Generational Accounting in Turkey*

Damla Hacıibrahimoğlu**
Republic of Turkey Ministry of Economy and
Middle East Technical University

Pınar Derin-Güre***
Middle East Technical University

Abstract

Generational Accounting, developed by Auerbach, Gokhale and Kotlikoff (1991), is an alternative and dynamic method employed in measuring the impact of existing fiscal policies on current and future generations. In contrast to the traditional and static measures of fiscal sustainability, the Generational Accounting method reveals the intergenerational distribution of tax burden and helps identify the policies that can alleviate the generational imbalance. This paper constructs and presents the first set of generational accounts for Turkey in an attempt to measure the generational gap and compare the Turkish intergenerational fiscal outlook with a number of developed and developing countries. Findings in the paper suggest that a 24.3% fiscal imbalance will be to the detriment of future generations in Turkey. Several hypothetical policy experiments have been implemented in the paper to correct the generational balance in Turkey.

Keywords: generational accounting, fiscal sustainability, Turkish Fiscal System.
JEL Classification: H61, H62, J18.

Türkiye'nin Nesilsel Hesapları

Özet

Auerbach, Gokhale ve Kotlikoff (1991) tarafından geliştirilen Nesilsel Hesaplama, maliye politikalarının farklı nesillere olan etkisini ölçmek için kullanılan alternatif ve dinamik bir yöntemdir. Yöntem, bugünün ve gelecek nesillerin ödeyeceği net vergilerin şimdiki değerinin, devletin net değeriyle olan toplamının, devletin gelecekteki tüketimini karşılamaya yeterli olması gerektiği ilkesine dayanır. Geleneksel borç sürdürülebilirliği hesaplamalarının aksine Nesilsel Hesaplama, vergi yükünün nesiller arası dağılımını ortaya çıkarır ve nesilsel dengesizliğin giderilmesi için politika önerilerinde bulunur. Bu çalışma Türkiye için ilk nesilsel hesapları vermekte ve Türkiye'nin mali görünümünü gelişmiş ve gelişmekte olan ülkelerle karşılaştırmaktadır.

Anahtar kelimeler: nesilsel hesaplama, mali sürdürülebilirli, Türkiye'nin Mali.Sistemi.
JEL Kodu: H61, H62, J18

M acroeconomic discussions have predominantly been centred on the monetary sphere in the past decades. However the recent developments, especially that of the Eurozone sovereign debt crisis, are insuring that fiscal policy will be at least of equal concern in the upcoming years. Massive bailout budgets, combined with the ageing population problem and generous social security systems, are likely to threaten the sustainability of fiscal balances both in the US and in a number of European countries. While uncertainties about the future of many economies remain, it is evident that additional government debt burdens are likely to undermine the budgetary positions and alter the intergenerational fiscal equity. The need for a long term fiscal view will necessitate the utilization of new and dynamic tools, one of which is the Generational Accounting.

Generational Accounting (GA) was developed as a response to the common discontent with the static measures of fiscal sustainability; it has become increasingly popular as a method to assess the distribution of a government's debt burden among different generations. After its introduction by Auerbach, Gökhale and Kotlikoff (1991), the methodology has been revised, improved and applied to a number of developed and developing countries, especially in the late 1990's and early 2000's. [1]

The main argument of those who favour GA is that deficit -- the simple difference between government's aggregated revenues and expenditures -- is a concept that can easily be manipulated. Depending on how the government chooses to label its receipts and payments, the deficit figure may vary substantially. The practice of dragging expenditures to the next fiscal year's budget to undervalue deficit, excluding the deficit generating public institution's balances from the central budget sheet, creating extra-budgetary funds to hide certain liabilities, privatising state owned enterprises to raise revenue, resorting to one-time taxes at times of downturns, and practising rebates and amnesties as part of the political cycle are just a few examples of how the concept of deficit can easily be manipulated according to the political and economic priorities. Moreover, major studies find mixed evidence about the direction and magnitude of the relation between deficit and key macroeconomic variables.[2] Therefore, deficit has proven to be an ill-defined and arbitrary concept in understanding the fiscal structure and sustainability of a country.

The main contribution of this paper is to construct and present the first set of generational accounts for Turkey in order to evaluate fiscal sustainability by investigating the intergenerational distribution of debt burden and to give policy recommendations to alleviate the generational imbalance. In this respect, this will be the first study in Turkey to go beyond the standardized measures of budget deficit and primary balance and to analyse the fiscal gap from an intergenerational perspective, namely how the government's debt burden is generated among different age and gender groups. In addition to

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[1] Details of these studies will be given in literature review part.

[2] See Barro (1987), Bohn (1998) and Catão and Terrones (2005) for unconventional evidence on the correlation between budget deficit and macro aggregates and discussions on causality.

that, the effect of different policy exercises on long term fiscal gap and intergenerational distribution of debt burden have been investigated. Foreseeing that the methodology will be revived in line with the recent and upcoming fiscal developments, we strongly believe that it is essential to acquire comparable figures for Turkey.

The study is organized as follows: The development of GA literature and the major studies related to it will be presented in the next section. The following section will provide GA methodology. Then the data and statistics used in the study will be summarized. After that the results, sensitivity analysis and policy experiments will be summarized. The last section will conclude the discussion.

Review of the Literature

A turning point in the development of GA methodology came with the idea that the long-term growth of the economy can be altered by short-term policy changes in consumption and savings behaviors. This can influence the distribution of wealth across generations, depending on the time the changes are put into effect. Kotlikoff (1989) and a number of other authors confirmed that both the size and the way which the government finances its spending mattered in the long-run. Hence both the deficit concept itself and the idea of Ricardian Equivalence were put to the test. Evaluation and cross validation of these critiques by a number of writers, combined with the necessity to incorporate the lifecycle decision theory and the intertemporal budget constraint, has driven the development of GA.

As a response to the drawbacks of the budget deficit, Auerbach, Gökhale and Kotlikoff (1991) developed the GA methodology as an alternative tool to assess the fiscal sustainability. The method not only served the purpose of constructing a meaningful way to evaluate the long term outlook of the budget balance but also revealed a number of undisclosed features related to the intergenerational distribution of net tax burden in the US. The results were striking in that they revealed a 17%-24% fiscal gap among current and future generations, a gap much wider than what had been expected. Authors addressed the impact of a number of fiscal policy changes, namely the effect of a cut in the capital gains tax, faster growth in Medicare, slower government consumption growth, and loan bailout and cancellation of the 1983 social security amendments.

