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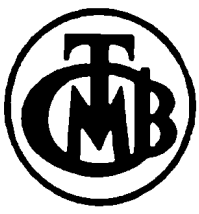
The Central Bank of the Republic of Turkey



Balancing Turkey's Intertemporal Budget Gap

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Abstract

The paper proposes an alternative to the static budget deficit measure for constructing fiscal policy which we call Intertemporal Budget Gap (GAP). The GAP corrects for the deficiencies of the annual budget, makes projections for revenue and expenditures and provides an answer to the sustainability of current policies. The deficiencies are implicit in the public debt stock and demographic changes, i.e. social security payments that will be made to the aging population. We use the measure to analyze impact of financial crisis and stabilization policies on the GAP of Turkey. The GAP also allows us to provide policy recommendation for fiscal sustainability in order to prevent future fiscal crisis. We observe that recent financial crisis, which resulted in an increase in the real value of debt stock and reduced maturity structure for servicing debt, has a significant adverse affect on the sustainability of fiscal policy in the medium term. A quick comparison of our findings with Gokhale and Smetters (2003) indicates that even after the crisis, the GAP of Turkey is only 4.3 percent of the Present Value of it's GDP whereas in the United States this number is 6.5 percent. Although stabilization policies are a good first step in the right direction, in order to eliminate GAP more substantial expenditure cuts and/or tax hikes are needed. Moreover, our measure indicates that over the longer term Turkey will experience an adverse effect on the GAP rising from social security payments to the baby boomers. This will require further contraction in fiscal policy today. The burden that will be faced by current generation is smaller than the one that will be absorbed by next generations if the government delays the implementation of tax hikes/expenditures cuts.

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All the views expressed in this paper are of the author and do not necessarily represent those of the Central Bank of the Republic of Turkey or its staff.

1 Introduction

Government's legislate benefits, delivered in the future, which are not reflected on current budget accounts. This is especially true for social insurance services. Demographic changes, retiring population and lengthening of life span, will play a crucial role in determining the size of future payments to social insurance institutions. Moreover, rather than increasing taxes governments may decide financing current expenditures through borrowing. However, stock of debt does not guarantee when the government will pay its obligations. We can safely claim that short term legislative process does not necessarily correlate with long-term obligations of the government. The budget deficit in its foundation, is an arbitrary measure in assessing the stance of the fiscal policy. It is a decision on choosing different labels for it's revenues and expenditures. It also understates the financial obligations that the central government has to fulfill under current fiscal policies (Cecchetti, 2002) and (Jackson, 2002).

The government could easily choose different methods and magnitudes of borrowing, taxation and expenditures and methods of reporting budget deficits, surpluses and balances. The arbitrary nature of fiscal labeling has been discussed in various articles by Kotlikoff (1984, 1986 and 1988). Kotlikoff indicates that the labeling is irrelevant to the stance of fiscal policy. The size and sign of government deficits are not unique.

As Kotlikoff (1993) points out

> "… equations of neoclassical models do not uniquely define the size or sign of government deficits, and "the deficit" in such models is purely a reflection of how the government chooses to label its receipts and payments".

The goal of this paper is to define a measure that we call Intertemporal Budget Gap (GAP) to evaluate the stance of fiscal policy. GAP is similar to the "open-group liability" concept that is used in the analysis of social insurance programs and sometimes called the Fiscal Imbalance (Gokhale and Smetters 2003) or Fiscal Gap (Auerbach, Gale, Orszag, and Potter 2003). GAP is the comparison of the present value of the government's projected net receipts (revenues minus expenditures) in the infinite horizon and government's net worth (government assets minus domestic and foreign debt). With the help of GAP, we can answer the following questions. What is the current situation in a government's intertemporal budget? How much reduction (increase) is needed in expenditures (revenues) to balance the GAP? What are the implications of alternative policies on the fiscal stance of the economy? Are the ongoing policies in the right size

and magnitude? Is further adjustment needed? What are the tradeoffs between changes in interest rates and changes in productivity growth? etc.

GAP, although similar in nature, should not be confused with Generational Accounting, which was developed by Auerbach, Gokhale and Kotlikoff (1991), that involves a reform that forces the GAP to zero by increasing tax burden on unborn generations. Generational Accounting in this respect, is simply the difference in the tax burden per capital between current newborns and future generations.

Of course, not all items of the government's budget are predictable as the net debt.[1] One needs more information on the forecasts of various items of the budget. One aspect of forecasting future expenditures and revenues is to figure out the population dynamics in the future. This will accommodate the population growth rate into the figures. On the other hand, one can argue that the number of people in each age group will not be the same due to the changes in population dynamics. At this point, we can move further by incorporating the information regarding the portion of population who will be benefiting from expenditures or paying taxes. These we will call the relative profiles. Relative profiles are the average payments or revenues that certain gender and age groups benefit or pay with respect to a reference individual in the economy, the 40 year old male.[2] Bringing the population dynamics and relative profiles together will constitute the first component of our analysis.

The second component of the analysis is to find out the responsiveness of revenues and expenditures to the growth rate of the economy. In order to examine this, we need to observe a stable relationship between the growth rate and the budgetary items. Elasticities of the budgetary items with respect to the growth rate of the economy is a measure to serve the purpose. Therefore, by assuming that this stable relationship will prevail in the future we will construct forecasts for these expenditures in different growth rates.

We chose Turkey to be the country for analysis. Turkey has undergone major changes in fiscal accounts over the last two decades. Nevertheless, problems created by the fiscal state of the economy characterized economic developments

[1] The complexity of the instruments used in domestic and foreign borrowing and uncertainties that can prevail in the future would bring uncertainty to the future net position of the government, however an educated guess would help the policy maker to determine the size of net debt easier than other budgetary items.

[2] As an example, consider education expenditures. Those who are benefiting from these expenditures are the ones that belongs to the pre-education, primary education, higher and college education which correspond to the age groups 4 to 25 in both gender. If we know the growth dynamics of these ages for both males and females we can observe part of the expenditure that the government will be making in the future.

in Turkey. The rise of chronic inflation and heavy financing of government deficits through domestic borrowing created a vulnerable economy to both internal and external shocks. The two financial crises of April 1994 and February 2001 led to a significant devaluation of the Turkish Lira, increased the risk premium, lowered the maturity of the domestic debt and slowed down access to foreign borrowing. The sharp increase in the real interest rates accelerated the accumulation of the debt stock. By the end of 2001, Turkey had a public debt which was 110 percent of the Gross National Product, which placed it at the top most indebted countries in the world.

In 2001, with the help of the IMF and World Bank, Turkey had undergone significant restructuring of the financial sector and the public accounts to provide answers to the problems created by the public sector. The programs required sound fiscal policies aimed at reducing expenditures and increasing revenues. In order to create budget surpluses to pay off the debt gradually. However, they did not take the future fiscal problems into consideration, i.e. higher budget deficits in the future due to an aging population that results in an increase in social security payments, lower income taxes due to a reduction in the labor force or an increase in women's participation in the labor force which will increase the receipts from income taxes and social security contributions, distortions of contractionary fiscal policy in terms of lower output, etc. The calculations that we will be presenting show that the portion of the population that is joining the labor force in the near future will create higher revenues which will easily offset the burden that the aging population creates in terms of payments to pension funds.

The methodology that we follow in this paper for projecting revenues and expenditures is closely related to Baker, Basendorfer and Kotlikoff (1999). Incorporating the population projections for Turkey, which we obtained from the World Bank, and relative expenditure and revenue profiles in different age and gender groups, we calculate the average expenditure made to each age and gender group. Accommodating elasticities into calculations provides the responses of budgetary items to the growth rate of the economy. After projecting expenditures and revenues into the future and discounting the net receipts we calculate the present value of the budget balance to construct the time path of the GAP over different terminal years. For baseline growth rate we will be using 3.3 and for discount factor we will use the ex – post real return on Treasury Bills, which is 25.3 percent.

The two components (population dynamics along with elasticities) by themselves underestimate the stance of the fiscal policy. Taking the pre – crises year 2000 as the base year, population dynamics reports 2.3 billion dollars of GAP. Using only the elasticity measure for forecasts, we calculate an GAP of 1.2 billion dollars (dollars). However, these figures are well below the negative 14 billion dollar GAP which is calculated by bringing these two components

together. The new definition of budget gap presents a significant improvement over the earlier ones. Overall, the GAP presents an improvement equal to approximately 11 to 13 billion dollars over each component.

When we conduct the same calculations using 2001 as the base year, in which the financial crises took place, we observe a GAP of 57 billion dollars. The major determinant of the GAP is due to the sharp increase in the dollar value of the net debt. The devaluation of Turkish Lira (TL) against dollar accounts to 50 billion dollars of the GAP.

The next section provides a brief introduction to the Turkish economy. Section 3 outlines the methodology which is followed by data and data sources in section 4. Section 5 presents details of the process for calculating elasticities. Section 6 studies the calculation of relative profiles. We reserve section 7 for results. Finally, section 8 concludes. In the end, we provide three appendices. In Appendix 1, we give an example on the irrelevance of fiscal labeling on stance of fiscal policy. Appendix 2 describes details of calculations that we made in regards to the allocation of population into different age groups and years for each gender. In the third, we report the methodology that we use for the non – linear approximation of relative profiles.

2 A Brief Outlook on the Turkish Economy

Financial crises in November 2000 and February 2001 required the three-party coalition government, IMF and World Bank, to take extraordinary measures to prevent further social and economic obscurities. The crisis, although fiscal in nature, had important financial consequences for the banking sector — including the failure of some private banks, which were taken over by the Deposit Insurance Fund. This of course increased the burden on the fiscal accounts of the government. The IMF and World Bank agreed to provide support to overcome the extra burden created by the defaulted banks and to restructure the financial sector to make the system immune from future disturbances.

