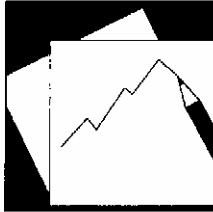


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Fiscal Sustainability—The Case of Eritrea

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IMF Working Paper

African Department

Fiscal Sustainability—The Case of Eritrea

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Abstract

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The paper examines fiscal sustainability issues for the case of Eritrea but has wider implications for addressing fiscal and debt sustainability. It begins with a formal definition and explanation of analytical sustainability indicators, followed by an assessment of the causes of fiscal deficits and their impact on the usual indicators of fiscal and external debt sustainability. The paper then goes beyond the usual analytical indicators by attempting to identify how and through which channels fiscal and other economic policies have affected the behavior of endogenous variables that in one way or another influence sustainability.

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I.	Introduction.....	3
II.	The Importance of Fiscal Sustainability	3
A.	Definition of sustainability	3
B.	Discussion of key variables influencing sustainability	5
C.	Links between fiscal and external debt sustainability.....	7
III.	Public Finance: Developments and Trends.....	8
A.	Key fiscal indicators	8
B.	Indicators of fiscal sustainability	10
C.	Government assets and liabilities.....	12
D.	Key macroeconomic developments and policies.....	14
IV.	Responses to Fiscal Policy and Management	17
A.	Key response variables and their effect on sustainability	17
B.	Influence of nominal rigidities and policies taken to minimize endogenous effects.....	20
V.	Restoring Sustainability	21
A.	Sustainability gap indicators.....	21
B.	Scenarios and sensitivity analysis.....	24
C.	Key policies needed to restore sustainability.....	24
Figure		
1.	Fiscal Policies and the Sustainability of Public Finances.....	18
Tables		
1.	Key Fiscal Indicators, 1993-2002.....	9
2.	Indicators of Fiscal Sustainability, 1993-2002	11
3.	Assets and Liabilities of Government, 1993-2002	13
4.	Key Economic Developments, 1993-2002	15
5.	Sustainability Indicators, 1993-2002	22
6.	Minimum Primary Balance and Adjustment Required—Status Quo.....	23
7.	Minimum Primary Balance—Sensitivity Analysis, 2002-2020	25
Annex		
	Measures of Fiscal Sustainability Gaps	27
	References.....	28

I. INTRODUCTION

1. Following a promising start after independence in 1993, the war with Ethiopia during 1998-2000 drastically changed the performance of the Eritrean economy: GDP declined, inflation rose, the external current account worsened, international reserves were nearly depleted, and banking assets were severely compromised. However, the most significant change was the sharp deterioration of the public finances and rapid increase in domestic and external public debt, as a result of both war-related factors and policy decisions.
2. Against the backdrop of these developments, the purpose of this paper is to examine developments in Eritrea's public finances with respect to their sustainability. Problems with sustainability could arise as the direct result of fiscal policies or indirectly through the changes in key variables or behavioral responses that government policies might induce. This paper will give considerable attention to the identification of these responses.
3. The paper is organized as follows: In the next section, the sustainability of the public finances will be more formally defined and explained. In Section III, developments in key indicators affecting sustainability will be described and analyzed against the background of the economic policies of the authorities and developments in exogenous variables. Section IV attempts to identify endogenous responses to developments in the variables that directly affect sustainability, and draws inferences about the prospective responses under unchanged policies. Finally, Section V discusses possible policy adjustments for restoring sustainability.

II. THE IMPORTANCE OF FISCAL SUSTAINABILITY

A. Definition of sustainability

4. In the most general terms, sustainability is said to exist when the present value of budget constraint (PVBC) is satisfied without a major and abrupt correction having to be made in the balance of income and expenditure to avoid solvency and liquidity problems. Solvency, in turn, is ensured when the present value of current and future primary expenditure is not greater than that of current and future streams of income, net of any initial indebtedness, that is,

$$\sum_{i=0}^{\infty} \frac{E_{t+i}}{\prod_{j=1}^i (1+r_{t+j})} \leq \sum_{i=0}^{\infty} \frac{Y_{t+i}}{\prod_{j=1}^i (1+r_{t+j})} - (1+r_t)D_{t-1}, \quad (1)$$

where E_t is the primary expenditure (i.e., total expenditure minus interest payment) at period t , Y_t is the income (GDP for a country), D_{t-1} is the beginning-period stock of debt at period $t-1$, and r_t is the nominal interest rate. Liquidity exists when liquid assets and available financing are sufficient to meet or roll over maturing liabilities, regardless of whether the solvency condition is satisfied.

5. On the basis of this general definition, fiscal sustainability can be said to exist when government policies satisfy the PVBC, which is defined as follows:

$$D_t = \sum_{i=0}^{\infty} \frac{PB_{t+i}}{\prod_{j=0}^i (1+r_{t+j})} = \sum_{i=0}^{\infty} \frac{Z_{t+i}}{\prod_{j=0}^i (1+r_{t+j})} - \sum_{i=0}^{\infty} \frac{E_{t+i}}{\prod_{j=0}^i (1+r_{t+j})}, \quad (2)$$

where D_t is the beginning-period stock of government debt at period t , PB_t is the primary balance, Z_t is government revenue (including grants), E_t is the primary expenditure (i.e., total expenditure minus interest payment), and r_t is the nominal interest rate. Equation (2) states that the value of today's government debt must be matched by (or smaller than) an excess of future primary surpluses over primary deficits in present value terms. Temporary deficits can, therefore, be accepted as long as they are eventually offset by the sum of future primary surpluses.

6. If equation (2) is expressed in terms of the ratio of the variables to GDP, the PVBC becomes

$$d_t = \sum_{i=0}^{\infty} \frac{\prod_{k=1}^i (1+n_{t+k})}{\prod_{j=0}^i (1+r_{t+j})} pb_{t+i} = \sum_{i=0}^{\infty} \frac{\prod_{k=1}^i (1+n_{t+k})}{\prod_{j=0}^i (1+r_{t+j})} z_{t+i} - \sum_{i=0}^{\infty} \frac{\prod_{k=1}^i (1+n_{t+k})}{\prod_{j=0}^i (1+r_{t+j})} e_{t+i}, \quad (2a)$$

where lower letters correspond to the ratio of the variables to GDP and n_t is the nominal growth of GDP. In this formulation, the critical influence on sustainability of the performance of the economy (growth of GDP) becomes clear.

7. Equation (2) can be modified to take account the situation of both domestic and external debt as follows:

$$D_t = DD_t + \varepsilon_t DE_t = \sum_{i=0}^{\infty} \left(\frac{(1-\lambda_{t+i})}{\prod_{j=0}^i (1+r_{t+j})} + \frac{\lambda_{t+i} \varepsilon_t \prod_{j=0}^i (1+q_{t+j})}{\prod_{j=0}^i (1+r_{t+i}^*)} \right) PB_{t+i}, \quad (3)$$

where DD_t is the beginning-period stock of government domestic debt denominated in local currency at period t , DE_t is the beginning-period stock of government external debt denominated in foreign currency, ε_t is the nominal exchange rate (local currency per foreign currency), λ_t is the share of external borrowing in financing the primary balance, q_t is the rate of appreciation of the nominal exchange rate, and r_t^* is the nominal interest rate on external debt. Expressed in terms of the ratio of the variables to GDP, equation (3) becomes

$$d_t = dd_t + \varepsilon_t de_t = \sum_{i=0}^{\infty} \left(\frac{(1-\lambda_{t+i})}{\prod_{j=0}^i (1+r_{t+j})} + \frac{\lambda_{t+i} \varepsilon_t \prod_{j=0}^i (1+q_{t+j})}{\prod_{j=0}^i (1+r_{t+i}^*)} \right) \prod_{k=1}^i (1+n_{t+k}) pb_{t+i}. \quad (3a)$$

8. Equations(3) and (3a) indicate that the key variables determining the sustainability of the public finance (debt sustainability) are government revenue, primary expenditure, the domestic/external debt stock, the domestic/foreign nominal interest rate, the nominal exchange rate, real GDP growth, and the inflation rate. For the assessment of sustainability, it will, therefore, be necessary to understand the importance of these variables and the factors, including government policies, that affect their values.

B. Discussion of key variables influencing sustainability

Revenue

9. In the case of Eritrea, revenue Z consists of tax and nontax revenue T , exceptional revenue ER , such as receipts from privatization and external grants from donors and the Eritrean diaspora G .² Total revenue therefore is

$$Z_t = T_t + ER_t + G_t . \quad (4)$$

Tax revenue is a function of tax rate t and the tax base TB , which in the general terms is a function of GDP. Thus,

$$T_t = tTB(Y_t) . \quad (5)$$

10. Unless domestic tax rates are raised or tax administration improves, GDP growth determines the level of tax revenue, and policies to enhance growth are therefore critical for fiscal sustainability. Customs revenue and port fees and charges, which are very important in Eritrea, are determined by trade activities and relations, and an increase in trade would not only raise domestic revenue but also relieve the foreign reserve constraint. Progress in privatization is the dominant factor affecting exceptional revenues. Finally, external grants are primarily influenced by the relationship with donors and the diaspora and by special factors, such as development programs, drought, and other calamities.

Primary expenditure

11. Primary expenditure E can be broken down into three types of components: primary current expenditure, excluding interest payments, C ; capital expenditure (investment) I ; and spending under special programs SP . Accordingly,

$$E = C + I + SP . \quad (6)$$

12. In the case of Eritrea, primary current expenditure is mainly composed of wages and materials and services (defense and nondefense), as well as government grants and contributions (for ex-soldiers and for food assistance). At present, the amount of defense spending depends significantly on the progress with demobilization. Capital expenditure is

² The Eritrean diaspora is a community of Eritrean people outside the country who generously support their families and relatives in Eritrea with recurrent transfers. During the war of 1998-2000, they also provided significant financing to the government in the form of grants and loans. For the scale of their contribution, see Table 1 and Paragraph 41.

dominated by the government's reconstruction efforts and donor-financed development projects. The latter will not influence the fiscal balance, but they will affect sustainability if debt financed. Special program spending consists of spending on the Emergency Reconstruction Program (ERP), demobilization, and humanitarian assistance, and is entirely donor financed, including by grants.

