ERC Working Papers in Economics 03/02

March 2003

A Note on the Debt Sustainability Issue In Turkey*

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Abstract

The purpose of the paper is to shed light on the composition of the public sector debt stock and using the end-2002 *net public debt stock-to-GNP ratio* as the starting point, estimate the primary surplus-to-GNP ratio that will be necessary for the sustainability of the debt stock, using a modified version of the approach suggested by the World Bank (2000:16-18; 121-124). The relevant tables on the primary surplus-to-GNP ratio requirements are constructed under different scenarios with respect to real interest rate, growth rate and inflation rate. At the second stage, the weighted average real interest rate on the current central government debt stock is estimated. Then the debt sustainability issue is evaluated by comparing the estimated primary surplus-to-GNP ratios required with the targeted primary surplus ratio, taking into consideration the real interest rate on the existing stock.

Introduction

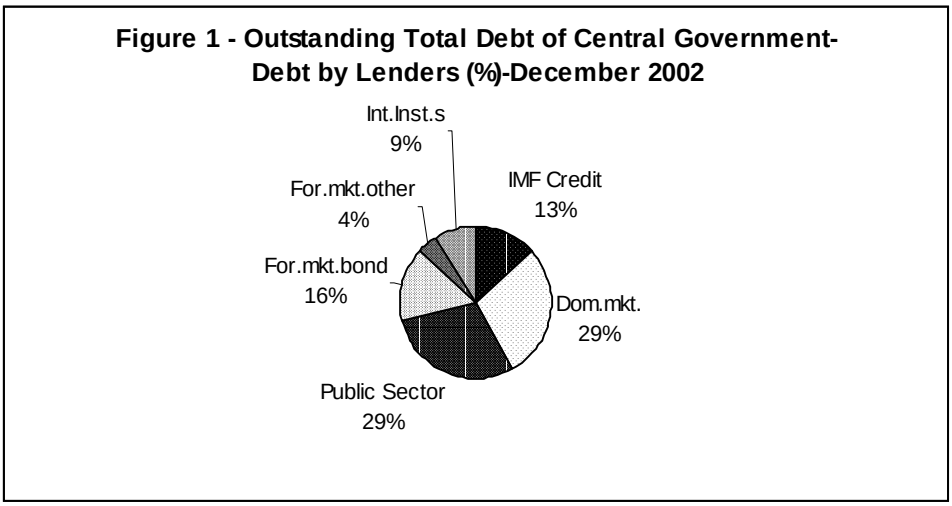
Over the implementation of the Exchange Rate Based Stabilization Program (ERBSP), adopted in December 1999 (Erçel, 1999), the exchange rate was used as the nominal anchor. Until the last quarter of 2000 all was going well. Inflation as well as the real interest rate was down, the primary surplus-to-GNP ratio needed for the sustainability of the debt stock was at low and easily attainable levels (Keyder, 2001). However, there were delays in coming up with the necessary structural adjustments and the banking sector was too weak to support this *quasi currency board* regime. The end-result was; overvalued TL, huge current account deficit and enlarged open positions in foreign exchange (FX), which rendered the financial system highly vulnerable to external shocks. The Exchange Rate Based Program ended following the November 2000 and the February 2001 crises. The TL was let to float and the Strengthened Stabilization Program (Derviş, 2001) was adopted in May 2001. The new program carried the structural elements of the previous program but it was to be implemented under a floating rate regime. Economic indicators point to success of the program so far. One of the most significant issues remaining concerns debt sustainability. Hence in the present paper, this topic is given special attention against the background of debt stock composition.

Debt Stock

The provisional figures announced for the outstanding central government debt stock (consolidated budget based; involving general and annexed budget administrations only[1]) for December 2002, are as follows: The Central Government's total debt stock was TL 242.4 quadrillion; of which TL 149.9 quadrillion was domestic and TL 92.5 quadrillion was external. In dollar terms, the total was $148.3 billion, of which $91.7 billion was domestic and $56.6 billion was external (The Undersecretariat of Treasury, 2003). 48% ($27.3 billion) of the $56.6 billion external debt was to international institutions, 52% ($29.3 billion) to commercial banks ($6.2 billion) and the bond market ($23.1 billion). (The stock figures mentioned are ***gross*** and they do not include Turkish Central Bank's (CBRT) debt and Treasury guaranteed debt.)