Budget deficits have been a common phenomenon in the post-1980 period (Figure 1). During the 1980s, Personnel Expenditures and Interest Payments constituted 38 percent of total expenditures on average (though at the end of the period this total was 50 percent of total expenditures), whereas Tax Revenues were the main item on total revenues with 84 percent on average. In the post-1990 period, tax revenues averaged 79 percent of total revenues, and total personnel and interest payments averaged 62 percent of total expenditures — double the previous period's figures. It is important to mention that in 2001, total interest payments were 50 percent of total expenditures.

Transfers to State Economic Enterprises (SEE) in the first half of the 1980s and 1990s also contributed to the ongoing budget deficits. Although the composition of revenue items of the consolidated budget did not present much of a difference in the post-1980 period, the personnel expenditures and interest payments became the major source of expenditures in the total expenditures part of the budget. In the meantime, investment expenditure remained at almost the same quantity, which fluctuated between the two and four billion US dollar band. The main reason for this dramatic change is the heavy reliance on domestic borrowing to finance the budget deficit, especially after 1990. (Figure 1)

Due to two crucial crises, one domestic in 1994 and the other international in 1998, aggregation of systematic risks in the economy triggered the risk premium, and in some cases the real interest paid on domestic debt, which went up to 35 percent. The average real interest rate paid over the post-1990 period was 13.1 percent, where as the post-1994 period it averaged 17.8 percent. On the other hand, the maturity of the total debt stock was approximately one year. This of course raised the total debt stock exponentially over the past eight years. In 1996 the total debt stock was 59 percent of GDP, which increased to 87 percent of GDP in 2000 and 134 percent of GDP in 2001. Of this total, the domestic debt stock was 17 percent of GDP in 1996 and 57 percent of GDP in 2001. Currently, the total debt stock is 204 billion dollars, which is almost double the 1996 level of 108 billion dollars. The share of the public debt of the total debt stock is almost 80 percent.

The IMF programs after the 1994 and 2001 crises intended to exercise contractionary fiscal policy aimed at lowering expenditures and raising taxes to obtain a primary surplus (the budget balance excluding the interest expenditures). On the other hand, the privatization revenues and a pick-up in the growth of the economy were expected to help lower the interest expenditures. However, the growth rate of the debt stock has been significantly higher than the growth rate of the primary surplus, mainly due to the presence of both internal and external risks. Therefore, the budget deficit has continued to grow up to the present day. By the end of 2001, the budget deficit climbed to almost 20 percent of GDP.

Growing deficits and established inflation inertia averaged CPI inflation to 44 percent in the 1980s, which increased to 76 percent in the 1990s. Despite the presence of disinflationary attempts, little success was achieved in lowering inflation. In two (1993 and 1997) of the 4 cases (1991, 1993, 1997, 2001) the attempts resulted in financial crises. It is also important to note that for the two decades the average growth rate of GDP was five and four percent, respectively, with a high degree of volatility. (Figure 1)

3 Methodology

Intertemporal Budget Gap (GAP) is the sum of the present value of the future receipts and net worth of the government subtracted from payments. This will involve the projection of these receipts and payments into the future by an appropriate growth rate along with each receipts (payments) response to this growth rate. The equations that we will be presenting are for payments. Equations for receipts are analogous to payments and omitted. Equations 4 to 6 closely follow Baker et al (1999) modified to incorporate growth rates of revenue items.

The initial step is to find out average expenditures per age group at some base year b. Denote $E_{i,b}$ as the total payment type i $(i=0, \ldots I)$ at base year b. Given total payments, relative profiles ($R_{i,m,a}$, $R_{i,f,a}$) and population counts ($P_{m,a,b}$, $P_{f,a,b}$) for both male and females for each age group a, we can write the total payments of type i as follows,

$$E_{i,b} = \bar{e}_{i,m,40,b} \sum_{a=0}^{110} \left(R_{i,m,a} P_{m,a,b} + R_{i,f,a} P_{f,a,b} \right) \tag{1}$$

Here $\bar{e}_{i,m,40,b}$ stands for the average payment i made for a 40 year old male. Inverting this equation will provide us with the quantity for $\bar{e}_{i,m,40,b}$. This will allow us to calculate the average payments i made for each age group a in each gender (m,f) at base year b. This relation can be represented by Equation 5,

$$\bar{e}_{i,j,a,b} = \bar{e}_{i,m,40,b} * R_{i,j,a} \tag{2}$$

Given 5, population counts and sensitivity of each payment type to output growth G, we can project total payments into the future for each t (for t = 0, … ,∞).

$$E_{i,b,t} = \left[\sum_{a=0}^{110} (1+Gg_i)^{t-b} \left(\bar{e}_{i,m,a,b} * P_{i,m,a} + \bar{e}_{i,f,a,b} * P_{i,f,a} \right) \right] \tag{3}$$

Denote $T_{l,t}$ as the total receipts l $(l=0,\ldots L)$ at time t, and NW_b as the net worth at base year. We can now calculate the GAP by using the relation that is given by Equation 7.

$$GAP_b = \left[\sum_{i=0}^{I} \sum_{t=0}^{\infty} (1+r)^{-t} E_{i,t} - \sum_{l=0}^{L} \sum_{t=0}^{\infty} (1+r)^{-t} T_{l,t} \right] - NW_b \quad (4)$$

Here, r stands for the discount rate.[3] We can set the horizon to be finite and also evaluate the finite horizon aspects of the fiscal policy. This is simply changing the horizon to some finite positive number. The time path for each consecutive finite number will provide us with the cumulative GAP. When we begin presenting results in the next section, we will also show that even in shorter horizons there is a sizable difference in estimates of GAP relative to the each component of GAP.

Results indicate that GAP performs better in analyzing the fiscal policy than methods used by Baker et al. (Method 1) and population projections (Method 2) incorporated separately. Moreover, this will be also true in shorter horizons. Finally, with the help of the cumulative budget balance, one can examine the short, medium and infinite horizon stance of the fiscal policy given the current conditions are unchanged.

4 Data

4.1 Population Projections

We obtained the population projections from the World Bank. There is no international migration and the population converges to 96.5 million by 2050. We also report the population for the ages 25 – 54 to represent the labor force and 55 plus to represent retirees at Figure (2). One can see that both of them have positive slopes. The base year for projections is mid – 1995. The average annual growth rate is computed from end-point data using an exponential growth model. The data is provided for five year age groups ranging from 0 – 4 to 75+ for both males and females in five year intervals (Bos, Eduard, M. T. Wu, E. Massiah, and R. Bulatao, 1994). The details are provided at Table 1. Without changing the distribution we use a linear approximation method to extend the data for each year and each age until 101 and assume that for the 75-

[3] Note that, GAP will be sensitive to the initial values for payments, receipts and net worth. This may bring up the question that the choice of base year may create a bias in the estimation. However, recall that the question of interest is whether the current fiscal policy is sustainable. Therefore GAP will be able to provide a precise answer for this particular question.

101 ages the number of people at each age is the same. We choose to use the World Bank data since projections are based on more recent base year and extend for a longer period of time. We provide the details of the linear approximation method in the Appendix 2.

4.2 Budget Revenues, Expenditures and Net Worth

Budget figures are from various sources for the period of 1990 to 2001. The consolidated budget figures are from the Undersecretariat of Treasury (UT). We use the consolidated expenditures from the consolidated budget and detail these figures by using two different databases. The macroeconomic aggregates of the Republic of Turkey State Planning Organization (SPO) are used to incorporate the *Health and Education Expenditures* into the consolidated budget. In addition, Payments to Social Insurance Institutions and to Unemployment Insurance Fund are from the databases of Ministry of Employment and Social Security (MESS) and Ministry of Finance (MF). Revenue data is gathered from the Department of Revenue (DR) of the MF.

All data represented in Turkish Lira's are converted into dollars using the average US dollar – Turkish Lira exchange rate for each year. The details of the Expenditures and Revenues of the government are presented in Table 2.

Net worth of the government can be calculated as follows: Privatization revenues (15 billion dollars)[4] plus gold reserves (1 billion dollars), Central Bank's official net foreign currency reserves (13 billion dollars)[5] and seigniorage revenues (10 billion dollars) minus total stock of public debt. This metric can be evaluated as the expected future taxes that government has to generate [6](Barro, 1974). For 2000, we calculate net worth as negative 78 billion dollars and for 2001 negative 127 billion dollars. This significant change is a result financial crisis in the year 2001. Due to the crisis, the maturity of domestic debt was reduced where as the real interest rate paid to debt increased. The growth rate of domestic debt stock exceeded the devaluation therefore we observe a sharp increase in the US dollar value of the domestic debt – from 54 to 84 billion dollars. On the other hand, to resolve crisis the Turkish government extended the stand – by agreement with the IMF and received additional loans which results in a slight increase in foreign debt from 62 to 70 billion dollars. On the other hand, during the process of the transition from managed floating to full floating of the exchange rate, the Central Bank of Turkey intervened in the foreign exchange markets to stabilize the currency which resulted in a reduction in the Central Bank reserves from 25 to 18 billion dollars. This sharp decline in

[4] Expected privatization revenues are included in this number. The data is obtained from Republic of Turkey Privatization Administration.
[5] This is an approximate figure excluding foreign workers accounts at the Central Bank.
[6] Assuming finite horizons.

the net worth necessitates stronger measures for fiscal policy since the government needs to generate greater revenues to close the GAP.