GA methodology has been applied to more than twenty countries; the summary of these studies is given in Table 1. In a number of countries, results indicated an imbalance among generations mainly to the disadvantage of those who are not yet born. Norway, with a percentage imbalance of 4018% ranked the first in terms of the size of fiscal burden inherited by the future generations. However one point needs to be clarified: in the Norwegian case study, contrary to the benchmark US case, education is not treated as a government consumption item but as a transfer. Since such treatment inflates the current generation's transfer receipt item drastically, the generational gap has widened to a level that cannot be compared to the rest of the studies.

Among the European countries, the accounts of the Netherlands, Germany, Italy and France (for the base year 1995) displayed an excessive imbalance mainly due to the

generous transfer and social security schemes adopted. The population ageing problem that is viewed as suppressing the pool of workers and inflating the elderly population is another factor that contributed to the accumulation of unfunded liabilities under the pay-as-you-go social security scheme and led eventually to the deterioration of generational equity. Of the Latin American countries, Argentina, Brazil and Mexico who have suffered from prolonged periods of debt crisis, also appeared to generate significant degrees of intergenerational inequity given the existing fiscal structure and the level of debt.

Some of the country studies reviewed in Table 1 went beyond the standard methodology and contributed to the literature either by examining the effect of structural changes or by incorporating different variables. The first one of these is the German case studied by Gökhale, Raffelhüschen and Walliser (1995) that aimed to measure the fiscal burden of the German unification. It constituted an exemplar for the Korean study (Auerbach, Chun and Yoo, 2004) that aimed to weigh the generational cost of such unification for Korea.

GA has not been calculated before for Turkey. Although there have not been any studies that work on generational accounting in Turkey, there are three papers that can be linked to this paper. Salman (2004) proposes an alternative to the static budget deficit calculation and calls it Intertemporal Budget Gap (GAP). GAP is equivalent to Fiscal Gap or Fiscal Imbalance suggested by Gökhale and Smetters (2003). The GAP measure for the government is the current debt held by the public plus the present discounted value in today's TL's of all projected non-interest spending minus all projected government receipts. Although GAP gives a longer run alternative to conventional debt and deficit measures and therefore is a more reliable measure of fiscal gap, it is not capable of fully reflecting the fiscal impacts of the all types of policy changes. A new policy change that increases the projected expenditures and revenues by the same amount leaves GAP unchanged, but these policies might transfer net tax burdens from current to future generations. Therefore Salman (2004) is not able to measure these intergenerational transfers as a result of the policy changes.

The second effort of suggesting an alternative and better measure of public debt in Turkey is given by Erbil and Salman (2006). The authors suggest a new method of measuring the debt burden which they call debt burden (DB). The suggested measure takes into account the intertemporal budget obligations of the government and therefore suggests a better measure for the fiscal burden. DB is calculated on a daily basis and clearly identifies debt risks. This innovative measure is a good step towards a better and more meaningful measure of public burden, but still it does not incorporate the redistribution across generations as a result of the policy change.

Table 1:
Generational Accounts for Various Countries

Author	Country	Year	Currency	Current Newborns			Future Generations	Absolute Imbalance	Percentage Imbalance
				Males	Females	Total			
Altamiranda, Kotlikoff, Leibfritz	Argentina	1994	U.S. dollars, thsnd.	21.8	5.7	13.9	24.3	10.4	74.8
Ablett, Kotlikoff, Leibfritz	Australia	1994/95	U.S. dollars, thsnd.	105.1	52.8	79.6	105.2	25.6	32.2
Kotlikoff, Stijns	Belgium	1994	U.S. dollars, thsnd.	N/A	N/A	43.2	90.4	47.2	109.25
Decoster, Flawinne, Vanleenhove	Belgium	2010	Euros, thousands	-55.5	-186.0	-119.2	181.0	300.2	-251.9
Malvar, Kotlikoff, Leibfritz	Brazil	1995	U.S. dollars, thsnd.	17.3	2.8	10.2	22.1	11.9	116.4
Oreopoulos, Kotlikoff, Leibfritz	Canada	1995	U.S. dollars, thsnd.	88.7	22.1	56.3	58.0	1.7	3.1
Jensen ,Raffelhüschen, Leibfritz	Denmark	1995	U.S. dollars, thsnd.	35.0	-73.0	-18.0	26.0	-44.0	-244.4
Levy, Dore, Leibfritz	France	1995	U.S. dollars, thsnd.	82.2	37.2	105.0	117.3	57.6	96.4
Raffelhüschen, Walliser, Leibfritz	Germany	1995	U.S. dollars, thsnd.	155.2	36.0	97.1	248.8	151.7	156.1
Gal, Simonovitz, Szabo, Tarcali	Hungary	1996	U.S. dollars, thsnd.	N/A	N/A	8.4	43.9	35.5	422.6
Sartor, Kotlikoff, Leibfritz	Italy	1995	U.S. dollars, thsnd.	89.3	39.0	64.8	209.9	145.1	223.8
Cardarelli, Sartor	Italy	1998	Lire, millions	35.9	-80.8	-22.7	77.2	99.8	440.8
Sarrapy, Caso	Mexico	1997	U.S. dollars, thsnd.	7.4	7	7.2	6.4	0.6	-10.8

Table 1:
Generational Accounts for Various Countries (continued)

Author	Country	Year	Currency	Current Newborns			Future Generations	Absolute Imbalance	Percentage Imbalance
				Males	Females	Total			
Bovenberg, Rele, Leibfritz	Netherlands	1995	U.S. dollars, thsnd.	N/A	N/A	49.4	137.0	87.6	177.1
Baker, Kotlikoff, Leibfritz	New Zealand	1995	U.S. dollars, thsnd.	47.7	-13.3	18.0	16.0	-2.0	-10.8
Steigum, Gjersem, Leibfritz	Norway	1995	U.S. dollars, thsnd.	64.9	-65.8	1.4	57.3	55.9	4018.0
Takayama, Kitamura, Yoshida	Japan	1995	U.S. dollars, thsnd.	N/A	N/A	73.0	319.4	246.4	337.8
Jablonowski, Müller, Raffelhüschen	Poland	2007	Zloty, thousands	N/A	N/A	-55.0	125.0	180.0	-327.3
Cardarelli, Gobat, Lee	Singapore	1999	Singapore dlrs., thsnd.	70.9	-111.0	-20.1	-386.1	-366.0	-375
Auerbach, Chun, Yoo	South Korea	2004	Won, thousands	72.1	39.0	56.4	122.2	65.9	117
Hagemann, John, Leibfritz	Sweden	1995	U.S. dollars, thsnd.	213.6	153.6	184.4	143.5	-22.2	-22.2
Kakwani, Krongkaew,Leibfritz	Thailand	1993	Baht, thousands	-189.3	-97.4	-143.4	-215.8	-72.5	50.5
Haciibrahimoglu, Derin-Gure	Turkey	2008	TL, thousands	49.5	-1.30	24.2	30.3	6.1	24.3
McCarthy, Sefton, Weale	UK	2008	Pounds, thousands	N/A	N/A	68.4	159.7	91.3	133.5
Cardarelli, Sefton,Kotlikoff	UK	1997	U.S. dollars, thsnd.	52.4	1.5	26.9	39.0	12.1	44.9
Gokhale, Page, Sturrock	US	1995	U.S. dollars, thsnd.	77.4	51.9	64.7	194.2	129.5	200.3
Auerbach, Oreopoulos	US	1999,0	U.S. dollars, thsnd.	79.2	55.5	67.4	67.1	-0.3	-0.4