Looking at the composition of the $148.3 billion ***central government total debt stock*** by lenders, we see that 29% is to the market and 29% to the public sector; 20% is owed to the foreign markets against money collected via bond issue (16%) or other means (4%); 9% of the

debt is owed to international institutions ($13.3 billion) and the remaining 13% ($19.9 billion) is owed to IMF (Figure 1).



Source: www.hazine.gov.tr/stat/ToplamKonsolideButce_tr2_htm

Looking at the domestic debt stock alone, we see that of the TL149.9 quadrillion total, 52.8% represents Treasury's indebtedness toward other public institutions (18.8% to CBRT, 16.2% to State Banks, 7.4% to SDIF and 10.5% to other public institutions) and 47.2% represents Treasury's indebtedness toward the market (Figure 2 and Figure 3). Treasury's debt to other public institutions can be restructured or consolidated with interest rates in favor of the debtor, also the interest payments among the public institutions are netted out when the public sector balance sheet is consolidated. Hence, in discussing the debt sustainability issue, actually, the public sector debt stock toward the market should be our major concern.

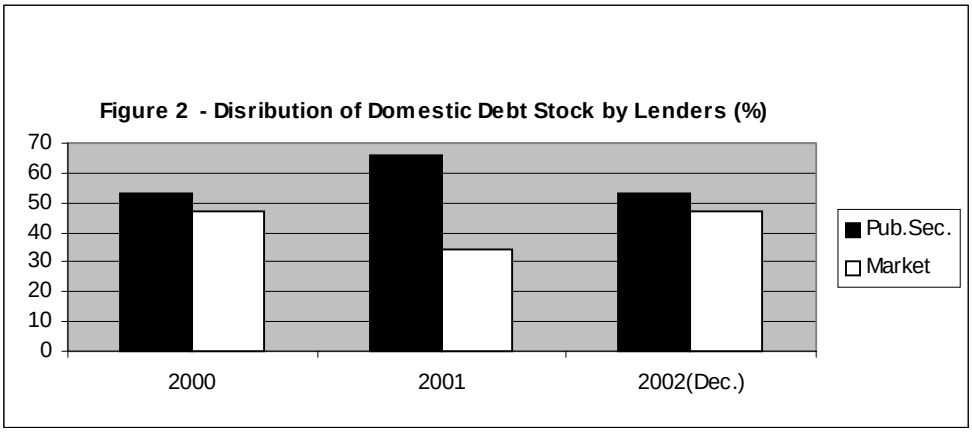


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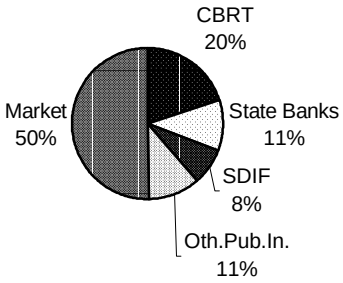
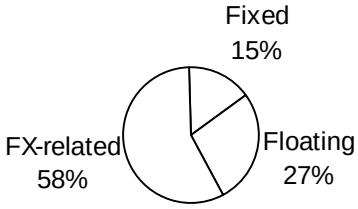
Figure 3 - Composition of Domestic Debt Stock by Lenders (%) - December 2002



Source: www.hazine.gov.tr/stat/iç borç istatistikleri

The debt stock figures given in the first paragraph of this section indicate that external debt makes up 38% and the domestic debt makes up 62% of the total central government debt stock. 32% of the domestic debt stock, on the other hand is FX-related. This corresponds to 20% of the total stock. Hence 38%+20%=58% of the total stock is FX-related[3]. The other components of the total central government debt stock by instruments are; 15.5% fixed, 26.6% Floating Rate Notes (FRNs) (Figure 4). Large weight of FX-related debt in the total stock increases vulnerability of the debt stock to exchange rate shocks. However, under the present floating rate system, we believe that the real exchange rate is not likely to show extreme volatility, except for possible temporary fluctuations in response to an exogenous shock, such as the Iraq war.

Figure 4 - Composition of Total Debt Stock of Central Government by Instruments (%) - December 2002



Source: Calculated by the author using data from www.treasury.gov.tr/stat

Real Interest Rate on the Central Government Debt Stock

In the average the real interest rate on the FX-denominated debt stock is assumed to be 7% in TL terms[4]. As of end-2002, the average real interest rate on the TL-denominated part of the debt stock was around 25% (knowing that 43% of government domestic debt stock is made of floating rate notes (FRNs), should the risk premium go down in time, these issues' real interest rate will automatically decline in line with the yield set at the 3-month reference auctions). Hence, as of December 2002, the weighted average real interest rate on the total public debt stock can be estimated as follows:

7% (real interest rate of FX-related debt stock) x 58% (share of FX-related debt in total debt stock)+25%(real interest rate of TL-denominated debt stock) x42% (share of TL-denominated debt in total debt stock)= 14.6%.

