

# Strategic Analysis of and Scenario Planning for the Turkish Public Social Security System

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## **Abstract**

*In this study the public social security system in Turkey is described, and the largest component of public social security system, Social Insurance Institution (SII), is analyzed in detail. The aim of the analysis is to form the basis for strategic planning through informed public policy formation by the use of scenario analysis. Taking 1995 as the base year, and the prevailing conditions in that year as given, several scenario analysis are carried out. A pension model that is based on the contribution and pension characteristics of SII, such as the minimum retirement age, minimum contribution period, replacement ratio, contribution collection rate, etc., and Turkish demographic and labor market data are used in system simulation. Scenario analysis indicate that even with mild scenarios, with no shocks introduced to the system, it is financially possible for the system to be viable.*

## **1. Introduction**

Social security systems throughout the world are subject to change due to increasing life expectancy, increasing ratio of pensioners to contributors, the resulting financial gap between pensions and contributions, and the financial inefficiency of pension plans (Arrau1994). The direction of change is to decrease the burden of social security systems on public expenditures, to improve the financial markets in these countries while emphasizing private social security schemes ( Kotlikoff 1996), (Mitchell and Zeldes 1996), ( Feldstein 1996).

The public social security system in Turkey is also on the agenda. Different social parties such as employers, employees, their unions, the government, and international financial organizations have different and controversial views on the issue. The debate gained momentum especially after social security transfers started to exert pressure on public sector borrowing requirement. At the core of the controversy is the lack of systems thinking and a comprehensive analysis of the public social security and pension system as a subsystem of the larger labor market and the economy. Section 2 summarizes the basic features of, and the current debates on the Turkish Social Security System.

In this study the largest component of public social security system, Social Insurance Institution (SII) is analyzed in detail. Section 3 presents the basic components of the SII insurance scheme, sources and uses of funds, relation of SII to the labor market and the governments role. Problems of the Turkish public social security system are summarized in Section 4. A brief outline of the ILO pension

model adopted for SII to simulate the SII pension scheme, data sources, assumptions, and parameter estimation based on Turkish data are presented in Section 5. Taking 1995 as the base year, and the prevailing conditions in that year as given, several scenario analyses are carried out. The results of the base case (simulating the natural course of the current system) and various scenarios are summarized in Section 6. Section 7 presents concluding remarks.

## 2. Turkish Social Security System

The first national scheme based on social insurance principles, covering the risks of employment injury and maternity, was established in late 1940s. The division between private and public sector provision was established with the creation of contributory pension scheme for government- Emekli Sandığı (ES). Various social insurance schemes for private sector establishments were consolidated under the Social Insurance Law in 1965. This placed a responsibility on SII to provide benefits to all workers covered by the Turkish Law. Bag-Kur (BK), social security institution for tradesmen and craftsmen, and other self-employed was established in 1972.

In 1997, SII covered 57% of total insured population, whereas BK covered 23% and ES covered 20%. All three social insurance organizations provide old-age, invalidity, death, and health insurance benefits.

A SII insured to be eligible for retirement must (a) at least be at the age of 50/55 (female/male) and have made contributions for 5000 days, or (b) have been insured for 15 years, made contributions for at least 3600 days, and be at least 50/55 (F/M) years old, or (c) been insured for 20/25 (F/M) years, and made contributions for at least 5000 days. Eligibility requirement for retirement from BK and ES is to have made contributions for 20/25 (F/M) years or be at least 50/55 (F/M) years old and made contributions for at least 15 years.

Total contribution rate, percentage of earnings paid as contribution, ranges between 33.5% and 39% for SII, 14% of which is employee share, 32% for BK and 35% for ES of which 15% is employee-civil servant share.

Reference period, the period over which average insurable income is taken into account in the calculation of pensions, is the last 5 years for SII, the last earning level for BK, and the last month's salary for ES.

Replacement rate determines the percentage of average insurable earning a pensioner will be paid as initial pension when she/he retires. The minimum replacement rates for SII, BK, and ES are 60%, 70% and 75% respectively.

Contribution period, reference period and replacement rate are the key determinants of a pension.

In 1996, the percentage of insured population (including children and spouses) to total population was 81.3%, whereas the percentage of active insured to workforce is 47.6%, and the ratio of active insured to pensioners is 2.3.