Domestic/external debt stock

13. The total debt of Eritrea consists of domestic and foreign debt, and can be defined as follows:

$$D_t = DD_t + \varepsilon_t DE_t = (1 + r_t)DD_{t-1} - (1 - \lambda_t)PB_t + \varepsilon_t(1 + r_t^*)DE_{t-1} - \lambda_t PB_t, \quad (7)$$

where r_t is the interest rate on domestic debt and r_t^* is the interest rate on foreign debt, and the primary balance PB_t is financed either domestically or externally. The debt stock in every period is therefore equal to the stock at the end of the preceding period and interest payments on this debt, plus any primary deficit in the current period. Apart from the primary balance, the debt stock is also affected by exchange rate and interest rate developments, which are, in turn, affected by fiscal policies and the sustainability of public finance itself, as much as by economic activities and external developments and the expectations they generate.

Nominal interest rate

14. Equations (3) and (3a) indicate that sustainability is critically dependent on the domestic and foreign interest rates on public debt. In particular, the higher these interest rates, the larger the primary surplus must be to repay the initial debt stock. The domestic interest rate on government securities is administratively fixed in Eritrea, and no market mechanism functions as to government borrowings. The real interest rate is, therefore, often negative as a result of high inflation. The domestic interest rate is currently clearly below equilibrium, and, correspondingly, a substantial debt-service cost would emerge were the rate to be raised or freed. While this fact may be seen as an argument against freeing the domestic interest rate, it must be judged against the efficiency gains to be realized from market-determined interest rates. The interest rate on external debt is by and large the concessionally fixed donor rate, while borrowings from non-Paris club members and the diaspora entail different rate profiles and more closely reflect market risk.

Nominal exchange rate

15. The exchange rate plays a critical role in the determination of the external debt and debt service burden, as well as the sustainability of both, first because of its direct effect on their size and, second, because of its effect on competitiveness and growth. The equilibrium exchange rate generally reflects macroeconomic policies and developments, including fiscal policies and their sustainability, and is also a function of investors' confidence. The current exchange rate system in Eritrea is close to that of a conventional peg, at least as far as official transactions are concerned. Although the rate is allowed to respond to market forces, the current arrangement bears a substantial risk of depreciation, especially because of the large

external deficits and low level of official reserves. Should such an adjustment occur, the foreign-currency-denominated debt would swell unless debt relief could be secured. At the same time, a market-determined exchange rate would strengthen the country's exports and growth.

Real GDP growth

16. Real GDP affects not only the ratios to GDP of a number of variables of sustainability but also the development of key constituent variables of fiscal sustainability, for example, tax revenues, inflation, and the exchange rate. The behavior of GDP is, therefore, critical for the maintenance of fiscal sustainability, and all economic policies affecting the growth of GDP therefore simultaneously affect fiscal and external sustainability. In the current situation, the growth of real GDP depends in large measure on the pace of demobilization, reconstruction efforts by the government, structural reforms conducive to private sector growth, developments in the foreign exchange markets and the financial sector, and macroeconomic stability.

Inflation

17. Inflation would have no impact on the real economy if markets functioned properly, that is, the nominal interest rate and the exchange rate kept their real rates unchanged by reflecting inflation developments. However, inflation does have an impact on fiscal sustainability, positively in the short term if nominal rigidities prevail and prevent those variables from regaining their equilibrium values. In particular, while ratios of debt to GDP decline when the nominal interest rate and exchange rate are administratively fixed, as in the case of Eritrea, the related rigidities impair economic growth.

C. Links between fiscal and external debt sustainability

18. As described above, any primary deficit needs to be financed either domestically or externally. When one source of finance is insufficient, the other must expand. External borrowing directly reduces external sustainability. At the same time, an expansion in domestic credit will increase imports and thereby reduce the amount of foreign exchange available to the domestic economy. Domestic financing may also cause a rise in inflation and increase pressure for an exchange rate depreciation. Domestic financing is, therefore, no panacea for the problems of external sustainability.

19. For a country like Eritrea, the external budget constraint is more likely to be binding than the domestic financing constraint because the country does not issue a convertible currency and its access to foreign lending is limited. It is, therefore, particularly important to assess the linkage between fiscal and external debt sustainability.

20. External debt sustainability is generally defined as the following:

$$F_t = \sum_{i=0}^{\infty} \frac{\prod_{k=1}^i (1 + q_{t+k})}{\prod_{j=0}^i (1 + r_{t+j}^*)} CA_{t+i}, \quad (8)$$

where F_t is the gross foreign liabilities of a country denominated in foreign currency terms and CA_t is the (primary) current account balance in domestic currency terms. Equation (8) indicates that today's external debt must be matched by the present value of future (primary) current account surpluses (excess of surpluses over deficits). The large and chronic current account deficit in Eritrea suggests a violation of external debt sustainability and the need for major and abrupt corrections in imports in the absence of large and stable flows of official and private transfers.

21. Equation (8) can be explained further by reference to the national income identity:

$$CA_t = PB_t + S_t^P - I_t^P, \quad (9)$$

where S_t^P is private saving at period t and I_t^P is private investment. The equation indicates that the external current account balance is equal to the sum of the saving-investment balance of the public sector and that of the private sector. Because the public sector saving-investment balance is equal to the primary deficit, the link between fiscal sustainability and external sustainability becomes clear.

III. PUBLIC FINANCES: DEVELOPMENTS AND TRENDS

A. Key fiscal indicators

22. Developments in government revenue, expenditure, and financing, as well as different concepts of fiscal deficit in Eritrea, are reported in Table 1. The key factors that affected fiscal variables and sustainability of the public finances over the period of observation were the following:

- The war with Ethiopia during 1998-2000 dominated developments in the fiscal sector: revenues declined and expenditure increased sharply, and fiscal deficits reached extreme proportions.
- Total revenue (excluding grants), which until 1998, had averaged some 35 percent of GDP, plummeted to some 25 percent of GDP in 2000, driven entirely by the sharp decline in nontax revenue; this revenue consisted mainly of port fees from Ethiopia as

Table 1. Eritrea: Key Fiscal Indicators, 1993-2002
(In percent of GDP, unless otherwise indicated)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Total revenue and grants 1/	56.8	50.1	48.4	42.1	46.9	42.6	41.5	44.8	42.6	37.9
Revenue 1/	36.2	31.1	36.1	31.3	41.1	33.3	33.3	25.3	24.9	25.5
Tax revenue	21.0	19.9	19.2	18.7	19.3	17.7	17.0	15.8	16.5	17.0
Direct taxes	7.3	9.6	9.1	8.6	9.0	9.3	8.7	7.6	7.4	6.1
Indirect taxes	13.7	10.4	10.1	10.2	10.3	8.4	8.4	8.2	9.1	10.9
Nontax revenue	15.2	10.1	16.9	12.5	21.4	10.8	10.0	12.9	6.9	8.0
Port fees and charges	9.9	4.6	6.3	6.4	8.9	1.8	1.8	1.0	1.3	1.6
Contributions and other	5.3	5.5	10.6	6.1	12.4	9.0	8.2	12.0	5.5	6.4
Exceptional revenues 1/	0.0	1.1	0.0	0.1	0.4	4.8	6.3	-3.5	1.6	0.5
Extraordinary revenue	0.0	0.0	0.0	0.0	0.0	2.1	4.6	5.2	2.3	0.3
Privatization	0.0	1.1	0.0	0.1	0.4	2.7	1.6	-8.7	-0.6	0.2
Grants	20.6	19.0	12.3	10.8	5.8	9.4	8.2	19.4	17.7	12.4
Contribution from diaspora	0.0	0.0	0.0	0.0	0.0	1.1	2.2	3.2	0.5	0.2
Grants in kind/earmarked	20.6	19.0	12.3	10.8	5.8	8.3	6.0	16.3	17.2	12.2
Total expenditure and net lending, incl. special programs	63.2	61.5	71.9	61.4	52.1	77.9	93.8	85.5	78.1	67.9
Total expenditure and net lending, excl. special programs	53.5	43.0	66.2	56.7	51.4	76.3	91.4	66.7	58.5	57.3
Current expenditure	35.0	29.3	51.5	37.7	28.4	50.3	53.7	54.3	42.3	40.5
Wages, salaries, and allowances	9.5	14.0	17.5	18.0	14.2	15.5	16.4	21.1	15.0	16.3
Materials and services	22.2	13.0	22.7	16.2	10.4	30.4	31.4	24.7	18.1	16.5
Subsidies	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.8	0.0
Pensions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.2
Interest	0.0	0.1	0.5	0.8	1.0	1.2	1.9	2.8	3.4	3.9
Domestic	0.0	0.1	0.5	0.8	1.0	1.1	1.7	2.5	2.6	2.6
External	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.8	1.2
Grants and contributions	3.3	2.2	10.9	2.8	2.8	3.2	4.1	4.9	3.7	3.6
Capital expenditure	18.5	13.8	15.6	19.6	23.1	26.0	37.5	11.7	17.5	16.9
Central treasury	3.6	3.9	6.7	11.9	13.8	10.6	19.3	4.8	6.9	7.0
Externally financed	14.8	9.8	8.9	7.7	9.2	15.4	18.2	7.0	10.5	10.0
Net lending	0.0	0.0	-0.9	-0.7	-0.1	0.0	0.1	0.7	-1.3	-0.1
Special programs	9.8	18.5	5.7	4.7	0.7	1.6	2.4	18.8	19.6	10.6
ERP	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	8.3	5.1
Demobilization	4.0	4.7	1.1	0.3	0.0	0.0	0.0	0.0	0.1	0.1
Humanitarian	5.8	13.8	4.6	4.4	0.7	1.6	2.4	15.6	11.1	5.4
Domestic balance	-2.4	-3.2	-21.2	-17.8	-1.5	-30.2	-41.3	-25.5	-21.6	-20.8
Overall balance, excl. special programs and grants	-17.2	-11.9	-30.1	-25.3	-10.4	-43.0	-58.1	-41.4	-33.6	-31.8
Overall balance, excl. special programs and incl. grants	3.4	7.1	-17.8	-14.5	-4.6	-33.6	-49.9	-22.0	-15.9	-19.4
Primary balance, incl. special programs and excl. grants	-27.0	-30.3	-35.4	-29.2	-10.0	-43.5	-58.6	-57.4	-49.7	-38.5
Primary balance, incl. special programs and grants	-6.4	-11.3	-23.1	-18.4	-4.2	-34.1	-50.4	-38.0	-32.0	-26.1
Financing	-0.4	10.5	19.3	17.9	7.7	34.5	51.6	41.2	32.9	30.2
External (net)	0.1	4.7	1.2	1.2	4.1	3.7	8.7	8.6	13.5	10.2
Official (net)	0.1	4.7	1.2	1.2	4.1	3.5	5.6	6.2	12.4	7.4
Bilateral	0.0	0.5	0.0	0.0	0.4	1.4	2.0	0.7	0.0	0.3
Multilateral	0.5	3.0	0.9	0.5	0.7	2.1	3.7	5.6	12.4	7.7
Borrowings from diaspora (net)	0.0	0.0	0.0	0.0	0.0	0.1	3.1	0.9	0.1	-0.6
Rescheduled and debt forgiveness	0.0	0.0	0.0	0.0	0.0	0.1	0.0	1.5	1.0	3.3
Domestic (net)	-0.5	5.8	18.0	16.7	3.6	30.8	42.9	32.6	19.5	20.0
Banking system	-0.5	5.8	18.0	16.7	3.6	30.8	42.9	32.1	19.5	20.0
Central bank	-0.5	5.8	18.0	16.7	3.6	-5.2	27.4	9.4	11.1	12.0
Commercial banks	0.0	0.0	0.0	0.0	0.0	36.0	15.5	22.7	8.3	8.0
Nonbanks 2/	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0
Errors and omissions	6.8	0.8	3.8	0.5	-3.5	-0.4	-1.2	-3.2	-0.9	-4.1
Memorandum items:										
Domestic borrowing of government 3/	-7.5	39.1	56.0	58.5	21.2	68.2	107.3	109.9	43.7	76.5
Excess reserves of the banking system 4/	-51.0	37.3	39.0	59.6	93.0	19.9	18.7	14.3	3.6	2.5
Port fees and charges (in percent of total revenue)	27.4	14.9	17.4	20.3	21.7	5.4	5.4	3.8	5.3	6.4
Grants (in percent of total revenue and grants)	36.2	37.9	25.4	25.6	12.4	22.0	19.7	43.4	41.5	32.7
Wages 5/	17.7	32.5	26.4	31.8	27.6	20.3	18.0	31.6	25.7	28.4
Interest 5/	0.1	0.2	0.7	1.4	1.9	1.6	2.1	4.2	5.9	6.7
Capital expenditure 5/	34.6	32.0	23.6	34.6	44.9	34.1	41.1	17.6	29.8	29.5
Defense expenditure 5/	...	...	...	21.1	12.7	35.0	37.2	35.8	24.2	23.3