4.3 Revenues and Payments Profiles

The data for profiles are gathered by using different data sets from State Institute of Statistics (SIS) Consumer Expenditure Survey (HHGTHA) and SIS's 1994 Employment and Wages Survey. Profiles for Sales Taxes and Income Taxes are calculated through SIS sources. For Current Education Expenditures and Investment Expenditures on Education we use the Ministry of Education's dataset, National Education Numerical Data 2002-2003. From Ministry of Health (Basic Health Statistics) and State Planning Organization (Basic Economic Indicators) we gathered the data for Investment Expenditures on Health and Current Health Expenditures. The *Payments to Unemployment Insurance* profiles are constructed from the Republic of Turkey Employment Administration's Monthly Statistical Bulletin's (EA). The *Wealth Tax* profiles are constructed from the UT. Figure 3 presents the details of these profiles. Undersecretariat of Customs has databases for import duties where we create the profiles for *Import Taxes.* For some expenditures such as police, defense it is not possible to differentiate within the population. Same is true for some taxes, i.e. *Corporate Taxes*. For the revenues and payments that are not reported on Figure 3, we use flat profiles, i.e. even distribution, every age and gender group receive equal weight. Table 3 presents profiles that have flat distributions.

4.4 Productivity and Discount Rate

For the baseline case we will use a productivity rate of 3.3 which is calculated as growth rate of GDP per employment for the 1980 – 2001 period. This figure is almost the mid – point of the OECD (2.3) and WB (4.7) calculations. The discount rate will be 25.3 percent. This is the average of ex-post real interest rate that Treasury pays for domestic debt in the period 1999 – 2002 (Figure 1). To calculate the ex – post real interest rate we need inflation forecasts for the next few years. We use the government's inflation targets of 20, 10 and 5 percent that are expected for years 2003, 2004 and 2005, respectively.[7] Note that due to low maturity of domestic debt a majority of repayment is made in the years 2003 and 2004.

[7] Maturity figures are readily available at UT. I obtain the nominal interest rates for Treasury auctions from the Central Bank of Turkey. This rate is monthly weighted average of the nominal interest rate that is realized at the Treasury auctions in any given month. Taking the weighted average of the maturity of monthly auctions, one can calculate the maturity rate. Along with the inflation assumptions for the coming years, ex – ante real interest rate can be calculated for TL denominated debt. For foreign currency denominated debt, we assume that annual devaluation of TL against a basket of currencies will be equal to the inflation rate.

5 Revenues and Payments Elasticities

As one would guess, not all government revenues (taxes, incomes, fines etc.) and payments (expenditures, contributions, tax returns etc.) would not respond to the growth rate of the economy on a one to one basis. With a progressive income tax structure, revenues generated from income taxes should grow faster than the economy since tax payments at higher income groups would be higher due to increasing rates. On the other hand, the opposite is true for some government expenditures. Take personnel expenditures as an example, as the relative income of the public personnel deteriorates, as compared to private sector employees, a real increase would be demanded by public sector workers. We would expect that the raise would be less than or equal to the growth rate of the economy since the government is aiming at contractionary fiscal policy.

Nevertheless, not all expenditures should react to the growth rate of economy. As economic theory suggests that decisions of government expenditure results from political process and some of the expenditure items are exogenously determined by the government in power. However, goals of social welfare suggest that government's will provide at least the basics of social security regardless of the state of the economy, i.e. health and education expenditures, defense, crime and fire protection, etc. Therefore, we can expect that some of the expenditures are endogenously determined and would react to the state of the economy and the rest will be determined as a natural outcome of the political process and can be treated exogenous (not a function of the growth rate of the economy).

Although, some items of the consolidated budget would react to the growth rate of the economy they would also react to the state of the economy and the structure of the tax system (Barth and Hemphill, 2000). In an economy with persistent high inflation, the impact of the growth rate on tax revenues would be relatively less than in an economy with low inflation. The lag between the generation of tax liability and the actual payment of the liability creates this result. The same is true for tax exemptions, tax deductions and tax caps.

One measure to capture the relationship between the growth rate of the economy and the budgetary items is to calculate elasticity of the payments and expenditures with respect to the growth rate of the economy. We assume that income elasticity of revenues(expenditures) is a long term stable measure to be used for forecasts. In this respect, we will be using following equations to estimate the elasticities,

$$b_{i,t} = c + g_i y_{i,t} + u_t \qquad (5)$$

$$u_t \sim N(0,\sigma^2) \quad (6)$$

$b_{i,t}$ is the percentage change in the per – capita budgetary item[8], $y_{i,t}$ is the percentage change in the per – capita output growth, g_i is the elasticity of the budgetary item with respect to output growth, c is a constant and u_t is an i.i.d. error.

We obtained the detailed budgetary items from the databases of the UT and SPO. The population counts are from the World Bank and our own calculations.[9] We use annual data that is denominated in Turkish Lira terms for the period 1990 – 2001.

The results of the estimates are presented on Table 4 along with the standard errors and significance levels. One can observe that most expenditure items are not significant, despite their right sign. This can be explained by exogeneity of government expenditures as we argued above. However, some government expenditures turn out to be endogenous. *Payments to Social Security Institutions* and *Current Expenditures* have the right sign and significant at 10 percent level. Social security expenditures grow faster than the economy where as current expenditures are slower. The corresponding elasticities are *2.3* and *0.6*, respectively.

In order to deal with the exogenous expenditure items we assume that there exist a one-to-one correspondence with the growth rate of the economy.

On the revenues side, despite two outliers, elasticities move in the same direction as the growth rate of the economy. *Income Tax, Corporate Tax, Value Added Tax (VAT)* and *Additional Budget Income* have elasticities less than *one* and significant. As explained at earlier paragraphs, due to Turkey's high and persistent inflation levels the, revenues do not grow as fast as the economy and in this case government ends up paying the "Inflation Tax" by sacrificing from revenues.[10] *Vehicles Purchase Tax, Stamp and Custom Duties* and *Import VAT*

[8] Note that per – capita budgetary item is only considering the portion of the population that this item refer to, i.e. if it is an education expenditure then average education expenditures per student are calculated, in this case those in the age group of four to twenty – five.

[9] Details are provided at Appendix 2.

[10] Although, Turkey does not exercise inflation accounting, the lag between the determination of liability and the actual payment of the taxes, exemptions and deductions have greater impact on the taxes paid by the private sector. Also, private sector benefits from frequent approval of pardon laws for late tax payments. The recently elected

have elasticities greater than *one*. This is an indication that during economic booms imports are growing faster than the economy.

The rest of the revenue items are insignificant. For those items, we will be using the Department of Revenues (DR) elasticity estimates. The results of DR estimates are presented on column 4 of Table 4. Note that our estimates are smaller than the DR estimates. Using only output growth would result in a negative bias and this can be because of omitted variables in Equation 1. Therefore, we need to be careful in the interpretation stage of our results.

6 Profiles

In order to introduce population dynamics into our calculations, we need to incorporate the relative contribution of population counts in every age and gender groups to consolidated budget. For example let's consider education expenditures. Those who will benefit from education expenditures are the ones within age groups four through twenty – five. More precisely from pre – school to graduate school. Assume that profiles do not change over time. Therefore, government expenditures (revenues) will change with respect to the change in the number of people that are within the schooling age. Therefore, the level of expenditures (revenues) will be different in 20 years from now depending on the number of people in and out of expenditure (revenue) groups.

The following formula is used to calculate the profiles. For an expenditure (revenue) type *i*, gender *j* and age *a*, denote relative profile as $R_{i,j,a}$.

$$R_{i,j,a} = \frac{\begin{array}{c}Average\ payments\ (receipts)\ i\ (j)\ made \\ for\ (received\ \ from)\ gender\ \ j\ group\ a\end{array}}{\begin{array}{c}Average\ expenditure\ i\ made\ \ for \\ a\ 40\ \ year\ old\ male\end{array}} \tag{7}$$

For social insurance profiles the denominator is chosen to be the average payments made for a 55 year old male and for education expenditures it is chosen to be the average payments made to a 15 year old male.

For some payments such as defense, police etc. and some receipts such as corporate taxes it is hard to differentiate between the relative contributions of each gender in each age group. Those profiles are distributed evenly across the

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government is considering passing a law to pardon all the late and unpaid tax liabilities which adds up to approximately 2 billion dollars.

population. The expenditures and receipts that we use even profiles are presented in Table (3).

We present Profiles in Figure (3). The latest published data are used to calculate profiles and we assume that it will stay constant for the infinite horizon for baseline calculations. We are aware that government policies may change profiles in the future, however, one can easily incorporate updated figures into calculations.[11]

7 Results

7.1 GAP in the pre – financial crisis era

We being our analysis with the comparison of our GAP measure with the Baker et al.'s and individual elasticity forecasts. Baker et al. incorporate only the population dynamics into forecasts. On the other hand, elasticity forecasts incorporate only elasticities into the calculation of GAP. The results are presented in Figure (4a). We take the year 2000 as the base year with a net worth position of negative 78.0 billion dollars. Later, the choice of the year will allow us to compare the impact of the crisis of 2001 on GAP which is presented in the following section. The figure is the cumulative representation of the GAP over the course of next 50 years.[12] Therefore, end point of each curve corresponds to the GAP in the infinite horizon.[13] Calculations made with Baker et al's methodology result in a negative 2.3 billion dollars of GAP, whereas forecasts by using elasticities present a negative 1.2 billion dollars of GAP. However, GAP that integrates these two components records a negative GAP of 14 billion dollars (Table 5). The results indicate a significant difference between our measure and Baker et al and elasticity measures'. Nevertheless, the difference is also significant in the short – term. The response of each item to the growth rate of the economy plus the population – profile dynamics build extra structure in the model. These in turn presents an intertemporal budget surplus.[14] Initial results indicate the following: given that current conditions prevail in the future,[15] fiscal policy used by the government is contractionary. This in turn suggests that government in the long run has flexibility in loosening the fiscal policy.

