	0,2	0	-0,1	-0,1

Source: (EPC, 2015b)

As is well understood demography calls for reforms in Pay-as-you-go pension systems, something which has repeatedly been brought to the attention of the Greek governments in the recent past.

2b. Macroeconomic assumptions used in the NTS valuation

In order to work on a valuation as the one analyzed in this paper, a set of macroeconomic assumptions have to be used. Labor force projections, participation rates, unemployment rates and employment rates as well as interest rates and GDP growth are all necessary.

The set of assumptions used in the valuation of NTS proposal has been acquired by the DG ECFIN (Directorate-General for Economic and Financial Affairs of the EU). It was initially commissioned by the DG to the EPC (Economic Policy Committee). (EPC 2015b). The projections of the macroeconomic variables have been constructed using uniform assumptions and methodologies for all member states, after the latter had been agreed at the EPC (EPC 2015a).

The starting point is the EUROPOP2013 population projection for the period 2013 to 2060 (Eurostat 2015). These combined set of projections enabled the calculation of GDP for all Member States up to 2060. It is worth mentioning at this point that the Greek GDP has shrunk by approximately 20% from 2010 to 2013 and more than 30% from 2008 to 2013. (Symeonidis, Venetsanakou 2016)

The basic macroeconomic assumptions for Greece are given in Table 2 below:

Table 2: Macroeconomic assumptions for Greece for the projection period 2013-2016

MAIN VARIABLES	2013	2020	2030	2040	2050	2060
Actual real GDP (growth rate)*	-3,9	0,1	1,5	1,1	0,9	1,1
Potential real GDP (growth rate)	-3,5	0,1	1,5	1,1	0,9	1,1
Labor input (growth rate)	-1,7	1,0	0,2	-0,9	-0,9	-0,5
Employment growth (15-74)	-2,3	1,0	0,2	-0,9	-0,9	-0,5
Changes in Hours worked per employee (growth rate)	0,5	0,0	0,0	0,0	0,0	0,0
Labor productivity (growth rate, per hour)	-1,8	-0,9	1,3	2,0	1,9	1,5
TFP (growth rate)[3]	-1,4	-0,2	0,8	1,3	1,2	1,0
Capital deepening (contribution to labor productivity growth)	-0,4	-0,8	0,4	0,7	0,7	0,5
GDP per capita (growth rate)	-3,1	0,6	2,0	1,6	1,5	1,8
Real GDP per capita (thousands of 2000 PPS per head)	19,5	18,1	20,8	26,1	30,3	35,8
Real GDP (in billions euros)	182,1	187,1	202,6	241,6	267,1	296,1
Nominal GDP (in billions euros)	182,1	202,9	267,9	389,3	524,6	709,0
Employment growth (15-64)	-4,9	0,9	0,0	-1,1	-0,7	-0,3
Population growth (working age:15-64)	-0,9	-0,8	-1,1	-1,3	-0,7	-0,3
Participation rate (15-64)	67,7	71,9	73,5	75,5	76,0	75,4
Employment rate (15-64)	48,7	56,0	63,4	69,8	70,3	69,8
Unemployment rate (15-64)	28,0	22,1	13,7	7,5	7,5	7,5
Participation rate (20-64)	72,6	77,3	79,1	81,0	82,2	82,0
Employment rate (20-64)	52,6	60,5	68,4	75,0	76,2	76,0
Unemployment rate (20-64)	27,7	21,7	13,5	7,4	7,4	7,4
Inflation (GDP deflator)	-2,1	2,0	2,0	2,0	2,0	2,0
Consumer Price Index	-0,9	2,0	2,0	2,0	2,0	2,0

* Actual GDP growth up to 2018.

* From 2019, potential GDP growth = actual GDP growth.

Source: (EPC 2015b)

[3] Total-factor productivity (TFP), also called multi-factor productivity, is a variable which accounts for effects in total output growth relative to the growth in traditionally measured inputs of labor and capital.

Making use of these assumptions, five large sectors of benefits are projected, all related to aging, namely health-care, long-term care, education, pensions and unemployment benefits. Our focus in this paper is on pensions. However, representative numbers are provided for all sectors below (Table 3).

Table 3: Projection of age-related spending as a percentage of GDP for the baseline scenario

Projection of age-related spending as percent of GDP for the baseline scenario											
	Diff 2013-2060	2013	2020	2025	2030	2035	2040	2045	2050	2055	2060
Pensions	**-1,9**	**16,2**	**15,5**	**15,0**	**14,4**	**14,1**	**14,1**	**14,1**	**14,4**	**14,2**	**14,3**
Long-term care	0,4	0,5	0,5	0,6	0,6	0,6	0,7	0,7	0,8	0,9	0,9
Education	-1,1	4,1	3,5	3,2	3,0	2,8	2,7	2,7	2,9	2,9	3,0
Health-care	1,3	6,6	6,6	6,8	7,0	7,3	7,5	7,7	7,8	7,9	7,9
Unemployment benefits	-0,9	1,2	0,8	0,6	0,5	0,3	0,2	0,2	0,2	0,2	0,2
Total age-related spending	**-2,3**	**28,5**	**27,0**	**26,2**	**25,5**	**25,1**	**25,2**	**25,5**	**26,1**	**26,2**	**26,2**

Source: (EPC 2015b)

It must be stated here that these long-term projections are not forecasts. Projecting economic developments over the next almost 50 years is one of the most difficult analytical tasks facing policy makers. The uncertainty surrounding the projections is high and the longer the projection period, the higher the degree of uncertainty. The projection results are strongly influenced by the underlying assumptions. For this reason, a set of sensitivity tests were carried out, to illustrate the extent to which the public expenditure projections are sensitive to key assumptions. The sensitivity tests are seven and are further divided in three large main sections: Population, labor force and growth modification scenarios.

<u>Sensitivity scenarios</u>

Population

1) High life expectancy – an increase in life expectancy at birth by 2 years until 2060, compared to the baseline
2) Lower migration – a decrease in migration by 20% compared to the baseline

Labor force:

3) Higher employment rate – an increase in the employment rate being 2 percentage points higher compared to the baseline projection for the age group 20-64. The increase is introduced linearly over the period 2016-2025 and remains 2 percentage points higher thereafter

4) Higher employment rate for older workers – A scenario with labor productivity growth being assumed to converge, to a productivity growth rate which is 0.25 percentage points higher/lower than in the baseline scenario. The increase is introduced linearly during the period 2016-2025, and remains 0.25 percentage points above/below the baseline thereafter.

Productivity:

5) Higher and 6) lower productivity – A scenario with labor productivity growth being assumed to converge, to a productivity growth rate which is 0.25 percentage points

higher/lower than in the baseline scenario. The increase is introduced linearly during the period 2016-2025, and remains 0.25 percentage points above/below the baseline thereafter.

