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Evidence from Turkey (1970-2000)

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Abstract:

We investigate the conditions from which inferences can be drawn regarding sustainability of fiscal stance on the one hand, and a long-run relationship between inflation and budget deficits on the other. These issues have assumed even greater importance in the aftermath of the collapse of the 1999 stabilization program in February 2001 that was designed to achieve sustainability in debt dynamics and produce a permanent reduction in inflation rates. The first set of findings indicates nonstationarity in the discounted debt to GNP ratio process during 1970-2000, implying an unsustainable fiscal outlook. The inference does not imply insolvency, but points to the necessity of a policy change towards fiscal austerity. The second set of findings pertaining to the long-run relationship between the inflation rate, budget deficit, and real output growth suggests two important results. The first of these is that the consolidated budget deficit does not have a long-run component unlike the inflation rate, suggesting that changes in the consolidated budget deficit have no permanent effect on the inflation rate. On the other hand, the PSBR does have a long-run component and is cointegrated with the inflation rate, which implies that the PSBR is a better indicator of fiscal deficits in comparison to the consolidated budget deficit.

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1. INTRODUCTION

Turkey had embarked yet another disinflation and structural reform program in December 1999 that failed drastically after the two crises in November 2000 and February 2001. Prior to the crises, the government had been sending very dim fiscal signals, and even counter-effective ones in the form of lack of commitment for durable fiscal measures and increased transparency in public accounts. These weak signals had led to the contention by the domestic and foreign holders of the government debt that the government would not be able to reduce real interest rates and hence the interest burden, and the fiscal credibility stood at an all time low since the initiation of the program in December 1999. Lackadaisical fiscal performance had prevailed for an extended time period, and the tolerance limits of the markets were being tested presumably without being too aware of it. The program has been given another push by substantial foreign financial backing and the IMF Executive Board has initiated a second phase after the approval of the Letter of Intent in May 2001.

The primary focus of the 1999 stabilization program was the rehabilitation of fiscal balances through structural reforms, a natural by product of which would have been disinflation. Despite substantial progress on both fronts, the program nevertheless failed due mainly to inadequate fiscal adjustment through structural reforms, which exacerbated the sustainability outlook in the medium term. What are the features of the predicament the Turkish economy is in, after the collapse of the exchange rate based stabilization program, and how prevalent are they expected to be in the foreseeable future? The inflation threat seems to be alive and doing well, and the debt/GDP ratio has taken a substantial turn for the worse, undermining the debt dynamics seriously. Tough choices and unforgiving tradeoffs, it seems, will be the high on the agenda more than ever.

During the past two decades, Turkish inflation experience has been a particularly interesting one for its high and chronic nature and for the absence of any hyperinflationary episodes. It jumped to different plateaus and displayed varying degrees of persistence at these plateaus, but hyperinflation never materialized.[1] The consensus view has been that the main culprit behind the inflationary process is fiscal imbalances, but the latest understanding on the nature of inflation is that it is a highly inertial process.[2] Alper and Uçer (1998) demonstrate the nominal dimension of the inflationary process in Turkey and assert the need for a sufficiently credible and elegantly designed disinflation program that could dislodge the inertial component substantially. Using the 1948-1985 annual data Metin (1998) finds a significant link from higher deficits to higher inflation, while Akçay *et al.* (1996) find a weakened link in the post 1985[3] period from budget deficit and money growth to inflation in the case of Turkey.

The empirical link from budget deficits to monetary expansion and then to inflation is usually weak, leading some people to hastily jump to the conclusion that deficits may indeed be less crucial than one may think in determining the course of inflation. These very same advocates of "inflationary processes detached from budget deficits" point to declining or intact seigniorage revenues, i.e., lack of monetization in the face of increasing budget deficits, and provide that as further empirical support for their position. Yet, even when a central bank does not monetize the deficit, adjustments in the private sector to higher deficit policies may very well lead to inflation. The transmission can be through the real and/or financial sectors or

[1] For detailed analyses of the inflationary process in Turkey, see Alper and Ucer (1998) and Ertuðrul and Selçuk (2001).

[2] The inertial nature of inflation in Turkey had been emphasized for the first time by monetary authorities in the monetary program announced at the time of signing of the 17th stand-by arrangement with the IMF in December 1999. Akcay et al. (1996) demonstrated the increasingly inertial nature of the inflationary process in the post-1985 bond-financing era.