As far as we know the only study that includes information in terms of the generational fairness of the Turkish Fiscal system is Aydede (2007). The author calculates the aggregate social security wealth series for Turkey. Although the study presents interesting results, the author concentrates only on the pay-as-you-go social security system in Turkey but not on the fiscal burden in Turkey as a whole; therefore it differs from this paper. In addition to these studies, Ünlükaptan (2009) includes a literature survey of Generational Accounting in Turkish. The author explains the GA methodology and summarizes the important papers in the GA literature, but the paper does not include any calculation in terms of GA.

The Methodology

Generational accounting is based on the government's intertemporal budget constraint, which principally requires the present value of current and future generations' net tax payments plus the existing net wealth to be sufficient to cover the government's future consumption. The analytical reasoning behind GA can be formulated in the following manner;

Present Value (PV) of Net Tax Payments of Current Generations (A) $+$ PV of Net Tax Payments of Future Generations (B) $=$ PV of Government's Future Consumption (C) $+$ Government's Net Wealth (D)

or;

$$\sum_{s=0}^{L} N_{t,t-s} + \sum_{s=1}^{\infty} N_{t,t+s} = \sum_{s=t}^{\infty} G_s (1+r)^{-(s-t)} + W_t \qquad (1)$$

where;

$N_{t,t-s}$: Present value of the remaining net taxes for the current generation born in year t-s;

$N_{t,t+s}$: Present value of the net taxes for the future generation born in year $t+s$;

L : Maximum life span;

G_s : Government consumption;

W_t : Government's net wealth at time t;

r : The discount rate.

The first, third and the fourth items of the equation can be calculated with existing figures. What we do not know in this equation is the amount of net tax burden left for future generations. After implementing the relevant projections and discounting the figures, we can calculate the future generations' net tax burden from the current generation's total fiscal liability.

The first term on the left-hand side of the equation represents the present value of the remaining net tax burden (all taxes paid less transfer received) of the existing generations.

An individual born in the base year is represented by $N_{t,t}$ and is assumed to live a life span of $L - s(=0) = L$ years, while an individual born in year $t - L - 1$ will bear a net tax burden of just one year. Generational accounts of all cohorts will be added up in this fashion until the last member of the current generation dies. The second term on the left hand side of the equation, in a similar fashion to the first one, represents the present value of the net tax payments of future generations. The term begins with the first future generation after the base year and totals the relevant net tax burdens until infinity. The notion of "discounting to the present value" is incorporated in the following way:[3]

$$N_{t,k} = \sum_{s=\max(t,k)}^{k+L} T_{s,k} P_{s,k} (1+r)^{-(s-t)} \tag{2}$$

where $N_{t,k}$ is the generational account of a cohort born in year k, $T_{s,k}$ represents the expected net tax payments received from the kth cohort in year s, $P_{s,k}$ is the number of individuals from the kth cohort alive in year s, $(1+r)^{-(s-t)}$ is the discount factor *r that* stands for the real interest rate. $s=max(t, k)$ implies that if the individual is born before the base year $(k \leq t)$ then the remaining life time tax burden is discounted to the base year, whereas if the individual is born after the base year $(k \leq t)$ the whole life time burden is aggregated and discounted. This reflects the fact that generational accounts are forward looking calculations meaning that payments made or benefits received from the government before the tax year are not taken into account.

The first term on the right hand side of the equation stands for the government consumption, which is assumed to grow at a constant rate equal to the growth rate of the overall economy. It is discounted to present value by the term $(1+r)^{-(s-t)}$. The last term W_t in (1) stands for the negative net wealth (liabilities-assets) of the government. A positive W_t term would indicate that the liabilities of the government exceed its assets. Hence, assuming a predetermined level of government consumption and tax revenue from the current generation, the amount to be borne by the future generations increases proportionately. W_t can also be considered as the net indebtedness of the government.

The initial step of constructing generational accounts is to calculate the age and gender specific distribution of net tax burden, namely the sum of all payments (income tax, corporate tax, indirect taxes, taxes on property, etc.) less all receipts (health care, education, widow orphan benefits, pensions, etc.) for current generations. Adopting the formula from Raffelhüschen (1999), this can be represented as follows:

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[3] The formulation is adopted from Auerbach, Kotlikoff and Leibfritz (1999).

$$T_{s,k} = \sum_{n} \tau_{s,k,n} \tag{3}$$

where $\tau_{s,k,n}$ is the average per capita tax or transfer burden of an s-k aged individual in year s, and n being the various payment or receipt item. The second step is to project these tax and transfer aggregates to the future by making use of a valid growth assumption. In general it is assumed that the annual growth of taxes and the transfers will be realized at a rate equal to the annual nominal growth rate and is constant throughout (meaning there will not be any fiscal structural change).

$$\tau_{s,k,n} = (1+g)^{s-t} \tau_{t,t-(s-k),n} \tag{4}$$

Equation 4 is critical in calculating the net tax burden of future generations. It says that the net tax burden borne by an unborn individual of a specific age group is a function of the net tax burden borne by the members of the current generations of that same age.

After the construction of future tax and transfer projections specific to the age and gender categories, these figures are aggregated as explained in Equation 2. For the current generations, the ratio of the remaining lifetime net tax burden to the number of cohort members alive in the particular base year yields that cohort's generational account:

$$GA_{t,k} = \frac{N_{t,k}}{P_{t,k}} \tag{5}$$

Under the presence of perfect generational equality, the net tax burden of the current and the future new-borns should only differ by the growth factor:

$$GA_{t,t} = (1+g)GA_{t+1,t+1} \tag{6}$$

If that is not the case and there exists a wider gap among the fiscal burden of current and future generations (either to the favour of former or the latter), then it is calculated as follows:

$$\theta = \frac{GA_{t+1,t+1}}{GA_{t,t}(1+g)} \tag{7}$$

If $\theta > 1$ then the conclusion will be that a generational imbalance exists to the advantage of the current generations and vice versa if $\theta < 1$. The $\theta = 1$ case would suggest generational equality, as denoted.