7) Lower TFP (risk scenario) – TFP growth would converge to 0.8%, with convergence to the target rate in 2035 from the latest outturn year, i.e. 2013, and the period of fast convergence limited to 5 years, i.e. until 2040.

Further analysis of these scenarios is beyond this paper, except for the Higher Employment Rate scenario which is analyzed further below in paragraph 2c.

Labor force projections

In Greece, labor force participation is projected to increase for age group 55-64 (from 42,4% in 2013 to 78,0% in 2060). The largest increase will be experienced until 2020 (reaching 59,4%). The projection also shows the labor force participation age group 65-74 to increase substantially (from 4,9% in 2013 to 25,1% at the end of the projection).

The participation rate for age group 65-74 increases from 4,4 in 2013 to 24,4 in 2060 and this is the main driver behind the results of the projection, reflecting on the changes in social values and the life expectancy (Table 4).

Table 4: Participation rates for Greece, 2013-2060

Participation rate, employment rate and share of workers for the age groups 55-64 and 65-74						
	2013	2020	2030	2040	2050	2060
Labor force participation rate 55-64	42,4	59,4	69,4	74,5	77,2	78
Employment rate for workers aged 55-64	35,5	51,5	63,6	71,3	73,8	74,6
Share of workers aged 55-64 on the labor force 55-64	83,7	86,6	91,7	95,6	95,6	95,7
Labor force participation rate 65-74	4,9	7,2	14,3	19,5	23,4	25,1
Employment rate for workers aged 65-74	4,4	6,5	13,6	18,9	22,7	24,4
Share of workers aged 65-74 on the labor force 65-74	89,8	91,3	94,8	97,1	97,2	97,3
Median age of the labor force	39	42	44	44	43	43

Source: (EPC, 2015b)

The average effective entry age remains constant for the projection period (22.6 years for men and 24.1 for women). Due to pension reforms the average contributory period reached 37,8 years for men and 37,5 for women by 2060. Percentage of adult life spent at retirement decreases for both men and women.

AWG/EUROPOP2013 assumptions on labor force participation rates, employment rates have been taken into account. According to the analytical data of the funds the base year total number of insured workers is higher than that of AWG/ EUROPOP2013 given. However the evolution of employees is assumed proportional to the evolution given by AWG. This mainly happens because of the fact that people may be enrolled in two different social security funds, e.g. as employees and self-insured. For this reason, an active population of 1,2 times the one of the AWG is assumed throughout the projection period.

Wages

The wage growth for all funds is obtained by the product of inflation and labor productivity. No negative growth is applied.

Salary valorization is adjusted by the inflation and labor productivity. Obviously, this adjustment is higher than the actual increase in the salaries observed in the past years, leading to overestimation of pension expenditure.

Inflation

The inflation used in the valuation (GDP deflator) can be seen in Table 5 below.

Pension indexation

Main pensions benefit indexation is fully linked to a uniform adjustment index which cannot exceed CPI. In particular, the index is equal to the minimum of CPI and the sum of 50% CPI and 50% GDP growth [min (50% GDP growth +50% CPI, CPI)]. No nominal increase in pensions up to 2015 applied.

The formula for auxiliary pensions benefit indexation according to legal provision is

$$\gamma_t = \min\left(\left[1 + g_{t-2} - r\right]SF_t - 1, \text{inflation}_{\text{t-1}}\right) \quad (2.b.1)$$

where

g : notional rate of return, r : discount rate=1,3%, SF : sustainability factor = Contributions previous year/Benefits previous year. This indexation can take negative values. Table 5 below includes the abovementioned values:

Table 5. Maturity, inflation, indexation 2013- 2060

	2013-2015	2016	2017	2018	2019	2020	2021-2060
main pension indexation	0,00%	0,30%	0,50%	1,40%	2,00%	1,80%	2,00%
auxiliary pension indexation	$\gamma_t = \min\left(\left[1 + g_{t-2} - r\right]SF_t - 1, \text{inflation}_{\text{t-1}}\right)$						
salary indexation	inflation X productivity						
	2013	2014	2015	2016	2017	2018-2060	
inflation	-2,1	-0,7	0,4	1	1,5	2	

Source: (EPC 2015d)

2c. The higher employment scenario

In the valuation of the NTS proposal a second macroeconomic scenario is used instead of the baseline. In this scenario – higher employment – the participation rates for employment are assumed to be 2 percentage points higher per year, for the age group 20-64 compared to the baseline. The increase is linearly introduced between 2016-2025 and remains stable thereafter. Experience has shown that the reduction of contributions has helped boost employment, so this scenario is the most appropriate in our case.

3. The 2015 projection of the Hellenic Actuarial Authority (HAA), base year 2013, and previous valuations

According to current legislation, the Hellenic Actuarial Authority has been commissioned to produce actuarial valuations for the whole pension system every three years. These valuations are then submitted to the Aging Working Group, subgroup of the EPC for peer review. The next valuation will be prepared at the end of 2017, while the last one was prepared at the end of 2014, with 2013 as a base year. That valuation was then released in 2015, as part of the 2015 Aging Report.

The 2015 projection is extensively used for comparison against the NTS proposal and will be henceforth referred to as the Status Quo (SQ), since it is the last official social security impression of the Greek state thus far.

In the latter valuation, most social security funds are actuarially valuated. For the rest, a loading has been assumed. Funds (1-6) mentioned below in the table are the ones explicitly valuated while 7 and 8 have been added as a loading.

Table 6: Social Security funds in the 2013 base year valuation

	Fund	Occupational type
Explicitly modeled funds		
1	IKA-ETAM	Private sector employees
2	TAP-DEH	Public electricity company employees
3	PUBLIC SECTOR	Civil servants
		Firefighters-Policemen-Air Force-Army-Navy
4	OAEE	Self-employed
5	OGA	Agricultural workers
6	ETAA	Lawyers-Engineers-Notaries
		Doctors
Funds not explicitly modeled		
7	ETAP-MME	Media Employees
8	NAT	Shipmen

Source: (EPC 2015d)

The pension expenditures per GDP are provided below, as these were projected in the SQ.

As mentioned above, for funds 7,8 – not explicitly modeled – a loading has been added in order to cater for the whole pension expenditure. This loading amounts to 0,6% of GDP for

the base years. An amount of 0,1% of GDP has been added for a small group of the unemployed seniors with no other pension.