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[11] In Appendix 3, we present a linear approximation method to smooth the calculated profiles.

[12] Add up each period's budget balance to the previous period's budget balances.

[13] The calculations are made until the year 2200 which are approximated by year 2050.

[14] As argued before population dynamics play an important role in the longer term. The contribution of population dynamics to forecasts using elasticities contributes significantly. This in turn provides a more accurate estimate of GAP.

[15] We assume that relative price effects are zero.

The cumulative GAP states that for the baseline case – growth rate of 3.3 and discount rate of 25.3 percent – majority of dynamics come in the first 10 to 15 years of the projections. The high rate of discount is the main determinant of this result. One would easily guess that a lower discount rate will result in the increase in the impact of future developments therefore population dynamics on the GAP.

Changes in the current expenditure dominate the expenditure side dynamics. The contributions of each item to total expenditures and revenues for the years 2000 and 2050 are presented in Table 6. We observe that 33 percent of year 2000 expenditures are coming from current expenditures. Note that, since current expenditures have a flat profile, the population growth rate is the only determinant in dynamics. Population in the 50 year period grows almost by 1 percent. We can restate this as an increase in the growth rate of the economy by an additional percentage point. However, in 2050 current expenditures constitute only 7 percent of the total whereas social security expenditures (sum of payments to Social Security Institution, Civil Servants Pension Fund and Self-Employed People Insurance Fund) contribute 72 percent of expenditures. This is a significant increase from its 2000 share i.e. 12 percent. Aging population and young retirement age will be the main determinant for expenditures in the future.

Due to the way we construct estimates, each item's growth rate can be decomposed into its responsiveness to growth rate and population dynamics in the age group that pays (benefits) from the item. The growth rate of pension payments is more than four times the growth rate of the economy. Half of this effect is generated by the elasticity component and the other half is coming from the growing percentage of older people in Turkey's population in the next 50 years. Notice that, high discount rate significantly reduces the contribution of future pension payments to GAP. We predict that dynamics of the second half of the 2000 – 2050 period will become more pronounced with the use of lower discount rates.

On the revenues side, the short – run dynamics are dominated by movements in the income tax, VAT, Petroleum Tax and VAT on Imports. These items constitute 52 percent of total revenues in 2000. We predict that, interest income tax and excise consumption tax, which are mainly paid by older people, will be the main determinants of revenues in the longer term. Note that, the latter two items grow faster than the expenditures. Therefore, the impact of these items will be very significant on the overall GAP with lower discount rates.

To demonstrate the last point take 15 percent discount rate. This is a 10 percent reduction from its 25.3 percent level. This rate is more realistic for the Turkish

economy since it excludes the crises periods.[16] The result of the projections is presented on Figure (4b). We observe negative and a very significant improvement in the GAP. The GAP is now negative 141 billion dollars. Although this is the case, one cannot compare these two figures of budget surpluses. Note that although there seems to be a very significant difference between the two periods there will be significant growth that would be associated with lower discount rates. To make the comparison, we need to normalize these two figures with intertemporal GDP (IGDP). With higher discount rate the GAP and is 1.3 percent of the IGDP whereas lowering the discount rate improves this figure to negative seven percent.

Two main results that arise from our initial estimates are as follows; first, as expected discount rate plays an important role in determining the relative contribution of budgetary items to the GAP. Second, current stance of fiscal policy is contractionary and this point is more pronounced with lower discount rates. At some point the government is urged to loosen the fiscal policy. To further investigate this we present Table 5. Fourth column of the Table also presents the degree of possible looser fiscal policy that can be accommodated to balance the GAP. Total revenues can be decreased by four percent or all expenditures can be increased by 5.4 percent. On the other hand, government can choose to aim at reductions in some of the revenue and expenditure items. An adjustment of 17.6 percent in current expenditures will be needed to close the GAP. On the revenues side, 7.8 percent reduction in income tax rate (that corresponds to a decrease in income tax collection by 25.9 percent) or a 4.8 percent reduction in VAT (which correspond to a 32.1 percent reduction in VAT collection) will eliminate the GAP.[17]

7.2 Financial Crisis and the GAP

The results presented in the previous section are very optimistic about the stance of fiscal policy. However, one has to be careful in interpreting these results. Net worth of the government is highly sensitive to financial stability. For an emerging market like Turkey with multiple episodes of financial crises and high debt of the public sector, net worth position of the government changes frequently. This section will make it clear to the reader that with a sharp reduction in net worth results should be reinterpreted.

Consider taking 2001 as the base year for our calculations. Assume that growth rate and discount rate are 3.3 and 25.3 percent, respectively. Different from the base year 2000, in 2001 we calculate the net worth to be negative 127 billion dollars. This number is 49 billion dollars less than the year 2000. The difference

[16] As of October 2003, expected real interest rate on domestic debt is 13.5 percent.

[17] We assume that average income tax rate is 30 percent and average VAT rate as 15 percent.

is mainly due to the sharp increase in the value of the domestic debt from 54 to 84 billion dollars.[18] The reduction in Central Bank reserves by 7 billion dollars and increase in foreign debt by 8 billion dollars adds up to the rest of the change.[19] In light of these facts, GAP is 57 billion dollars (Table 5). In year 2000 terms the GAP is 45.5 billion dollars. Figure 5 presents the change from the year 2000 to 2001. Note that, if we exclude debt in the year 2000, GAP is negative 92 billion dollars where as this figure changes to 70.4 billion dollars in the year 2001. However, some part of this difference is due to high rate of devaluation of the Turkish Lira against the US dollar and some part is due to the use of less conservative fiscal policy. The latter point is important since it is the opposite of the one would expect. In the short-run the government has attempts to employ conservative fiscal policy. However, in the long run this results in looser fiscal policy due to not considering population dynamics. Adjusting for the devaluation we can compare the fiscal policy between the two years.[20] In both of the years fiscal policy aims at a primary surplus.[21] In 2000 and 2001 budget runs a surplus of 12.1 and 10.6 billion dollars, respectively (Table 2). Moreover, we observe that there is a reduction in all expenditures and revenues in US dollar terms, adjusting for the devaluation still reflects the same outcome.[22] This is also a further evidence of loose fiscal policy during the crisis year.

In this respect to eliminate the GAP, government has to aim an increase in all revenues by 21.3 percent or a 28.9 percent reduction in all expenditures (Table 5). Current expenditures have to be reduced to zero in order to eliminate GAP or dramatic increases in the tax rates will be needed to achieve a zero GAP. Note that an increase in average VAT rate from 15 to 39 percent or an increase in average Income Tax rate from 30 to 63 percent will eliminate the GAP. These are dramatic changes in the tax rate and one cannot guarantee that a sharp increase in tax rates will increase revenue.[23]

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[18] A sharp increase in real interest rates resulted in sharp increase in the domestic debt stock in US dollar terms.

[19] Central Bank reserves decreased from 25 to 18 billion dollars and foreign debt increased from 62 to 70 billion dollars.

[20] Inflation rate in the year 2001 is 89 percent whereas devaluation of the Turkish Lira against the US dollar is 96 percent. This implies that TL depreciated against the US dollar by 4.2 percent in real terms. This result is due to the assumption that inflation equals the devaluation rate.

[21] Primary balance is the budget balance excluding the interest payments on debt.

[22] Same is true if inflation adjustment is made on TL denominated items.

[23] In 1999, the government's belief was that tax rate's fall onto the downward sloping section of the "Laffer Curve". Therefore, a reduced income tax rate would increase tax revenue. As predicted this attempt increased tax revenue significantly.

Similar pattern for the composition and time path of the composition of revenues and expenditures are observed. The results are presented on column 3 and 4 of Table 6. Pension payments do contribute more in the later half of the projection period and contributions of income tax, VAT, Petroleum tax and VAT on imported goods drop dramatically. Note that as opposed to the year 2000 estimates, interest income tax does not have a significant jump. This should be attributed to the reduction in the tax rates on interest income in 2001 due to change in the Tax Law.

As expected reductions in the discount rate improves the GAP. A negative GAP of 21.6 billion dollars is estimated with 15 percent discount rate. We will provide the details of a different discount rate – growth rate combinations for the year 2001 in the following section.

7.3 Sensitivity Analysis

By now, it should have been clear that high rate of discount in the economy worsen the GAP. On the other hand, lower growth rate of the economy will contribute to the deterioration of the GAP. This section will try to answer the following question. What is the response of GAP to different discount and growth rates. Table 7 presents the answer. We assume that lower bound for growth rate to be one percent and the upper bound to be four percent. For discount rate, we assume that lower bound is five percent and upper bound as the current discount rate. The choices are arbitrary, however, for an emerging economy like Turkey they are not unrealistic. We refer the reader to re – examine Graph 1 for the outlook for the Turkish economy.

