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Democratic Republic of São Tomé and Príncipe: Selected Issues

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INTERNATIONAL MONETARY FUND

DEMOCRATIC REPUBLIC OF SÃO TOMÉ AND PRÍNCIPE

Selected Issues

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Approved by the African Department

June 4, 2008

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INTRODUCTION

This selected issues paper has the following two chapters:

Chapter I examines São Tomé and Príncipe's domestic revenue performance, discusses factors affecting tax performance, and offers recommendations on tax reforms with a view to achieving fiscal sustainability. The chapter illustrates that the country's tax performance highly depends on indirect taxes from imports and uses cross country analysis to reach a benchmark tax potential for São Tomé and Príncipe. The chapter then offers some policy recommendations to improve tax performance in the country.

Chapter II assesses the role of external and domestic factors in determining inflation in São Tomé and Príncipe and discusses policy options to achieve price stability in the country. The chapter reviews inflation and monetary developments in the country, examines the factors explaining inflation, and studies the relationships between monetary policy, fiscal spending, and inflation. The chapter then offers some recommendations to improve the policy mix implemented in the country to achieve price stability.

I. São Tomé and Príncipe—Domestic Revenue Performance and Potential [1]

A. Introduction

1.   **São Tomé and Príncipe is a small low-income island country.** The economy is undiversified—relying principally on cocoa production and a fledgling tourism sector. In recent years, the public sector has been supported by large inflows of oil signature bonuses, which have been the main source of financing for large and increasing public spending.[2] At the same time, domestic revenue collection is constrained by a small economic base and weak administration.

2.   **Mobilizing domestic revenues on a more sustainable basis will be key to meeting pressing development and social needs**. As oil signature bonuses run out, public expenditures must fall and/or domestic revenues must increase to fill the gap. To successfully meet the social and poverty alleviation objections under the country's Poverty Reduction and Strategy Paper (PRSP) and also move closer to achieving the Millennium Development Goals (MDGs),[3] the authorities will need to mobilize domestic revenues to create the much needed fiscal space to allow for increased social spending.

3.   **This chapter examines São Tomé and Príncipe's domestic revenue performance, discusses factors affecting tax performance, and offers recommendations on tax reforms with a view to achieving fiscal sustainability.** Sections B and C analyze recent developments in domestic revenue performance and reforms. Section D studies São Tomé and Príncipe's tax potential using statistical evidence and cross-country empirical analysis. Finally, Section E discusses possible steps to reform the country's tax system and move toward fiscal sustainability.

B. Recent Domestic Revenue Developments

4.   **São Tomé and Príncipe's domestic revenue is dominated by indirect tax revenue.** Over the period 2001-2007, tax revenue has been increasing, mainly due to increases in excise taxes and the introduction of taxes on imported petroleum products. Total tax revenue made up about 85 percent of total domestic revenue,[4] with indirect taxes making up about 61 percent of tax revenue, reaching about 10 percent of GDP in 2007. Excise duties on

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[1] Prepared by Nisreen Farhan.

[2] Oil bonuses were received in 2005 and 2007. Receiving the oil bonuses from Blocks 5 and 6 in 2008 is uncertain, given some disagreements between the investors in the two blocks and the Joint Development Agency.

[3] One core element of the MDGs strategy is for all low-income countries to increase their own resource mobilization and devote budget revenues to priority investments.

[4] Non-tax revenue averaged about 2.7 percent of GDP over the period 2001-2007, mainly from fishing royalties and an oil-related payment from Nigeria.

imported petroleum products make up over half of total excise taxes, amounting to
20.3 percent of tax revenue and reaching 3.3 percent of GDP in 2007. Custom duties
amounted to 21.1 percent of tax revenue, reaching 3.5 percent of GDP.[5] Meanwhile, personal
income taxes (corporate and personal) made up 27.4 percent of tax revenue, reaching
4.5 percent of GDP in 2007 (Figure I.1).[6] The relatively poor performance of personal
income taxes reflects weak tax enforcement and low compliance.[7, 8] Non-tax revenue
changed little, averaging about 16 percent over the period.