Table 7: Analysis of pension expenditure over GDP for the main pension for SQ

2015 HAA (SQ) Valuation Pension Expenditure over GDP for the main pension						
Fund	2013	2020	2030	2040	2050	2060
Total Pension Expenditure for the main pension	13,70	13,40	12,40	12,10	12,40	12,30
IKA-ETAM	5,2	5,1	4,7	4,7	5,4	5,6
OAEE	1,7	1,8	2	2,2	2,3	2,5
OGA	2,1	1,6	1,3	1,1	1	1
PUBLIC SECTOR	3,2	3,3	2,8	2,6	2,2	1,7
ETAA	0,5	0,6	0,7	0,7	0,8	0,9
TAP-DEH	0,4	0,4	0,3	0,2	0,1	0,1
Unemployed Seniors	0,1	0,1	0,1	0,1	0	0
Loading	0,5	0,5	0,5	0,5	0,5	0,5

Source: (EPC 2015d)

It becomes obvious when looking at the results that the funds for the farmers (OGA) and the public sector are shrinking, with simultaneous transfer of people to the fund of private employees (IKA-ETAM). The new public sector employees as of 1.1.2011 will be employed by the IKA-ETAM fund. Since both OGA and the public sector will be transferring people to the fund for private employees, the latter will gradually become larger and in due course, its increasing number of pensioners will also cause the benefit expenditure to rise.

The intermittent reduction in benefit expenditure in IKA-ETAM until 2038 is caused due to the transition in the new reformed system (2010 reform). From 2040 on, when the new system is almost in full effect, the benefit expenditure will gradually increase due to the increase in the mandatory years of contribution to the system.

On the other hand, the increase of IKA-ETAM benefit expenditure as a percentage of the total is attributed to the fact that the pensions in IKA-ETAM are relatively small, hence not as eligible to pension cuts applied in Greek pensions since the 2010 crisis as other funds' pension amounts.

The funds for the Self-employed and Lawyers-Engineers-Notaries also see an increase. This is because of the reforms not greatly affecting the effective age of retirement versus the legislated age thresholds, as people in these professions tend to retire late in their career.

In general, the projected benefit expenditure decreases because of the new pension formula and the reduced replacement rates.

This valuation has been created on the set of assumptions of the EPC as analyzed in the above chapters. The model used for the projections is an adaptation of the ILO model specifically recalibrated for the Greek pension system. It helps to provide the quantitative basis for making policy decisions on social security pension funds. The model estimates future cost on the basis of the cohort decomposition method and various statuses of a person and associated values (average wage, average pensions) are provided year by year. To the extent possible, a distribution is considered for income level. For each generation, the transition of a status of a person (active person, inactive person, pensioners) is mapped onto the next year's status by using actuarially assumed transition probabilities (mortality rate, retirement rate, invalidity rate) and applying the eligibility conditions and pension formula. This cycle is iterated until the end of the projection period. By summarizing age-specific results, global future costs are obtained. For the basics of the calculation, one can be refer to (ILO 2002).

To sustain the possibility of comparison, the valuation of the present reform proposal has used the same way of projection as the 2015 HAA valuation for one of the main portions of the insured. As stated earlier, there is a main distinction between people first insured in the public pension system before 1/1/1993 and the ones first insured after in Greece. In this case, the projections were identically run for the portion of people first insured before 1/1/1993.

Generally, the HAA valuations are projected every three years. The results for the last three projection rounds can be found in Table 8 below. All of them reach out to 2060.

Table 8: Results for the three last projection rounds for the AWG, for Greece, as % of GDP

Projection Round	Starting point (Benefit Expenditure as a % of GDP at base year)	Change in benefit expenditure as a % of GDP	Benefit expenditure as a % of GDP in 2060 (summation of the previous two columns)
2009 (2007-2060)	11,7	12,4	24,1
2012 (2010-2060)	13,6	1,0	14,6
2015 (2013-2060)	16,2	-1,9	14,3

Source: (EPC 2015d), (EPC 2012), (EPC 2009)

In the 2009 projection round, the benefit expenditure as a % of GDP was 11,7% in base year 2007. This amount would rise to a staggering 24,1% in 2060, almost one quarter of the country's whole GDP. This valuation was a messenger of later collapse of the system but was not adequately appreciated up until the need for a fiscal bailout in 2010. Later in 2012, base year 2010, the respective benefit expenditure projected in 2060 was 14,6%. Under extreme reform policy people fled to retirement thus destabilizing the system temporarily and increasing the base year 2013 – round 2015 – benefit expenditure to 16,2%, projected to 14,3% in 2060. This proves that the reform policy is expected to bring results in the long

term, but in the short term it proves inconsistent with the essential short-term reduction of benefit expenditure. The 2015 projection includes all legislation up until the Second Memorandum of Understanding between the Greek Government and the Troika.

4. Technical specifications of the valuation of the present proposal

4a. Coverage

In the present valuation three main social security funds are explicitly projected. These are the fund for the Private Employees, the Self- Insured and the Public Sector employees. Of these, the public sector is not a separate fund in legal terms, as the benefits are calculated and paid by the State General Accounting Office of the Ministry of Economy. The benefit however, is part of the general social security benefit so it is important that it is added. Moreover, from January 1st 2011 and on, new public sector employees are going to be employed through IKA-ETAM, the fund for the private employees.

The abovementioned three funds make up for 79% of the insured and 73% of the pensioners in the SQ valuation. Benefit-wise the make up for 59% of the total benefit.

The coverage statistics can be found in Table 9 below:

Table 9: Coverage percentages for present valuation

Base year (2013) coverage percentages	Insured	Pensioners	Benefit Expenditure in billions of euros	Expenditure as % of GDP
SQ total	4.188.000	2.632.001	29,5	16,2
Present valuation (NTS) total	3.297.001	1.926.328	17,4	9,5
	79%	73%	59%	59%

Source: Calculations by author, (EPC 2015d)

The auxiliary funds analysis is made in a separate chapter of this paper and includes the total population, as an important principal of this proposal is the mandatory participation of all labor in this fund. Hence, the total population of the SQ valuation is taken into consideration, namely 4.188.000 people.

Lump-sum benefits (part of first Pillar as described in the first chapter) are not taken into consideration neither in this valuation nor the SQ one.

4b. Pension benefit projection models and description of the one used in the valuation of the NTS proposal

Pension benefit projection is very important to both countries and life insurance companies as it is a key component of long-term care. In order to project pension system benefits, different models are used by companies and countries. These models are generally divided in standard and microsimulation models. (PENMICRO 2009) (European Commission 2007).

Standard models are further categorized in cohort models and standard agents. The former are most of the times partial equilibrium deterministic models, but there are also cohort models which incorporate the economic behavior of households, firms and pension funds.

In the valuation for the NTS proposal an adaptation of the free version of the International Labor Office has been used. (ILO 2002)

Certain modifications were applied and new parameters inserted, so that the Notional character of the system for the main pension and the Defined Contribution character for the auxiliary pension are projected.