Data and Results

The very first step of generational accounting is to construct age and gender specific tax profiles for a particular year. In order to do so, we have utilized the *"Household*

Budget Survey" of 2008 conducted by the Turkish Statistical Institute (Turk Stat). [4] The survey contains detailed information about the consumption structure, income sources and income levels of 33,287 individuals from 8640 households and compiles statistics about the employment, union membership, social security status, healthcare benefits, pension payments and miscellaneous transfers for thirteen age categories in a gender specific classification. Despite being comprehensive, the budget survey lacks many of the essential variables and details that could have been significant for the purposes of this study. Nonetheless such information is approximated from macro aggregates in a reasonably consistent way.   Statistics about the aggregate budget figures are gathered from Revenue Administration and Ministry of Finance databases. Government consumption is defined as the government expenditure less current transfers and interest payments. More formally it represents the amount spent on the purchase of goods and services, wage payments, defence, education, judicial system expenditures, etc. The relevance of government consumption to the GA calculations is that this sum represents an amount that cannot be distributed according to age and gender specifics. Hence it is taken as an aggregate and projected to the future by using a predetermined growth rate. For the year 2008, government consumption was realized as 100 billion TL according to the economic categorization of central government budget aggregates.

The government net indebtedness, or the negative of the government net wealth, is the difference between government's outstanding liabilities and its assets at a given point in time. In the GA literature there are different views about the accurate calculation of this amount depending on the availability of data; different authors make use of different variables or aggregates. For the purposes of this study, the Total Public Net Debt Stock data taken from the Undersecretaries of Treasury database provides the best approximation to calculate that amount.. The Total Public Net Debt Stock is calculated as the Total Public Gross Debt Stock less the Central Bank Assets, Public Assets and Unemployment Insurance Fund's Assets. Total Public Net Debt Stock was 268 billion TL for the year 2008.

At this point it will be useful to clarify the assumptions underlying the relevant projections. GA literature builds upon cross-country comparisons, hence certain parameters, like the growth rate and the discount rate merely stand as indicative values (and no way represent the realistic figures of the actual economy). The consecutive studies carried out by a number of authors aim to quantify the generational gap for different countries (some of which are developing countries). In doing so, the literature parameterizes the problem with the same discount rate, same growth rate and similar demographic trend assumptions. The benchmark figures that were chosen as the "annual growth rate of %1.5, discount rate of %5 and medium population growth" had been equal among the countries. This equalization allows us to answer the following question: "If everything else held equal, how would a country's initial fiscal structure affect its fiscal trajectory?" One might argue that these figures are far from being realistic, yet it is hard to define

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[4] We used 2008 as it was the most recent data set available when we started the paper; we could get some information about the other variables of interest for that year as well.

accurate parameter values for developing countries. Projecting for a decade might be meaningful, yet trying to construct a 100 year-projection (that the GA necessitates) is an ambitious goal. Hence annual growth rate and discount rate figures are chosen in accordance with the rest of the literature.

Age and gender specific population statistics and projections for the years 2008-2025 are taken from Turk Stat. These are appended with the "UN Population Prospects" provided for the years 2030, 2035, 2040, 2045 and 2050.

In order to construct the age-gender specific tax and transfer profiles, the budget figures have been disaggregated in the following manner: First the raw data from the budget survey is divided into age and gender categories. For each of these 22 categories (11 age groups and 2 genders), the income from various sources (salaries, agricultural income, income from entrepreneurial activity, annual income from immovable property and estates, interest, payment receipts from foreign and domestic bank accounts, dividend payments and rents), from transfers, social security payments and receipts were calculated. Given that income items appear as gross figures in the data, relevant tax rates were applied to calculate the net tax amount per category. Having obtained all these tax-transfer-social security profiles for each group, we calculate each category's contribution to the gross figure as a percentage. Say, for example of the 20,093,956.44 TL income tax paid by the whole sample, males aged between 15 and 19 (age group 3) have made a payment of 154,125.45 TL which accounts roughly for the 0.77% of the total payments. Assuming that the survey sample is a good representative of the whole population and knowing that a total amount of 38,029,985,000 TL income tax was collected in 2008, we conclude that the expected gross payment for this age-gender group is 287,510,554 TL. Per capita tax figures are calculated accordingly. Ideally the income tax collected from a gender-age group could be gathered from the tax data. In US for example tax information is available individually through the IRS; therefore the data they use in the GA calculation is the actual income tax collected for the age-gender group rather than an approximation. In Turkey the Ministry of Finance does not give information about tax payments individually.[5] This makes any kind of empirical research on public economics difficult if not impossible to implement for Turkey.

To calculate the generational accounts, we utilize and modify the MATLAB GA program made available by Philip Oreopoulos at http://elsa.berkeley.edu/~burch/research.htm. The program enables us to set the exogenous parameters (population growth, interest rate), and hence to make alternative scenarios of demographic and fiscal projections. Per capita tax and transfer burdens (which had been calculated by the methodology explained above) and the population statistics are uploaded to the program accordingly. The US fiscal items are replaced with the Turkish ones, without distorting the row-column conformity. Given the base year (2008) we simulate the age-gender specific generational accounts from t=0 to a maximum age of L=100 years. For individuals born after the base year, the program calibrates the fiscal burden through

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[5] We are not talking about names of tax payers here, we are mainly talking about the amount of tax payment, income and other important information like age, gender, etc.

$$\sum_{s=0}^{L} N_{t,t-s} \text{ and } \sum_{s=1}^{\infty} N_{t,t+s} \text{ for individuals born thereafter.}$$

Table 2
Generational Accounts under Baseline Scenario* (TL)

Generation's Age in 2008	Net Lifetime Payments		
	Males	**Females**	**Total**
0	49,510	-1,030	24,240
5	58,860	-1,190	28,835
10	70,460	-0,560	34,950
15	89,510	0,160	44,835
20	104,800	-0,160	52,320
25	116,010	-2,640	56,685
30	133,060	-8,070	62,495
35	131,540	-15,650	57,945
40	106,500	-26,680	39,910
45	67,390	-38,190	14,600
50	20,000	-41,480	-10,740
55	-3,010	-46,580	-24,795
60	-17,690	-47,440	-32,565
65	-31,140	-56,580	-43,860
70	-34,660	-49,430	-42,045
75	-40,640	-49,250	-44,945
80	-43,550	-47,520	-45,535
Future Newborns	58,990	1,610	30,300
Percentage Difference			24.3%