The most interesting part of the Table is the importance of discount rates on the GAP. It is more pronounced than the effect of the growth rate. The significant change is obtained for the discount rates at 15 percent level. A high growth rate and a reduction in discount rate to 15 percent represent dramatic improvements in the GAP. For growth rates above 2.5 percent, we obtain a negative GAP (a surplus in intertemporal budget). Lower growth rates have to be accompanied by adjustments in the fiscal policy. The highest GAP is 22.2 billion dollars with 15 percent discount rate and this estimate is significantly lower than the baseline estimate of 57 billion dollars.

8 Conclusion

Fiscal labeling is irrelevant in explaining the stance of the fiscal policy. A more comprehensive method is needed to determine the net budgetary position of the government in the infinite horizon. However, estimation of such a budget requires strong assumptions about the future. The dynamics are tractable given the assumptions of the model. This paper attempted to construct an GAP for the

government and described the fiscal policy options that the government is facing.

Construction of an GAP necessitates a stable relationship between the budgetary items and the output growth. Assuming a growth rate and requiring that this stable relationship will be constant for the projection period we are all set with the first component of the GAP. The second component is the population – profile dynamics. One needs to know, ceteris paribus, how much expenditures (revenues) will be made (received) to (from) different age groups during the projection period.

By using the information generated by elasticity estimates and population – profile dynamics we find out that the modified GAP is a better measure than using the two components individually. The choice for the discount rate influences the results significantly. For an aging society population – profile dynamics are important in the longer term. Therefore, a high discount rate leads to the loss of information in the longer horizon. Lowering the discount rate introduces the future population developments into the estimates.

Based on this result, we examined the case of Turkey before and after the financial crisis in 2001 with different assumptions for discount and growth rates. It is clear that the financial crisis worsen the debt position of the government. This in turn results in a lower initial point for the government's cumulative GAP. In the infinite horizon we can observe a significant deterioration of the GAP for the baseline case. If the baseline case is prevail in the economy, the government has to tighten fiscal policy to eliminate GAP. On the other hand, The government can take measures to lower the real interest rate that is paid to the debt. We found that with lower discount rates GAP presents improvement and in some growth – discount rate pairs a fiscal loosening would be needed. One suggestion would be the substitution for domestic debt with foreign debt. By eliminating risks associated with domestic currency (such as inflation and devaluation), Turkish government can borrow at a lower rate in terms of foreign currency. However, we are aware that a devaluation of the domestic currency would increase the Turkish Lira size of the domestic debt.

Although results are promising, they have to be interpreted carefully. One needs to re – estimate profiles and elasticities and incorporate population projections in every new information arrival. Therefore, a more realistic estimate can be constructed. In this respect, the GAP will be a very powerful tool for a policy maker. It will allow the policy maker to observe implications of changes in the expenditure and revenue policies today over the longer horizon of fiscal stance. Also, even though the government is not willing to change the fiscal policy, it can take other measures to achieve different interest and growth rates which will ultimately affect the GAP.

Appendix 1 – An Example on Irrelevance of Fiscal Labeling

Consider an emerging economy aiming at improving the quality of labor force in a country. The government, to achieve this goal, is planning to change the primary school system. This change will involve an increase in the number of years of primary school education from five to eight years. The government enjoys budget balance when it decides to implement the reform. The total cost of the reform is 1 billion dollars. To finance the cost, government asks for credit from the World Bank (WB) in favorable terms. WB issues the credit of 1 billion dollars to be repaid after 5 years without any principal and interest payment in between. In addition, let's assume that the credit is very favorable that interest rate charged over the five year term is ten percent. The government implements the reform right away. At the end of the five year term the principal plus interest payment will be 1.1 billion dollars.

When we examine this transaction on budget accounts of the government we see that due to the education expenditures at time *t*, it reports a budget deficit of 1 billion dollars. Assume that the government is very prone in keeping the budget balance at all times. For *t+1* to *t+4* government reports a budget balance. At *t+5* since it will repay the loan to WB it decides to finance the repayment by imposing lump-sum taxes equivalent to 1.1 billion dollars. At the end of period *t+5* a budget surplus of 1.1 billion dollars is reported.

Rather than looking at temporal budget, the government can do better by choosing to report intertemporal budget balance for the years *t* to *t+5*, simply by consolidating the net debt to the budgetary figures.

This simple example demonstrates that a more comprehensive and intertemporal budget measure works better in explaining the stance of the fiscal policy. On the other hand, the government can also announce the timing of the taxes (*t+5* in this case). Those who will be alive at t+5 will be the ones who are going to bear the burden of the taxes.

Appendix 2 – Linear Approximation Method for Population Projections

World Bank Reports the Population Projections data for 5 year intervals for 5 year age groups. We calculate the growth in population for each age group on an annual basis we use a linear growth model for each 5 years. Denote $P_{t,a}$ as the Population at time t to for age group a and use the following formula,

$P_{t,a}$ = Population at year t for age group a.

$$D_{t+4} = \frac{(P_{t+4,a} - P_{t,a})}{5} \tag{8}$$

For $t+1$ to $t+4$

$$P_{t+1,a} = P_{t,a} + D_{t+4} \tag{9}$$

Between age groups the distribution is more complicated. Take an age group 5 – 9. Denote the total number of people in age group g at time t as $T_{t,g}$.

$$B_{t,g} = \frac{T_{t,g}}{5} \tag{10}$$

and use $B_{t,g}$ this number as the mid – point for the age group g i.e. age 7 in this case

$$d_{t,g} = \frac{(B_{t,g+4} - B_{t,g})}{5} \tag{11}$$

for $g+1$ and $g+2$

$$B_{t,g+1} = B_{t,g} + d_{t,g} \tag{12}$$

$$d_{t2,g} = \frac{(B_{t,g+9} - B_{t,g+5})}{5} \tag{13}$$

for $g+3$ and $g+4$

$$B_{t,g+3} = B_{t,g+2} + d_{t2,g} \tag{14}$$

In this respect, without changing the number of people in each age group we obtain number of people at each age.

Appendix 3 – Approximation to a Higher Order Polynomial

Profiles in their raw form are step functions. Payments in government accounts are reported in age groups rather than per age. In addition, since we do not have detailed data for the people over 55 for most cases, we distribute the population evenly for the 55+ age groups. Therefore, one can observe sudden jumps in the raw profiles. Therefore, we choose to approximate the profiles through a higher order polynomial.

There are two steps involved in the construction of the profiles, approximate the data through a higher order polynomial and secondly after comparing with the original data truncate the tails.

Least squares method is an easier one to implement the first step. Consider the following regression,

$$y_t = a + bf(x) + e_t \tag{15}$$

here y_t is the step function for profile, a is a constant, b is a matrix of coefficients, $f(x)$ is a higher order polynomial and et is the i.i.d. error. Running this regression and obtaining the fitted values for y_t will provide us with our curve. We take the coefficient of determination as the benchmark for the choice of $f(x)$. The threshold for coefficient of determination is 80 percent.

Second step is to plot the fitted values for y_t and the raw data and truncate the tails. This will provide us with the smooth profile figures which are presented on Figure 3.

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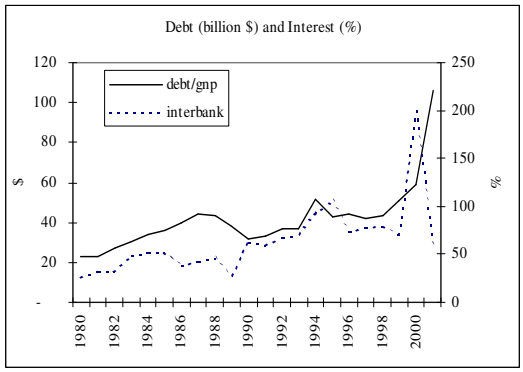
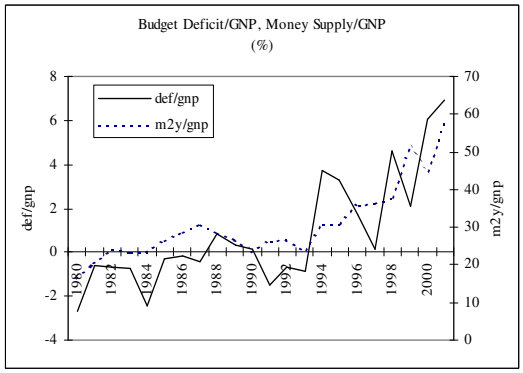
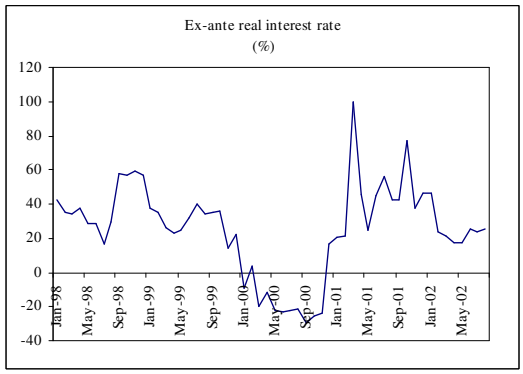
Figure 1

Macroeconomic Developments
1980 – 2001







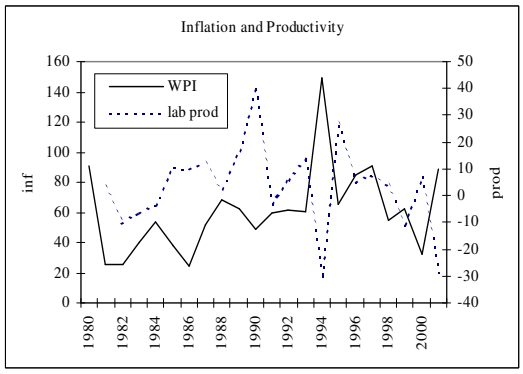


Figure 2

Population Dynamics (millions)