Net Public Debt-to-GNP Ratio

Even though the stock figures given above are gross, the analysis of debt stock's composition may be illuminating in sustainability discussions. However, in evaluating the debt sustainability issue, the *Net Consolidated Public Debt Stock* figures should be used. To arrive at the *net consolidated public debt stock* figure; the deposits held by the Treasury at the Central Bank and CBRT's Net Foreign Assets (NFA) need to be deducted from the gross figure, also adjustment should be made for the Central Bank's external debt used by the Treasury for budget financing purposes, which is recorded under both domestic and external

debt. The "net" figure comes out to be considerably below the "gross" figure. In Turkey, the *net consolidated public debt stock-to-GNP* ratio climbed from 57% in 2000 to 93.5% in 2001 due to conversion of the implicit duty losses[5] at the state banks into Treasury debt and restructuring and recapitalization of the SDIF and state banks (Table 1). The *net consolidated public debt-to-GNP ratio* at end-2002 was 81.6% (provisional estimate), which will be the reference point in the debt sustainability calculations given in the next section. This ratio is not high compared to some of the countries listed in Table 1 (note that percentages given for countries other than Turkey are *gross public debt-to-GDP* ratios (the net-debt ratios would have been lower), whereas in the case of Turkey, they are *net consolidated public debt-to-GNP ratios*. Hence the ratios are not directly comparable). Even though the Maastricht criteria sets the limit for the gross debt ratio as 60%, some of the countries in the EU have debt-to-GNP ratios considerably higher than 60%. For example in 2002, Belgium had 104% consolidated gross debt-to-GDP ratio, for Italy the ratio was 108% and for Greece it was 98%. In the Euro area (excluding Luxembourg, including East Germany) as a whole, the ratio was 69%. Japan too, has a debt-to-GDP ratio (121%) much higher than Turkey's. In these countries, however, the stock carries much longer average maturity and the real interest rate is much lower than in the case of Turkey. Hence it is not the size of the debt but it is its maturity and the real interest rate that should call for concern (Figure 5).

Table 1 - General Government Consolidated Gross Debt (% of GDP)

	1999	**2000**	**2001**	**2002**
Belgium	115.0	109.3	107.5	104.3
Greece	103.8	102.8	99.7	97.8
Italy	114.5	110.6	109.4	107.8
Euro Area*	72.8	70.5	69.4	68.8
Japan**	101.7	108.8	115.4	121.3
Turkey***	61.0	57.4	93.5	81.6

*Excluding Luxembourg, including East Germany.

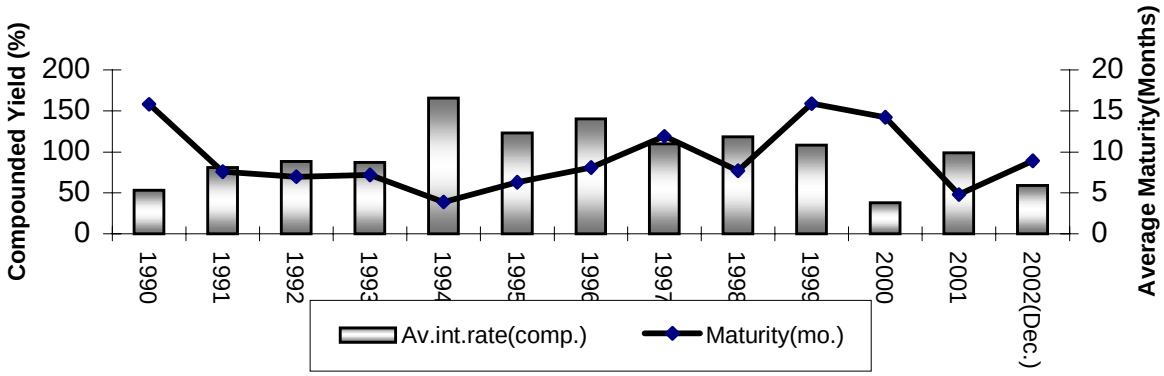
**Debt-to-GDP ratio

***Net Public Debt-to-GNP ratio.

Source: European Commission, Directorate-General for Economic and Financial Affairs, European Economy, no.3, 2002. Public Finances in EMU. Table A.4.16, p. 368. For Japan, European Commission, Directorate-General for Economic and Financial Affairs, European Economy, No.72, 2001, 2001 Broad Economic Policy Guidelines, p. 350. For Turkey, IMF, IMF Country Report No.02/264. December 2002, Table 15, p.66. 2001

revised figure; 2002, provisional estimate (Figures given by IMF for 2001 and 2002 were 92.8 and 82.1, respectively).