Discount rate (r) =5%, Growth Rate (g) =1.5%, Medium Population Growth

The first results of the Generational Accounting calculation for Turkey are given in Table 2. Table 2 displays the baseline generational accounts of males and females alive in the base year 2008 through five-year intervals and compares these values with the net tax burden of future new-borns. [6] The accounts are presented for males and females separately and for the total population. The initial observation is that there exists a huge gender gap among male and female accounts. Whereas a new-born male (i.e. born in

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[6] Baseline scenario: Discount rate (r) =5%, Growth Rate (g) =1.5%, Medium Population Growth. By medium population growth we mean that we use the medium growth assumptions as used in the population projections of Turkstat and the UN. The generational accounts have been calculated for all those who were aged between 0-100 in 2008. However for convenience the results are presented in five year intervals and population among 80 years or a presumed population that will live 80 years or 80 people, being a portion of the population in 2008? , which is a negligible portion of the population in 2008, has been excluded.

2008) bears a 49,510 TL life time net tax burden, a new-born female appears to be a net beneficiary through nearly the whole life cycle. However this should not be regarded as an evidence of gender inequality to the disadvantage of males. Turkish females are engaged in income generating activities that are not typically exchanged in the market. Moreover the life expectancy for females is higher than that of males, which means that women receive higher benefits during the elderly period of their life cycle due to old age benefits, widow funds and inherited pensions from their deceased spouses.[7]

The second remarkable finding is that, like a number of countries studied in the literature, a fiscal imbalance disadvantages those who are not yet born in Turkey as well. The gap among current and future generations' accounts on the other hand remains relatively modest with a percentage difference of 24.3%. The results might seem puzzling at first sight given the frequently uttered discontent with the fiscal balances and the level of debt; however a closer attention to the tax, transfer and social security dynamics will be helpful in understanding the relatively small magnitude of the imbalance. First of all, Turkey does not have a generous and redistributive transfer system that is capable of distorting fiscal balances in favor of future generations. The amount of in cash and in kind benefits transferred to the households is significantly low compared to a number of countries and it is expected to remain the same in both the short and the long run. More important than that, the pay-as-you-go system is not as deadlocked as it is in the European welfare states who are faced with the problem of an ageing population in the near future. Tables 3, 4 and 5 provide details of the GA calculations summarized in Table 2 according to genders. As a suggestion for an interpretation of the results, take for instance the first row in Table 4. It says that the present value of the net tax burden of a male born in the base year 2008 is 49,150 TL. Of this net figure 61,719 TL comes from the "payments" part and is distributed among the income tax, corporate tax, value added tax, other taxes, consumption tax, import tax and social security contributions. Summation of the net lifetime receipts on the other hand is 12,569 TL and consists of pensions, widow/orphan benefits, health, education, old age receipts and other benefits. For a male aged 30 at year 2008 on the other hand the net tax burden is much higher since he is close to the peak-tax period of his lifetime and distant from the transfer payment years. For a more elderly citizen who has passed the peak-tax period of his lifetime, the receipts are much higher than the payments, making his net tax burden accounts "negative." The figures vary drastically for women due to the reasons explained in the preceding discussion. Table 5 combines these gender specific calculations with the appropriate population figures and projections.

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[7] See Tables 3, 4 and 5 for the distribution of GA according to payment and receipt items for females, males and the total population, respectively.

Table 3:
Composition of Generational Accounts for the Base Case (TL)-FEMALES

Age in 2008	Net Tax	Payments								Receipts					
		Income Tax	Corporate Tax	VAT	Other Taxes	SCT	Import VAT	Social Security Premium	Pension	Widow Orphan	Health	Education	Old Age	Other
0	-1,030	544	289	1,343	352	2,538	1,716	3,518	-1,058	-4,821	-2,713	-1,886	-344	-508
5	-1,196	651	346	1,617	424	3,057	2,065	4,187	-1,277	-5,866	-3,113	-2,233	-409	-644
10	-563	771	412	1,923	505	3,640	2,457	4,937	-1,538	-7,097	-3,622	-1,667	-482	-801
15	159	974	521	2,450	644	4,638	3,126	6,214	-1,977	-9,159	-4,519	-1,086	-606	-1,060
20	-1,610	1,130	627	2,656	711	5,107	3,428	7,256	-2,463	-10,830	-5,103	-660	-735	-1,286
25	-2,656	1,152	683	2,624	712	5,097	3,466	7,101	-2,989	-12,573	-5,575	-174	-873	-1,308
30	-8,117	1,232	795	2,833	772	5,511	3,744	7,057	-4,035	-16,517	-6,838	-62	-1,157	-1,451
35	-15,733	1,103	819	2,816	767	5,479	3,753	6,243	-5,240	-20,453	-7,976	-31	-1475	-1,537
40	-26,810	913	857	2,719	738	5,290	3,619	4,542	-7,046	-24,992	-9,733	-13	-2,013	-1,691
45	-38,379	673	507	2,357	639	4,587	3,198	2,532	-8,280	-28,610	-11,464	-6	-2,701	-1,812
50	-41,680	338	292	1,713	463	3,333	2,387	854	-7,349	-28,143	-10,702	-3	-3,147	-1,716
55	-46,799	243	166	1,259	339	2,451	1,835	314	-5,768	-30,037	-11,464	-1	-4,214	-1,923
60	-47,657	172	113	918	248	1,787	1,521	225	-4,161	-28,726	-12,018	0	-5,580	-2,155
65	-56,832	154	51	704	190	1,370	1,453	0	-3,233	-31,295	-14,922	0	-8,426	-2,880
70	-49,648	91	30	414	112	806	761	0	-2,671	-25,837	-13,794	0	-6,968	-2,593
80	-47,721	16	5	73	24	142	77	0	-2,212	-21,371	-16,460	0	-5,774	-2,242