Budgetary transfers to Social Security institutions in million USA dollars, and as a percentage of GNP are presented in Table 1.

Table 1. Budgetary Transfers to Social Security Institutions (Million USA \$ nominal)

(Million USD)	1991	1992	1993	1994	1995	1996	1997	1998
SSK	0	176	819	492	1,295	1,799	2,217	1,741
BK	0	0	246	153	175	864	809	1,680
ES	325	581	1,047	673	1,006	1,356	1,842	2,355
Total	325	757	2,112	1,318	2,477	4,019	4,868	5,776
Percent of GNP	0.21%	0.47%	1.16%	1.01%	1.44%	2.18%	2.55%	2.82%

However, it should be noted that as compared to 5% of GDP allocated to social security expenditures in Turkey, EU countries allocate 27% on the average. Furthermore, Turkey is the unique European country in which there is no legislative arrangement for state contribution to the system. Similarly Turkey is the unique OECD country where there is no unemployment insurance. The contribution rates for SII, BK and ES, ranging between 32% and 39% are very high compared to Japan (10%), Spain (12%), and Germany (21%). Thus the burden on both employees and employers is quite high (Er, 1998).

Based on these features, different social parties have different views on the system.

The government side argues that the system is in crisis due to low retirement ages, and the budgetary transfers to the three pension funds. Early retirement combined with labor market distortions results in the early retirees going back to the labor market for jobs (unofficially), complying with lower wages, hindering employment opportunities of new entrants, and thus new contributors to the social insurance system.

Trade unions argue that social security system should be reformed together with the unregistered economy, tax system, and the labor market legislations. Unemployment insurance as well as regular state contribution should be established and the quality of the products (benefits) and services should be improved. They also argue that the minimum retirement age should not be increased given the working conditions and life expectancy of the workers in Turkey.

Confederation of Employers and the Association of Turkish Industrialists and Tradesmen assert that the system is spoiled owing to government's intervention, and that not only should it be redesigned but the coverage should be increased by closer monitoring of unregistered economic activity and employment.

International organizations such as IMF, and the World Bank state that despite the young demographic structure, the social security system is in crisis with deficits already equal to 3% of GNP and expected to increase rapidly in the near future. Their suggested approach is to limit indexation of pensions, impose higher minimum retirement ages to be increased further to international norms in a short period of time (Orsmond 1998).

Since ES and BK have different structures and since more than 50% of the insured are covered by SII, analysis of and scenario planning for the Turkish public security system will be confined to SII in the following sections.

### **3. Basic Components of the SII Insurance Scheme**

SII is a financially and administratively autonomous public organization under the jurisdiction of the Ministry of Labor and Social Security. SII covers the following universally accepted risks: old-age, death, invalidity, health, maternity, sickness and temporary incapacity/disability.

Contributions are made from declared insurable earnings. The insurable earning of an employee cannot be less than a minimum level and cannot exceed the ceiling determined by an indexation table renewed by the Government.

Pensions are calculated based on the indexation tables, contribution period, reference period and replacement rate to which a flat portion called Social Support Payment (SSP) is added. If an insured retires from a public enterprise SSP is paid by the enterprise to SII, whereas if the insured retires from a private company than SII pays this portion.

Revenue sources of SII are contributions from the insured, revenues from investments in securities, revenues generated from enterprises in which SII has shares, rent from properties, budgetary transfers from the general budget, and penalties on arrears. When the revenues of SII are analyzed over the period 1950 to 1996, it is seen that until 1993 85%-90% of the revenues come from contributions of the insured. The remaining 10%-15% of the revenues are interest income from securities and banks, and rent from property in descending order of magnitude.

Between 1980-1990 real contributions increased significantly due to increases in the number of contributors and the increase in the contribution rate. But with the economic crisis in 1993 contributions showed a dramatic decline. The share of rent income in total revenue remained below 2% over 1950-1990 and decreased to less than 0.5% in 1990. SII officials admit that they are not able to assess the exact value of properties and assets they own, and they are not allowed to dispose of them. Arrears collected are negligible over 1950-1996 despite the fact that contribution rates varied between 75% and 85%.

The major expenditure categories of SII are social insurance payments, health expenditures and administrative costs. Social insurance payments are comprised of old-age, invalidity, death, sickness, maternity, funeral, occupational diseases and work injury benefits.