[3] Primary market auctions of government securities started in June 1985.

thorough the "unpleasant monetarist arithmetic".[4] The real sector will suffer the consequences of higher deficit policies financed by the issuing of bonds in the form of crowded out investment in plant and equipment, culminating in reduced output growth. With money supply intact and output falling, prices will start to increase. In the financial sector, on the other hand, innovations in the form of new financial instruments are encouraged through high interest rates, and repos are typical examples of such innovations in chronic and high inflation countries. People are thus able to hold interest-bearing assets that are almost as liquid as money, and monetization is effectively done by the private financial sector instead of the government. The final transmission mechanism leading to higher inflation now is based on expectations of higher future inflation. The impact of reduced seigniorage and increased borrowing increases the debt, implying that either the deficit will have to increase or that government will have to print money to keep the deficit/GDP ratio intact. If future deficits are to be avoided at some stage to ensure sustainability of the debt/GDP ratio, then monetization will have to be resorted to, and hence the expectation of higher future inflation. Thus the link between budget deficits and inflation is not very straightforward, and high inflation equilibrium may very well be one of the equilibria corresponding to the same fundamentals. A proper analysis of the budget deficit-money growth- inflation link will have crucial policy implications. If inflation is found to be a "nominal" problem with a strong inertial component, then the costs of disinflation are presumably being overemphasized. Hence our motivation to explore some basic issues regarding the inflationary process in Turkey, which will also contribute to the debate pertaining to the appropriateness of the chosen disinflation strategy at the end of 1999. An overwhelmingly nominal nature for inflation would legitimize the choice of a nominal anchor, inevitably the exchange rate in the case of Turkey. It goes without saying that the very same nature of inflation would make credibility an indispensable ingredient of any disinflation program.

Macroeconomic effects of budget deficits, their financing, and the ensuing debt dynamics have enjoyed substantial attention in macro theory recently, particularly in the light of different growth performances displayed by developing countries (See Easterly, 2001). The link from sound fiscal policies to macroeconomic stability and ultimately to sustainable growth is now fully recognized and a group of countries, most of which constitute the emerging markets segment of the world economy, spend all their efforts to put themselves on the sustainable growth path. The size of the budget deficit a country registers and the means of financing it determine the debt dynamics and the fiscal constraints the country will be subject to in the medium to long term.

Unstable debt dynamics have dire implications for budgetary policy. When the public perceives the unsustainability of fiscal policy, it will relinquish its holdings of government debt and necessitate a change in policy. The intention of the governments should be to pre-empt this and conduct a change of policy before the holders of debt impose the change on them. The Turkish Government has been taking fairly drastic measures in the first half of 2001 following the devaluation in February 2001, but how and if these will lead to a change in public's expectations, still remains as a question. An inference of unsustainability would shift the market sentiment drastically towards a pessimistic outlook, and throw the economy into the bad equilibrium it tried to avoid in the first place.

Intuitively, sustainability of a given fiscal policy will be determined by projections of the future path of debt/GNP ratio. It is ultimately the willingness and appetite of the creditors that will determine the sustainability of the ratio.

Formal tests of sustainability are based on the *accounting* and *present value constraint* (PVC) approaches.[5] In the accounting approach, sustainability of a primary deficit (or surplus)

[4] For the first two mechanisms, see Miller (1983) and Sargent and Wallace (1981) for the third.

[5] For an excellent and exhaustive survey on this issue, see Cuddington (1996).

is measured by its capability to generate a constant debt/GDP ratio given a growth target and unchanging real interest rate. Liabilities are allowed to grow at the output growth rate, leaving debt/GDP growth constant, and the role of lenders in defining the sustainability of fiscal policy is questionable. The PVC approach is based on the "no Ponzi game" (NPG) condition, effectively saying that the presented discounted value of expected future surpluses be equal to the outstanding debt stock at any instance for sustainability of the debt/GDP ratio. Anand and Wijnbergern (1989) conduct an analysis pertaining to the sustainability of fiscal deficits in Turkey whereby they seek levels of "financeable deficit" that is compatible with sustainable internal and external borrowing. Simultaneous sustainability of current account deficits and budget deficits has also been investigated under an extension of the PVC approach in Ahmed and Rogers (1995).

Testing of the NPG or the transversality condition has been mostly applied to the US and G-7 data for reasons of demanding data requirements (See for example, Flavin and Hamilton, 1986; Trehan and Walsh, 1991; Ahmed and Rogers, 1995; and Uctum and Wickens, 2000). Tests involve checking for stationarity in series such as fiscal deficit and debt, discounted debt, real deficit inclusive of real interest payments, or cointegration between government revenue and spending, between real government revenue, expenditure, and real interest payments, etc. Unit root and cointegration techniques require fairly long time series over a constant fiscal regime and such requirements can naturally be putting developing countries in a handicapped position for long-term analysis purposes. There are possible compromises as indicated in Cuddington (1996) such as utilizing fiscal rules to be implemented in the foreseeable future, and then using these to obtain the implied time path for the internal and external debt with current debt levels as the initial conditions. We are aware of these and other data limitations, but have chosen to explore the sustainability issue with the actual data we have been able put together after making certain corrections and transformations.

In this paper we investigate empirically the sustainability of fiscal policies in Turkey as well as the existence of a stable long-run relationship between budget deficits and inflation using annual data for the 1970-2000 period.