Future Generations: *1,610*

Table 4:
Composition of Generational Accounts for the Base Case (TL)-MALES

| Age in 2008 | Net Tax | Payments | | | | | | | Receipts | | | | | |
		Income Tax	Corporate Tax	VAT	Other Taxes	SCT	Import VAT	Social Security Premium	Pension	Widow Orphan	Health	Education	Other	Old Age
0	49,510	14,175	5,648	4,852	1,343	9,459	6,594	19,648	-5,126	-232	-3,948	-1,620	-710	-304
5	58,860	16,844	6,715	5,807	1,608	11,326	7,902	23,210	-6,129	-290	-4,650	-1,926	-866	-361
10	70,460	19,902	7,950	6,899	1,911	13,462	9,407	27,269	-7,297	-356	-5,499	-1,333	-1,048	-425
15	89,510	25,027	10,011	8,735	2,421	17,050	11,921	34,075	-9,259	-465	-6,963	-688	-1,337	-533
20	104,800	29,354	11,973	10,097	2,805	19,714	13,784	40,073	-11,365	-436	-8,198	-213	-1,571	-646
25	116,010	32,696	13,637	11,094	3,091	21,668	15,253	44,572	-13,594	-391	-8,772	-100	-1,759	-766
30	133,060	38,440	16,809	12,864	3,595	25,135	17,571	51,456	-18,051	-373	-10,424	-76	-2,177	-1,014
35	131,540	39,092	18,827	13,363	3,743	26,121	18,361	51,824	-23,079	-449	-11,687	-66	-2,545	-1,291
40	106,500	34,918	17,821	13,116	3,676	25,659	17,783	44,115	-31,045	-521	-13,536	-54	-3,127	-1,758
45	67,390	27,611	14,065	12,032	3,371	23,564	16,612	32,166	-39,921	-476	-15,120	-51	-3,775	-2,354
50	20,000	15,665	8,384	8,685	2,428	17,044	1,1461	15,587	-37,454	-535	-14,418	-41	-3,960	-2,740
55	-3,010	10,037	5,740	6,835	1,909	13,461	9,311	8,673	-33,945	-694	-15,848	-37	-4,792	-3,670
60	-17,690	6,627	3,939	5,223	1,462	10,346	6,806	5,126	-28,817	-817	-17,122	-30	-5,658	-4,856
65	-31,140	5,258	3,065	3,979	1,131	8,005	5,512	3,679	-24,036	-793	-21,686	-17	-7,786	-7,590
70	-34,660	3,164	1,800	2,329	680	4,810	3,211	2,157	-19,860	-655	-19,069	-13	-7,084	-6,277
75	-40,640	1,705	916	1,179	365	2,585	2,246	1,096	-17,878	-589	-20,289	-9	-6,494	-5,653
80	-43,550	590	257	327	126	889	713	307	-16,444	-541	-19,444	0	-5,312	-5,201

Future Generations: 58,990

Table 5:
Composition of Generational Accounts for the Base Case (TL)-TOTAL

Age in 2008	Net Tax	Payments							Receipts					
		Income Tax	Corporate Tax	VAT	Other Taxes	SCT	Import VAT	Social Security Premium	Pension	Widow Orphan	Health	Education	Old Age	Other
0	24,375	7,360	2,968	3,098	848	5,999	4,155	11,583	-3,092	-2,526	-3,330	-1,753	-324	-609
5	28,996	8,747	3,531	3,712	1,016	7,191	4,983	13,698	-3,703	-3,078	-3,881	-2,080	-385	-755
10	35,140	10,337	4,181	4,411	1,208	8,551	5,932	16,103	-4,418	-3,727	-4,561	-1,500	-454	-925
15	45,077	13,001	5,266	5,592	1,532	10,844	7,523	20,144	-5,618	-4,812	-5,741	-887	-569	-1,198
20	52,605	15,242	6,300	6,376	1,758	12,411	8,606	23,665	-6,914	-5,633	-6,650	-437	-691	-1,428
25	56,987	16,924	7,160	6,859	1,901	13,383	9,359	25,836	-8,291	-6,482	-7,173	-137	-819	-1,534
30	62,819	19,836	8,802	7,849	2,184	15,323	10,657	29,257	-11,043	-8,445	-8,631	-69	-1,086	-1,814
35	58,241	20,097	9,823	8,090	2,255	15,800	11,057	29,034	-14,160	-10,451	-9,832	-49	-1,383	-2,041
40	40,119	17,916	9,339	7,917	2,207	15,474	10,701	24,329	-19,045	-12,757	-11,634	-33	-1,885	-2,409
45	14,673	14,142	7,286	7,194	2,005	14,076	9,905	17,349	-24,100	-14,543	-13,292	-28	-2,528	-2,794
50	-10,787	8,001	4,338	5,199	1,445	10,189	6,924	8,220	-22,401	-14,339	-12,560	-22	-2,944	-2,838
55	-24,910	5,140	2,953	4,047	1,124	7,956	5,573	4,494	-19,856	-15,366	-13,656	-19	-3,942	-3,358
60	-32,714	3,399	2,026	3,071	855	6,066	4,163	2,675	-16,489	-14,771	-14,570	-15	-5,218	-3,907
65	-44,056	2,706	1,558	2,341	661	4,688	3,483	1,840	-13,634	-16,044	-18,304	-9	-8,008	-5,333
70	-42,227	1,627	915	1,372	396	2,808	1,986	1,079	-11,266	-13,246	-16,431	-6	-6,622	-4,839
75	-44,270	860	460	626	195	1,364	1161	548	-10,045	-10,980	-18,374	-4	-5,713	-4,368
80	-44,756	299	130	179	71	475	412	154	-9,175	-9,465	-19,131	0	-5,082	-3,623

Future Generations: 30,300

Sensitivity Analysis and Demographics

As underlined in the previous discussions, one of the major empirical criticisms against generational accounting is in the choice of exogenous parameters, namely the growth and the discount rates. Hence we present a sensitivity analysis with three discount rate and three growth rate assumptions. Although the magnitude of fiscal imbalance changes, the direction does not.

The highest generational imbalance suggested by the figures is 80.84%, realized under the 1% growth rate and 7% discount rate combination. A growth rate of 2% accompanied by a 3% discount rate yields the lowest fiscal gap; 7.43% to be precise. The variation among percentage imbalances might seem puzzling however GA results are very susceptible to the changes in the exogenous parameters, which are confirmed by other studies as well (see the Appendix for sensitivity analysis results from Japan, Germany, Canada, Italy and Thailand). The change in the direction of the generational account is a much less interpretable result than the change in the magnitude. Our results indicate that regardless of the choice of exogenous variables, a fiscal imbalance exists to the disadvantage of those who are not yet born. The standardized practice in the GA literature is to calculate the relevant accounts under different fertility assumptions, which might be thought as an extension of the sensitivity analysis. Table 7 presents the generational accounts under low, medium and high fertility assumptions. In line with our expectations, the fiscal gap narrows down to 21.69% under a high fertility scenario whereas it widens to 27.73% under low fertility projections.