During 1950 to 1977 the share of social insurance expenditures in total SII expenditures ranged between 20% and 36%. It increased sharply thereafter until 1985 and reached 60%, then decreased to 40% in 1987 and stabilized between 40%-50% during 1988-1996. The share of health expenditures decreased from 13% to 9% between 1981 and 1996, and the share of administrative expenses in total expenses decreased continuously from almost 8% in 1951 to 1% in 1995.

It is observed that until 1992 revenues and expenditures were in balance, but in 1992 SII faced the first deficit (Table 1). In 1996 contributions accounted for only 60% of expenditures whereas interest and rent income was around 15%, with deficits being financed through budgetary transfers from the Treasury. The deficits are estimated to be 1.4% of GDP in 1998, and expected to increase to 2.8% of GDP in 2030 and 5.5% of GDP in year 2050 if no intervention is made.

#### **4. Problems of the Turkish Public Security System and SII**

The increasing deficits of the system are a consequence of the declining ratio of contributions to pensions. This ratio is declining despite the rapid increase in the economically active population, increasing employment due to an average GNP growth rate of 5%/year, and the requirement of compulsory registration to SII when employed by an institution. The major reasons for this can be enumerated as:

##### *a) Weak Link Between Contributions and Pensions*

The link between contributions and pensions is weak due to government interference in determining SSP, reference period and range of insurable earnings.

SSP is a flat rate not based on any contribution, and paid to all pensioners equally, irrespective of their contributions while working. Furthermore as explained in Section 3 SSP portion of the pensions of those retired from private organizations are paid by SII. In 1978, the share of SSP in total pension payments was 23.3%. It increased continuously and reached 63.1% in 1995. After 1995 it was kept constant at its nominal level of 4,690,000 TL. Due to the high inflation rates experienced, in 1997 its share in total pension payments decreased to 15.8%. But due to its non-contributory feature it exerted a heavy burden on SII funds in the early 1990's.

In determining a pensioners pension the last 5 years' average earnings are taken as reference. Those who payed the same contributions in the reference period are entitled to the same level of pensions even if their contributions were different in the earlier periods, thus weakening the link between contributions and pensions.

Insurable earnings are limited between a base and a ceiling. The minimum and maximum levels are determined based on the minimum and maximum index on the indexation table, and the civil servants' wage coefficient. Both are determined and adjusted by the government. Since contributions are paid on declaration basis, pension increases through readjustment either in the indexation tables or civil servants' wage coefficient need not be followed by contribution increases.

*b) Lack of regular state contribution to Public Pension schemes*

Turkey is the unique OECD country where state does not contribute regularly to public pension schemes. In 1990, the percentage of state contribution in overall revenues of the pension schemes of selected countries was as follows: 26.3% in Switzerland, 25.66% in Germany, 31.11% in Belgium, 19.63% in France, 14.95% in Netherlands, 55.06% in UK, 22.78% in Japan, and nil in Turkey.

*c) Low Contribution Collection (Compliance) Rates*

The compliance rates for SII ranged between 73% and 85% during the period 1981-1996. Debt and amnesty laws, and organizational deficiencies are the main reasons for low compliance rates. Debt laws allowed people to pay for their past services and thus to retire earlier and be eligible for pensions. The arrears of employers were subjected to amnesty, resulting in substantial revenue losses for SII. Furthermore these laws encouraged additional arrears with the expectation of new amnesty laws.

Not only amnesties but lack of control for compliance, and double-checking mechanisms among institutions contributed to low compliance rates. SII inspected only 5.8% of the organizations registered to SII during the period 1994-1997. Lack of a properly functioning inspection system backed-up with necessary personnel and information flow is a deficiency of SII. Similarly, despite the requirement of the registration of newly established organizations to the chambers of industry and commerce, municipalities, tax authorities, etc., the lack of information flow and control mechanisms among related institutions encourage low compliance rates.

*d) Low Coverage Rate*

SII reports that 175,000 work places were inspected in the period between April 1994 and May 1998, and that 18.58% of the work-places were unregistered, 25.38% of the workers in the inspected workplaces were also unregistered (SII 1998). According to State Planning Organization 2.4 million of the total employed population are not insured. When only the private sector is taken into account, the share of uninsured in total employed population is almost 37%. Thus by increasing the coverage, contributions are expected to increase.