Figure I.1. São Tomé and Príncipe—Developments in Domestic Revenue, 2001-2006
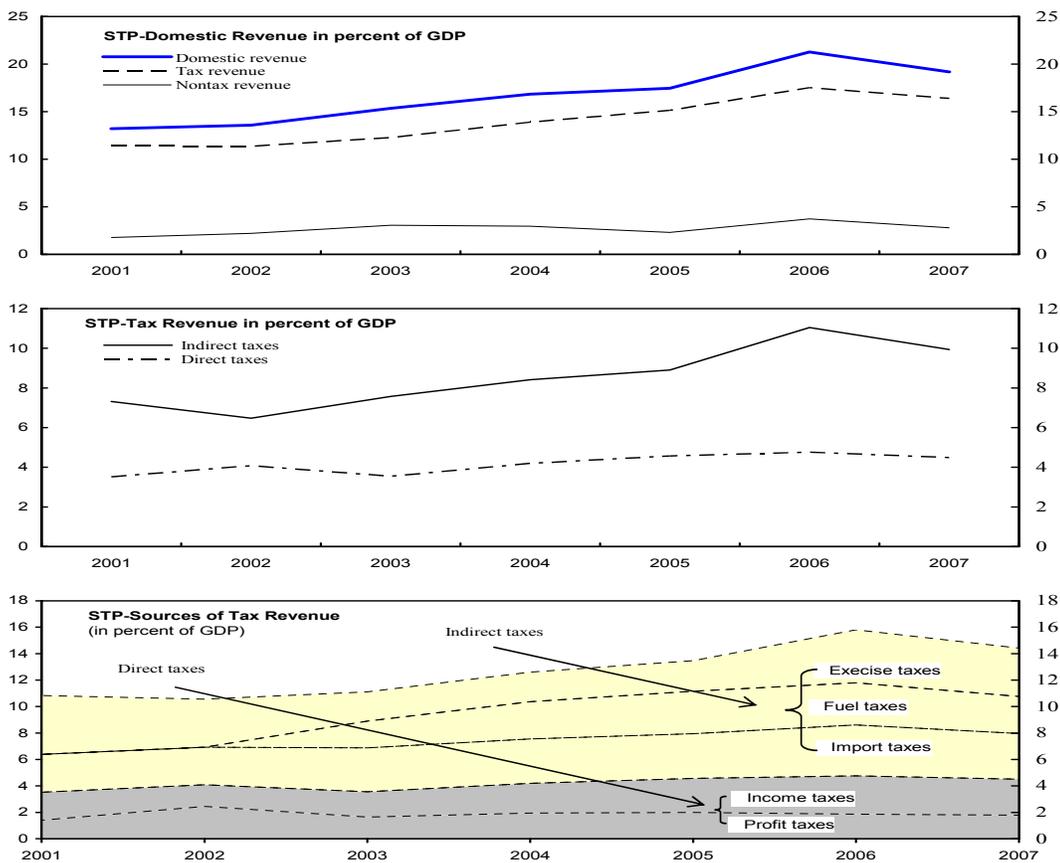
Source: Sao Tome and Principe authorities and IMF staff estimates.

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[5] Custom duties range between zero and 20 percent.

[6] Other taxes, including an urban property tax and other taxes made up about 12 percent of tax revenue in 2007.

[7] The weak tax enforcement has also resulted in a significant stock of tax arrears of about 104 billion dobra. For reference, this stock of arrears is equivalent to 25.1 percent of tax revenue and 4.1 percent of GDP in 2007.

[8] Available data indicates that average income tax for neighboring African countries was 6.1 percent and that for island economies was 6.5 percent in 2006.

5.   **São Tomé and Príncipe's tax performance compares somewhat unfavorably with neighboring countries and other island economies.** Available data indicate that tax-to-GDP ratios in selected Sub-Saharan African countries, for example, average about 21 percent in 2006, compared with 17.5 percent for São Tomé and Príncipe, partly highlighting the cost of weak tax collection and administration. Compared with selected island economies as well, São Tomé and Príncipe's tax-to-GDP ratio is about 8 percentage points lower than the average for these economies in 2006, suggesting that the country's revenue potential remains unfulfilled, given its narrow productive base (Figure I.2).