The first set of findings indicates nonstationarity in the discounted debt to GNP ratio process during 1970-2000, implying an unsustainable fiscal outlook. The inference does imply insolvency, but points to the necessity of a policy change towards fiscal austerity. The second set of findings pertaining to the long-run relationship between the inflation rate, budget deficit, and real output growth suggests two important results. The first of these is that unlike the inflation rate, the consolidated budget deficit does not have a long-run component, suggesting that changes in the consolidated budget deficit have no permanent effect on the inflation rate. On the other hand, the PSBR does have a long-run component and is cointegrated with the inflation rate, which implies that the PSBR is a better indicator of fiscal deficits in comparison to the consolidated budget deficit.

The paper is organized as follows. In section 2, we present the analytical framework by focusing on the economics of government budget constraint. We briefly derive the condition for checking the sustainability of fiscal policy for a high nominal growth country like Turkey. We also present the theoretical long-run relationship between inflation and scaled budget deficit to be used for empirical analysis. Section 3 describes data and presents the empirical results. Section 4 concludes.

2. THE ANALYTICAL FRAMEWORK

This section presents the framework that will be used in the empirical analyses. We focus on two important issues: sustainability of Turkish fiscal policy and the characterization of the long-run relation among budget deficit, money and inflation in Turkey.

From national income identities, the simple definition of budget deficit of the consolidated public sector equals the sum of private sector savings less private sector investment expenditure, and current account deficit. The identity merely states the possibility of crowding out of private investment in the face of a budget deficit increase in an open economy; a rise in the budget deficit leads to a reduction in private investment for given private savings and current account deficit.[6] The impact of budget deficits on private investment is unequivocal, mostly with dire repercussions on output growth and further worsening of fiscal balances through reduced tax revenues.

The financing of the deficit can be done through money printing, internal and/or external borrowing and use of central bank's foreign reserves. External borrowing and use of reserves combined would correspond to the link between budget and current account deficits, and money printing and use of central bank's reserves combined would emphasize credit extension by central bank. Each financing mechanism would entail different macroeconomic repercussions; money printing would be linked to inflation, use of reserves with exchange rate movements and possible balance of payments crises, foreign borrowing with external debt crises, and internal borrowing with higher interest burden and potentially explosive debt dynamics.

2.1 Sustainability of Fiscal Policy for a High Nominal Growth Economy

We assume that all public debt consists of one period debt and the primary government budget deficit can be financed in two different forms: money printing and bond financing (internal and external). The nominal one-period intertemporal government budget deficit can be written as:

$$G_t - T_t + i_t B_{t-1} = \Delta M_t + \Delta B_t \qquad (1)$$

where G_t is government expenditure, T_t is tax revenue, B_t is the total stock of domestic and foreign debt[7] at the end of period t, M_t is reserve money, and, i_t is the nominal interest rate on government debt. Dividing each term in the equation by the nominal output, Y, and rearranging we obtain:

$$g_t - t_t + i_t b_{t-1} \frac{Y_{t-1}}{Y_t} = m_t - m_{t-1} \frac{Y_{t-1}}{Y_t} + b_t - b_{t-1} \frac{Y_{t-1}}{Y_t} \qquad (2)$$

[6] The rise in the budget deficit could alternatively lead to a deterioration in the current account with private investment staying intact, but the link is a bit ambiguous in this case as the monetary policy accompanying the fiscal expansion becomes crucial. If monetary policy is contractionary, that increases the interest rate and pushes up the exchange rate as well, leading to a depreciation of the currency. That in turn improves the current account balance, rather than worsening it along with the higher budget deficit.

[7] All the variables entering the government budget constraint are expressed in TL. For brevity, it is assumed that lenders are indifferent between borrowing TL denominated government securities and Turkish Eurobonds.

where the lower-case variables (excluding i_t) denote the ratio of corresponding upper-case variables to nominal output. Using the growth rate of the nominal output, $g_{Y,t}$, and rearranging the right hand side, we obtain:

$$g_t - t_t + \frac{i_t b_{t-1}}{(1+g_{Y,t})} = \Delta m_t + \Delta b_t + (m_{t-1} + b_{t-1})\left(\frac{g_{Y,t}}{(1+g_{Y,t})}\right) \qquad (3)$$

Collecting b_{t-1} on the left hand side,

$$g_t - t_t + b_{t-1}\frac{(i_t - g_{Y,t})}{(1+g_{Y,t})} = \Delta m_t + \Delta b_t + m_{t-1}\left(\frac{g_{Y,t}}{(1+g_{Y,t})}\right) \qquad (4)$$

and rearranging we obtain

$$g_t - t_t + b_{t-1} r_t - \Delta m_t - m_{t-1}\left(\frac{g_{Y,t}}{(1+g_{Y,t})}\right) = \Delta b_t \qquad (5)$$

where $r_t = (i_t - g_{Y,t})/(1+g_{Y,t})$ and stands for the nominal interest rate adjusted for the nominal output growth. Alternatively, considering the "exact" relationship between the growth rate of nominal output, $g_{Y,t}$, of real output, $g_{Q,t}$, and inflation rate[8], p_t, $(1+g_{Q,t})(1+p_t) = (1+g_{Y,t})$, one can obtain $r_t = (i_t - p_t - g_{Q,t} - p_t g_{Q,t})/(1+g_{Q,t})(1+p_t)$ which can be interpreted as the *ex-post* real interest rate adjusted for real output growth.