*e) Lack of Harmonization Among Social Insurance Organizations*

The procedures and regulations for the three social security institutions are quite different, the current legislative framework is extremely complicated, and the pensions paid by the institutions are different. When an insured changes workplaces and therefore the social security institution, the aggregation of services under different institutions, the calculation of pensions, and the collection of accumulated

contributions from the previous social security institutions are quite problematic. Furthermore when the inter-institutional transfer balances of SII are analyzed over 1992-1997 it is seen that the burden of transfers are mainly on SII as given below:

Million TL.

Year	1992	1993	1994	1995	1996	1997
Debts of SII to ES and BK	554,163	227,907	784,430	845,998	2,334,270	19,963,982
Debts of ES and BK to SII	1,361,350	1,428,102	2,538,843	5,303,567	21,941,454,	86,318,862

f) *Growing Deficits of Health Insurance*

Per capita health expenditures in real terms are growing very fast both in the world and in Turkey due to the fact that health care services are becoming increasingly technology dependent, and increasing life expectancy leads to longer health care requirement. Thus the gap between health care component of contributions and pensions are increasing over the years.

g) *Lack of Autonomy of SII*

SII's establishment law states that SII is an administratively and financially autonomous enterprise. However many decision ranging from changing the key parameters (such as retirement age, reference period, indexation tables, etc.) in the calculation of pensions and contributions, debt and amnesty laws, investment decisions, personnel policies, to the management of the institution is actually under the control and interference of the government. These result in the actuarial considerations being ignored and be distorted, which further weakens the link between contributions and pensions.

i) *Inefficient Management of Funds*

When the public social security system of Turkey is analyzed a very important point goes unnoticed. Turkey with a 50 years history of social security experienced deficits only after 1992. Until 1992 the system continuously gave surpluses. These surpluses were either transferred to the Treasury or invested into government bonds and securities. Even when the fact that Turkey is the unique country with no regular state contribution is ignored, and it is assumed that the surplus funds are invested at the modest real rates of return ranging from zero to 9 percent, it is seen that the value of funds that would have accumulated by the end of year 1993 would have been substantial as presented in the table given below. So the argument that the main cause of government deficits and additional borrowing are social security systems deficits are not very substantive.

Real Rate of Return	0 %	3 %	5 %	7 %	9 %
Accumulated funds by 1993 (in constant 1998 billion TL)	4,012,210	6,415,746	9,098,303	13,304,181	20,065,806

In the section that follows the ILO pension model adopted for SII for scenario planning is presented.

## **5. The SII Pension Model, Data Sources and Assumptions**

The model is based on actuarial techniques and simulates the behaviour of the SII pension scheme based on demographic and financial projections.

While actuarial valuation assesses the long-term viability of the SII pension plan at a valuation date, pension projections provide insight on the expected cash flows of contribution income and benefit expenditure based on demographic trends. The model provides deterministic projections of pensions determined on a defined-benefit basis, based on a set of initial data and projection assumptions over time. Demographic data used and assumptions made in estimating the parameters of the actuarial model are summarized below.

Expected total population and total labor force are two important determinants of the financial projection of the system. The economically active population is determined by applying labor force participation rates to active age groups. Total employment is calculated on the basis of growth assumptions. To the employed labor force, coverage rates are applied to reflect the actual insured population under SII.

Mortality rates provide the basis for aging the insured population and are very important for actuarial models. There are no officially prepared 'Turkish Life and Mortality Tables'. The State Institute of Statistics assumes a joint female/male life expectation at birth in 1990-1995 of 67.3 years, rising to 73.4 years in 2030, with constant mortality thereafter. In this study Duransoy's Turkish mortality table is used (Duransoy 1993). According to this study the life expectancy at birth for females is 68.71 years, and it is 63.08 years for males for 1980-1990. The joint female-male expectation is 65.9 years. Old age pensioners and survivors are assumed to experience the same mortality as the general population, whereas the mortality rates of the invalids below retirement age are assumed to be higher than those of the general population.

Demographic and health survey for Turkey (1993) carried out by the Ministry of Health and Hacettepe University was used in determining the proportion of insured that are married, the average age of the surviving spouse, the average number and age of eligible orphans, and the probabilities of benefit continuation.

The assumed annual growth rate of real pensions are calculated based on SII's real pension expenditures between 1965 and 1996. The average growth rate of real pensions in this period is found to be 1.84%.