Sources: Ministry of Finance; Bank of Eritrea; and IMF staff estimates.

1/ Including privatization receipts.

2/ Excluding privatization receipts.

3/ In percent of total loans of the banking system.

4/ In percent of net domestic credit.

5/ In percent of total expenditure, excluding special programs.

a result of the cessation of transshipments through the port of Massawa and Assab by landlocked Ethiopia. After the war, total revenue did not recover because the surtax collected during the conflict was gradually lifted, leading to a loss of revenue of some 5 percent of GDP. On the basis of the current revenue system, no major recovery of revenue to prewar levels can be expected. However, external grants for reconstruction and humanitarian purposes sharply increased following the cessation of hostilities in 2000, keeping total revenue and grants at about the same level as in the previous years.

- Total expenditure, which had fluctuated between 43 percent of GDP in 1994 and 66 percent in 1995, exceeded 90 percent of GDP in 1999 during the height of the war with Ethiopia. At the same time, primary current expenditure increased from 30 percent of GDP to more than 50 percent. All measures of fiscal balance worsened markedly with the onset of war in 1998. In particular, the overall deficit (excluding grants and special programs) widened to 58 percent of GDP in 1999 and remained above the prewar levels of 12-30 percent of GDP. The same pattern applies to the primary balance, the major determinant of fiscal sustainability.
- The deficit financing of the Eritrean government is characterized by the large recourse to domestic credit and diaspora financing during the war, and by the substantial increase in external assistance for reconstruction thereafter. Financing of the government from domestic sources reached 43 percent of GDP in 1999 and amounted to a cumulative total of 106 percent of GDP during 1998-2000. Moreover, in 1999, credit to the government accounted for more than 100 percent of the increase in domestic credit of the banking system. This development sharply reduced excess liquidity in the financial system and crowded out private sector credit demand, which, in turn, impaired private sector growth and development.

23. On balance, then, fiscal indicators deteriorated substantially as a result of the war. Their impact on fiscal sustainability was aggravated by the deterioration of conditions for growth, as well as the weakening of confidence, including among investors and donors.

B. Indicators of fiscal sustainability

24. Developments in key debt and debt-service ratios affecting fiscal sustainability are presented in Table 2. On balance, they suggest the following broad conclusions:

- Debt indicators have worsened significantly since 1998. As a result of the large fiscal deficits discussed above, the overall public debt-to-GDP ratio jumped from less than 10 percent in 1994 to 42 percent in 1997, and 77 percent in 1998, before reaching some 200 percent of GDP in 2002. The increase in debt was driven mainly by the accumulation of domestic debt. However, external debt and debt-service ratios also

Table 2. Eritrea: Indicators of Fiscal Sustainability, 1993-2002
(In percent of GDP, unless otherwise indicated)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Fiscal balance, excl. grants and special programs										
Overall balance	-17.2	-11.9	-30.1	-25.3	-10.4	-43.0	-58.1	-41.4	-33.6	-31.8
Primary balance	-17.2	-11.8	-29.7	-24.5	-9.4	-41.8	-56.2	-38.6	-30.1	-27.9
Fiscal balance, incl. grants and special programs										
Overall balance	-6.4	-11.4	-23.5	-19.2	-5.2	-35.3	-52.3	-40.8	-35.4	-30.0
Primary balance	-6.4	-11.3	-23.1	-18.4	-4.2	-34.1	-50.4	-38.0	-32.0	-26.1
Public debt										
Domestic debt	-3.7	8.6	26.9	38.4	41.5	77.1	134.2	177.3	180.7	201.8
External debt	-4.2	2.7	20.3	31.7	30.5	58.2	96.7	125.9	119.9	123.2
External debt	0.5	5.9	6.6	6.7	11.0	18.8	37.5	51.4	60.8	78.6
Net present value of public external debt (NPVX)										
In percent of exports of goods and services 1/	0.4	2.6	3.4	3.7	7.0	11.8	23.3	31.9	36.0	43.9
In percent of domestic revenue 2/	2.0	13.0	14.7	14.9	25.2	51.7	135.4	225.9	247.8	198.3
In percent of domestic revenue 2/	1.8	13.2	17.6	19.6	36.2	66.9	137.0	201.2	218.7	257.5
Debt service										
Domestic debt service (in percent of domestic revenue) 2/	0.0	0.1	0.2	0.2	0.3	0.5	3.0	4.1	7.6	19.5
External debt service (in percent of exports of goods and services) 1/	-6	-16	42	163	179	299	583	876	1,130	1,080
Memorandum items:										
Real GDP (annual percentage change)	13.3	21.3	2.9	9.3	7.9	1.8	0.0	-13.1	10.2	1.8
Exports of goods and services (in millions of U.S. dollars)	93.3	144.3	171.4	200.2	203.3	110.4	65.7	97.5	147.5	184.4
Gross foreign reserves of the central bank 3/	3.9	5.0	4.1	3.8	5.0	1.4	1.1	0.9	1.1	0.7
External public debt (in millions of U.S. dollars)	0.5	5.9	6.6	6.7	11.0	18.8	37.5	51.4	60.8	78.6
External debt service / external debt (in percent)	0.0	0.4	0.9	0.8	0.7	0.6	1.4	1.1	1.8	5.5
Exchange rate (in nakfa per U.S. dollar, average)	5.2	6.2	6.3	6.4	7.2	7.4	8.2	9.6	10.9	14.0
Exchange rate (1993=100)	100.0	117.8	120.5	121.6	137.7	141.0	155.9	183.6	208.4	266.9
Changes in debt-to-GDP ratio										
Domestic	...	12.3	18.4	11.5	3.1	35.6	57.1	43.1	3.5	21.1
External	...	6.9	17.7	11.4	-1.2	27.7	38.5	29.2	-6.0	3.3
External	...	5.4	0.7	0.1	4.3	7.8	18.7	13.9	9.5	17.8
<i>Of which: due to new borrowings</i>	...	8.1	19.0	15.4	5.5	36.2	54.1	37.9	26.6	24.2
Domestic	...	5.8	18.0	14.6	2.2	30.8	42.9	32.6	19.5	20.0
External	...	2.3	1.0	0.8	3.3	5.4	11.3	5.4	7.1	4.2
<i>Of which: due to changes in GDP</i>	...	0.9	-1.0	-4.3	-4.2	-4.2	-5.8	-4.7	-35.8	-25.2
Domestic	...	1.1	-0.3	-3.3	-3.4	-3.1	-4.4	-3.4	-25.4	-16.7
External	...	-0.1	-0.7	-1.1	-0.7	-1.1	-1.4	-1.3	-10.4	-8.5
<i>Of which: due to changes in exchange rate</i>	...	3.2	0.4	0.4	1.7	3.6	8.8	9.8	12.7	22.0
Changes in NPVX of debt-to-exports ratio										
Due to changes in NPV of debt	...	11.0	1.7	0.2	10.3	26.5	83.7	90.5	21.9	-49.5
Due to changes in NPV of debt	...	11.3	4.4	3.2	11.9	23.5	65.4	38.1	48.9	19.0
Due to changes in exports	...	-0.3	-2.6	-3.0	-1.5	3.0	18.3	52.4	-26.9	-68.5

Sources: Ministry of Finance; Bank of Eritrea; and IMF staff estimates.

1/ Three-year-average of exports of goods and services used.

2/ Domestic revenue excludes exceptional revenue. Maturity is six months, while principal has never been repaid.