Equation (5) can be expressed more compactly as

$$d_t + b_{t-1} r_t = \Delta b_t \qquad (6)$$

where $d_t = g_t - t_t - \Delta m_t - m_{t-1}\left(g_{y.t}/(1+g_{y.t})\right)$ and denotes the primary deficit less the reserve money change and seigniorage, each term scaled by nominal output. Solving for b_{t-1}, equation (6) can be written in discounted terms as

$$b_{t-1} = \frac{1}{(1+r_t)}(b_t - d_t). \qquad (7)$$

Uçtum and Wickens (2000) show for the general case, where r_t is stochastic and d_t is allowed to be either strongly or weakly exogenous, that a necessary and a sufficient condition for sustainability is that the *discounted* nominal debt-nominal output ratio[9] be stationary.

[8] For countries with low inflation and nominal output growth rates, the real output, nominal output approximation given by $g_{Q,t} = g_{Y,t} - p_t$ may be valid, however, for a high-inflation country like Turkey, one has to use the exact relationship.

[9] The discounted debt-output ratio may be written as $X_t = b_t \prod_{k=1}^{t}(1+r_k)^{-1}$

2.2 The Long-Run Relation Between Budget Deficits, Money Growth and Inflation

The nominal one-period intertemporal government budget constraint to be used in this section is a slightly modified version of the one used in the sustainability section where the budget deficit, D_t^* now is inclusive of interest payments:

$$D_t^* = \Delta M_t + \Delta B_t \qquad (8)$$

where B_t and M_t are as defined in the sustainability section. Our purpose is to express inflation as a function of the terms in the budget constraint for a long-run estimable relationship.

Rewriting equation (8) as

$$D_t^* = \frac{\Delta M_t}{M_{t-1}} M_{t-1} + \frac{\Delta B_t}{B_{t-1}} B_{t-1} \qquad (9)$$

and noting that in a steady-state growing economy,

$$\frac{\Delta M_t}{M_{t-1}} = \frac{\Delta B_t}{B_{t-1}} = \frac{\Delta Y_t}{Y_{t-1}} = g_{y,t} = \left[g_{Q,t} + p_t \left(1 + g_{Q,t}\right) \right] \qquad (10)$$

where the nominal output growth is expressed in terms of the real output growth and the inflation rate. Substituting equation (10) into (9) and solving for the inflation rate, we obtain the following long-run relation between inflation, scaled budget deficit and real output growth.

$$p_t = \frac{D_t^*}{\left(M_{t-1} + B_{t-1}\right)\left(1 + g_{Q,t}\right)} - \frac{g_{Q,t}}{\left(1 + g_{Q,t}\right)} \qquad (11)$$

Equation (11) is the estimable equation for analyzing the long-run relationship between inflation rate, scaled deficit and real output growth.

3. DATA AND EMPIRICAL RESULTS

3.1 Data

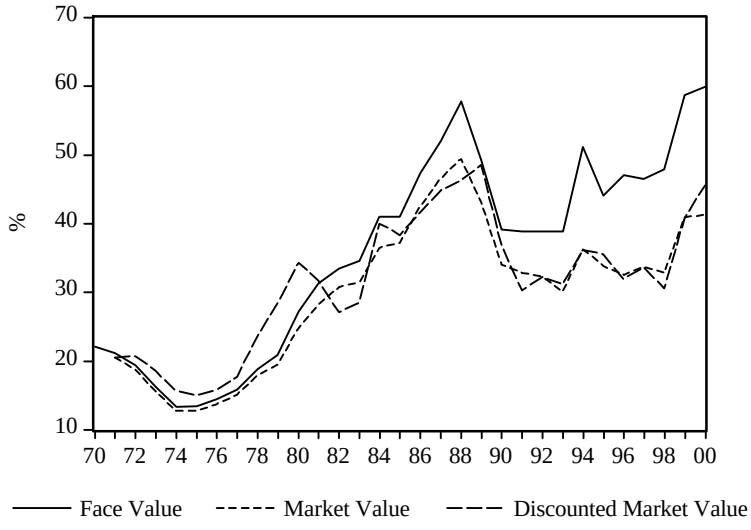
Finding reliable and consistent data on public sector fiscal accounts, even for annual frequency, proved to be a challenging task. This is merely a reflection of the traditional lack of accountability and transparency in the fiscal accounts.[10] Fiscal accounts data from various sources like the State Institute of Statistics, the Treasury, the Ministry of Finance, and the State Planning Organization, more often than not, turned out to be inconsistent. Moreover, consolidated budget balance, which includes the balances of general government as well as the annexed institutions, came out to be less than 50% of the public sector borrowing

[10] The very issue has been vociferously phrased in the Turkish Audit Court's "Year 2000 Fiscal Report".

requirement. Since consolidated budget balance data is the only available high frequency data released with a minor lag, reliance on this information content-wise deficient data source would lead to misleading inference. Taking these limitations into account, we made an attempt to form a database, which would entail expenditure and revenue figures consistent with the financing of the public fiscal accounts. Tables A1-A4 present annual fiscal accounts data in stock and flow forms expressed in terms of million USD.[11] We caveat, however, that the stock of duty losses of the state banks, which have been proclaimed as 1/6 of the total debt stock of the public sector in April 2001, is not included in these figures since information regarding the evolution of the duty loss stock is unavailable.