Figure 5 - Interest Rates (compound, annual) (%) and Average Maturity (months) at Treasury Auctions



Note: Includes only auction and public offer sales. Figures include FRN issues. The interest rate for FRNs is calculated

assuming that the initial term interest rate remains the same during the lifetime of the bond.

Source: www.hazine.gov.tr/stat.

Primary Surplus-to-GNP Ratio Requirement for Debt Sustainability

Change in the public sector debt stock = operational deficit-seigniorage-growth effect (all expressed as percentage of GNP). Growth and inflation therefore have a reducing effect on the debt stock-to-GNP ratio, while operational deficit has an increasing effect.

The growth effect alone, can be expressed as follows:

$$[g /(1 + g)] b \qquad (1)$$

where, b is the public sector debt stock-to-GNP ratio at the beginning of the period and g is the growth rate. The long-term primary surplus-to-GNP ratios (s) that need to be achieved for net debt stock-to-GNP ratio sustainability are estimated under different real interest rate (r) -

growth rate (g)-inflation rate (p) scenarios. In estimations, a modified version of the methodology suggested by World Bank (2000:16-8; 121-124) is used. For derivation of the equations refer to this source. Primary surplus-to-GNP ratio under different g-r-p combinations is calculated using the following formula[6]:

$$s=[(r - g) / (1 + g)] b – [(p + g + p*g) / (1 + p + g +p*g)] m \quad (2)$$

Here m denotes reserve money-to-GNP ratio, which takes different values under different real interest rate-inflation rate combinations. "m" can be estimated using the following regression equation[6]:

ln m = f(r+p) = f(R) where R is the nominal interest rate. The equation estimated is as follows:

ln m = -2.2555 – 0.6053 R

(-70.1004)(-10.7901)

R^2 =0.81; SSR= 0.2946; DW-statistic= 1.6934

The term,

$$[(p + g + p*g) / (1 + p + g + p*g)] m$$

gives the seigniorage amount expressed as percent of GNP[7]. In end-2002 the *net consolidated public debt-to-GNP ratio* was 81.6% (provisional estimate). The primary surplus (as percent of GNP) required for sustainability of the debt ratio at this level or for lowering the ratio, is estimated using the m calculated at different nominal interest rates and the elements of the relevant scenario used, within the context of Equation 2. The results are given in Tables 2-4.

Table 2: The Required Primary Surplus as a percentage of GNP

Real	**Inflation Rate**				**Inflation Rate**			
GNP	**20%**				**25%**			
Growth	**Real Interest Rate**				**Real Interest Rate**			
	5%	**10%**	**15%**	**20%**	**5%**	**10%**	**15%**	**20%**
4%	-0.83	2.98	6.96	10.92	-1.2	2.77	6.74	10.73
5%	-1.68	2.01	6.04	9.97	-2.07	1.89	5.82	9.78
6%	-2.50	1.22	5.13	9.03	-2.9	1.02	4.93	8.84
7%	-3.32	0.37	4.24	8.10	-3.72	0.17	4.03	7.92

Source: Author's own calculations based on data from tcmb.gov.tr/evds and www.treasury.gov.tr/stat.

Table 3- The Required Primary Surplus as percentage of GNP

Real	Inflation Rate						Inflation Rate					
GNP	20%						25%					
Growth	Real Interest Rate						Real Interest Rate					
	10%	11%	12%	13%	14%	15%	10%	11%	12%	13%	14%	15%
4%	2.98	3.76	4.56	5.36	6.15	6.96	2.77	3.56	4.36	5.15	5.95	6.74
5%	2.01	2.87	3.66	4.45	5.23	6.04	1.89	2.66	3.46	4.25	5.03	5.82
6%	1.22	1.99	2.77	3.56	4.34	5.13	1.02	1.80	2.58	3.36	4.14	4.93
7%	0.37	1.13	1.90	2.68	3.44	4.24	0.17	0.94	1.71	2.49	3.26	4.03

Source: Author's own calculations based on data from www.tcmb.gov.tr/evds and www.treasury.gov.tr/stat.