4c. Social Security Data

The data used in this projection refer to the total population of the three funds in question. They have been used in two main categories, individual data and consolidated data.

These are assumed for the base year, but also a few years before, so that possible fluctuations and trends are recognized and smoothed. An example would be an increased number of retirees in base year caused by legislation of that exact year, which should be smoothed out for the following years using the data of the previous quinquennium or decade.

4d. Use of the different macroeconomic scenarios of assumptions and clarification for reduction in contributions

The present proposal adopts the Notional Capitalization for the main pension branch. This is closely knit to the reduction of contributions by as much as 50%, exceeding that in special cases where the insured had been asked to contribute even more because of the special nature of their profession which made it imperative that they retire sooner than the legislated age thresholds (e.g. military, construction). The time of first application of the notional part of the system is 2017.

As stated earlier, legislation passed in 1992 still applicable in the time of the SQ projections, creates two large cohorts of insured in Greece. One first enrolled in the system before 1/1/1993 and one after. In the projection for this proposal, the projection of the cohort first insured before 1993, the exact same macroeconomic environment has been used as in the SQ projection, so as to ensure full comparability. This environment has been extensively analyzed in Chapter 2.

On the cohort first enrolled in the system after 1993, the NDC system is applied in 2017. Since the bibliography at hand (OECD 2011) (Carone and Salomäki 2001) (Van Rijckeghem 1997) has shown that reduction of contributions has widely increased employment, this cohort is projected using the improved employment rates found in the macroeconomic scenario of Higher Employment (refer to Chapter 2). This leads to 2 percentage points increased employment in the long run.

As per contributions, the reduction by 50%, hence 10% on the amount of income instead of 20% is targeted in IKA-ETAM and the public sector. In the fund for the self-employed, the amount of reduction refers to the insurance class, as OAEE worked with presumptive

earnings and presumptive insurance classes until recently. Again, the result is the same as the presumptive classes were the sole driver for pension calculation.

4e. Age Thresholds

The age threshold as legislated in 2010 and modified in 2012 has reached 67 years of age with the alternative of 62 if 40 full years of contributions have been fulfilled. Furthermore, the legislated age threshold has been linked to life expectancy change at year 65; therefore a further increase in age thresholds has been modelled for years 2021, 2030, 2042 and 2051 by one year.

5. Results of the valuation for the three main pension Social Security Funds IKA-ETAM – OAEE – Public Sector and grossing up to the total of the Main Pension Benefit

5a. Demographics

As stated earlier in the text, the projection of the cohort first insured in the pension system before 1/1/1993 is identical to the one of the SQ, as reported in Chapter 3. For this reason, the amounts and number in this period appear to be the same. As regards people first insured after 1/1/1993, these are projected using the same base year data, but the course changes as the macroeconomic environment is different. The scenario used, higher employment rates, calls for increased amounts of insured and this in turn means more pensioners in later years. The results are shown in Table 10 below:

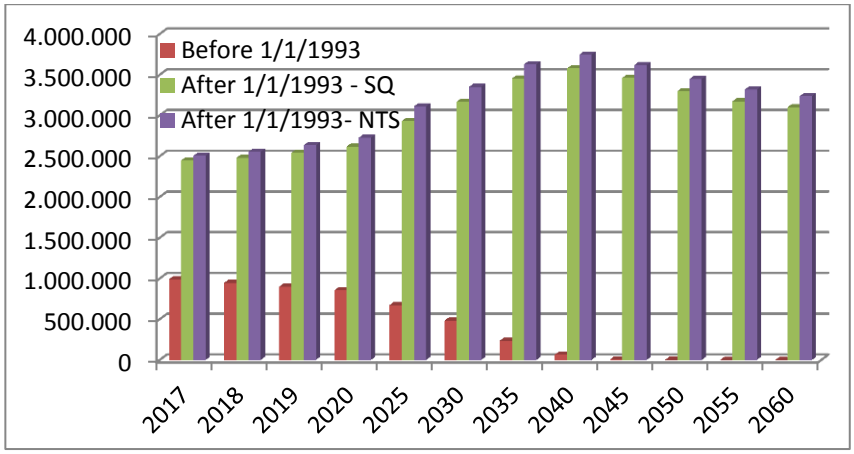
Table 10: Number of insured (first insured before and after 1/1/1993) for the valuation of the present proposal and the SQ

Year	Insured		
	Before 1/1/1993	After 1/1/1993 – SQ	After 1/1/1993 – Present proposal
2017	989.899	2.448.251	2.506.112
2020	854.164	2.618.659	2.727.016
2030	483.641	3.169.627	3.350.659
2040	65.222	3.578.258	3.746.090
2050	521	3.297.829	3.447.939
2060	0	3.101.033	3.237.896

Source: Calculations by author

The graph below helps the reader better digest the numbers above:

Graph 4: Evolution of the insured population first insured before and after 1/1/1993 for the SQ and the valuation of the present proposal



Source: Calculations by author, (Eurostat 2015)

In analogy to the number of the insured, a slight difference in the number of projected pensioners is also expected. More people entering the system in the early years lead to more retirees in the long run, which are depicted in Table 11 below:

Table 11: Total number of pensioners

Year	Total number of pensioners	
	HAA rounds 2015 - SQ	Present proposal - NTS
2017	1.926.752	1.926.752
2020	1.914.363	1.914.375
2030	1.829.546	1.830.477
2040	2.043.315	2.048.500
2050	2.254.734	2.268.620
2060	2.252.260	2.308.414

Source: NTS valuation

5b. Benefit expenditure, contribution and deficit projections for the main pension for the three projected funds as grossing up to the total of the main pension as compared to the SQ (HAA Round 2015) valuation

Starting from the benefit expenditure of the three projected funds, namely IKA-ETAM, OAEE and the public sector, the results are summed up in Table 12 below:

Table 12: Present proposal: Projection of benefit expenditure for the main pension for the three funds in question

Present Proposal – Benefit expenditure projection of the three main social security funds						
Fund	**2013**	**2020**	**2030**	**2040**	**2050**	**2060**
IKA-ETAM (Private employees)	4,6	4,2	3,4	3,2	2,7	2,1
OAEE (self-insured)	1,7	1,8	1,7	1,7	1,3	0,9
Public sector	3,2	3,2	2,4	1,9	1,2	0,7
Total of three funds	9,5	9,1	7,5	6,7	5,3	3,7

Source: NTS valuation

It becomes obvious that the implementation of the system in 2017 reduces benefit expenditure and as it comes in full effect throughout the projection period the benefits are drastically reduced. Especially for the public sector, since new entrants are absorbed in IKA-ETAM as stated earlier in this paper, the amount is reduced by as much as 5 times.