3/ In months of imports of goods and services.

increased sharply, not only because of new external borrowing but also because of the depreciation of the exchange rate of the nakfa.³

- The net present value (NPV) of external public debt also increased sharply in 1999 and 2000 in terms of both exports of goods and services and domestic revenue, owing largely to new external borrowings but also because of the significant decline in exports and domestic revenue. Because of the largely concessional nature of loans to Eritrea, its NPV amounted to only 44 percent of GDP in 2002, while the external debt stood at 79 percent of GDP.

C. Government assets and liabilities

25. Debt and debt-service ratios give an incomplete picture of the sustainability problems they raise. To obtain a more accurate picture, these ratios need to be examined with respect to the uses of the financing on which they are based. Clearly, for the same debt ratios, sustainability is more of a problem if the financing has been used for consumption rather than investment. It is, therefore, important to examine whether, and to what extent, the increase in indebtedness of government has financed investment in both physical and human capital. This assessment is critical because such investments strengthen the productive capacity of the country and thereby improve sustainability through their effect on potential output. To assess these issues for the case of Eritrea, an attempt has been made to measure changes in the country's physical and human capital stock since independence in 1993 (Table 3). In the estimation, the government assets are assumed to consist of three kinds: physical capital, human capital, and government deposits.⁴ Physical and human capital stock is calculated based on the annual investment flow net of depreciation and war damage. The major findings are follows:

- Following independence in 1993, Eritrea's physical and human capital stock increased dramatically, reaching a cumulative level of 147 percent of GDP in 1999, despite increasing war damage. This substantially increased the growth potential of the country and strengthened fiscal and external sustainability.
- Following the eruption of hostilities with Ethiopia in 1998, net assets of the government declined substantially because new borrowing largely surpassed the increase in assets, resulting in a negative net worth of government by 2000.⁵

³ For a breakdown of the components of the increase in debt ratios, see the memorandum items in Table 2.

⁴ The calculations in Table 3 are indicative only because it is practically impossible to obtain the "correct," or market-determined, values of government assets as most of them are by nature not transacted in the market.

⁵ However, because of the absence of data on government assets and liabilities, the analysis starts artificially with a zero net worth at the time of independence.

Table 3. Eritrea: Assets and Liabilities of Government, 1993-2002

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
(In millions of nakfa)										
Net assets	702	975	996	1,379	2,510	1,987	768	-2,069	-2,812	-4,670
Government assets	610	1,258	1,999	3,083	4,574	6,248	8,795	8,922	11,233	13,556
Physical capital stock 1/	442	870	1,409	2,212	3,262	4,476	6,401	6,477	8,235	9,928
Gross capital formation	455	454	582	869	1,148	1,437	2,246	925	2,005	1,991
Depreciation 2/	-13	-26	-42	-66	-98	-134	-192	-194	-247	-298
War damage 3/	...	...	...	...	...	-90	-128	-655	...	...
Human capital stock 1/	65	165	337	464	685	943	1,215	1,478	1,758	2,052
Gross capital formation	65	100	173	127	220	259	272	263	280	294
Government deposits	104	223	253	407	627	829	1,179	966	1,240	1,575
Public liabilities	-91	283	1,003	1,704	2,063	4,261	8,028	10,991	14,046	18,226
Domestic debt	-104	88	757	1,405	1,517	3,221	5,786	7,806	9,318	11,128
External debt	13	195	247	299	547	1,041	2,242	3,186	4,728	7,098
(In percent of GDP)										
Net assets	28.5	29.6	26.7	31.1	50.5	35.9	12.8	-33.4	-36.2	-51.7
Government assets	24.8	38.1	53.7	69.5	91.9	113.0	147.0	143.9	144.6	150.1
Physical capital stock 1/	17.9	26.4	37.8	49.9	65.6	80.9	107.0	104.5	106.0	109.9
Gross capital formation	18.5	13.8	15.6	19.6	23.1	26.0	37.5	14.9	25.8	22.0
Depreciation 2/	-0.5	-0.8	-1.1	-1.5	-2.0	-2.4	-3.2	-3.1	-3.2	-3.3
War damage 3/	...	...	...	...	...	-1.6	-2.1	-10.6	...	...
Human capital stock 1/	2.6	5.0	9.1	10.5	13.8	17.1	20.3	23.8	22.6	22.7
Gross capital formation	2.6	3.0	4.6	2.9	4.4	4.7	4.6	4.2	3.6	3.3
Government deposits	4.2	6.8	6.8	9.2	12.6	15.0	19.7	15.6	16.0	17.4
Public liabilities	-3.7	8.6	26.9	38.4	41.5	77.1	134.2	177.3	180.7	201.8
Domestic debt	-4.2	2.7	20.3	31.7	30.5	58.2	96.7	125.9	119.9	123.2
External debt	0.5	5.9	6.6	6.7	11.0	18.8	37.5	51.4	60.8	78.6
(In millions of nakfa)										
Memorandum items:										
Physical capital expenditure 4/	455	454	582	869	1,148	1,437	2,246	925	2,005	1,991
Central treasury	89	130	249	529	688	584	1,157	493	559	665
Externally financed	366	324	333	340	460	853	1,089	432	1,446	1,326
Human capital expenditure 5/	65	100	173	127	220	259	272	263	280	294
Education	46	65	98	71	139	159	169	164	182	183
Health	18	35	75	56	81	99	103	99	98	111
Borrowing for consumption (flow) 6/	-530	-208	-37	-201	-985	202	382	1,218	192	196
Borrowing for consumption (cumulative) 7/	-530	-738	-775	-976	-1,961	-1,759	-1,376	-158	34	230
Total capital spending	520	554	755	996	1,368	1,696	2,518	1,188	2,285	2,285
Physical capital expenditure	455	454	582	869	1,148	1,437	2,246	925	2,005	1,991
Human capital expenditure	65	100	173	127	220	259	272	263	280	294
Total borrowing	-11	346	718	795	384	1,898	2,900	2,406	2,477	2,481
Domestic borrowing	-12	192	672	740	179	1,704	2,565	2,019	1,512	1,810
External borrowing	1	154	46	55	205	194	335	387	964	671
(In percent of GDP)										
Physical capital expenditure 4/	18.5	13.8	15.6	19.6	23.1	26.0	37.5	14.9	25.8	22.0
Central treasury	3.6	3.9	6.7	11.9	13.8	10.6	19.3	8.0	7.2	7.4
Externally financed	14.8	9.8	8.9	7.7	9.2	15.4	18.2	7.0	18.6	14.7
Human capital expenditure 5/	2.6	3.0	4.6	2.9	4.4	4.7	4.6	4.2	3.6	3.3
Education	1.9	2.0	2.6	1.6	2.8	2.9	2.8	2.6	2.3	2.0
Health	0.7	1.1	2.0	1.3	1.6	1.8	1.7	1.6	1.3	1.2
Borrowing for consumption (flow)	-21.5	-6.3	-1.0	-4.5	-19.8	3.6	6.4	19.6	2.5	2.2
Borrowing for consumption (cumulative)	-21.5	-22.4	-20.8	-22.0	-39.4	-31.8	-23.0	-2.6	0.4	2.5
Total capital spending	21.1	16.8	20.3	22.4	27.5	30.7	42.1	19.2	29.4	25.3
Physical capital expenditure	18.5	13.8	15.6	19.6	23.1	26.0	37.5	14.9	25.8	22.0
Human capital expenditure	2.6	3.0	4.6	2.9	4.4	4.7	4.6	4.2	3.6	3.3
Total borrowing	-0.4	10.5	19.3	17.9	7.7	34.3	48.5	38.8	31.9	27.5
Domestic borrowing	-0.5	5.8	18.0	16.7	3.6	30.8	42.9	32.6	19.5	20.0
External borrowing	0.1	4.7	1.2	1.2	4.1	3.5	5.6	6.2	12.4	7.4

Sources: Ministry of Finance; Bank of Eritrea; and IMF staff estimates.

1/ End-year stock. Initial capital stock at end-1992 is assumed to be none. No depreciation is assumed for human capital.

2/ Assumed at 3 percent of the current period capital stock.

3/ Total damage is estimated from the study in July 2000 by the University of Asmara. Assumed at 2 percent of capital stock in 1998 and 1999 and the rest in 2000.

4/ Including capital spending related to Emergency Reconstruction Project (ERP).

5/ Only current expenditure. Including externally financed spending up to 1999.

6/ Positive numbers indicate that the borrowing for consumption in the year was higher than that for investment, while the negative numbers indicate the opposite.

7/ Not adjusted for exchange rate movement.

- The drastic change in the net asset position of the government reflects in good measure the shift in the use of borrowings from investment to consumption, notably for defense spending, which reached 20 percent of GDP in 2000.

26. On balance, then, the productive capacity of Eritrea and the related sustainability of its public finances and external debt, which had improved significantly until 1997, deteriorated substantially during the war years and have yet to recover.

D. Key macroeconomic developments and policies

27. Apart from the fiscal variables discussed above that influence sustainability directly and indirectly, the equations on fiscal and external sustainability point to other key economic variables that can have a substantial impact on sustainability measures. These include, above all, economic growth and inflation, as well as external competitiveness and export performance; also important are changes in monetary and exchange rate policies that may become necessary to “correct,” offset, or accommodate the impact of fiscal policies. In addition, special factors, such as drought or the war, have a key impact on the economy and sustainability. Developments and influences of these variables are reported in Table 4 and discussed below.

Growth and inflation

28. Growth performance over the last ten years was mixed, and no clear trend emerged. On average, real GDP grew by 5 percent, driven by the expansion in the nonagricultural sectors. Industry experienced the highest growth among major sectors, reaching 13 percent on average, and its share in GDP rose to 25 percent by 2002. By contrast, the growth of agriculture fluctuated significantly year by year, largely owing to the weather conditions, and, on the whole, Eritrea’s food security did not improve. In U.S. dollar terms, GDP per capita remained basically unchanged over the last ten years at a very low level by international standards. Inflation, which had remained manageable during the four years following independence, has been consistently high since 1998, mainly reflecting the war, drought conditions, monetary expansion for deficit financing, and the depreciation of the nakfa since 1998.