Table 4- The Required Primary Surplus as percentage of GNP

Real	Inflation Rate						Inflation Rate					
GNP	20%						25%					
Growth	Real Interest Rate						Real Interest Rate					
	15%	16%	17%	18%	19%	20%	15%	16%	17%	18%	19%	20%
4%	6.96	7.75	8.55	9.34	10.13	10.92	6.74	7.54	8.34	9.13	9.93	10.73
5%	6.04	6.82	7.61	8.39	9.18	9.97	5.82	6.61	7.41	8.19	8.98	9.78
6%	5.13	5.91	6.69	7.47	8.24	9.03	4.93	5.71	6.49	7.27	8.04	8.84
7%	4.24	5.01	5.79	6.56	7.33	8.10	4.03	4.81	5.60	6.37	7.15	7.92

Source: Author's own calculations based on data from www.tcmb.gov.tr/evds and www.treasury.gov.tr/stat.

Actually, the large share of the FX-related debt in the total stock adds a fourth determinant to the debt sustainability issue, which must be incorporated into the analysis. If TL records a real appreciation against foreign currency (as it happened in 2002[8]) ceteris paribus this would exert a downward pressure on the debt-to-GNP ratio. Whereas, TL's real depreciation against FX would cause the ratio to go up[9]. However, as mentioned earlier, during the next couple of years, we expect no long-lasting appreciation or depreciation of the TL. Hence the role of exchange rate movements is not considered in the present paper.

Evaluation of the Results

Under the 20% inflation rate, 16% real interest rate scenario; growth rates 6% and above, ensure debt sustainability. When real interest rate falls below 15%, any growth rate used in the analysis is sufficient for debt sustainability, since the primary surplus-to-GNP ratios

required are all below the 6.5% target. Even in the case of 17% real interest rate, debt is sustainable at growth rates 7% and above (primary surplus-to-GNP ratio requirement is 5.79% for 7% growth rate). In the case of 25% inflation, 17% real interest rate scenario, at growth rates 6% or above, the primary surplus requirement is below the target. In the case of 25% inflation rate and 16% real interest rate scenario, growth rates 6% and above; and in the case of 25% inflation rate and 15% real interest rate scenario, growth rates 5% and above ensure debt sustainability, since then, the primary surplus requirement is below 6.5%. Actually 25% is the annual average inflation rate targeted for 2003, while 20% is the year-end target. Earlier, the weighted average real interest rate of the end-2002 debt stock of the central government was estimated to be around 15%. As the debt is rolled over, to maintain this or lower real interest rate on the stock, the replacing issues should bear 15% or lower real interest rate. If this is achieved, then in Turkey, the public debt sustainability issue will be no problem and in addition, the net public debt-to-GNP ratio can be expected to go down in the years to follow, provided that growth rate is at reasonable levels. It is this declining trend that is needed to satisfy the relaxed Maastrict criteria.

Conclusion

In sum, Turkey's debt, under the scenarios adopted, comes out to be sustainable on condition that the real interest rate is reduced to 15% or less (during the January 2003 auctions, on the TL-denominated issues, the nominal interest rate was between 44% (3-month term) and 58% (1-year term); and the weighted average real interest rate was around 25%, which is extremely high). The real interest rate, in large part, reflects the risk premium, which is closely tied to people's confidence in the economy and in the government. All it takes is a strong determination on behalf of the government about pursuing the Strengthened Stabilization Program adopted in May 2001, to meet the aspirations of the public at large and rebuild the confidence.

* The author wishes to thank Professor Merih Celasun for his most helpful comments and Özge Bozkurt for her assistance with estimations.

Notes

[1]This part of the debt stock indicates direct indebtedness of the Treasury. SEE's and Central Bank's debts are excluded. As of end-2002, the Central Bank was not in a net-debtor position; and if SEEs are assumed to be able to pay their debts out of their earnings, the *central government net debt stock* is the part of the total debt stock that should be considered in connection to the debt sustainability issue.

[2]Exchange rate= TL1.635 million per $.

[3]Either FX denominated (11% of domestic debt stock) or FX-indexed (12% of domestic debt stock – IMF credit; Swap and other-).