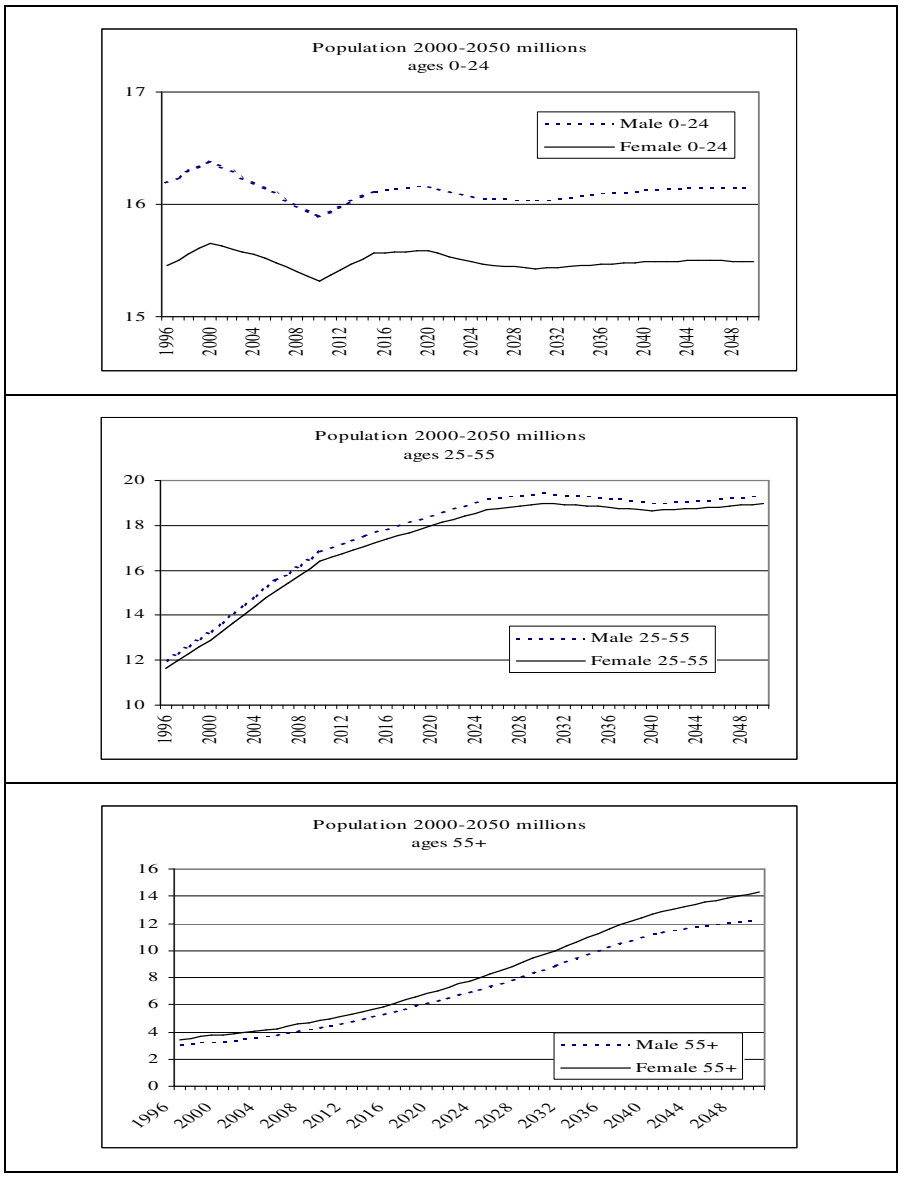
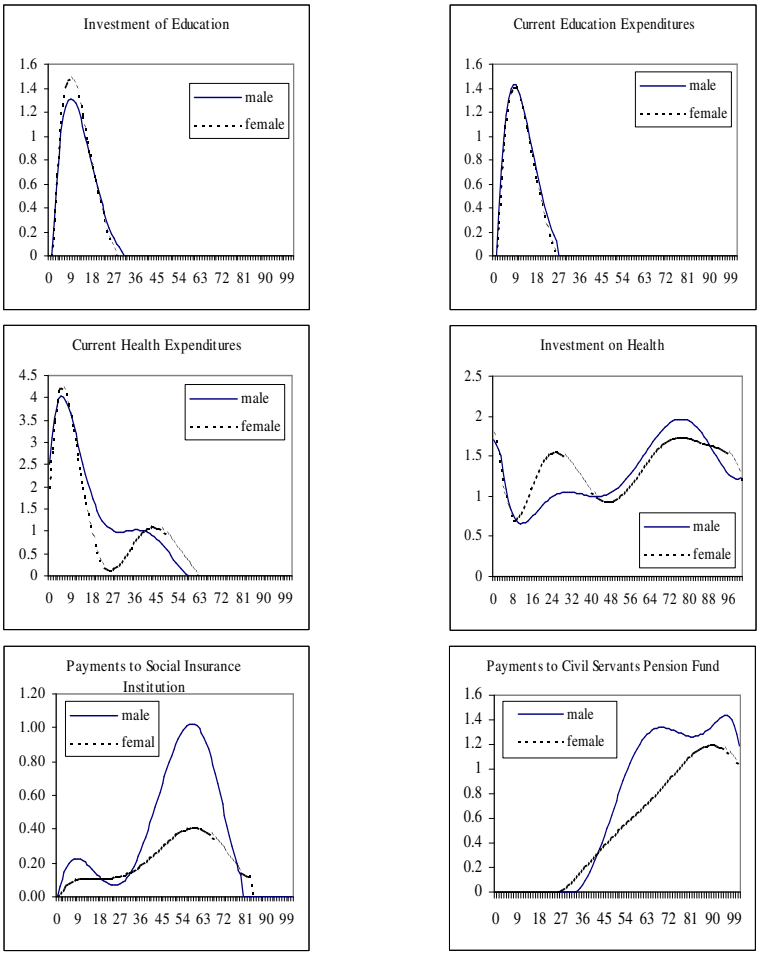


Figure 3

Profiles



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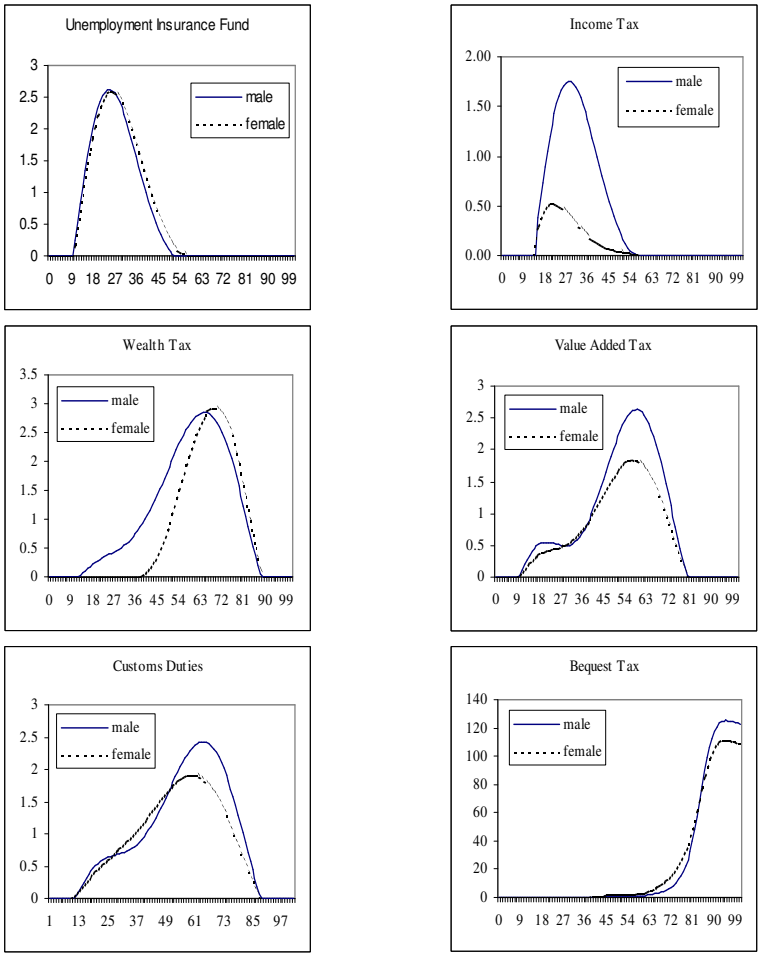

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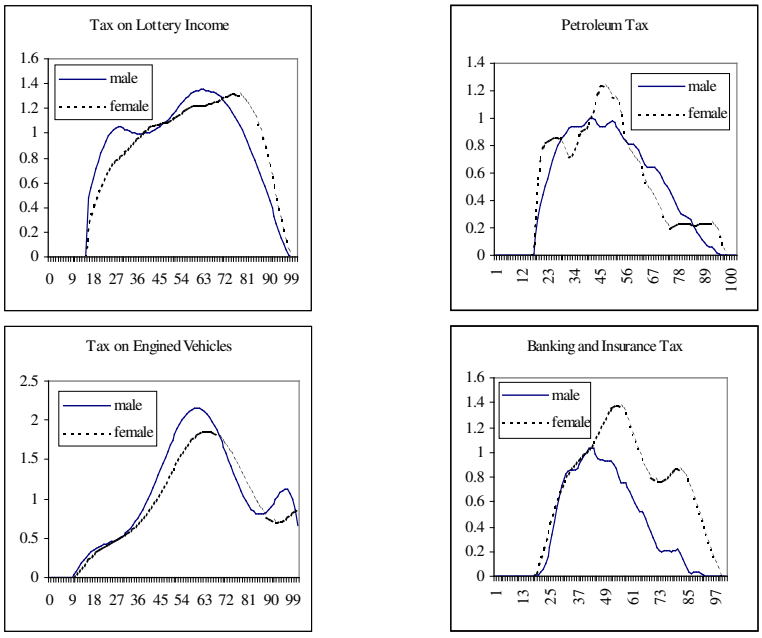