Figure I.2. São Tomé and Príncipe—Regional and International Comparisons

Tax Revenue in Selected African Countries
(2006, Percent of GDP)

Tax Revenue in Selected Island Economies
(2006, percent of GDP)
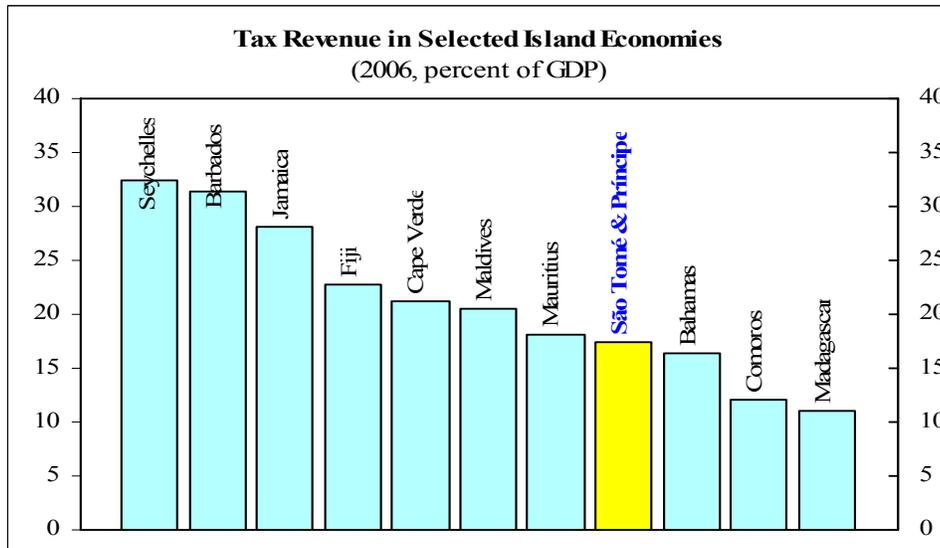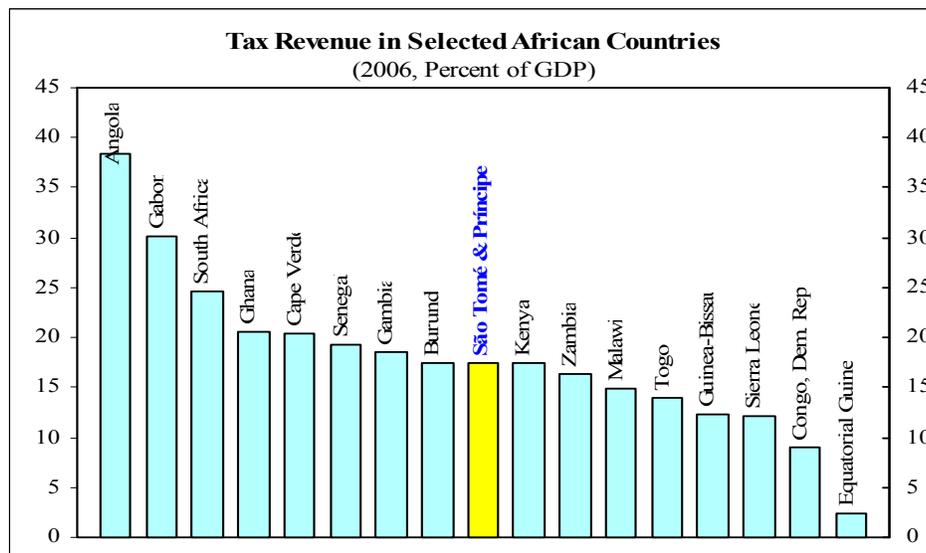
Sources: Sao Tome and Principe authorities and IMF staff estimates.

6.   **Despite efforts to strengthen fiscal performance, domestic revenues persistently fell below current public expenditures over the period 2001-2007.** As a benchmark, it is useful to assess the level of domestic revenue resources that can finance current expenditures, in order to assess the sustainability of the fiscal position.[9] In São Tomé and Príncipe, current expenditures have consistently outpaced domestic revenues by an average of 41.4 percent, implying an average financing gap on the order of 6.9 percent of GDP (Figure I.3). While increases in the wage bill explain in large part the increase in the domestic primary deficit, increased spending on goods and services (mostly on utilities) also drove the deficit up.[10] Since 2005, these deficits have been financed by the use of oil signature bonuses placed in the National Oil Account (NOA).