External performance

29. Information on the external accounts of Eritrea suggests that, particularly because of the war, the country has become more dependent on foreign assistance. Since 1998, current account deficits have widened mainly as a result of the loss of the traditional export market of Ethiopia, a surge in food and defense imports, and the decline in service receipts and private transfers. Capital inflows were not sufficient to cover the widened current account imbalance, and gross foreign reserves dropped to 1.4 months of imports of goods and services in 1998 from 5 months in the previous year, and declined further to less than 1 month in 2002. Together with the external debt developments discussed above, these changes in external performance, which are in good measure the result of fiscal policies, suggest that external sustainability cannot be achieved without major support by donors and improvement in economic growth and export performance.

Table 4. Eritrea: Key Economic Developments, 1993-2002

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	Average 1993-2002
(Annual percentage change)											
Growth											
GDP at constant factor cost	9.9	25.7	2.8	9.2	7.7	3.9	0.3	-12.0	8.7	-1.2	5.1
Agriculture	-19.4	36.7	-11.7	-5.8	0.5	57.4	-7.7	-43.5	29.1	-35.5	-4.5
Nonagriculture	22.8	22.5	7.4	13.1	9.3	-6.9	3.0	-2.3	5.0	6.3	7.7
Industry	43.4	14.0	21.2	36.9	19.8	-6.5	2.8	-6.4	6.3	9.2	13.0
Services	18.4	24.7	4.2	6.7	5.7	-7.1	3.0	-0.7	4.6	5.2	6.2
GDP per capita (in U.S. dollars)	138.6	153.5	165.1	189.9	182.9	193.2	183.8	157.6	169.8	152.6	168.7
GDP per capita	-41.1	10.7	7.6	15.0	-3.7	5.6	-4.9	-14.2	7.7	-10.1	0.5
Special factors affecting growth											
Drought year 1/ War year	x		(x)	x	x			x		x	
						x	x	x			
Inflation 2/											
Food 3/	4.6	11.6	10.7	9.3	3.7	9.5	8.4	19.9	14.6	16.9	10.8
Nonfood 3/	...	...	...	...	6.8	1.0	2.1	18.0	13.9	25.0	10.8
(In millions of U.S. dollars, unless otherwise indicated)											
External performance											
Current account, excl. official transfers (in percent of GDP)	-17.3	18.0	-53.2	-130.7	-37.0	-235.9	-282.1	-206.8	-252.6	-181.6	-137.9
Current account, incl. official transfers (in percent of GDP)	-3.7	3.4	-9.0	-18.7	-5.4	-31.5	-38.4	-32.0	-35.4	-28.1	-19.9
Gross foreign reserves (in months of imports of goods and services)	88.8	168.5	154.6	179.0	243.3	69.0	54.3	36.6	50.6	33.1	107.8
	3.9	5.0	4.1	3.8	5.0	1.4	1.1	0.9	1.1	0.7	2.7
Monetary developments											
Net claims on the central government 4/	-62.9	13.4	40.9	47.5	41.2	51.7	67.2	75.4	74.0	67.1	41.6
Credit to the economy 4/	112.6	86.6	59.1	52.5	58.8	48.3	32.8	24.6	26.0	32.9	53.4
Excess reserves 4/	-51.0	37.3	39.0	59.6	96.7	20.8	19.8	14.8	3.6	1.4	24.2
Velocity	1.4	1.3	1.2	1.2	1.1	1.0	0.8	0.7	0.8	0.7	1.0
Money multiplier	6.5	3.6	2.3	1.5	1.0	1.9	1.9	2.0	2.6	2.8	2.6
Exchange rate developments											
Exchange rate (in nakfa per U.S. dollar; period average)	5.2	6.2	6.3	6.4	7.2	7.4	8.2	9.6	10.9	14.0	
Nominal effective exchange rate (1997=100)	87.7	87.8	89.1	92.9	100.0	95.3	90.8	81.9	72.7	56.8	
Real effective exchange rate (1997=100)	81.7	83.9	86.9	93.0	100.0	102.2	102.9	109.8	112.0	101.4	

Sources: Ministry of Finance; National Statistics Evaluation Office; and IMF staff estimates.

1/ Decline in cereal production in 1995 was due to severe locust infestation.

2/ Consumer price index in Asmara; average.

3/ Average inflation is only during 1997-2000.

4/ In percent of net domestic credit.

Monetary policies and aggregates⁶

30. Monetary policy influences fiscal sustainability directly via credit to government and indirectly through the availability and conditions of credit to the private sector and the stability of the financial system. The latter can substantially affect the functioning of the economy and its capacity to grow out of debt. Since the introduction of a separate national currency in 1997, the Bank of Eritrea, the central bank, has been subordinating its objectives to fiscal policy objectives and cannot independently pursue its statutory objectives. This fact is especially evident from the large share of credit to government in total credit (Table 4). In addition, the rate of interest on government securities is administratively fixed at 2.5 percent. These significant rigidities hamper the implementation of an effective monetary policy and prevent the financial sectors from playing an intermediation role. In this environment, monetary policy has not been able to contribute to economic growth and sustainability.

Exchange policy and developments⁷

31. As discussed above, exchange rate movements exercise a very important influence on fiscal and external sustainability. The choice of an exchange rate regime is, therefore, important for sustainability. At the same time, the regime has a critical effect on external competitiveness and growth. Experience in other countries demonstrates that a wrong exchange rate policy may temporarily support sustainability but will eventually undermine growth to such an extent that sustainability is damaged. For an assessment of the effects of exchange rate policy on fiscal sustainability, it will be important to examine these factors, as well as the functioning of foreign exchange markets and their influence on private sector activity. Mainly in order to limit the fiscal costs of foreign payments, including external debt service, the Eritrean authorities have kept the official nominal exchange rate of the nakfa essentially unchanged. This has supported “nominal” sustainability. However, the present exchange rate system and its management have resulted in a dual exchange rate regime with a strong parallel market and are marked by a high degree of rigidity that not only undermines transparency and competitiveness, but also hampers domestic growth.

Influence of special factors

32. As can be seen from Table 4, special factors such as droughts and war, have had a significant influence on economic performance and fiscal and external balances. Drought conditions have affected Eritrea for six years out of the last ten years. They have mainly caused large swings in agricultural productions but have otherwise not affected so much the performance of other sectors and macroeconomic balances. By contrast, the effects of the 1998-2000 war are reflected clearly in every key variable of the economy: growth has declined, inflation has risen, public expenditure has increased, the current account deficit has widened, and foreign reserves have nearly been depleted.

⁶ A more complete discussion of the issues is given in “Monetary Policy and Management,” in International Monetary Fund, 2003b.

⁷ A more detailed treatment of the issues is given in “Exchange Rate Policy and Management,” in International Monetary Fund, 2003b.

IV. RESPONSES TO FISCAL POLICY AND MANAGEMENT

33. As in most other developing countries, fiscal policy in Eritrea has a comprehensive and profound influence on the economy because directly or indirectly it affects virtually all economic agents and sectors through the financial impact of revenue and expenditure measures, as well as by influencing incentive structures and expectations. For a full evaluation of sustainability, it is, therefore, important to examine the channels through which these influences work and to assess the endogenous responses they entail. A full discussion of these issues lies outside the scope of this paper. References will, therefore, be made only to those variables that are of particular importance in Eritrea. They include, above all, the following: GDP growth, private initiative, financial sector stability, confidence in government policies, and diaspora and donor financing. The discussion is then extended to examine the effects on sustainability of endogenous responses to nominal rigidities in interest rates, exchange rates, and prices.

A. Key response variables and their effect on sustainability

34. The principal interdependences between fiscal policy and endogenous variables that affect fiscal sustainability are depicted in Figure 1. The chart shows the main elements through which fiscal policies and developments influence the behavior of key actors and variables in the economy, and how their responses, in turn, affect fiscal sustainability.

Growth of GDP

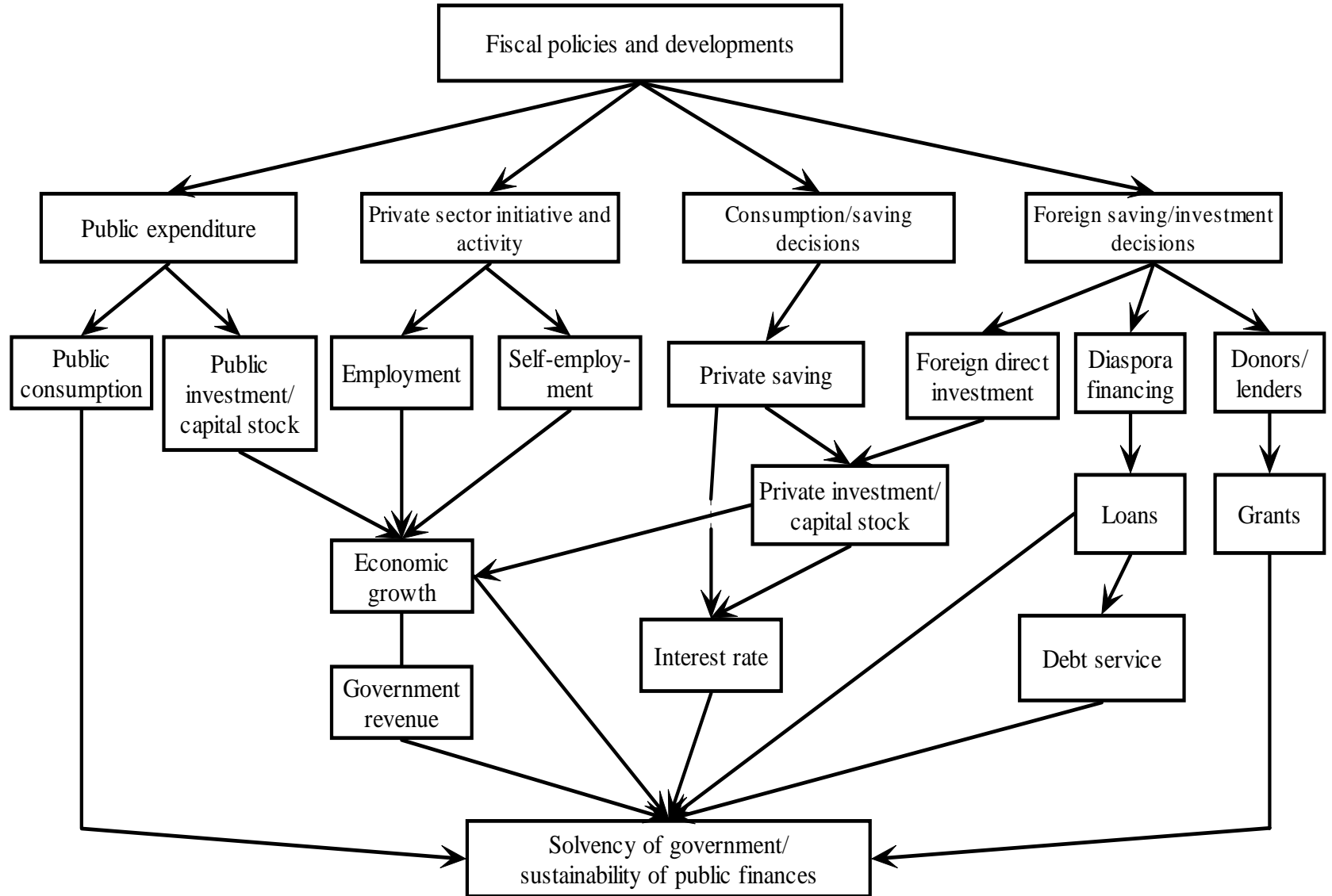
35. Conventional growth theory posits that the growth of an economy depends on three factors: capital, labor, and total factor productivity (TFP). Fiscal policy typically influences all of these factors. First, Eritrea's capital stock is directly affected by the authorities' investment in economic and social infrastructure, as discussed above. Additional influences work through tax policies and income transfers that affect incentives and resources for private sector saving and investment. In support of sustainability, it will therefore be necessary to examine these influences and correct policies where they are seen to undermine capital formation.