Next, we touch upon the issue of calculating the market value of discounted debt using government debt data measured at par. We first get an estimate of the market value of the debt by dividing the face value each period's debt stock by one plus the yield on government debt. Yield on government debt is difficult to obtain due to its heterogeneity with respect to maturity. We follow the common practice in the literature and obtain an approximate value for the yield on government debt by dividing total interest payments in this period by the face value of last period's stock of outstanding public debt (using TL values of Table A4). Calculation of the discount rate entails the nominal GNP growth rate as well as the weighted average interest rate on 12-month deposits.[12] Finally, the discounted market value of the debt to GNP ratio is calculated using the formula given at endnote 9. For expository purposes, the face value, market value and the discounted value of the public debt to GNP ratio are displayed in Figure 1. Two things are apparent from Figure 1. First, the market value of the debt is less than the face value. Second, the discounted market value of debt lies sometimes above, sometimes below the undiscounted value, depending on the sign of the discount term.

Figure 1
Turkey's Debt to GNP Ratio



Source: Turkish Audit Court, Treasury and Authors' own calculations

[11] Even though the data given in the tables are quoted in million USD, the data used in the empirical part is in terms of TL. The average TL/USD exchange rate is used for the conversions.

[12] Ideally, we would have liked to use the yield on government securities, had they been available. The implied yield obtained for the purpose of calculating the market value of public debt generated negative discount rates after adjusting for nominal output growth. Hence the 12-month deposit rates are used.

Data on wholesale price index, gross national product, and reserve money stock, and annual weighted average of 12-month saving deposit interest rates are obtained from the web site of the Central Bank of the Republic of Turkey and the International Financial Statistics, published by the IMF.

3.2 Empirical Results

In this section we present the results of Augmented Dickey Fuller unit root tests as well as the Phillips-Perron unit root tests for the variables defined in the analytical section. For the purposes of fiscal policy sustainability in Turkey, a necessary and sufficient condition is that the market value of the discounted debt to GNP ratio be stationary. Our findings indicate that each of the three definitions of the debt to GNP ratio is nonstationary and integrated of order 1, implying that the current fiscal policy is unsustainable. The results obtained from the unit root tests are in line with the visual conjecture provided by Figure 1 that the debt to GNP ratio has a nonzero mean, and that the process seems to be non-mean reverting. At this point a caveat is in order; stationarity test results may be interpreted as indicators of sustainability and not of solvency. A reduction in the discounted deficit GNP ratio due to either primary surpluses or the monetazition of the deficit may change the current unsustainable outlook.

Table 1: Testing the Order of Integration

		Constant	Trend	# of lags	ADF Test	PP Test
b_t^f	Level	Yes	No	0	-0.36	-0.49
	Difference	Yes	No	0	-4.85*	-4.85*
b_t	Level	Yes	No	0	-1.32	-1.09
	Difference	Yes	No	0	-3.87*	-3.87*
X_t	Level	Yes	No	0	-1.16	-1.25
	Difference	Yes	No	0	-4.32*	-4.26*
p_t	Level	Yes	Yes	1	-3.26	-3.76
	Difference	Yes	No	0	.6.06*	-6.44*
CD	Level	Yes	Yes	0	-4.27*	-4.39*
	Difference	-	-	-	-	-
PSBR	Level	Yes	No	0	-2.84	-2.80
	Difference	Yes	No	0	-5.66*	.6.29*
h_Q	Level	Yes	No	0	-5.63*	-5.69*
	Difference	-	-	-	-	-

Data definitions: b_t^f : face value of the public debt-GNP ratio; b_t : market value of the public debt-GNP ratio; X_t : discounted market value of the public debt-GNP ratio; p_t : wholesale price inflation; *CD*: scaled consolidated deficit; *PSBR*: Scaled public sector borrowing requirement; h_Q is the real output growth divided by one plus the real output growth.

* indicates rejection of the null hypothesis of non-stationarity at 5% level of significance

Next, we investigate the existence of a stable long-run relationship between the inflation rate, scaled deficit and real growth rate. Stationarity test results indicate that even though the inflation rate and the scaled PSBR series are integrated of order 1, implying the existence of long-run components, the scaled consolidated budget deficit and the real output growth related variable are not. In other words, the scaled consolidated budget deficit process does not have a long-run component and hence cannot be related to the inflation rate process. This result confirms our aforementioned proposition that the consolidated budget deficit, even though easily available, is not a good indicator of public account balance.

