Generational Accounting in Iran

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The aim of this paper is to study of the generation accounts for Iranian's generation. We applied the method of Auerbach, Gokhale and Kotlihoff (1991) on the period 1967-2008 in Iran. Our calculation shows with compare to industrial countries, fiscal burden for Iranian's population is very chip and that depend on fiscal system in Iran. Except the recent years the rate of tax in Iran has been very low. The generation account for the old people (40 olds) is 2117 $ but the future generation (t+1) is 36985 $. The share of male and female, during the years, in this burden is similar. Fiscal burden for Iranian's generation is low but this population should support other burden that calls inflation. Because when the government do not receive the tax income, a low generation account transfer to price general level.

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1. Introduction

In view of the fact, generational accounting considered as a method of long-term fiscal analysis and planning. It aims to answering a series of questions, such as: how large a fiscal burden does current fiscal policy leave to future generations? Is fiscal policy sustainable without major additional sacrifices (either in terms of higher taxes or lower transfers) on the part of current or future generations or major cutbacks in government purchases? What alternative policies would suffice to produce generational balance – a situation in which future generations face the same fiscal burden as do current generations when adjusted for growth (when measured as a proportion of their lifetime earnings)? Finally, how would different methods of achieving such balance affect the remaining lifetime fiscal burdens of those now alive? In order to answer these questions it is defined with generational accounts the present value of net taxes (taxes paid minus transfer payments received) that individuals of different age cohorts are expected, under current policy, to pay over their remaining lifetimes. Adding up the generational accounts of all currently living generations gives the collective contribution of those now alive toward paying the government's bills. The government's bills refers to the present value of its current and future purchases of goods and services plus its net debt (its financial liabilities minus its financial and real assets, including the value its public-sector enterprises). Those bills left unpaid by current generations must be paid by future generations.

2. Literature review

Kotlikoff (1979) and Summers (1981) analysed the impact of social security and tax reforms on individual consumption and saving behaviour by using a 55 period life cycle models and incorporating

intergenerational transfers to capture the dynamic nature of the economy. Studies confirmed that both the choice of the social security system and the tax base have long run impacts on the capital stock of the economy and the generational distribution of welfare.

The paper by Kotlikoff et al., (1999) finds evidence of a 61% fiscal imbalance to the disadvantage of future generations in Belgium. Decoster et al., (2011) reconsider the Belgium case that the direction of the imbalance has been reversed in the course of time. Their results indicate 251.9% higher fiscal burden for the current generations (although both the male and female accounts of current and future generations are calculated as negative-meaning Belgians receive more than what they pay; an inherently unsustainable fiscal pattern). The two consecutive studies by Sartor, Kotlikoff and Liebfritz (1999) and Cardarelli and Sartor (2000) verify the existence of an intergenerational imbalance to the advantage of current Italian generation, although the magnitudes of this imbalance are different. This kind of sequential studies are important for the generational accounting literature because they enable us to see how the intergenerational distribution of government's debt burden has been reallocated among generations within the course of time. This serves the ultimate goal of making generational accounting an annual and regular calculation that will replace the budget deficit figure.

3. Methodology

The purpose of this paper is to investigate the financial burden of government current fiscal polices on future generations. The government expenditures in current time affect different generations. For our object, we apply present value method for the calculation of this financial burden. In fact, we apply Auerbach, Gokhale andKotlihoff (1991) method for the calculation of generational

accounts in Iran. For the period 1967-2008 we calculate below equation:

$$PVG_t = NW_t + PVL_t + PVF_t$$

Where t stands for current year policies, PVG stands for present value of the government's projected purchases on goods and services, NW is the government's current net financial wealth, PVL shows the present value of net tax payments by living generations and PVF is the present value of net tax payments by future-born cohorts.

NWt is calculated as the sum of past budget surpluses.

$PVGt$ is calculated in this way:

$$PVG_t = G_0 + \frac{G_1}{(1+r)} + \frac{G_2}{(1+r)^2} + ... + \frac{G_T}{(1+r)^T}$$

Where G is government's projected purchases on goods and services and r stands for discount rate

$$PVL_t = L_0 + \frac{L_1}{(1+r)} + \frac{L_2}{(1+r)^2} + ... + \frac{L_T}{(1+r)^T}$$

PVL is calculated in this way:

Where L is net tax payments by living generations.

$$PVF_t = F_0 + \frac{F_1}{(1+r)} + \frac{F_2}{(1+r)^2} + ... + \frac{F_T}{(1+r)^T}$$

PVF is calculated in this way:

Where F is net tax payments by future-born cohorts. We obtain the present value cost that should pay by future generations by below equation:

PVGt PVLtNWt

We can calculate approximately per capita fiscal burden that should been paid by future generations by considering above equations. We calculate accounting generation for the generations born in year $t+1$ (financial burden of government current fiscal polices on future generations) by below equation but should consider that the

productivity growth could decries fiscal burden then we apply this rate in our calculation:

$$AG_t = \frac{(PVG_t - PVL_t - NW_t)(1 + r_{t+1})}{\displaystyle\sum_{s=t+1}^{\infty} N_s \left[\frac{(1+g)}{(1+r)}\right]^{s-(t+1)}}$$

Where g shows labour productivity growth, s stands for future cohorts' birth years and Ns is the population sizes. Here we can estimate per capita fiscal burdens in different years.

4. The results

Table 1

Generational accounts for Iran in US dollars

Year of birth	Age in 2007	Total	Male	Female
2008	-1	36985	18950	18035
2007	0	26774	13692.7	13081.3
2002	5	11363	5922	5441
1997	10	15932	8251.9	7680.1
1992	15	7180	3708.6	3471.4
1987	20	55288	28555.7	26732.3
1982	25	19730	10122.2	9607.8
1977	30	10545	5315.4	5229.6
1972	35	5007	2553.6	2453.4
1967	40	2117	1100.4	1016.6

By using 20% for the rate of discount, and the year of 2007 for the fiscal year (t=2007) and calculating US dollar amounts in current dollars we have estimated the Iranian fiscal burden. Table 1 represents generational accounts for Iranian male and female populations. The generational accounts for these born in 2008 (t+1) is 36985$ per capita that considerably is greater than 2007 newborns because of the fiscal policies in the recent years. In the different years, the share of male and female from fiscal burden approximately is the same. We can apply fiscal burden as lifetime net tax rates (LNTR) that different generations would face. $LNTRf = GAs/PVEs$, for all $s > t$, where $PVEs$ stands for the present value as of period s of projected labor wages per capita for the group born in period s. The newborns (until 15 years) receive pure benefits for the government for example education, health and…we calculate this generation as inactive generation. In these years these generations are net receptors. In Iran, generational accounts were augmented in the recent years because of increase in fiscal income, for example for those born 1 to 5 years this account is 11363$ and for those born 1 to 10 is 15932$, (1 to 15, 7180$) and so on. The younger generations support additional burden. The most generational accounts are for the younger from 16 to 20, this amounts is 55288$. The most amount of tax is paid by the younger generations.

According to our calculation the older generations support lower amount of the generational accounts because in the past years Iranian population have paid lower tax in their lifetime. This is in the resent years the government has increased the rate of tax. The lower generational account is paid by generations with 40's olds. This account for UK in 1997 is 52355 Pounds   (Cardarelli, Sefton and Kotlikoff (1999)) and this difference come form the fiscal system. If the fiscal responsibility implanted in current policy is neither improved nor maintained, Iranian's children could pay significantly higher generational accounts than their parents now pay.

So far, generational accounting in 25 countries has been accounted. These countries contain UK, USA, Turkey, Japan, Italia, Korea and so on. We can compare the generational accounts in Iran to certain countries.

The inter temporal budget gap (IBG) is defined as the imbalance in the inter temporal budget constraint. Generational accounts imbalance has been accounted for 11 European countries. Italia, Norway and Hungary have the most generational accounts imbalance. In continent of America the most imbalances belong to Brazil with 116.4 % and the lowest imbalance belongs to Mexico with -10.8%. Generational accounts imbalance for Iran is 38%, that's mean Iranian's generations tolerate fiscal burden more than the generation in Australia, USA, Turkey, New Zealand and Canada.

Table 2

Generational accounting in different countries

Country	Year	Money	New born	Future generation	Generational budget imbalance	Inter temporal budget imbalance
Argentina	1994	U.S. dollars, thsnd.	13.90	24.3	10.4	74.8
Australia	1994/95	U.S. dollars, thsnd.	79.60	105.2	25.6	32.2
Belgium	1994	U.S. dollars, thsnd.	43.20	90.4	47.2	109.25
Belgium	2010	Euros, thousands	-119.2	181.0	300.2	-251.9
Brazil	1995	U.S. dollars, thsnd.	10.20	22.1	11.90	116.40
Canada	1995	U.S. dollars, thsnd.	56.30	58.0	1.70	3.10
Denmark	1995	U.S. dollars, thsnd.	-18.0	26.0	-44.0	-244.4
Estonia	2010	Kroon, thousands	860	1411	551	0.64
France	1995	U.S. dollars, thsnd.	105.0	117.3	57.6	96.4
Germany	1995	U.S. dollars, thsnd.	97.1	248.8	151.7	156.1