Table 6
Sensitivity Analysis

	g=1%			g=1.5%			g=2%		
	r=3%	r=5%	r=7%	r=3%	r=5%	r=7%	r=3%	r=5%	r=7%
Current Males	104.41	49.51	23.79	106.04	49.75	23.96	129.07	60.39	28920
Future Males	111.54	58.77	38.67	112.06	58.99	38.77	135.99	69.05	42690
Current Females	-10.23	-1.03	209.00	-10.28	-1.03	210.00	-15.98	-2.03	150
Future Females	-8.70	16.20	4.73	-8.75	1.61	4.72	-14.50	320.00	4.21
Current Newborn	47.59	24.24	12.00	47.88	24.36	12.09	56.55	29.18	14.54
Future Newborn	51.42	37.49	21.70	51.66	30.30	21.75	60.75	34.69	23.45
Absolute Imbalance	3.83	13.245	9.701	3.775	5.94	9.66	4.2	5.505	8.915
Percentage Imbalance	8.05	54.64	80.84	7.88	24.38	79.93	7.43	18.87	61.33

Source: Authors' own calculations

Table 7
Generational Accounts under Low, Medium and High Population Assumptions
(thousand TL)

Generation's Age in 2008	Net Tax Burden								
	Low			Medium			High		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
0	53.4	-0.6	26.4	49.5	-1.0	24.2	46.6	-1.0	22.8
5	61.9	-0.6	30.6	58.9	-1.2	28.8	57.0	-1.1	27.9
10	73.2	0.2	36.7	70.5	-0.6	35.0	69.8	-0.3	34.7
15	92.8	1.2	47.0	89.5	0.2	44.8	90.0	0.6	45.3
20	110.2	1.3	55.8	104.8	-0.2	52.3	107.6	0.3	53.9
25	124.6	-1.0	61.8	116.0	-2.6	56.7	120.0	-2.3	58.8
30	139.2	-7.0	66.1	133.1	-8.1	62.5	132.8	-8.2	62.3
35	130.8	-15.6	57.6	131.5	-15.7	57.9	126.9	-16.1	55.4
40	102.6	-27.5	37.6	106.5	-26.7	39.9	102.8	-27.2	37.8
45	65.6	-39.9	12.8	67.4	-38.2	14.6	66.6	-39.1	13.8
50	22.5	-52.4	-14.9	20.0	-41.5	-10.7	19.0	-42.1	-11.6
55	-7.4	-66.8	-37.1	-3.0	-46.6	-24.8	-3.8	-46.6	-25.2
60	-32.9	-76.6	-54.7	-17.7	-47.4	-32.6	-17.0	-45.2	-31.1
65	-49.7	-82.8	-66.3	-31.1	-56.6	-43.9	-29.9	-54.4	-42.2
70	-57.9	-77.6	-67.7	-34.7	-49.4	-42.0	-35.9	-50.8	-43.3
75	-58.9	-69.4	-64.2	-40.6	-49.3	-44.9	-42.6	-51.3	-47.0
80	-49.8	-54.2	-52.0	-43.6	-47.5	-45.5	-43.1	-47.0	-45.1
Future Newborns	65.0	2.5	33.7	59.0	1.6	30.3	54.2	1.3	27.7
Percentage Diff.			27.73			24.30			21.69

Policy Experiments

The final contribution of this paper is to extend the Turkish GA analysis by making various policy experiments. In this respect, one can implement and measure the effect of a myriad of policy amendments. However the most sensible approach is to seek policies that can remedy the fiscal imbalance. Three of the policy experiments discussed in this section will serve this purpose, whereas an additional experiment will be carried out to show how the generational balances will be distorted by a change in the corporate tax rate.

Table 8
Generational Accounts under Alternative Scenario 1 (TL)
(56% Reduction in the Government Consumption)

Generation's Age in 2008	Net Lifetime Payments		
	Males	**Females**	**Total**
0	38,460	-1,610	18,425
5	45,720	-1,890	21,915
10	54,900	-1,390	26,755
15	69,920	-0,880	34,52
20	81,370	-1,420	39,975
25	89,290	-4,020	42,635
30	100,060	-9,710	45,175
35	94,480	-17,370	38,555
40	71,340	-28,520	21,41
45	39,540	-39,390	0,075
50	3,310	-42,270	-19,48
55	-14,520	-47,130	-30,825
60	-25,660	-47,880	-36,77
65	-37,420	-56,930	-47,175
70	-38,410	-49,710	-44,06
75	-42,650	-49,490	-46,07
80	-44,250	-47,730	-45,99
Future Newborns	38,780	1,610	20,195
Percentage Difference			0.96%

Discount rate (r) =5%, Growth Rate (g) =1.5%, Medium Population Growth

Table 8 presents the generational accounts for current and future generations under a 56% cut in the government consumption scenario. Although it is not a realistic experiment, the results indicate that a policy action that strives to alleviate the generational imbalance by cutting down on government consumption would necessitate unattainable deductions. The relevant balance can be attained by less costly policy actions. One of such policy actions is to increase the social security contributions by 10%. Table 9 presents the results of such a policy action.

Table 9
Generational Accounts under Alternative Scenario 2 (TL)
(10% Increase in Social Security Contributions)

Generation's Age in 2008	Net Lifetime Payments		
	Males	**Females**	**Total**
0	51,860	-650	25,600
5	61,640	-750	30,450
10	73,720	-400	36,840
15	93,600	820	47,210
20	109,610	610	55,110
25	121,340	-1,900	59,720
30	139,190	-7,360	65,910
35	137,690	-15,070	61,310
40	111,710	-26,320	42,690
45	71,120	-38,110	16,500
50	21,740	-41,590	-9,920
55	-2,110	-46,770	-24,440
60	-17,240	-47,630	-32,430
65	-30,900	-56,830	-43,860
70	-34,580	-49,650	-42,120
75	-40,710	-49,460	-45,080
80	-43,700	-47,720	-45,710
Future Newborns	52,710	-510	26,100
Percentage Difference			1.95%

Discount rate (r) =5%, Growth Rate (g) =1.5%, Medium Population Growth

As the results suggest, it is possible to attain generational balance by simply increasing the social security contributions by 10%, which is a smaller sacrifice and a more realistic policy action. An even more efficient way of alleviating the fiscal gap is to increase the tax revenue sourced from the highest income bracket. The fiscal burden of future generations might be decreased and generational balance can be attained by increasing the current income tax revenue by 0.2%, which can be achieved simply through a 1.42% increase in the revenue gathered from the highest income bracket.