36. Second, both the active volume and the productivity of labor matter. At present, demobilization policies dominate the availability of labor inputs into productive activities in the private and public sectors in Eritrea. The mobilization of combatants during the war severely impaired private sector activity and the functioning of public administration, not least because it affected skilled and managerial personnel most.⁸ It also significantly reduced the availability of labor in the rural areas and for agricultural production. Following the cessation of hostilities in 2000, demobilization has been slow so far, and an acceleration would, no doubt, increase economic activity and improve the public finances. At the same time, the Eritrean authorities have given substantial attention to investments in human capital through training and increases in spending on education and health. These actions should eventually increase labor productivity.

37. Finally, TFP in Eritrea is primarily influenced by imports of capital goods and know-how that result in technological advances and general efficiency gains in production. An open trade regime and adequate access of the private sector to foreign exchange are, therefore, critical. While good progress has been made in Eritrea in liberalizing trade and reducing tariffs, the

⁸ Compare the investment climate assessment study by the World Bank's Africa Private Sector Group (World Bank, 2002a).

Figure 1. Eritrea: Fiscal Policies and the Sustainability of Public Finances



precipitous decline in foreign reserves and the selectivity of their use have severely undermined private sector growth, and thereby reduced fiscal and external sustainability.

Private sector initiative and development

38. In most successful economies, the private sector has been the driving force for employment creation and economic development. Private sector initiative is particularly effective when the sector is offered an environment conducive to its development in an open and liberal organization of the economy. In Eritrea, most of these fundamental conditions were introduced after independence but have recently been rolled back in a number of areas, such as finance, foreign exchange, utility services, petroleum products, and trade. More generally, the authorities' dissatisfaction⁹ with the private sector has resulted in an increased role of the government in the economy, including its intervention into markets — a practice that may stifle private initiatives and could endanger fiscal sustainability by lowering growth prospects.

Financial sector stability and development

39. In Eritrea, as elsewhere, fiscal policies affect financial sector stability and development mainly through the volume and the terms and conditions of domestic deficit financing of the government. In addition, private saving, the source of private investment, is strongly influenced by interest rate policies and expectations about financial sector stability. In Eritrea, the large increase in deficit financing and the setting of interest rates at hugely negative levels in real terms carry the risk of reducing private savings; they may also undermine the stability of the financial sector and thereby constrain private investment. Such an outcome would substantially reduce the prospects of fiscal sustainability and undermine the country's prospect of growing out of its poverty trap.

Expectations and confidence

40. Given their central role in Eritrea's macroeconomic policy, fiscal policies not only constitute its principal tool but also are the key determinants of expectations and confidence in the economy. In particular, the large fiscal deficits and increases in government debt have raised doubts about the sustainability of the public finances and have prompted both domestic and foreign investors to take protective measures. If not corrected in time, the country may enter into a vicious circle of self-fulfilling expectations, which would further undermine fiscal sustainability.

Diaspora financing

41. In the past, Eritrea benefited substantially from diaspora financing, which brought the country much-needed foreign exchange. This support has been mainly guided by family relationships and patriotism, but has increasingly also been viewed as an investment in the country. As the latter element increases in importance, the soundness of government policies and the performance of the economy will increasingly condition the preparedness of the diaspora to make savings available to the country and influence the sustainability of the public finances. The

⁹ The authorities consider that, despite a liberal business environment and large-scale privatization, the private sector has not played the role of engine of growth in the economy.

importance of the diaspora for the public finances and foreign exchange is demonstrated by the fact that the level of bonds issued to the diaspora reached 3.1 percent of GDP in 1999 and grants amounted to 3.2 percent of GDP in 2000. On the external account, private transfers from the Diaspora are the largest single source of foreign currency inflows into the country, with the ratio of these transfers to GDP averaging 37 percent over the last ten years. These levels of diaspora financing are clearly exceptional; but even lower levels are achievable only if confidence and trust in government policies and economic developments are maintained and contracts are honored. Both fiscal and external sustainability depend critically on the continued support of the diaspora.

Donor financing

42. Generous donor financing is indispensable for Eritrea's economic development and the sustainability of its public finances and external deficits. Following independence, donor assistance became the largest engine of economic and social development. Similarly, following the conflict with Ethiopia, total assistance from donors, including net official loans and external grants, reached 31 percent of GDP in 2001, when the reconstruction and humanitarian support effort intensified. Since then, not only disputes over political governance but also concerns about fiscal and other economic policies have caused donors to hold back on new commitments, except for demobilization and humanitarian assistance. For sustainable economic development, a resumption of to budgetary and balance of payments support will be needed, and this will require a normalization of relationships with donors¹⁰.

B. Influence of nominal rigidities and policies taken to minimize endogenous effects

43. Mainly with a view to keeping budgetary costs low, the authorities have taken a number of actions to prevent market mechanisms from playing out. While these actions have temporarily avoided undesired consequences for the public finances, the external accounts, and the exchange rate, they are likely to result in compensatory action on the part of economic agents that are costly and undermine the responsiveness and development of the economy. This applies, in particular, to the measures taken on interest rates, exchange rates and foreign exchange allocation, and price controls¹¹. It is, therefore, important to review the need for these policies and to determine their long-term effect on incentives and growth.

¹⁰ Donor concerns relate to the imprisonment of political dissidents and journalists, as well as to delays in granting the permission to establish political parties and hold the elections provided for under the 1997 Constitution. These concerns remain unsolved and have so far prevented the full reengagement of donors in the country, outside of humanitarian assistance and the financing of demobilization. While the dialogue with the EU and other bilateral donors was resumed and resulted in an unblocking of part of the EU's demobilization assistance (€17 million out of €42 million), disbursements of budgetary and balance of payments assistance are conditional on satisfactory progress on the governance issues and a sound macroeconomic framework.

¹¹ See the relevant companion papers in International Monetary Fund (2003b).

V. RESTORING SUSTAINABILITY

A. Sustainability gap indicators

44. The various sustainability indicators calculated all indicate that fiscal policies over the last ten years have significantly moved away from sustainability, and that large adjustments in the balance of government revenue and expenditure are necessary for stabilizing the public finances.¹² Gap indicators are summarized in Table 5 where a negative number indicates how far away the indicator is from the balance needed for stabilization and sustainability. The indicators are all negative except for 2001¹³, indicating that the debt-to-GDP ratios could not be stabilized with the primary balance in the respective years because revenue was too low or expenditure too high. In the peak year of 1999, the gap indicators reached -52 percent of GDP, when grants and special programs are excluded, and -46 percent of GDP, including grants and special programs. These outcomes suggest that, in order to stabilize debt ratios at the 1999 level, total revenue and grants would have had to be raised to 88 percent of GDP, against the actual 42 percent, or total primary expenditure, including special programs, would have had to be cut to 46 percent of GDP, against the actual 92 percent.

45. Three factors suggest that even these large adjustments underestimate the actual correction now needed to move toward sustainability. First, the debt-to-GDP ratio climbed above 200 percent of GDP in 2002, and just maintaining this level is hardly enough. Setting more ambitious targets for debt reduction is, therefore, imperative. Second, the administratively fixed domestic interest rate for public debt underestimates the real costs of interest payments and thereby underreports the intrinsic size of gap indicators. Under an administratively fixed interest rate, inflation improves the gap indicators because nominal GDP growth, n_t , goes up, while r_t stays the same in the gap indicator formula.¹⁴ Third, the fixing of the official exchange rate at an overvalued rate underestimates the underlying size of the external debt stock and debt-service burden, and thereby underreports the sustainability gaps.¹⁵

46. To illustrate the dependence of changes in the sustainability gap and the need for adjustment on the two critical variables, GDP growth and interest rate, a matrix based on these two variables has been calculated for the situation observed in 2002 (Table 6). The upper matrix indicates the size of the primary deficit needed to stabilize the debt-to-GDP ratio at its 2002 level of 201.8 percent. If it is assumed that the domestic nominal interest rate on government debt remains fixed at 2.5 percent, and taking the average annual GDP growth rate of 3.5 percent projected for the baseline scenario in the staff report (International Monetary Fund, 2003a), the primary deficit needed for stability of the debt-to-GDP ratio is 14.7 percent of GDP, compared with the level of 26.1 percent of GDP lower than actually observed in 2002. The adjustment needed for stability could, therefore, have been 11.5 percent of GDP (see bottom matrix). By

¹² Analytical measures of various sustainability gaps are presented in Annex.