Hungary	1996	U.S. dollars, thsnd.	8.4	43.9	35.5	422.6
Iran	2008	U.S. dollars, thsnd	26.78	36.98	10.2	38.14
Italy	1995	U.S. dollars, thsnd.	64.8	209.9	145.1	223.8
Italy	1998	Lire, millions	-22.7	77.2	99,8	440.8
Mexico	1997	U.S. dollars, thsnd.	7.2	6.4	0.6	-10.8
Netherlands	1995	U.S. dollars, thsnd.	49.4	137.0	87.6	177.1
New Zealand	1995	U.S. dollars, thsnd.	18.0	16.0	-2.0	-10.8
Norway	1995	U.S. dollars, thsnd.	1.4	57.3	55.9	4018
Japan	1995	U.S. dollars, thsnd.	73.0	319.4	246.4	337.8
Poland	2007	Zloty, thousands	-55.0	125.0	180.0	-327.3
Portugal	1995	U.S. dollars, thsnd.	61.8	98.7	36.9	59.7
Singapore	1999	Singapore dlrs, thsnd.	-20.1	-386.1	-366.0	-375
South Korea	2004	Won, thousands	56.4	122.2	65.9	117
Sweden	1995	U.S. dollars, thsnd.	184.4	143.5	-22.2	-22.2
Thailand	1993	Baht, thousands	-143,4	-215,8	-72,5	50.5
Turkey	2008	TL, thousands	24.2	30.3	6.1	24.3
UK	2008	Pounds, thousands	68,4	159,7	91,3	133.5
UK	1997	U.S. dollars, thsnd.	26.9	39.0	12.1	44.9
US	1995	U.S. dollars, thsnd.	64.7	194.2	129.5	200.3
US	1999	U.S. dollars, thsnd.	67.4	67.1	-0.3	-0.4
US	2010	U.S. dollars, billions.	-111	387.9	498.9	-4.49

5. Sensitivity Analysis

We can account generational accounts by different rate of discount and growth. In the table 3 we represent the generational accounts by the rate of growth 2, 3, 4 and the rate of discounts 10, 20, 30. The lowest generational account belongs to the growth rate of 2 and the discount rate of 30 that include 92% of generational accounts. The most generational account belongs to the growth rate of 4 and the discount rate of 1% that include 109% of generational accounts.

Table 3

Sensitivity Analysis

g=0.04			g=0.03			g=0.02			
r=0.3	r=0.2	r=0.1	r=0.3	r=0.2	r=0.1	r=0.3	r=0.2	r=0.1	
13.059	13.959	15.003	12.864	13.693	14.785	12.669	13.548	14.567	Current(male)
19.132	19.132	19.132	18.948	18.950	18.948	18.764	18.764	18.764	Future (female)
12.338	13.188	14.175	12.153	13.081	13.968	11.969	12.799	13.763	Current(female)
18.213	18.213	18.213	18.038	18.035	18.038	17.863	17.863	17.863	Future (female)
25.397	27.147	29.178	25.017	26.774	28.753	24.639	26.347	28.330	Total (current)
37.345	37.345	37.345	36.985	36.985	36.985	36.626	36.626	36.626	Total (future)

6. Conclusion and remarks

The purpose of this paper is to investigate the financial burden of government current fiscal polices on future generations. For our objective we have applied the method of Auerbach, Gokhale and Kotlihoff (1991) on the period 1967-2008 in Iran. In this account we calculate the present value of government's budget, the government's current net financial wealth, the present value of net tax payments by living generations and the present value of net tax payments by future-born cohorts.

The results show that during the years the share of Iranian's male and female in generational accounts is approximately is the same. With compare to industrial countries such as UK, fiscal burden for

Iranian's population is very chip because of fiscal system. In Iran during the years the rate of tax has been very low then for the past years (except the recent years) generation accounts is very low and older generations support the lower burden for example Iranian's by 40 olds support 2117$ per capita. But because of a change in fiscal system the future generation will support 36985$.

In reality, it is true that Iranian's generation support a little burden with compare to industrial countries but population should endure other burden that calls inflation. In Iran the rate of inflation at mean is 20% (Central Bank of Iran). When the government do not receive the tax for the budget the generation account burden transform to inflation burden. Then we suggest that improvement of government fiscal system help to the government for the supply of general services and control of inflation burden.

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