For the remaining funds which are not explicitly projected in this valuation, a proportional calculation has been derived based on the fund for the private employees (IKA-ETAM), since this is the most representative one because of its volume and nature. This has led to results for all funds and helps in grossing up to the total of the main pension as presented in the table below. It is noted that IKA-ETAM also accommodates a few other funds under an older merge so an extra line has been added to distinguish between the fund projected (IKA-ETAM) and the one with the additional sub-funds (IKA ETAM with special fund loadings).

Table 13: Present Proposal: Benefit expenditure for the total of the main pension by fund, using the three projected funds.

Present Proposal: Benefit expenditure as a % of GDP for the total of the main pension						
Fund (Actuarially projected fund)**	**2013**	**2020**	**2030**	**2040**	**2050**	**2060**
Total benefit expenditure for main pension	**13,7**	**13,2**	**11,5**	**10,2**	**8,0**	**5,7**
IKA-ETAM (with special fund loadings)	5,2	5,0	4,6	4,3	3,8	2,9
IKA-ETAM as projected**	4,6	4,2	3,4	3,2	2,7	2,1
OAEE**	1,7	1,8	1,7	1,7	1,3	0,9
OGA	2,1	1,6	1,3	1,0	0,7	0,5
Public Sector**	3,2	3,2	2,4	1,9	1,2	0,7
ETAA	0,5	0,6	0,7	0,6	0,6	0,5
TAP-DEH	0,4	0,4	0,3	0,2	0,1	0,1
Uninsured seniors	0,1	0,1	0,1	0,1	0,0	0,0
Loadings	0,5	0,5	0,5	0,5	0,3	0,3

Source: NTS valuation, (EPC 2015d)

It becomes obvious that the implementation of the new system will proportionally reduce benefits, even when taking into account the extra number of pensioners in the system. The notional capitalization will closely link contributions to the benefits; hence the system will be alleviated from extra burdens of the defined benefit pension formulas.

In the same manner with the benefits, the contributions are proportionally analyzed and projected as a total, as can be seen in Table 14 below:

Table 14: Present proposal: Projection of total contributions based on the three projected funds and grossing up to the total of the main pension system

Projection of total contributions as a % of GDP based on the three projected funds						
	2013	2020	2030	2040	2050	2060
Contributions of the three projected funds from the SQ valuation	4,03	4,05	4,07	4,19	4,35	4,45
Contributions of the three projected funds from the valuation of the present (NTS) proposal	4,03	2,60	2,28	2,04	2,07	2,10
Total main pension contributions – present proposal (NTS)	4,95	3,40	3,00	2,62	2,65	2,69

Source: NTS valuation, (EPC 2015d)

Contributions diminish as expected, since the main idea behind the new system is reducing all contributions to the pension branch by 50% or more. This could mislead the reader in identifying that as a problem to the pension system. The reality however has been much different in countries where contribution reduction has been applied and experience has shown that the extra funds going around in the market instead of being trapped in the pension system leads to increase growth and employment rates.

Having projected both benefits and contributions leads one to the next logical step; which is calculating the deficits of the two systems.

Table 15: Projection of deficits for the total of the main pension system for SQ and the NTS valuation

Projection of deficits for the total of the main pension system						
	2013	2020	2030	2040	2050	2060
HAA Round 2015 (SQ) – three funds	-5,51	-5,17	-3,72	-3,37	-3,47	-3,11
Valuation for the present proposal (NTS) – three funds	-5,51	-6,51	-5,27	-4,70	-3,21	-1,57
Total main pension deficit (NTS) – present proposal	-8,77	-9,77	-8,53	-7,61	-5,32	-3,03
Total main pension benefit – HAA Round 2015 (SQ)	-8,75	-8,11	-7,04	-6,71	-6,81	-6,60

Source: Valuation for the NTS proposal, (EPC 2015d)

As expected, the deficits for the proposed system are larger in the short term than the ones in the status quo. Obviously, the reduced influx of contributions in the system is the underlying reason for that. It has to be said, however, that the deficits born now are carried through time by the generations who enjoyed generous replacement rates without having paid for the respective contributions and have already retired and not the present contributors who unfortunately have to deal with the problem themselves. In 2040, when the older cohort is almost eliminated, the scale begins to tip and in due course the deficits

are much less than the ones in the status quo scenario. Let us not forget that the present situation in the pension system in Greece is one of the main drivers of the near bankruptcy of Greece in the last few years and one of the key elements in the delegations with the Troika for a new financial bailout.

5c. Statistics for new pensioners

The statistics for new pensioners reveal a lot about the architecture of the new system and promote the idea behind the whole proposal in terms of adequacy as well as financial sustainability.

Table 16: Number of new pensioners by function for the projected funds of the present proposal

Number of NEW pensioners				
Year	Old-age	Invalidity	Survivor	Total
2017	44.734	7.034	24.845	76.614
2020	46.043	6.550	24.765	77.358
2030	54.876	8.611	25.071	88.558
2040	82.566	9.963	26.962	119.491
2050	77.153	9.533	28.891	115.577
2060	75.913	8.702	29.692	114.307

Source: NTS valuation

The average pension amounts for new pensioners as well as the replacement rates can be seen in the table below. The average effective age of retirement is also provided.

Table 17: Average pension amounts for new pensioners, replacement rates and average effective age of retirement

Year	Average pension amount		Replacement Rate		Average effective retirement age
	SQ	NTS	SQ	NTS	
2017	9.708	7.600	86%	87%	60,3
2020	9.741	7.314	88%	88%	61,6
2030	10.740	6.892	87%	83%	66,8
2040	17.488	9.485	81%	59%	67,9
2050	24.600	9.622	77%	33%	69,0
2060	33.966	11.528	74%	27%	69,8

Source: NTS valuation, (EPC 2015d)

Replacement rates are provided for earnings-related pension, hence old-age pension only. It is obvious that replacement rates are falling by a large percentage for the present proposal, which is only logical as contributions are reduced by at least 50% and are closely linked to the pension amount. One would expect a system to provide adequate pension amount, possibly close to 60% replacement on their income. The target of the present proposal is exactly that, but the total replacement rate is expected to be achieved by both the main pension and the auxiliary pension fund as described in the beginning. Hence, a replacement rate of 30% achieved in the main pension leaves a 30% to be inquired by the auxiliary pension amount.

Also, the notional capitalization nature of the main pension branch goes part and parcel with the notion that people can delay retirement so as to achieve greater replacement rates.

Finally, any other defined contribution fund would be greatly advised, in order to achieve even higher replacement and therefore better living standards in retirement. For professions of special nature, where present legislation calls for more than 20% on pension contributions, it is suggested that they all move to the new system and are equalized with everyone else; hence they should pay 10% contributions on income. The extra pension amount exceeding 20% (now legislated to be 6% more) is strongly suggested to be included in the auxiliary fund so that early retirement will again be possible but without extreme loss of replacement.