¹³ In 2001, high nominal GDP growth contributed to the exceptional improvement in the gap indicators.

¹⁴ See, for example, equations (2a) and (3a).

¹⁵ In equations (3) and (3a), a depreciation of the nakfa to its equilibrium level (q_t is negative) would widen the sustainability gap.

Table 5. Eritrea: Sustainability Indicators, 1993-2002
(In percent of GDP, unless otherwise indicated)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Primary gap indicator 1/										
Excluding grants and special programs	-18.0	-10.1	-26.9	-18.1	-6.7	-35.4	-52.2	-45.1	3.6	-21.4
Including grants and special programs	-7.2	-9.6	-20.3	-12.0	-1.6	-27.7	-46.4	-44.5	1.7	-19.6
Necessary primary balance	0.8	-1.7	-2.8	-6.4	-2.7	-6.4	-4.0	6.6	-33.7	-6.5
Tax gap indicator 1/										
Excluding grants and special programs	-18.0	-10.1	-26.9	-18.1	-6.7	-35.4	-52.2	-45.1	3.6	-21.4
Including grants and special programs	-7.2	-9.6	-20.3	-12.0	-1.6	-27.7	-46.4	-44.5	1.7	-19.6
Necessary total revenue and grants 2/	64.0	59.7	68.7	54.1	48.4	70.3	87.9	89.3	40.9	57.5
Necessary total revenue 3/	54.2	41.2	63.0	49.4	47.8	68.7	85.5	70.5	21.4	46.9
Necessary tax revenue 3/ 4/	54.2	40.1	63.0	49.3	47.4	63.9	79.3	73.9	19.7	46.5
Necessary exceptional revenue 3/ 4/	33.2	21.3	43.8	30.7	28.5	51.0	68.5	54.6	4.9	29.9
Necessary grants 2/	9.8	18.5	5.7	4.7	0.7	1.6	2.4	18.8	19.6	10.6
Expenditure gap indicator 1/										
Excluding grants and special programs	-18.0	-10.1	-26.9	-18.1	-6.7	-35.4	-52.2	-45.1	3.6	-21.4
Including grants and special programs	-7.2	-9.6	-20.3	-12.0	-1.6	-27.7	-46.4	-44.5	1.7	-19.6
Necessary primary expenditure, incl. special programs 2/	56.0	51.8	51.2	48.5	49.5	49.1	45.5	38.2	76.3	44.4
Necessary primary expenditure, excl. special programs 3/	35.4	32.8	38.9	37.7	43.7	39.7	37.3	18.7	58.6	32.1
Necessary primary current expenditure 3/ 4/	16.9	19.1	24.1	18.8	20.7	13.7	-0.4	6.3	42.4	15.2
Necessary capital expenditure 3/ 4/	0.5	3.7	-12.2	0.8	16.3	-9.4	-14.6	-32.7	19.8	-4.6
Necessary special programs 2/	20.6	19.0	12.3	10.8	5.8	9.4	8.2	19.4	17.7	12.4
Memorandum items:										
Primary balance, excl. grants and special programs	-17.2	-11.8	-29.7	-24.5	-9.4	-41.8	-56.2	-38.6	-30.1	-27.9
Primary balance, incl. grants and special programs	-6.4	-11.3	-23.1	-18.4	-4.2	-34.1	-50.4	-38.0	-32.0	-26.1
Tax revenue and grants	56.8	50.1	48.4	42.1	46.9	42.6	41.5	44.8	42.6	37.9
Tax revenue	21.0	19.9	19.2	18.7	19.3	17.7	17.0	15.8	16.5	17.0
Exceptional revenue	0.0	1.1	0.0	0.1	0.4	4.8	6.3	-3.5	1.6	0.5
Grants	20.6	19.0	12.3	10.8	5.8	9.4	8.2	19.4	17.7	12.4
Primary expenditure, incl. special programs	63.2	61.4	71.5	60.5	51.1	76.7	91.9	82.7	74.6	64.0
Primary expenditure, excl. special programs	53.4	42.9	65.8	55.8	50.4	75.1	89.5	63.9	55.1	53.5
Primary current expenditure	34.9	29.2	51.1	36.9	27.4	49.1	51.8	51.4	38.9	36.6
Capital expenditure	18.5	13.8	14.7	18.9	23.0	26.0	37.7	12.5	16.2	16.8
Special programs	9.8	18.5	5.7	4.7	0.7	1.6	2.4	18.8	19.6	10.6
Nominal GDP (annual percentage change)	12.8	33.8	12.9	19.1	12.1	11.2	8.2	3.7	25.3	16.2
Domestic interest rate (in percent)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Foreign interest rate (weighted average; in percent)	0.8	0.9	1.0	1.0	1.3	1.6	1.6	1.5	1.4	1.3
Rate of exchange rate appreciation (in percent)	-86.8	-17.8	-2.3	-0.9	-13.3	-2.4	-10.5	-17.7	-13.5	-28.1

Sources: Bank of Eritrea; and IMF staff estimates.

1/ The "primary/tax/expenditure gap indicator" measures how much adjustment a country needed in primary balance/tax revenue/expenditure relative to its actual level to keep the debt-to-GDP ratio constant. If positive, the primary balance/tax revenue/expenditure in a calculated period was enough to keep the debt-to-GDP ratio constant. If negative, the primary balance/tax revenue/expenditure was not enough to keep the ratio constant. See also Annex.

2/ Based on the assumption that grants are provided with special programs.

3/ Based on the assumption that grants are not provided without special programs.

4/ Based on the assumption that all the necessary adjustment is done to either primary current or capital expenditure.

Table 6. Eritrea: Minimum Primary Balance and Adjustment Required—Status Quo
(In percent of GDP, unless otherwise indicated)

	Real GDP Growth Rate										
	1.0	2.0	3.0	3.5	4.0	5.0	6.0	7.0	8.0	9.0	10.0
Minimum primary balance needed to stabilize debt/GDP ratio											
Domestic nominal interest rate											
1.0	-11.7	-13.6	-15.4	-16.3	-17.2	-19.0	-20.7	-22.4	-24.0	-25.7	-27.3
2.0	-10.6	-12.5	-14.3	-15.2	-16.1	-17.9	-19.6	-21.3	-23.0	-24.6	-26.2
2.5	-10.0	-11.9	-13.8	-14.7	-15.6	-17.3	-19.1	-20.8	-22.5	-24.1	-25.7
3.0	-9.5	-11.4	-13.2	-14.1	-15.0	-16.8	-18.5	-20.3	-21.9	-23.6	-25.2
4.0	-8.4	-10.3	-12.1	-13.0	-13.9	-15.7	-17.5	-19.2	-20.9	-22.6	-24.2
5.0	-7.2	-9.1	-11.0	-11.9	-12.8	-14.6	-16.4	-18.1	-19.8	-21.5	-23.2
6.0	-6.1	-8.0	-9.9	-10.8	-11.8	-13.6	-15.3	-17.1	-18.8	-20.5	-22.1
7.0	-5.0	-6.9	-8.8	-9.8	-10.7	-12.5	-14.3	-16.0	-17.8	-19.4	-21.1
8.0	-3.9	-5.8	-7.7	-8.7	-9.6	-11.4	-13.2	-15.0	-16.7	-18.4	-20.1
9.0	-2.8	-4.7	-6.6	-7.6	-8.5	-10.3	-12.1	-13.9	-15.7	-17.4	-19.0
10.0	-1.6	-3.6	-5.5	-6.5	-7.4	-9.3	-11.1	-12.9	-14.6	-16.3	-18.0
Adjustment required relative to 2002											
Domestic nominal interest rate											
1.0	14.4	12.5	10.7	9.8	8.9	7.2	5.4	3.8	2.1	0.5	-1.1
2.0	15.5	13.7	11.8	10.9	10.0	8.2	6.5	4.8	3.1	1.5	-0.1
2.5	16.1	14.2	12.4	11.5	10.6	8.8	7.0	5.3	3.7	2.0	0.4
3.0	16.7	14.8	12.9	12.0	11.1	9.3	7.6	5.9	4.2	2.5	0.9
4.0	17.8	15.9	14.0	13.1	12.2	10.4	8.6	6.9	5.2	3.6	1.9
5.0	18.9	17.0	15.1	14.2	13.3	11.5	9.7	8.0	6.3	4.6	3.0
6.0	20.0	18.1	16.2	15.3	14.4	12.6	10.8	9.0	7.3	5.6	4.0
7.0	21.1	19.2	17.3	16.4	15.5	13.6	11.8	10.1	8.4	6.7	5.0
8.0	22.2	20.3	18.4	17.5	16.5	14.7	12.9	11.1	9.4	7.7	6.1
9.0	23.4	21.4	19.5	18.6	17.6	15.8	14.0	12.2	10.5	8.8	7.1
10.0	24.5	22.5	20.6	19.7	18.7	16.9	15.0	13.3	11.5	9.8	8.1
Memorandum items:											
Public debt in 2002	201.8										
Domestic debt in 2002	123.2										
External debt in 2002	78.6										
Primary balance in 2002	-26.1										
Foreign inflation rate (in percent) 1/	1.2										
Annual depreciation of nakfa (in percent)	6.7										
Domestic inflation rate (in percent) 2/	9.0										
Foreign inflation rate (in percent) 3/	2.2										

Sources: Ministry of Finance; Bank of Eritrea; and IMF staff estimates.

1/ Historical weighted average.

2/ Based on a medium-term projection.

3/ Historical average for advanced economies.

contrast, in the case of the more optimistic scenario, under which demobilization advances speedily and donor assistance increases, average GDP growth is projected at 6 percent. In this case, the primary deficit needed for stabilization would be 19.1 percent of GDP under an unchanged interest rate on domestic public debt, implying an adjustment need of 7 percent of GDP. In turn, any increase in the interest rate to strengthen savings and banks' balance sheets would lower the "equilibrium primary deficit" again and require a stronger adjustment from either or both government revenue and expenditure to achieve the reduced deficit objective.