Figure 4(a)

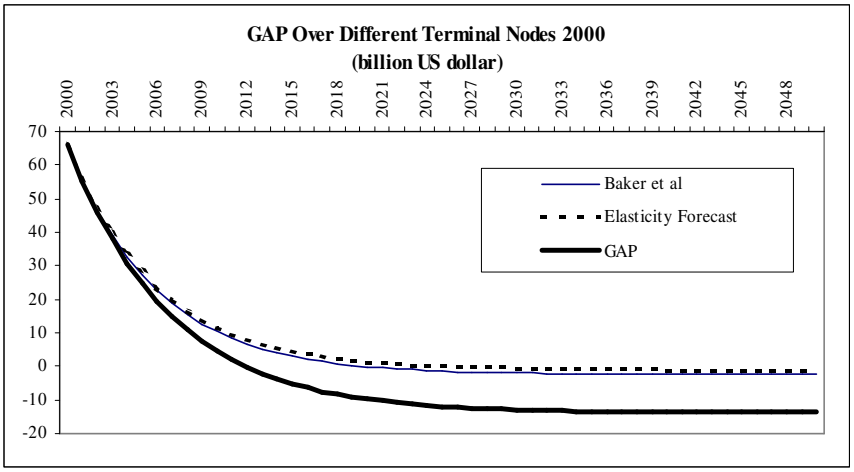

Figure 4(b)

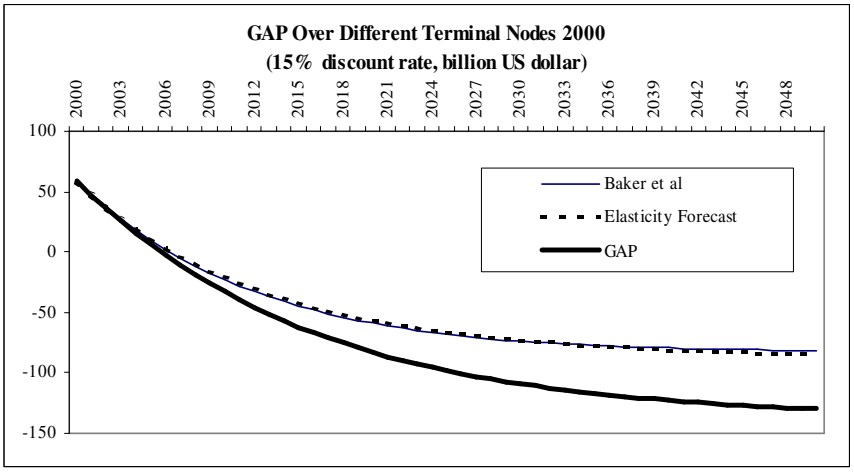

Figure 5

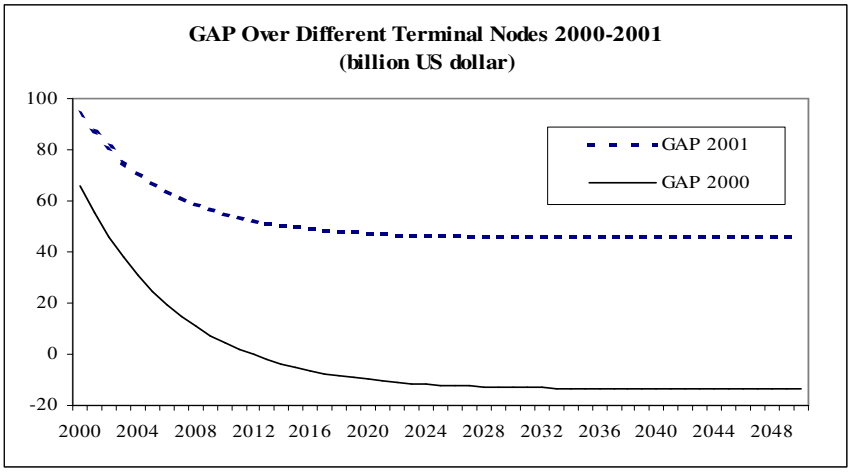
GAP Over Different Terminal Nodes 2000-2001
(billion US dollar)
100
80
60
40
20
0
-20
2000
2004
2008
2012
2016
2020
2024
2028
2032
2036
2040
2044
2048
GAP 2001
GAP 2000

Table 1

Population Dynamics*

	2000-05	2005-10	2010-15	2015-20	2020-25	2025-30	2030-35	2035-40	2040-45	2045-50
Male population	35,197	37,207	39,108	40,913	42,583	44,067	45,326	46,355	47,176	47,831
Female Population	34,591	36,683	38,683	40,604	42,428	44,098	45,566	46,819	47,855	48,724
Growth rate	1.3	1.1	1	0.9	0.8	0.7	0.6	0.5	0.4	0.3
Birth rate[1]	19.8	18.1	17	16.1	15.6	15	14.5	14	13.6	13.4
Death rate[1]	6.6	6.7	6.7	6.8	7.2	7.7	8.4	9	9.7	10.2
Rate of natural increase[1]	1.3	1.1	1	0.9	0.8	0.7	0.6	0.5	0.4	0.3
Total fertility rate[2]	2.2	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Net reproduction rate[3]	1	1	1	1	1	1	1	1	1	1
Life expectancy at birth[4]	70.1	71.3	72.4	73.5	74.1	74.7	75.3	75.9	76.6	77.3
Life expectancy at age 15[5]	58.3	58.9	59.6	60.3	60.8	61.3	61.8	62.3	62.8	63.3
Infant mortality rate[6]	31	26	22	18	17	15	14	12	11	10
Under-5 mortality rate[7]	38	31	26	22	20	18	17	15	14	12
Dependency ratio[8]	50.7	48	45.6	45.2	46.1	48	49.8	53	56.6	59.6

Source data: Bos, Eduard et. al.

**Male and Female population are in millions.*

(1) The number of live births and the number of deaths occurring per year per 1,000 midyear population.

(2) The difference between birth and death rates is the *rate of natural increase* (expressed in this table as per 100).

(3) The difference between immigration and emigration per thousand population.

(4) Number of children that would be born to a woman if it were to live to the end of her childbearing years and bear children in accordance with prevailing age-specific fertility rates.

(5) Number of daughters a woman will bear during her lifetime, assuming fixed age-specific fertility and mortality rates.

(6) Number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.

(7) Number of years a 15 year-old would live if prevailing patterns of mortality were to stay the same throughout its life.

(8) Number of infants who die before reaching one year of age, per 1,000 live births in a given year.

(9) Probability that a new born will die before reaching age 5, if subject to current age-specific mortality rates.

Table 2

Government Revenues and Expenditures
(million dollars)

Expenditures	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*
Current Expenditures	10,487	13,805	12,116	13,732	13,905	10,220
Current Education Expenditures	3,861	3,224	6,411	6,644	6,390	4,915
Current Health Expenditures	1,374	1,205	1,266	1,346	1,447	1,447
Investment Expenditures	2,180	2,711	2,436	2,209	2,547	2,321
Investment on education	676	993	1,202	1,218	1,151	793
Investment on Health	62	169	177	230	256	256
Transfers to SEEs	615	811	611	990	1,417	977
Other Transfers	2,061	2,540	1,569	2,346	3,196	1,209
Public Participations	306	1,183	115	419	397	418
Tax Rebates	1,286	1,636	2,060	2,753	2,609	2,375
Payments to Civil Servants Pension Fund	1,461	1,967	1,963	2,457	2,838	2,136
Payments to Social Insurance Institution	1,789	2,210	1,723	2,623	640	594
Payments to Self - Employed Insured People Fund	859	806	1,661	1,448	1,680	1,169
Unemployment insurance fund	-	-	-	-	-	260
Fund Appropriation	2,922	4,218	2,646	2,658	3,374	2,915

Revenues	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*
Declared Income Tax	793	729	1,106	1,141	552	394
Lump-sum tax	115	111	114	7	17	22
Income Tax collection	7,039	8,694	9,635	9,452	9,066	8,836
Income Tax Law G.Al.G.V.	334	307	331	263	288	174
Government bonds and Treasury bill interest	-	-	2,119	859	15	-
Declared Corporate Tax	1,177	1,364	1,376	1,194	636	561
Corporate Tax	96	94	271	113	40	29
Corporate Tax Inclusive	0	-	-	-	-	-
Corporate Tax Law G.Al.G.V.	1,020	1,122	1,213	2,372	3,094	2,402
Excise Income Tax	-	-	-	51	153	5
Interest Income Tax	-	-	-	0	2,624	311
Excise Corporate Tax	-	-	-	71	316	3
Tax on engined vehicles	207	213	252	300	322	325
Bequest Tax	23	19	26	25	21	18
VAT	5,137	5,650	6,073	5,778	7,178	5,934
Excise consumption tax	525	380	268	343	852	668
Tax on vehicle purchases	445	508	490	485	687	247
Petroleum tax	3,725	4,182	4,088	5,338	5,228	4,607
Banking and Insurance transactions tax	699	753	1,204	1,107	1,373	1,230
Stamp duties	703	806	920	845	1,127	679
Other income	665	744	738	593	726	637
Private communication tax	-	-	-	0	665	482
Private transactions tax	-	-	-	19	340	280
Custom duties	665	733	642	555	612	309
Import VAT	3,969	4,594	4,341	4,110	6,225	4,192
Ports duty	14	15	20	16	18	16
Corporate revenues and public share	68	282	241	316	443	440
Public Ownewships Income	1,016	1,420	3,190	2,258	2,477	3,656
Interest Exception Tax	364	368	459	918	1,020	427
Fines	344	472	604	652	713	755
Various Revenues	169	112	175	328	474	557
Income generated by Competition Board, RTÜK, ISE and	-	-	-	-	449	188
Funds	3,232	3,414	3,537	3,573	3,492	2,360
Education private income	-	-	664	766	552	476
Paid miltiary income	-	-	-	-	452	31
Other income	189	358	329	325	384	371
Additional Budget Income	-	152	963	749	1144	545