## **6. Scenario Analysis**

Based on the insight gained from the analysis outlined in section 4, the aim of scenario analysis is to find out how deficits of the system react when a parameter is changed or a policy intervention is introduced into the system. By studying which pure or mixed parameters or policy changes will offset deficits (no matter how unrealistic they are) the objective is to help policy makers assess the implementability of the policies.

In this respect, a Base Case which simulates the natural course of the current system is created and then from the mildest to the most radical, pure and mixed scenarios are analysed.

Expenditure/revenue ratio is used as the performance measure in evaluating the performance of the scenarios and comparing the Base Case with some other projections.

Since the overall effect of change or a policy intervention starts to emerge in 20-30 years' time in such a pension model, the projections are carried out over the period

1995 and 2050. However, since the environment is very uncertain, and no long-term or even medium-term official plans or projections are available for Turkey the results of the model over the period 1995 to 2030 should be taken into account.

a) *Base Case*

Our Base Case is quite different from that of ILO, IMF or official ones since we changed/updated almost all of the fundamental parameters, and financial and demographic assumptions as explained above.

Table 2. Deficit Figures for the Base Case in Different Studies

	2000	2010	2020	2030	2050
Our Study (% of GDP)	1.5	2.0	2.0	2.8	5.5
ILO (% of GDP)	1.7	2.9	3.9	4.8	7.5
IMP (% of GNP)	1.4	3.2	5.2	6.0	8.5
Official (% of GNP)	1.5	2.7	4.0	5.6	9.7

b) *Pure Scenarios*

The scenarios in which only one parameter is changed and the other parameters and assumptions are kept the same are called “pure” scenarios. In order to determine what is necessary to bring the ratio down to 1.00 several values for certain parameters were tried, that were pointed out as symptoms of problems.

In Scenarios 1-5, instead of 38/43 which are the minimum retirement ages specified for females and males, ages of 40/45, 45/50, 50/55, 55/60, and 60/65 (F/M) are tried. The results for selected years are reported in Table 3.

The results indicate that the longer the period the higher is the impact of the minimum retirement age scenarios. It should be pointed out that the not most radical minimum retirement age arrangement, 50/55 and 55/60 are sufficient to offset the deficits in the short and medium term.

Scenarios 6-10 assess the effect of replacement rates of 55%, 50%, 45%, 40% and 20%, respectively on expenditure/revenue ratio, over the years.

Table 3. Ratios for Minimum Retirement Ages and Different Replacement Ratios

Scenario		1995	2000	2010	2020	2030	2040	2050
Base Case	38/43	2.38	2.78	2.75	2.42	2.72	3.21	3.64
1	40/45	2.38	2.64	2.62	2.34	2.52	2.99	3.44
2	45/50	2.38	2.34	2.15	1.93	2.04	2.35	2.78
3	50/55	2.38	2.12	1.75	1.49	1.62	1.80	2.08
4	55/60	2.38	1.97	1.42	1.07	1.15	1.31	1.50
5	60/65	2.38	1.88	1.21	0.79	0.75	0.88	0.97
6	55 %	2.38	2.74	2.67	2.34	2.62	3.09	3.50
7	50 %	2.38	2.70	2.60	2.26	2.52	2.97	3.37
8	45 %	2.38	2.66	2.53	2.18	2.42	2.85	3.23
9	40 %	2.38	2.62	2.46	2.10	2.38	2.73	3.09
10	20 %	2.38	2.52	2.23	1.85	1.99	2.32	2.62



All of the respective ratios are better (lower) than the Base Case as shown in Table 3. However, the ratio for Scenario 10, which is quite unrealistic, is seen to be ineffective in bringing the expenditure/revenue ratio down to 1.00. Even with the most drastic change this parameter can only lower the ratio to 1.84. Furthermore, the additive effect of each decrement of 5% is found to be almost the same.

Scenarios 11 to 15 have contribution periods ranging between 6,000 and 10,000 days with an increment of 1,000 days for each consecutive scenario while Scenarios 16-18 have contribution period of 12,000, 14,000, and 20,000 days, respectively. The ratios for the scenarios are tabulated in Table 4 for the selected years.