[4] IMF and World Bank credits carry an interest rate 5% or less; in the January 28, 2003 auction, the dollar bond rate was 6.5%; and in the debt-swap operation of June 15, 2001, arranged by the Treasury with the private banks, the average yield was 15% on the FX-denominated paper with 3 to 5 year maturity.

[5] *Duty losses* originated from uncompensated credit subsidies and payments for agricultural sector and small and medium sized companies.

[6]To be able to apply this formula, it was necessary that real income (y) elasticity of real reserve money (rrm) (deflated by WPI) be close to unity. The OLS estimation result given below satisfies this condition. The reason why annual data over the period 1970-1999 was used is because the crises years (2000-2001) could not be accepted as normal years.

$$\ln rrm = -2.1268 + 0.967 \ln y - 0.0057 R \quad (R \text{ is the nominal interest rate on time deposits})$$

$$(-3.7513)\ (6.3432) \qquad (-3.5370)$$

R-Bar-Squared =0.76; SSR= 0.0.2975 ; DW-statistics=1.676

[7] The original seigniorage expression suggested by the World Bank (2000:16-18) was as follows:

$$[(p + g) / (1 + p + g)]\ m$$

This may be an acceptable approximation for the seigniorage term especially in low inflation cases.

[8]In 2002, the exchange rate movement was below that required by the purchasing power parity. This was mainly due to reversal of currency substitution during 2002. Hence TL, which was undervalued following the devaluation of February 2001, caught up and closed the year being overvalued (based on *real exchange rate series* calculated by the author, using 1999(12) as the base period; see Keyder, 2003 for more information on the real exchange rate developments in Turkey). Hence over 2002 alone, TL has appreciated in real terms against foreign exchange. This has been a favorable development for Turkey from debt sustainability point of view. OECD (2002: 144), describes the situation as follows: "...real appreciation is making the real interest rate on foreign currency debt negative (in TL terms). Therefore, the negative TL-adjusted interest rate on foreign borrowings is currently easing debt sustainability, even though the domestic interest rate (in both nominal and real terms) is very high."

[9] The exchange rate effects may be explored more usefully in the analysis of year-to-year changes in debt-to-GNP ratios for finite time periods, rather than in the steady-state analysis.

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Özet

Yazının amacı, ilk etapta 2002 sonu itibariyle kamu borç stoğunun kompozisyonunu borç verene ve enstrüman niteliğine göre irdelemektir. İkinci aşamada bu stoğun sürdürülebilirliği tartışması yer almaktadır. Büyüme hızı-reel faiz ve enflasyon kombinasyonları üzerine kurulan çeşitli senaryolar çerçevesinde, ilgili formüller kullanılarak, borcun sürderelebilmesi için gereken *faiz dışı fazla-GSMH* oranları hesaplanmış, elde edilen rakamlar hedeflenen oran ile karşılaştırılmak suretiyle borcun hangi koşullarda sürdürülebileceği ortaya konulmuştur. Döviz cinsi ve dövize endeksli borcun toplam kamu borcunun %58'ini oluşturması, borcun sürdürülebilmesinde kur hareketlerini dördüncü bir factor olarak ortaya çıkarmaktadır. Ancak, önümüzdeki yıllarda reel kurda aşırı dalgalanmalar beklenmediğinden dolayı, çalışmada kur hareketlerine yer verilmemiştir.

Kamunun toplam borç stoğunun reel faiz oranı ağırlıklı ortalama olarak hesaplandığında, 2002 sonu itibariyle %15 civarında çıkmaktadır. Bu rakam hedeflenen %6.5 faiz dışı fazlanın altında faiz dışı fazla gereksinimine işaret etmektedir (bkz.Tablo 3). Sonuç olarak, Türkiye'nin önümüzdeki yıllarda, yeni ihalelerde oluşan reel faizin %15 veya altına inmesi, böylece stoğun ortalama reel faizinin değişmemesi halinde, borcun sürdürülebilirliği konusunda problem yaşamayacağını göstermektedir. Ancak 2003 Ocak ayı ihalelerinde ortaya çıkan %25 düzeyindeki reel faizin düşürülmesi gereği vardır. Bunun için de Mayıs 2001'de başlatılan Güçlü İstikrar Programı'nın ödün verilmeden ciddi bir şekilde uygulanması gerekmektedir. Ancak bu şekilde güven ortamı tesis edilebilecek ve risk primini temsil eden reel faizlerde düşüş sağlanabilecektir.