Source Data: Republic of Turkey Undersecretariat of Treasury, State Planning Organization, Ministry of Employment and Social Security

Table 3

Revenue and Expenditure Items Assumed to Have Flat Distributions

Revenues	Expenditures
Lump-sum tax	*Current Expenditures*
Declared Corporate Tax	*Investment Expenditures*
Corporate Tax	*Transfers to SEEs*
Corporate Tax Law G.Al.G.V.	*Other Transfers*
Excise Corporate Tax	*Public Participation's*
Excise engined vehicles tax	*Tax Rebates*
Excise property taxes	*Fund Appropriation*
Banking and Insurance transactions tax	
Other income	
Private communication tax	
Private transactions tax	
Abolished tax excises	
Corporate revenues and public share	
Public Ownership's Income	
Fines	
Various revenues	
Income generated by CB, RTÜK, ISE and CMB	
Private revenues	
Funds	
Education private income	
Paid military income	
Additional Budget Income	

Table 4

Elasticity of Growth Rate of Per – Capita Budgetary Items w.r.t. Per – Capita Output Growth

	g_i	$\sigma(g_i)$	*Prob.*	R^2	*D. of Rev.*[1]
Current Expenditures	*0.58	0.24	0.04	0.63	*n.a.*
Current Education Expenditures	0.28	0.64	0.68	0.14	*n.a.*
Current Health Expenditures	0.08	0.28	0.79	0.09	*n.a.*
Investment Expenditures	0.19	0.58	0.75	0.11	*n.a.*
Investment on education	*0.97	0.57	0.12	0.49	*n.a.*
Investment on Health	0.11	1.62	0.95	0.02	*n.a.*
Transfers to SEEs	-1.18	1.34	0.40	0.28	*n.a.*
Other Transfers	0.33	1.37	0.81	0.08	*n.a.*
Public Participations	-0.38	3.14	0.91	0.04	*n.a.*
Tax Rebates	0.14	0.47	0.76	0.10	*n.a.*
Payments to Social Security Institutions	*2.26	0.65	0.01	0.76	*n.a.*
Fund Appropriation	0.93	2.20	0.69	0.16	*n.a.*
Income tax	0.74*	0.43	0.12	0.50	1.10
Corporate Tax	0.84*	0.39	0.06	0.58	0.93
Tax on Engined Vehicles	0.28	0.24	0.28	0.36	1.32
Bequest Tax	0.21	0.69	0.77	0.10	2.49
Value Added Tax (VAT)	0.68*	0.15	0.00	0.84	1.14
Excise Tax	1.65	2.71	0.56	0.20	3.26
Vehicle Purchase Tax	1.65*	0.84	0.08	0.55	1.28
Petroleum Tax	1.10	0.66	0.13	0.49	1.65
Banking and Insurance tax	0.63	0.46	0.20	0.42	1.28
Stamp Duties	1.19*	0.29	0.00	0.80	1.04
Various Revenues	1.32*	0.32	0.00	0.81	1.15
Custom Duties	2.00*	1.05	0.09	0.54	*n.a.*
Petroleum import Tax	4.26	5.22	0.44	0.26	1.17
One time tax	-1.27	1.28	0.35	0.32	0.31
Import VAT	1.12*	0.33	0.01	0.75	1.21
Other Foreign Trade Income	-1.23	1.79	0.51	0.22	1.12
Corporate revenues and public share	0.97	1.76	0.60	0.18	*n.a.*
Public Ownership's Income	2.22	1.58	0.19	0.43	2.03
Interest Exception Tax	1.84	1.48	0.25	0.38	2.14
Fines	0.70	0.81	0.41	0.28	1.48
Various Revenues	-1.65	1.52	0.31	0.34	1.64
Funds	0.75	1.04	0.49	0.23	1.43
Other Income	1.13	0.84	0.21	0.41	1.27
Additional Budget Income	0.69*	0.41	0.13	0.49	1.01

Source data: Author's own calculations.
* significance at 10% level
[1] Department of Revenue of the Ministry of Finance of the Republic of Turkey estimates

Table 5

Intertemporal Budget Gap (GAP) and Percentage Change Needed to Close the GAP

	billion dollars			percentage change	
	2000	*2001*	*2001**	2000	2001
Total Revenues	350.1	267.7	213.6	4.0	21.3
Total Expenditures	-258.2	-197.2	-157.4	-5.4	28.9
Net Worth	-78.0	-127.5	-101.7	-	-
Intertemporal Budget Gap	13.9	-57.0	-45.5	-	-
Current Expenditures	78.8	57.8	46.2	17.6	-98.6
Current Education Expenditures	36.7	28.2	22.5	37.9	-202.2
Current Health Expenditures	8.5	8.5	6.8	163.8	-673.3
Investment Expenditures	15.4	14.0	11.2	90.2	-406.9
Investment on education	6.6	4.5	3.6	211.3	-1259.6
Investment on Health	1.5	1.5	1.2	897.5	-3685.8
Transfers to SEEs	8.6	5.9	4.7	162.2	-966.3
Other Transfers	19.3	7.3	5.8	71.9	-781.1
Tax Rebates	16.6	15.1	12.1	83.6	-377.5
Payments to Civil Servants Pension Fund	24.2	18.2	14.5	57.4	-313.8
Payments to Social Insurance Institution	5.5	5.1	4.0	254.9	-1128.8
Payments to Self - Employed Insured People Fund	14.3	9.9	7.9	97.0	-573.4
Unemployment insurance fund	0.0	1.5	1.2	n.a	-3722.2
Fund Appropriation	20.2	17.4	13.9	68.9	-327.8
Income Tax collection	53.7	52.3	41.7	25.9	109.0
Corporate Tax Law G.Al.G.V.	18.2	14.1	11.3	76.1	403.1
Interest Income Tax	23.0	2.7	2.2	60.4	2093.4
VAT	43.3	35.8	28.6	32.1	159.4
Excise consumption tax	8.8	6.9	5.5	158.5	831.6
Petroleum tax	34.0	29.9	23.9	40.8	190.4
Import VAT	40.4	27.1	21.7	34.4	210.1
Public Ownerships Income	17.9	26.4	21.1	77.5	216.0
Funds	22.7	15.3	12.2	61.3	372.9

Source data: Author's own calculations.

Table 6

Percentage Contribution of Items to Total Expenditures and Total Revenues

	2000		2001	
	2000	*2050*	*2001*	*2050*
Current Expenditures	0.33	0.07	0.24	0.05
Current Education Expenditures	0.15	0.05	0.12	0.04
Current Health Expenditures	0.03	0.01	0.03	0.01
Investment Expenditures	0.06	0.03	0.06	0.02
Investment on education	0.03	0.01	0.02	0.01
Investment on Health	0.01	0.00	0.01	0.00
Transfers to SEEs	0.03	0.01	0.02	0.01
Other Transfers	0.08	0.03	0.03	0.01
Tax Rebates	0.06	0.04	0.06	0.03
Payments to Civil Servants Pension Fund	0.07	0.43	0.05	0.31
Payments to Social Insurance Institution	0.02	0.06	0.01	0.06
Payments to Self - Employed Insured People Fund	0.04	0.22	0.03	0.15
Fund Appropriation	0.08	0.03	0.07	0.03
Income Tax collection	0.17	0.03	0.16	0.03
Corporate Tax Law G.A.I.G.V.	0.06	0.01	0.04	0.01
Interest Income Tax	0.05	0.27	0.01	0.03
VAT	0.13	0.03	0.11	0.03
Excise consumption tax	0.02	0.21	0.01	0.16
Petroleum tax	0.10	0.04	0.09	0.03
Import VAT	0.12	0.06	0.08	0.04
Public Ownerships Income	0.05	0.07	0.07	0.10
Funds	0.06	0.04	0.04	0.03

Source data: Author's own calculations.

Table 7

Intertemporal Budget Gap (GAP)
(2001, billion US dollars)

		g						
		1	*1.5*	*2*	*2.5*	*3*	*3.3*	*4*
	5	-310.5	-488.1	-1619.0	-inf	-inf	-inf	-inf
	10	-44.3	-61.8	-85.1	-126.1	-262.7	-588.6	-inf
r	*15*	22.2	15.5	7.8	-1.2	-16.0	-21.6	-63.3
	20	51.5	48.0	44.0	39.7	34.8	31.5	22.3
	25.3	68.6	66.4	64.1	61.5	58.8	57.0	52.5

Source data: Author's own calculations.
(1) g: growth rate
(2) r: discount rate
(3) inf: numbers are so large therefore denoted as inf to represent short hand for infinity