Figure I.3. Sao Tome & Principe- Revenue & Expenditure (in percent of GDP)

Source: Sao Tome and Principe authorities and IMF staff estimates.
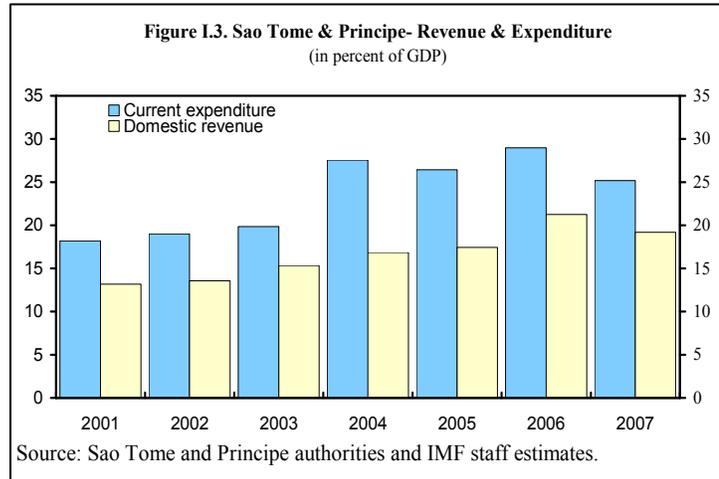
7.   **Compared with other countries in Sub-Saharan Africa and with other island economies, São Tomé and Príncipe remains the outlier with respect to fiscal sustainability** (Figure I.4).[11] Total expenditure in percent of GDP is the highest in São Tomé and Príncipe, compared to a selected group of African countries, and its revenue is one of the smallest. Similarly, the country also has the highest level of total expenditure and the lowest revenues, compared to selected, more diverse island economies.

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[9] This is similar to having a fiscal rule that specifies that current expenditure must be financed by domestic revenue collection, thus restricting public sector borrowing to fund investment projects (the so called "Golden Rule").There is an abundant literature on why unconstrained discretion over revenue and spending can erode public finances, given the generally strong pressure on expanding government expenditure and a reluctance to raise taxes to the extent necessary to fully finance public outlays.

[10] These two spending categories alone made up about 80 percent of revenue in 2007.

[11] Excluding oil signature bonuses.

Figure I.4. São Tomé and Príncipe—Domestic Revenue and Total Expenditure

Comparisons with SSACountries
(2006, in percent of GDP)

Domestic revenue

Lesotho · Equatorial Guinea · Angola · Seychelles · Zambia · Sub-Saharan Africa · Gabon · Ghana · Gambia · Cape Verde · São Tomé & Príncipe · Benin · Mozambique · Madagascar · Comoros · Guinea-Bissau · Cameroon

Total expenditure

Comparisons with Island Economies
(2006, in percent of GDP)

Domestic revenue

Maldives · Seychelles · Barbados · São Tomé & Príncipe · Jamaica · Fiji · Mauritius · Bahamas

Total expenditure

Sources: Sao Tome and Principe authorities and IMF staff estimates.

C. Recent Tax Reforms in São Tomé and Príncipe

8.   **The authorities have drafted new income tax laws that now await National Assembly approval.** These laws should help modernize and simplify the system—thus encouraging tax compliance.[12] Once the laws are approved, the personal income tax rates will range between zero (for the threshold of exemption) and 20 percent, while the corporate tax rate will be unified at 25 percent.

9.   **In 2001, the authorities implemented a number of trade policy reforms to simplify the system and remove distortions.**[13] Export taxes and non-tariff barriers were mostly eliminated. The tariff system was simplified with the introduction of four basic rates (zero, 5, 10, and 20 percent). This lowered the average tariff rate to 11.7 percent, which is substantially lower than neighboring countries.

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[12] The current applicable income tax law and the effective judicial tax regulations date back to 1993. The laws are complex, suffer from exemptions, and are lacking in taxpayer rights (thus increasing evasion). Under the laws, corporate income tax rates range between 25 and 45 percent and the personal income tax rate is a flat rate of 13 percent.

[13] The customs' administration uses the 1994 UNCTAD ASYCUDA system, which is no longer supported by UNCTAD. While evasion of customs' duties is not a significant problem, mainly due to low tariffs, control of smuggling is hampered by the lack of access to entry points beyond the airport and the seaport.

D. Tax Potential

10.   **São Tomé and Príncipe's revenue collection is relatively inefficient.**[14] Over the period 2001-2007, the country's tax efficiency has been low (averaging about 28.2 percent for trade tariffs, 17.7 percent for personal income tax, and 5.3 percent for corporate income tax). A narrow tax base, noncompliance, and weak collection and enforcement are behind the poor performance. In addition, a number of large enterprises, including hotels, enjoy significant tax incentives and holidays.