6. Calculation of the replacement rates for the fully capitalized auxiliary pension fund

As stated earlier in this paper, the present proposal calls for a fully funded auxiliary pension fund under the first pillar, in excess of the main pension branch. The idea behind this funds is that can belong to the state, but people will also be able to use contracting-out and contribute to any other private fund which will work under the same principals and legislation. IORPs can also be an alternative, but the mandatory character of the system must be in place and the minimum contribution rate has to be 6% on income.

In order to calculate representative replacement rates for the new fully funded system, namely ETEA, an average income of 21.500 is assumed in 2017, when the new system will be implemented. Prudent assumption are taken into account, like a 0,5% maturity per year on income, contribution rate (as a minimum) of 6% on income, and an expense rate 0,5% on contributions and a real return rate (after expenses) of 3,5% per year. Full working period is assumed to be the maximum, hence 40 years.

The final salary according to the above data will be 31.724 euros in 2060 while the accumulated capital will be 129.088 euros. In order to calculate a pension amount and deduct the replacement rate, we will need an annuity. In order to simplify things – also keeping in mind that people with 40 years of service can retire between 62 and 67 years of age based on current legislation – we assume an average/representative annuity of 15,64. This is a joint annuity and benefit transfer to a spouse after demise is assumed, even though not obligatory in a funded system.

Using the abovementioned annuity, the average monthly pension is calculated at 688 euros in 2057. The replacement rate is then calculated at 26,02% for 40 years or 0,65% yearly. In Table 18 below the reader can see the assumptions and results.

Table 18: Assumptions on calculating the replacement rates for the defined contribution fund ETEA

Assumptions on calculating the replacement rates for the defined contribution fund ETEA	
Annual income in 2017	21500
Income maturity	0,5%

Total contribution rate	6,0%
Expenses on contributions	0,5%
Total working life in years	40
Annuity	15,64

Source: calculations by author

Looking at the real return rate, earlier defined at 3,5%, another two scenarios are provided below in order to account for less or more promising returns from the market.

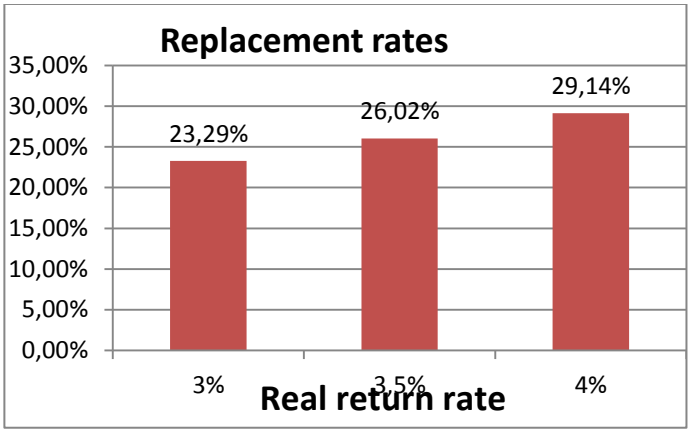
Table 19: Replacement rates for return rates of 3, 3,5 and 4% for ETEA with assumptions from Table 18

Real return rate	Final Salary (2057)	Accumulated capital in the end of the projection period (2057)	Monthly pension (2057)	Annual pension (2057)	Replacement rate	Annual replacement rate
3%	31.724	115.541	616	7.388	23,29%	0,58%
3,5%	31.724	129.088	688	8.254	26,02%	0,65%
4%	31.724	144.573	770	9.244	29,14%	0,73%

Source: calculations by author

The basic result in this table, the replacement rate is depicted the graph below for the three different return rate assumptions.

Graph 5: Replacement rate for the different return rate assumption in Table 19



Source: calculations by author

7. Calculation of the actuarial capital in the new auxiliary pension fund

A fundamental calculation of the total contribution revenue flowing into the system as described in the NTS proposal is deemed necessary so as to present the volume of investment fund available and the extent of growth these could provoke, provided they are re-directed from social security.

The calculation is made on the inflow basis of the existent fund for auxiliary pension as per the data in the SQ valuation. The population and contribution margin have been adapted to fit the Defined Contribution described in the previous chapters however, and so they include the total working population and the contribution percentage is 6%.

The macroeconomic scenario used is – as stated earlier – the higher employment scenario and this means that new entrants are calculated with the increased employment rate, introduced as described in paragraph 2c.

The accrued rights of the people already in the system before 1/1/2017, when the new system applies, should – in the opinion of the authors – receive compensation outside the system in the form of recognition bonds. This way, the new system will not inherit the financial burden from the previous, more generous and actuarially imbalanced systems. In the next table, the reader will find the amounts per decade for contributions, benefits and reserve. The reserve mentioned below is calculated as the remaining contributions of the last year increased by 3% - an estimated return rate for assets, plus the annual surplus of benefits minus the current contributions collected.

Table 20: Contributions, Benefits and Reserve for the New Auxiliary Fund as proposed in the NTS proposal, in millions of euros

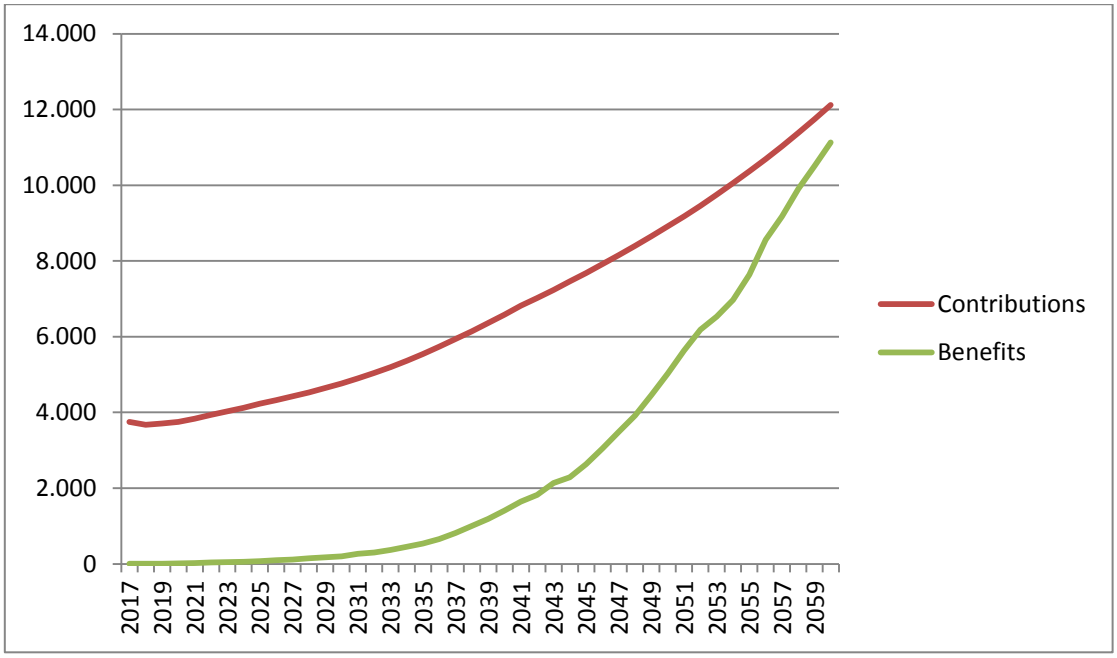
New Defined Contribution Fund ETEA			
	Contributions	Benefits	Reserve
2017	**3.751**	**1**	**3.750**
2020	**3.752**	**14**	**15.543**
2030	**4.766**	**200**	**68.670**
2040	**6.585**	**1.410**	**149.214**
2050	**8.911**	**5.025**	**255.722**
2060	**12.120**	**11.131**	**371.500**