We next test for the existence of a stable relationship between the inflation rate and scaled PSBR, by checking to see if the two variables are cointegrated. In other words, whether short-

run deviations from their long-term relation are temporary or not is formally tested. Likelihood ratio test statistics indicate the existence of a single cointegrating vector when a Vector Error Correction mechanism of order 2 with a constant in the cointegrating equation is estimated. Moreover, the error correction mechanism is validated for the inflation equation but not the scaled deficit equation, implying that the cointegrating vector be normalized for inflation.

The estimated cointegrating vector is given below.

$$\begin{array}{rcccc} \hat{p}_t & = & 0.36 & + & 1.134 \quad PSBR_t \\ & & [2.45] & & [2.39] \end{array}$$

The cointegrating vector suggests that a 1 percent increase in the scaled PSBR increase the long-run value of the inflation rate by 1.13%. The t-statistics obtained from the asymptotic standard errors are given in brackets.

For short-run dynamics, the estimated vector error correction mechanism is below.

$$\begin{array}{rcccccccc} \Delta\hat{p}_t & = & 0.18 & \Delta\hat{p}_{t-1} & + & 0.11 & \Delta\hat{p}_{t-2} & - & 0.23 \quad \Delta PSBR_{t-1} \\ & & [0.87] & & & [0.57] & & & [0.60] \end{array}$$

$$\begin{array}{rcccccccc} & - & 0.73 & \Delta PSBR_{t-1} & - & 1.36 & h_{Q,t} & - & 0.72 \quad ECM_{t-1} \\ & & [2.0] & & & [1.84] & & & [3.28] \end{array}$$

The error correction equation and the t-values given in brackets imply that the error correcting term is negative and significant, (validating the error correction mechanism) and the magnitude of 0.72 implies a rather fast convergence to equilibrium. On the other hand, the term involving the real output growth is increasing in the real growth rate and as expected, *ceteris paribus* an increase in the real output growth reduces the inflation rate.

4. CONCLUSIONS

In this study, we have looked at the conditions from which we could be drawing inferences regarding sustainability of fiscal stance on the one hand and a long-run relationship between inflation and budget deficits on the other. These issues have assumed even greater importance in the aftermath of the collapse of the stabilization program that had been designed to achieve sustainability in debt dynamics and produce a permanent reduction in inflation rates. The latter of these two goals would conceivably be achieved by dislodging the inertial component in the inflationary process, which was strictly conditional on success on the former goal.

Our first set of empirical findings indicates that the discounted debt to GNP ratio process during 1970-2000 is inherently nonstationary, implying an unsustainable fiscal outlook. Our findings do not point to insolvency at this point in time, but point to the necessity of a policy change towards fiscal austerity if insolvency is to be avoided in the medium to long term.

The second set of findings pertaining to the long-run relationship between the inflation rate, budget deficit, and real output growth suggests two important results. The first of these is that the consolidated budget deficit does not have a long-run component unlike the inflation rate, suggesting that changes in the consolidated budget deficit have no permanent effect on the inflation rate. On the other hand, the PSBR does have a long-run component and is cointegrated with the inflation rate. In non-technical terms, changes in the PSBR lead to

permanent effects on the inflation rate. Hence, the PSBR should be deemed a better indicator of fiscal deficits in comparison to the consolidated budget deficit.

Lack of accountability and transparency regarding that portion of the PSBR in excess of the consolidated budget deficit has been frequently referred to as endangering the medium to long-term fiscal sustainability. However, supportive empirical work has been lacking, and our intention was to contribute to the filling of this gap.

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DATA APPENDIX

Table A1: Public Sector Borrowing Requirement And Components (million USD)

Years	Consolidated Budget Deficit	Central Budget Deficit	PSBR	Interest Payments	GNP
1970	-14.2	-	-	-	13,994.3
1971	453.0	-	-	-	18,648.0
1972	25.9	-	-	-	22,438.5
1973	158.3	-	-	-	28,506.3
1974	282.2	-	-	-	38,821.5
1975	365.4	330.4	2,235.3	234	47,169.8
1976	639.0	633.6	3,605.5	240	53,468.8
1977	2,621.7	2,570.5	4,988.4	288	61,137.5
1978	1,017.6	1,121.4	2,159.8	305	66,456.8
1979	2,768.8	2,843.3	6,324.1	545	88,023.1
1980	2,230.7	2,786.1	6,242.1	423	71,180.6
1981	1,029.1	1,055.0	2,657.0	627	66,817.6
1982	955.7	1,020.2	2,273.0	531	64,485.3
1983	1,369.2	1,686.5	3,016.6	926	61,033.7
1984	2,651.2	2,094.4	3,235.3	1,195	60,049.0
1985	1,521.9	757.0	2,414.5	1,287	67,390.1
1986	2,070.2	805.8	2,741.7	1,952	75,072.6
1987	3,025.7	2,428.8	5,295.3	2,630	87,057.3
1988	2,776.1	2,386.4	4,338.1	3,463	89,870.7
1989	3,608.8	3,698.5	5,777.3	3,885	108,355.5
1990	4,577.7	5,480.4	11,268.8	5,348	152,087.1
1991	8,011.2	10,642.8	15,409.7	5,754	151,636.7
1992	6,886.3	11,667.5	16,939.3	5,850	160,217.6
1993	12,105.3	17,261.0	21,685.6	10,533	180,627.7
1994	5,098.5	8,445.0	10,283.3	9,993	130,256.6
1995	6,890.3	9,216.5	8,884.6	12,537	170,936.7
1996	15,136.9	17,338.4	16,391.6	18,307	183,116.0
1997	14,663.5	15,359.7	15,196.3	14,993	192,358.1
1998	14,203.3	15,725.6	20,607.2	23,547	204,031.5
1999	21,489.6	23,847.1	26,503.9	25,396	185,341.8
2000	18,433.5	17,408.4	30,552.4	32,614	201,002.4