Table 4. Ratios for Different Contribution Periods

Scenario	Days	1995	2000	2010	2020	2030	2040	2050
Base Case	5000	2.38	2.78	2.75	2.42	2.72	3.21	3.64
11	6000	2.38	2.63	2.65	2.33	2.60	3.08	3.50
12	7000	2.38	2.39	2.54	2.16	2.36	2.82	3.26
13	8000	2.38	2.14	2.17	1.79	2.04	2.43	2.85
14	9000	2.38	2.06	1.78	1.47	1.69	1.94	2.33
15	10000	2.38	2.01	1.60	1.35	1.45	1.68	1.97
16	12000	2.38	2.00	1.51	1.24	1.32	1.47	1.70
17	14000	2.38	1.99	1.48	1.20	1.25	1.39	1.61
18	20000	2.38	1.99	1.45	1.12	1.15	1.28	1.47

Even the most radical and the most unrealistic scenario, namely Scenario 18, cannot eliminate the deficits altogether but lowers the ratio to 1.12 by year 2020.

Scenario 19 assumes that contribution collection rate will increase to 95% by year 2030 whereas Scenario 20 foresees that it will increase to 95% by year 2005.

Especially Scenario 20 slows down the deterioration of the financial status since its impact will be in the short and medium term. However, after 2020, the ratio for this scenario increases steadily.

Scenario 21 assumes that the share of the active contributors of SII in the total employed population (the coverage rate) reaches 50% in year 2010 and increases at a rate of 0.5% per year. Scenario 22, on the other hand, envisages that the coverage rate will increase to 67% by year 2050.

Scenario 22 yields results better than the Base Case for all projection years while the other scenario produces results worse than the Base Case for the period between 2030 and early 2040s although it has dramatic improvement in the medium term. The reason for this is that the new contributors as a result of the sudden increase in the coverage in the early years will start to retire after the late 2020s and hence the number of pensioners will increase dramatically in that period.

Scenario 23 assumes that annual real pension growth rate (3%) is faster than annual real growth rate of wages (2.81%). Scenario 24 assumes that annual real pension and wage increase are equal (2.81%). Lastly, Scenario 25 assumes no real pension increase.

As Table 5 implies deficits are highly sensitive to changes in both real wages and pensions since the revenues and expenditures of the system are directly linked to these factors.

Table 5. Ratios for Different Contribution Collection and Coverage Wage and Pension Increases

Scenario		2000	2010	2020	2030	2040
Base Case	85% Forever	2.78	2.75	2.42	2.72	3.21
19	95% by 2030	2.55	2.48	2.26	2.38	2.85
20	95% by 2005	2.45	2.34	2.19	2.38	2.85
21	50% by 2010	2.57	1.89	1.99	2.79	3.37
22	67% by 2050	2.66	2.60	2.40	2.51	2.55
23	Faster pension increase	2.94	3.25	3.21	4.03	5.33
24	Equal wage and Pension increase	2.92	3.16	3.06	3.78	4.90
25	No real pension increase	2.54	2.09	1.54	1.44	1.43

Scenario 26 assumes that the ceiling of the contribution base equal 5 times the minimum wage.

Scenario 27 envisages that the probability of taking widow(er)s' pensions for the spouses of the insured people will be halvened by year 2050. Moreover, it assumes that the maximum number of children eligible to orphans' pension will be halvened. Furthermore, the laborforce participation rate for females will increase to 70% by year 2050.

Scenario 28 assumes that the State will contribute to the system regularly 1% of GDP every year.

Table 6. Ratios for Other Parameters

Scenario		2000	2010	2020	2030	2040
Base Case	1.8 Times minimum wage	2.78	2.75	2.42	2.72	3.21
26	Ceiling:5 Times Min. wage	2.35	2.46	2.20	2.47	2.92
27	Social Parameters Changed	2.70	2.54	2.15	2.33	2.74
28	State Contribution 1% of GDP	1.21	1.29	1.35	1.54	1.92

It is seen that Scenario 27 is better than Scenario 26 between 1995 and 2010, but the reverse is true for 2020-2050. The improved ratio in 1995 steadily deteriorates over the period for Scenario 28.

### c) Mixed Scenarios

Scenarios in which two or more parameters are cahged are called "mixed" scenarios. To see the additive effect of each parameter, the analysis starts with the change of two parameters and at each stage one more parameter is changed.