B. Scenarios and sensitivity analysis

47. A number of scenarios have been calculated to assess the impact of alternative assumptions about GDP growth, average interest on public debt, and—critical for external debt—the exchange rate of the nakfa. In addition, in order to evaluate the adjustments in the primary fiscal deficit needed to achieve a given debt-to-GDP ratio over time, the calculations have set a target for the debt-to-GDP ratio of 70 percent to be reached over the period 2003-20. Finally, the assumption has been made that the target will be reached in an accelerating fashion, with a manageable initial reduction, following by increasing adjustments as smaller deficits make it easier to become more ambitious in the quest for sustainability.¹⁶

48. Table 7 summarizes the results of these scenarios and sensitivity assessments; the assumptions about growth, interest rates, and the exchange rate are given in the footnotes of the table. The sensitivity assessments suggest that the key variables identified in the analysis above all exercise a significant influence on the size of fiscal adjustment needed to achieve the posited deficit objectives and sustainability. For the high GDP growth scenario, the average annual primary deficit could be 4.5 percent of GDP during 2003-20, against a zero balance needed under the low-growth scenario. On the other hand, a more market-oriented interest rate (high-rate scenario) would require an average primary balance of -0.8 percent of GDP, compared with an average deficit of 2.3 percent of GDP "acceptable" under the baseline scenario. Finally, the move of the official exchange rate to the levels currently observed in the parallel market—implying a 30 percent depreciation in 2003—would require smaller average primary deficits of 1.2 percent of GDP during 2003-20 (compared with average deficits of 3.3 percent of GDP under the smaller adjustment scenario) because of the heavier external debt and debt-service burden in domestic currency.

C. Key policies needed to restore sustainability

49. Policies needed to restore sustainability have to concentrate first, of course, on all those variables that directly influence the primary fiscal deficit, the key variable in all the fiscal sustainability equations discussed above. However, as was discussed in some detail above, there are a host of economic variables whose development influences sustainability, including, notably, GDP growth, but also private sector development and expectations. It is, therefore, important to pursue economic and financial policies that strengthen these variables through direct policy measures or by influencing incentives and confidence. Improving the business climate and investor expectations will be critical to pull out of a vicious circle that would otherwise require ever-increasing adjustment.

¹⁶ Alternative options would be a linear or a decelerating adjustment.

Table 7. Eritrea: Minimum Primary Balance—Sensitivity Analysis, 2002-20
(70 Percent Debt-to-GDP Ratio by 2020 and Accelerating Decline in Debt-to-GDP Ratio)
(In percent of GDP, unless otherwise indicated)

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average 2003-20
	Base year																			
GDP growth rate																				
Baseline	-26.1	-23.9	-21.0	-9.6	-5.9	-4.9	-4.3	-3.6	-2.8	-2.0	-1.1	0.0	1.1	2.3	3.6	5.1	6.8	8.5	10.5	-2.3
High growth 1/	-26.1	-23.9	-21.0	-9.6	-9.3	-8.3	-7.6	-6.8	-5.9	-5.0	-4.0	-2.8	-1.6	-0.2	1.3	2.9	4.8	6.8	9.0	-4.5
Low growth 2/	-26.1	-23.9	-21.0	-9.6	-2.3	-1.3	-0.8	-0.2	0.5	1.2	2.0	2.9	3.8	4.9	6.1	7.4	8.8	10.4	12.1	0.0
Domestic interest rate																				
Baseline	-26.1	-23.9	-21.0	-9.6	-5.9	-4.9	-4.3	-3.6	-2.8	-2.0	-1.1	0.0	1.1	2.3	3.6	5.1	6.8	8.5	10.5	-2.3
High rate 3/	-26.1	-23.9	-20.0	-7.5	-3.8	-2.8	-2.3	-1.6	-0.9	-0.2	0.7	1.6	2.7	3.8	5.1	6.4	7.9	9.6	11.4	-0.8
Low rate 4/	-26.1	-23.9	-22.0	-11.6	-7.9	-6.9	-6.2	-5.5	-4.7	-3.8	-2.8	-1.7	-0.5	0.8	2.2	3.8	5.6	7.5	9.6	-3.8
Exchange rate adjustment																				
Baseline	-26.1	-23.9	-21.0	-9.6	-5.9	-4.9	-4.3	-3.6	-2.8	-2.0	-1.1	0.0	1.1	2.3	3.6	5.1	6.8	8.5	10.5	-2.3
Larger adjustment 5/	-26.1	-3.8	-21.0	-9.6	-5.9	-4.9	-4.3	-3.6	-2.8	-2.0	-1.1	0.0	1.1	2.3	3.6	5.1	6.8	8.5	10.5	-1.2
Smaller adjustment 6/	-26.1	-41.9	-21.0	-9.6	-5.9	-4.9	-4.3	-3.6	-2.8	-2.0	-1.1	0.0	1.1	2.3	3.6	5.1	6.8	8.5	10.5	-3.3
Memorandum items:																				
Debt-to-GDP ratio	201.8	198.9	195.7	192.2	188.4	184.2	179.5	174.4	168.8	162.6	155.7	148.2	140.0	130.9	120.9	110.0	97.9	84.6	70.0	
GDP growth rate (annual percentage change)																				
Baseline	-1.2	5.4	9.0	5.1	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	4.3
High growth 1/	-1.2	5.4	9.0	5.1	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.9
Low growth 2/	-1.2	5.4	9.0	5.1	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	2.6
Domestic interest rate (in percent)																				
Baseline	2.5	2.5	5.0	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.1
High rate 3/	2.5	2.5	6.0	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	8.9
Low rate 4/	2.5	2.5	4.0	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.3
Exchange rate (in nakfa per U.S. dollar)																				
Baseline	14.0	16.3	18.0	19.5	21.0	22.4	23.9	25.5	27.2	29.0	30.9	33.0	35.2	37.6	40.1	42.8	45.7	48.7	52.0	
Large adjustment 5/	14.0	20.7	22.9	24.8	26.6	28.4	30.3	32.4	34.5	36.8	39.3	42.0	44.8	47.8	51.0	54.4	58.0	61.9	66.1	
Small adjustment 6/	14.0	12.4	13.7	14.8	15.9	16.9	18.1	19.3	20.6	22.0	23.4	25.0	26.7	28.5	30.4	32.4	34.6	36.9	39.4	

Sources: Ministry of Finance; Bank of Eritrea; and IMF staff estimates.

1/ Higher growth rate at 5.8 percent (2 percentage points higher than the baseline) is assumed from 2006 onward, when the recovery from the 2002 drought and the impact of demobilization disappears.

2/ Lower growth rate at 1.8 percent (2 percentage points lower than the baseline) is assumed from 2006 onward, when the recovery from the 2002 drought and the impact of demobilization disappears.

3/ Two percentage points higher interest rate is assumed on domestic interest rate.

4/ Two percentage points lower interest rate is assumed on domestic interest rate.

5/ A 30 percent larger real depreciation is assumed in 2003.

6/ A 30 percent smaller real depreciation is assumed in 2003.

50. On the fiscal policy side, direct measures should aim to streamline the tax system in order to make it more efficient. Additional measures should include broadening tax bases and making more improvements in revenue administration and collections. There may also be a need to raise selected excises and taxes, such as those on petroleum products. On the expenditure side, the largest gains could be expected from a swift and full demobilization of combatants, and a more general move toward a peacetime economy. In addition, there is scope for improvement in budget management and expenditure control. At the same time, investments in physical and human capital will be required to increase potential growth. These fiscal measures need to be combined—and made compatible—with other policies that foster economic growth, including, in particular, in the private sector, and affecting Eritrea's export potential and foreign-exchange earning capacity.

51. Because, for Eritrea, the foreign exchange constraint is the most binding constraint on economic development, it will be critical to attract both external investments and generous donor assistance. Both will depend critically on the soundness and transparency of economic policies, as well as accountability and good governance, and progress on restoring fiscal and external sustainability itself.

Measures of Fiscal Sustainability Gaps

Primary gap indicator (PGI)

$$PGI_t = pb_t - \overline{pb} = pb_t - (r_t - n_t)d_t, \quad (10)$$

where pb_t is the ratio of the primary balance to output at period t , $\overline{pb} = (r_t - n_t)d_t$ is the ratio to output of the permanent primary balance necessary to stabilize the debt ratio, r_t is the relevant interest rate for public debt service, n_t is the nominal output growth, and d_t is the ratio to output of the beginning-period stock of government debt. Making a distinction between domestic and external debt, the gap indicator becomes

$$PGI_t = (r_t - n_t)dd_t + (r_t^* - q_t - n_t)de_t + pb_t, \quad (10a)$$

where dd_t is the domestic debt-to-GDP ratio, de_t is the external debt-to-GDP ratio, and q_t is the rate of appreciation of exchange rate. Equations (10) and (10a) show that the current primary balance is enough to stabilize the debt ratio if PGI_t is positive. This is the case when the growth of nominal GDP exceeds the nominal interest rate on public debt.

Tax gap indicator (TGI)

$$TGI_t = t_t - \bar{t} = t_t + (n_t - r_t)d_t - g_t, \quad (11)$$

where t_t is the ratio of the total revenue with or without grants to output at period t , $\bar{t} = g_t + (r_t - n_t)d_t$ is the ratio to output of the permanent tax necessary to stabilize the debt ratio, and g_t is the ratio to output of government noninterest spending. Current tax revenue is enough to stabilize the debt ratio if TGI_t is positive.¹⁷

Expenditure gap indicator (EGI)

$$EGI_t = \bar{g} - g_t = t_t + (n_t - r_t)d_t - g_t, \quad (12)$$

where g_t is the ratio of the primary expenditure, including or excluding special programs, to output at period t , $\bar{g} = t_t + (n_t - r_t)d_t$ is the ratio to output of the permanent primary expenditure to stabilize the debt ratio, and t_t is the ratio to output of the total revenue with, or without grants. Current primary expenditure is small enough to stabilize the debt ratio if EGI_t is positive.

¹⁷ In a finite period of N , $TGI_t = t_t - \bar{t} = t_t + (n_t - r_t)d_t - \frac{1}{N} \sum_{i=0}^N g_{t+i}$, i.e., current tax revenue is enough to stabilize the debt ratio over the next N years if TGI is positive.

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