Data Sources: The State Planning Organization's Economic and Social Indicators, Turkish Audit Courts' "Fiscal Report 2000". Ministry of Finance and authors' own calculations.

Consolidated budget consists of the general budget and the annexed institutions. Central Government consists of the balances of the consolidated budget, local authorities, Revolving Funds, Social Security Institutions as well as the Extra-budgetary Funds and State Economic Enterprises under privatisation.

The Public Sector Borrowing Requirement includes the balances of Central Government as well as the State Economic Enterprises.

Table A2: Domestic Public Debt (million USD)

Years	Borrowing	Principal Repayment	Net Flow	Interest Payments	Debt Service	Net Transfer	Cumulative Net Transfer	Debt Stock
	A	B	A-B	C	B+C	A-(B+C)		
1970		155		38	193			1,241
1971	679	285	394	41	326	353	353	1,710
1972	808	617	191	82	699	109	462	1,902
1973	123	268	-145	100	368	-244	218	1,757
1974	420	170	250	116	286	134	354	2,026
1975	1,654	410	1,243	164	575	1,079	1,414	3,159
1976	1,782	513	1,269	161	675	1,107	2,383	4,119
1977	2,463	888	1,575	193	1,081	1,382	3,516	5,263
1978	3,179	963	2,216	202	1,165	2,014	4,587	6,068
1979	3,307	562	2,745	389	951	2,356	5,832	7,344
1980	1,477	367	1,110	297	665	812	3,370	4,331
1981	4,344	1,346	2,998	342	1,688	2,656	4,747	5,685
1982	2,744	1,383	1,362	208	1,590	1,154	4,617	5,509
1983	1,677	585	1,092	350	935	742	4,071	5,063
1984	7,486	2,562	4,923	478	3,040	4,445	6,963	8,055
1985	4,626	2,208	2,418	471	2,680	1,947	6,847	8,086
1986	7,807	2,799	5,008	951	3,751	4,057	9,324	11,229
1987	10,993	6,155	4,838	1,460	7,615	3,378	10,755	13,723
1988	14,377	4,250	10,127	2,197	6,448	7,930	14,378	18,354
1989	10,674	4,534	6,139	2,400	6,934	3,740	13,460	18,548
1990	11,432	5,734	5,698	3,682	9,416	2,016	12,974	20,798
1991	13,819	7,667	6,152	4,046	11,713	2,107	10,205	19,135
1992	21,999	11,728	10,271	4,430	16,158	5,841	12,039	21,892
1993	31,597	19,358	12,239	8,308	27,666	3,931	11,430	25,876
1994	28,164	19,613	8,551	7,780	27,393	771	5,005	18,137
1995	39,394	25,729	13,665	10,276	36,006	3,389	6,640	25,446
1996	68,088	48,764	19,324	16,208	64,973	3,115	6,845	33,619
1997	41,519	21,128	20,391	14,854	35,982	5,537	9,201	38,387
1998	55,765	33,855	21,910	21,440	55,295	470	5,831	44,273
1999	63,689	36,904	26,785	23,438	60,342	3,347	6,970	54,293
2000	51,808	30,266	21,542	29,690	59,956	-8,148	-3,453	58,114

Data Sources: Turkish Audit Courts' "Year 2000 Fiscal Report", the Treasury and authors' own calculations.
The debt stock includes outstanding stock of government bonds and treasury bills.
Short-term advances to the Treasury by the Central Bank and the duty losses of the state banks are excluded.