In mixed Scenario 1 the minimum retirement age is 50/55 (F/M) and the replacement rate is 50%. Mixed Scenario 2 is the same as Mixed scenario 1 but contribution period is 6000 days. In mixed Scenario 3, as well as the assumptions in Mixed Scenario 2, contribution collection rate is assumed to increase to 95% by year

2030. Mixed Scenario 4 is the same as Mixed Scenario 3, but the ceiling of the contribution base is assumed to be 5 times the minimum wage, when the assumption that the coverage rate of SII will be 50% by year 2010 is added to Mixed Scenario 4, Mixed Scenario 5 is obtained.

As well as the assumptions in Mixed Scenario 5, Mixed Scenario 6 envisages that the probability of taking widow(er)s' pensions for the spouses of the insured people will be halvened by year 2050. Moreover, it assumes that the maximum number of children eligible to orphans' pension will be halvened, and that the laborforce participation rate for females will increase to 70% by year 2050.

Mixed Scenario 7 is the same as Mixed Scenario 6 but state contribution which is 1% of GDP is introduced. Mixed Scenario 8 is independent of Mixed Scenarios 1-7 and assumes that the minimum retirement age is 50/55 and the ceiling for the contribution base equal 5 times minimum wage. Mixed Scenario 9, is the same as Mixed Scenario 8, and assumes that the State contributes to the system regularly by 1% of GDP annually.

Table 7. Ratios for Mixed Scenarios

Scenario	1995	2000	2010	2020	2030	2040	2050
Base Case	2.38	2.78	2.75	2.42	2.72	3.21	3.64
Mixed 1	2.38	2.09	1.69	1.43	1.54	1.70	1.97
Mixed 2	2.38	2.08	1.67	1.40	1.50	1.66	1.92
Mixed 3	2.38	2.05	1.59	1.30	1.34	1.49	1.72
Mixed 4	2.38	1.63	1.26	1.03	1.07	1.19	1.38
Mixed 5	2.38	1.51	0.87	0.85	1.00	1.22	1.37
Mixed 6	2.38	1.50	0.86	0.84	0.97	1.18	1.30
Mixed 7	2.38	0.83	0.57	0.58	0.72	0.89	1.04
Mixed 8	2.38	2.12	1.70	1.44	1.54	1.70	1.97
Mixed 9	2.38	0.88	0.77	0.78	0.90	1.03	1.23

For year 2010, the most dramatical impact of the additional parametric cahge is caused by both increasing the minimum retirement age to 50/55 (F/M) and decreasing the replacement rate to 50% as observed from Table 7. The impacts by Mixed Scenario 1,4, and 5 are much more than the others. The least additional effect is borne by the change in social parameters mentioned above.

In the long run, the additional impact of Mixed Scenario 1, is much more than the others. The least additional effect is borne by the change in the social parameters.

Mixed Scenario 7 enables the system to have surplus at the very beginning and leads to an average improvement of 72.9% over the ratio of the Base Case for the period between years 2000 and 2030. It is important to note that it is the only scenario for which the ratio is below 1 until year 2050.

The results show that regular State contribution to the system as much as 1% of the GDP annually, in any case, results in substantial improvement in the financial status of the system.

## 7. Conclusion

In this study, a comprehensive and systemic analysis of the Turkish social security system is carried out. The objective of the study is determine how deficits of the system react when a change in fundamental parameters or policies occur and which policy intervention will offset or decrease the deficits so as to aid policy

makers in formulating policies that are implementable (economically and politically feasible).

ILO pension model, was used in the simulations. However, almost all of the demographic and economic assumptions were updated based on SIS, SPO and SII data.

Several scenario analysis are carried out and all pure and mixed scenarios are compared with the Base Case simulating the natural course of the system. Expenditure/revenue ratios are used as the performance measures in comparing scenarios.

The results indicate that among the pure scenarios, only the scenario with minimum retirement age of 60/65 (F/M) and the one which envisages significantly higher real wage increase than real pension increase are found to bring the expenditure/revenue ratio down to 1. However, the mixed scenario which assumes minimum retirement age of 50/55 (F/M), replacement rate of 50%, 6000 days of contribution, contribution collection rate of 95% until year 2030 and coverage rate of 50% until year 2010 results in the ratio to decrease below 1.00. Each added parametric change improves the financial status of the system.

So the findings as a whole are much more optimistic than public and international financial institution forecasts, deeming the system financially unviable by 2025. It should be noted that when the policies are put into effect together with reorganization of the SII itself, the expected benefits would be even higher.

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