Source: calculations by author

The total reserve for 2060 is almost 372 billion euros, estimated with a 3% return rate for assets. If this amount of money was directed to the market through the insurance companies and other types of investment funds that operate in parallel to the public system – let us state again here that contracting out is one the main characteristics of the new system – then a definite degree of growth would be experienced in the country.

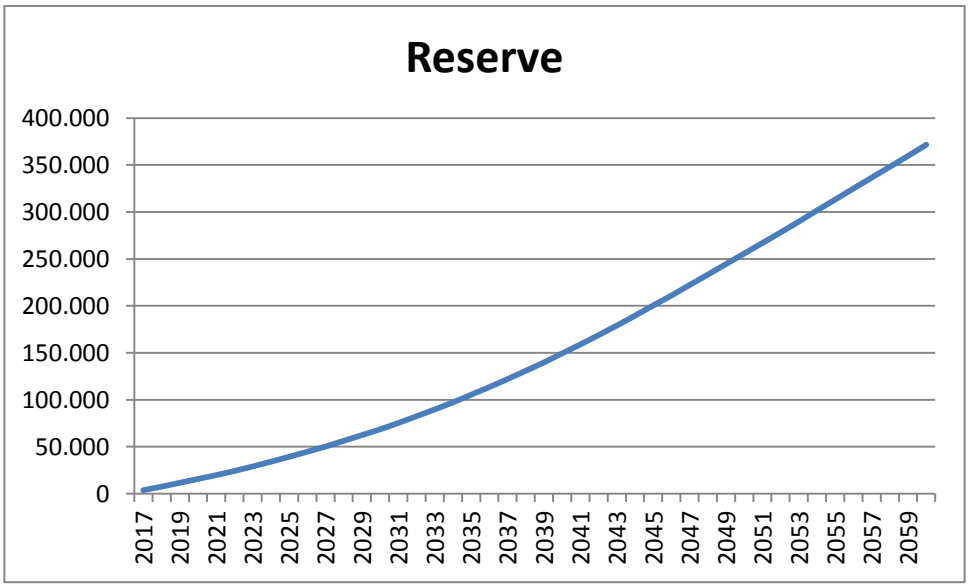
These results are also depicted in the graphs below:

Graph 6: Contributions and benefits for the total population for the new defined contribution fund



Source: calculations by author

Graph 7: Reserve of the new defined contribution fund with 3% yearly return rate



Source: calculations by author

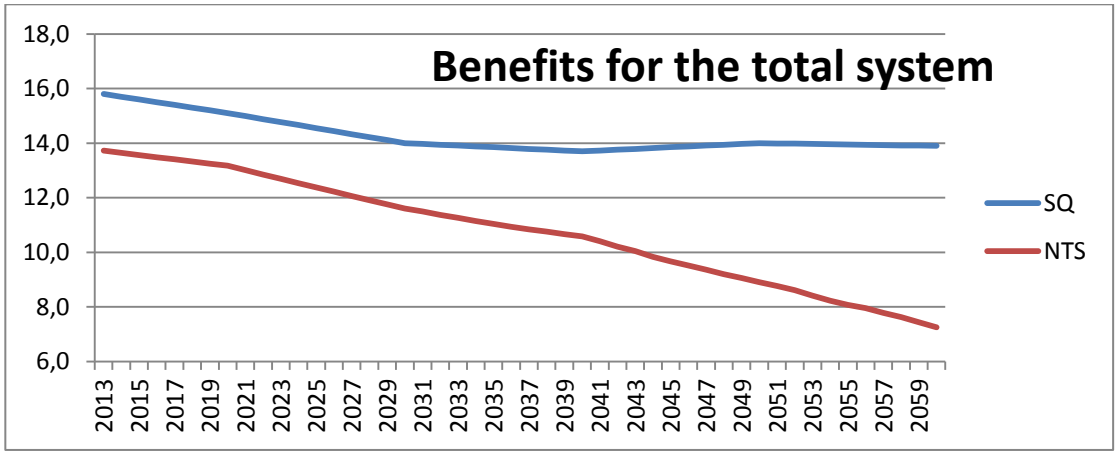
8. A cohesive comparison of the SQ and NTS proposal

After having analyzed the main pension and auxiliary pension branches separately, the ultimate step is to examine these two systems and prove why the new proposal leads

towards a new, unified and sustainable solution for the future, without the loss of adequacy in pension amounts.

The pension amounts as can be seen in the table below fall rapidly after the introduction of the new system in 2017, for the NTS proposal. As the system comes in full effect towards the end of the projection, with the pension amount strictly linked to the amount of contributions, the reduction becomes even more obvious. In contrast, in the SQ scenario, the pension benefits are slowly reduced until 2040 and experience an inverse trend until 2050, because of the demographic pressure.[4] From the on and for the last ten years of the projection, the trend levels off (Graph 8).