Table 10
Generational Accounts under Alternative Scenario 3 (TL)
(0.2% Increase in the Income Tax Revenue)

Generation's Age in 2008	Net Lifetime Payments		
	Males	Females	Total
0	51,890	650	25,620
5	61,670	750	30,460
10	73,760	30	36,860
15	93,650	820	47,240
20	109,660	620	55,140
25	121,410	-1,900	59,750
30	139,270	-7,360	65,950
35	137,770	-15,060	61,350
40	111,770	-26,320	42,730
45	71,170	-38,110	16,530
50	21,780	-41,590	-9,910
55	-2,090	-46,770	-24,430
60	-17,220	-47,630	-32,430
65	-30,880	-56,830	-43,860
70	-34,580	-49,650	-42,110
75	-40,700	-49,460	-45,080
80	-43,700	-47,720	-45,710
Future Newborns	52,630	-540	25,310
Percentage Difference			-1.21%

Discount rate (r) =5%, Growth Rate (g) =1.5%, Medium Population Growth

Our final experiment is based upon a hypothetical scenario that involves a 50% increase in the corporate tax revenues, and hence the adoption of pre-1983 corporate tax rates. Results presented in Table 11 indicate that the generational impact of such a practice would be to distort the fiscal balances in favor of future generations. Considering the magnitude of the change, the results are not surprising. Moreover they indicate that the fiscal balances of the economy are sensitive to the changes in the corporate tax, and that amendments to this particular item should be handled rigorously.

The first thing that should be noted regarding the policy experiments is that these calculations are carried out in a partial equilibrium framework. Therefore it is not

possible to compute or estimate the impact of these policy amendments on the price of capital and labor. The ultimate effect can be either narrower or wider depending on the repercussions and second round effects. Hence the results should not be interpreted as the exact solutions to the generational imbalance problem but more as indicators of the policy actions that can potentially reduce fiscal gap in an idealized framework. Secondly, generational accounts do not make any statement about the behavioral patterns that can arise from fiscal policy actions. It is possible to say that a 0.2% rise in the income tax revenues would remedy the imbalance. This change can be achieved through different tax increases in different tax brackets. Likewise, a 50% rise in the corporate tax revenues appears to alleviate the imbalance given the current fiscal structure, yet it is unknown whether such a policy will encourage tax evasion and informality. The literature on tax morale and informality is very limited, yet they could be exceedingly relevant and complementary in GA analysis studies. This should be noted for further research.

Table 11
Generational Accounts under Alternative Scenario 4 (TL)
(50% Increase in the Corporate Tax Revenue)

Generation's Age in 2008	Net Lifetime Payments		
	Males	**Females**	**Total**
0	55,130	-760	27,185
5	65,550	-870	32,340
10	78,380	-170	39,105
15	99,480	650	50,065
20	116,720	430	58,575
25	129,560	-2,010	63,775
30	149,690	-7,360	71,165
35	150,070	-14,960	67,555
40	123,960	-26,000	48,980
45	81,070	-37,900	21,585
50	28,060	-41,400	-6,670
55	2,430	-46,640	-22,105
60	-14,030	-47,550	-30,790
65	-28,370	-56,780	-42,575
70	-33,10	-49,620	-41,360
75	-39,950	-49,450	-44,700
80	-43,490	-47,720	-45,605
Future Newborns	41,660	-4,610	18,525
Percentage Difference			-31.85%

Discount rate (r) =5%, Growth Rate (g) =1.5%, Medium Population Growth

Conclusions

The contribution of this paper is to construct the first set of generational accounts for Turkey. Through the policy analysis the paper provides alternative policy suggestions for getting rid of the fiscal imbalance. The results indicate that a 24.3% fiscal imbalance exists to the disadvantage of future generations under the parametric assumptions provided above.

The basic observation regarding the generational accounts is that a huge gap exists among genders since women are the net beneficiaries of the government's redistributive policies and typically make one fifth of the tax contribution made by men. This pertains both to the fact that the labor force participation rate is low for females in Turkey and that women are traditionally engaged in non-market activities. Turkish men appear to reach peak tax burden in the middle of their life cycle whereas women enjoy redistributive policies for more than half of their expected lifetime.

The policy experimentations revealed that in order to attain generational balance, a 56% decline in the government consumption, a 0.2% increase in the income tax revenue sourced from the highest income bracket, and a 10% decline in the social security contributions could be adopted. A change in the corporate taxes to pre-1983 levels would cause a 31% generational gap to the disadvantage of current new-borns.

To conclude, despite the frequently underlined problem of informality, presence of a huge tax wedge and generational imbalance, the Turkish fiscal sustainability is not as alarming as it is in many countries. However the government should still consider the fact that a fiscal imbalance exists between current and future generations, and that government policies should be implemented accordingly.

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APPENDIX

Table 12

Sensitivity Analysis for Selected Countries

		g=1%			g=1.5%			g=2%		
		r=3%	**r=5%**	**r=7%**	**r=3%**	**r=5%**	**r=7%**	**r=3%**	**r=5%**	**r=7%**
Japan	Newborn	242.1	120.1	62.4	291.1	143.4	73.8	349.8	171.4	87.4
	Future	510.6	356.5	283.3	571.5	386.2	297.6	644.3	421.6	314.9
	Imbalance	110.9	196.8	354.0	96.3	169.3	303.3	84.2	146.0	260.3
Germany	Newborn	255.7	140.2	72.6	292.3	165.0	86.7	329.1	193.1	103.0
	Future	431.8	284.3	196.7	472.8	316.8	214.6	504.3	353.3	235.8
	Imbalance	68.9	102.8	170.9	61.8	92.0	147.5	53.2	83.0	128.9
Italy	Newborn	157.2	101.1	62.5	171.6	114.2	70.9	183.2	128.4	80.5
	Future	312.6	249.5	212.8	331.5	264.8	221.0	347.6	282.1	230.9
	Imbalance	98.9	146.8	240.5	93.2	131.9	211.7	89.7	119.7	186.8
Canada	Newborn	190.1	93.1	44.8	231.9	113.8	54.8	281.8	138.5	66.9
	Future	198.3	94.2	44.3	232.8	114.0	49.6	271.9	129.6	57.2
	Imbalance	4.3	1.2	-1.1	0.4	0.2	-9.5	-3.5	-6.4	-14.5
Thailand	Newborn	14.1	7.0	3.9	17.2	8.3	4.5	21.1	9.9	5.3
	Future	6.1	-0.1	-2.5	8.9	1.0	-2.0	12.6	2.4	-1.5
	Imbalance	-56.7	-101.4	-164.1	-48.3	-88.0	-144.4	-40.3	-75.8	-128.3

Source: Taken from Auerbach, Kotlikoff and Leibfritz (1999)