TableA3: External Public Debt (million USD)

Years	Borrowing	Principal Repayment	Net Flow	Interest Payments	Debt Service	Net Transfer	Cumulative Net Transfer	Debt Stock
	A	B	A-B	C	B+C	A-(B+C)		
1970	-	-	-	-	-	-	-	1,844
1971	401	109	292	53	162	239	239	2,224
1972	337	157	180	63	220	117	356	2,454
1973	415	126	289	80	206	209	565	2,866
1974	326	147	179	92	239	87	652	3,136
1975	293	156	137	106	262	31	683	3,182
1976	583	165	418	145	310	273	956	3,619
1977	849	196	653	168	364	485	1,441	4,438
1978	1,259	289	970	176	465	794	2,235	6,464
1979	4,410	445	3,965	266	711	3,699	5,934	11,030
1980	2,400	564	1,836	486	1,050	1,350	7,284	15,007
1981	1,887	768	1,119	960	1,728	159	7,443	15,241
1982	2,050	1,154	896	1,137	2,291	-241	7,202	16,066
1983	1,577	1,114	463	1,194	2,308	-731	6,471	16,042
1984	2,435	1,125	1,310	1,138	2,263	172	6,643	16,541
1985	2,745	2,229	516	1,295	3,524	-779	5,864	19,539
1986	3,553	1,916	1,637	1,461	3,377	176	6,040	24,291
1987	4,324	2,772	1,552	1,851	4,623	-299	5,741	31,541
1988	7,199	3,762	3,437	2,386	6,148	1,051	6,792	33,563
1989	4,465	3,503	962	2,593	6,096	-1,631	5,161	34,859
1990	4,634	3,664	970	2,816	6,480	-1,846	3,315	38,684
1991	5,307	4,242	1,065	2,735	6,977	-1,670	1,645	39,703
1992	6,214	4,600	1,614	2,865	7,465	-1,251	394	40,360
1993	7,069	3,987	3,082	3,004	6,991	78	472	44,259
1994	4,122	4,727	-605	2,882	7,609	-3,487	-3,015	48,519
1995	4,487	6,063	-1,576	2,916	8,979	-4,492	-7,507	49,958
1996	7,394	4,770	2,624	2,775	7,545	-151	-7,658	52,582
1997	3,301	4,724	-1,423	2,768	7,492	-4,191	-11,849	51,159
1998	8,761	6,451	2,310	2,661	9,112	-351	-12,201	53,469
1999	7,781	6,800	981	2,880	9,680	-1,899	-14,100	54,450
2000	16,276	8,510	7,766	3,428	11,938	4,338	-9,762	62,216

Data Sources: Turkish Audit Courts' "Year 2000 Fiscal Report", and the Treasury.

Table A4: Total Public Debt (million USD)

Years	Borrowing	Principal Repayment	Net Flow	Interest Payments	Debt Service	Net Transfer	Cumulative Net Transfer	Debt Stock
	A	B	A-B	C	B+C	A-(B+C)		
1970	-	-	-	-	-	-	-	3,085
1971	1,080	394	686	94	488	592	592	3,934
1972	1,145	774	371	145	919	226	818	4,356
1973	538	394	144	180	574	-35	783	4,623
1974	746	317	429	208	525	221	1,006	5,162
1975	1,947	566	1,380	270	837	1,110	2,097	6,341
1976	2,365	678	1,687	306	985	1,380	3,339	7,738
1977	3,312	1,084	2,228	361	1,445	1,867	4,957	9,701
1978	4,438	1,252	3,186	378	1,630	2,808	6,822	12,532
1979	7,717	1,007	6,710	655	1,662	6,055	11,766	18,374
1980	3,877	931	2,946	783	1,715	2,162	10,654	19,338
1981	6,231	2,114	4,117	1,302	3,416	2,815	12,190	20,926
1982	4,794	2,537	2,258	1,345	3,881	913	11,819	21,575
1983	3,254	1,699	1,555	1,544	3,243	11	10,542	21,105
1984	9,921	3,687	6,233	1,616	5,303	4,617	13,606	24,596
1985	7,371	4,437	2,934	1,766	6,204	1,168	12,711	27,625
1986	11,360	4,715	6,645	2,412	7,128	4,233	15,364	35,520
1987	15,317	8,927	6,390	3,311	12,238	3,079	16,496	45,264
1988	21,576	8,012	13,564	4,583	12,596	8,981	21,170	51,917
1989	15,139	8,037	7,101	4,993	13,030	2,109	18,621	53,407
1990	16,066	9,398	6,668	6,498	15,896	170	16,289	59,482
1991	19,126	11,909	7,217	6,781	18,690	437	11,850	58,838
1992	28,213	16,328	11,885	7,295	23,623	4,590	12,433	62,252
1993	38,666	23,345	15,321	11,312	34,657	4,009	11,902	70,135
1994	32,286	24,340	7,946	10,662	35,002	-2,716	1,990	66,656
1995	43,881	31,792	12,089	13,192	44,985	-1,103	-867	75,404
1996	75,482	53,534	21,948	18,984	72,518	2,964	-813	86,201
1997	44,820	25,852	18,968	17,622	43,474	1,346	-2,648	89,546
1998	64,526	40,306	24,220	24,101	64,407	119	-6,370	97,742
1999	71,470	43,704	27,766	26,318	70,022	1,447	-7,131	108,743
2000	68,084	38,776	29,308	33,118	71,894	-3,810	-13,215	120,330

Data Sources: Turkish Audit Courts' "Year 2000 Fiscal Report", the Treasury and authors' own calculations. The total debt stock of the public does not include the duty losses of the state banks as well as the short-term advances to the Treasury.