Graph 8: Comparison of the total pension amounts (main and auxiliary) for the SQ and NTS proposal valuations as a % of GDP

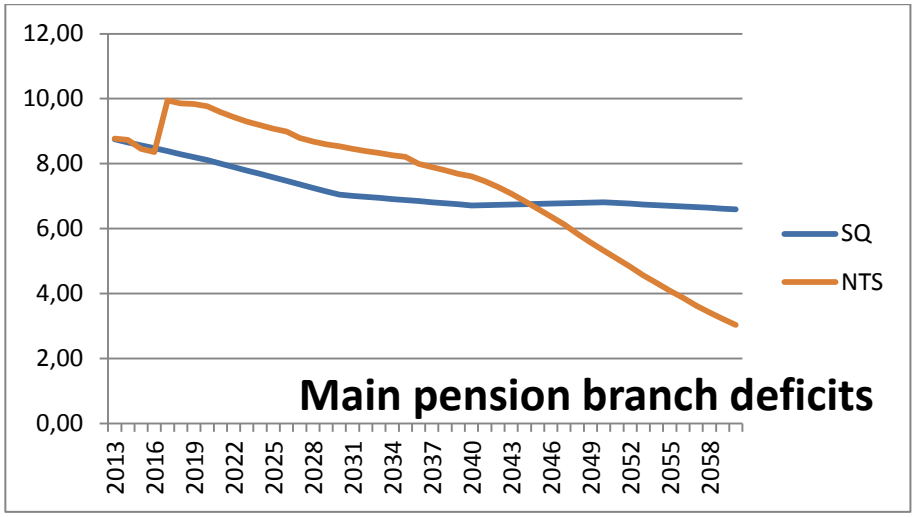


Source: calculations by author

As per the deficits each pension branch creates, let us first focus on the main pension. In the NTS proposal, as expected, the rapid contribution reduction causes the deficits to be higher than the SQ in the beginning of the projection. Because, however, the benefits of the NTS proposal also rapidly decrease as the system comes into effect, from 1/1/2017 and on, the trend is inverted in the long term and the two lines cross towards the end of the projection period, thus proving the NTS system to be more sustainable one.

[4] As mentioned earlier, demographic dependency peaks at 2050 for Greece for the projection period until 2060, having the most centennials in its history.

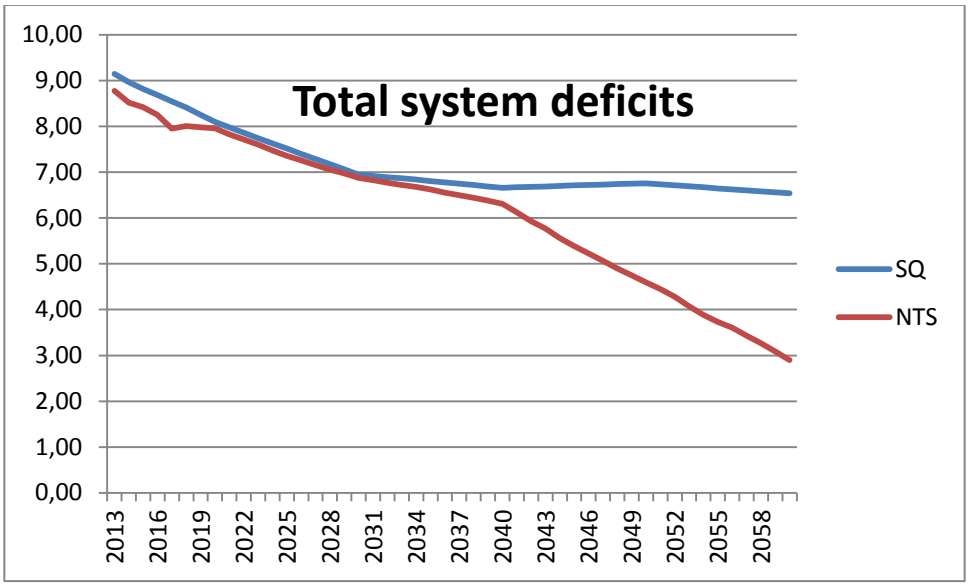
Graph 9: Comparison of the main pension deficits for the SQ and NTS proposal valuations (as a % of GDP)



Source: calculations by author

If the auxiliary deficits are added, the picture is very different. As the SQ scenario carries a large burden from the existent auxiliary funds and the NTS starts off without the former, the total deficit for the NTS proposal is steadily smaller and becomes even more as the system is fully implemented.

Graph 10: Comparison of total deficits for the total of main and auxiliary pension for the SQ and NTS proposal valuations (as a % of GDP)



Source: calculations by author

The final and equally important comparison is intended to be that of the total replacement rates for the two valuations. For the NTS proposal, the replacement rate for the auxiliary

fund is reported only for the years as of 1/1/2017, when the new system is introduced. The table below proves that as more years are accrued in the new system, the loss of replacement from the main pension is complemented up to a point by the auxiliary system.

The option of contracting out and the competitive environment this will create for the auxiliary pension branch is expected to reduce expenses and increase replacement rates. Therefore, people can expect more from their contributions than they used in the past.

Table 21: Comparison of total replacement rates for the main and auxiliary pensions, between the SQ and NTS proposal valuations

	SQ		NTS proposal		SQ	NTS
Year	Replacement Rate - main pension	Replacement Rate - auxiliary pension	Replacement Rate - main pension	Replacement Rate - auxiliary pension	Total replacement	
2020	88%	12%	88%	2%	99%	90%
2030	87%	11%	83%	6%	98%	89%
2040	81%	9%	59%	12%	91%	71%
2050	77%	8%	33%	19%	85%	51%
2060	74%	8%	27%	23%	82%	50%

Source: calculations by author

It has therefore been shown that a new system for the new generations in Greece can be implemented on the basis of the NTS proposal. Sustainability of the system improves as compared to the present situation and adequacy is achieved through the first pillar (main and auxiliary pension branches) and a second pillar which is fully funded and includes IORPs and other defined contribution schemes. An additional 25% return on a funded scheme outside the first pillar can top up the approximately 50% replacement rate provided by the first pillar (main and auxiliary pensions) and secure adequate pension in the retirement period for the period of acute aging, from 2050 and on.

9. Epilogue

At the time of writing of this paper the NTS proposal had received great attention from the main political parties of the opposition in Greece and main stakeholders. Its first presentation took place in the yearly conference of the Hellenic Actuarial Association in December 2016 and the Hellenic Association of Insurance Companies also expressed its interest and support. There were press and media publications and the London School of Economics, Hellenic Observatory, posted a summary of the proposal in its website.

The increasing interest in a new system in Greece is two-fold. Firstly, the current legislation passed only a year ago foresees further pension reductions in 2018, thus stating the obvious,

that the reform was once again obsolete. Secondly, people are hesitantly realizing that if the system is not reformed wisely once and for all, the vicious circle of unemployment and pension reductions will continue until a definite burnout of the Greek economy. Therefore, even though difficult to agree to and accept it, people start to realize that an imminent, carefully applied intervention in the direction of the NTS proposal is the most safe path to sustainability and adequacy for the years and generations to come.

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Georgios Symeonidis

Executive Board Member

Hellenic Actuarial Authority

Contact information:

Email:

g.simeonidis@eaa.gr

george.simeonidis@gmail.com

Address:

Stadiou 29,

Ypourgeio Ergasias

Ethniki Analogistiki Arhi

Athens, 10 110

Greece