11.   **Cross-country analysis using tax revenue, per capita GDP, imports, and the size of the agriculture sector to help identify the country's tax potential.** The following equation was used for a cross section of 34 countries in 2006: [15]

$$Tax_{it} = \alpha_{it} + \beta \, imp_{it} + \delta \, agr_{it} + \gamma \, pcGDP_{it} + v_{it}$$

were "Tax" is the ratio of tax revenue to GDP; "imp" is the ratio of imports of goods and services to GDP; "agri" is the ratio of the agriculture output to GDP; and "pcGDP" is PPP per capita GDP. In looking at the performance of revenue, the rational for using these indicators is as follows: (i) per capita income (as an indicator of taxable income); (ii) the structure of output (some sectors are more difficult to tax than others); (iii) integration into the world economy (openness can increase the tax base). Such a cross-country analysis can help provide a benchmark of the amount of tax revenue that can be collected (defined here as tax potential) in São Tomé and Príncipe, if the authorities were to make an average effort in tax collection, compared to the cross-country sample.

12.   **Empirical results from the model used above support the view that there is room for improving São Tomé and Príncipe's tax system**. The results show that the country's 2007 tax-revenue-to-GDP ratio of 16.3 percent is below the potential of 37.3 percent implied by the model (Tables I.1 and I.2 and Appendix I.1).[16] The cross-section empirical analysis also shows that the gap between São Tomé and Príncipe's actual revenue performance and the potential revenue performance in 2006 is highest among neighboring African countries and island economies analyzed in the model (Figure I.5).

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[14] Tax efficiency is defined as total tax revenue in percent of GDP divided by the standard tax rate. The higher the percentage, the more efficient the tax collection is.

[15] See Appendix I.1 for details of the data set and the full results of the model.

[16] This result should be considered as indicative of the view that there is room to increase domestic resources, rather than a benchmark for the optimal level of tax potential for São Tomé and Príncipe.

Figure I.5. Comparative Actual Tax Revenue and Tax Potential
(in percent of GDP)
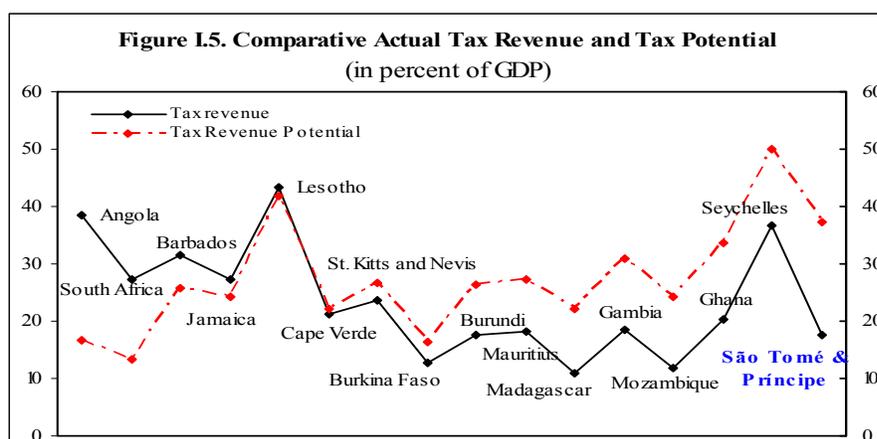
13.   **However, it must be noted here that this result of a high tax potential could be reflecting São Tomé and Príncipe's current economic structure of a small agricultural sector and high dependence on imports.** As discussed earlier, dependence on import duties and excises, including on petroleum products, is not the optimal source of domestic revenue. Therefore, the result should be interpreted as indicative of some of the room available for improving the tax-to-GDP ratio.

14.   **The empirical result on tax potential presented in this model is broadly consistent with one of the objectives of São Tomé and Príncipe's poverty reduction strategy.** The 2006 PRSP, calls for an increase in tax revenue as a percent of GDP to 25 percent by 2010 and to 30 percent by 2015.[17]

Table I.1. Cross-Section Analysis of Tax Potential

Dependent Variable: Tax revenue in percent of GDP
Included observations: 34

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Imports of goods and services (% of GDP)	0.38653	0.089525	4.317586	0.0002 *
Agriculture output (% of GDP)	-0.219006	0.048946	-4.47448	0.0001 *
PPP per capita	0.017177	0.016327	1.052074	0.3012
Constant	1.872337	0.397489	4.710412	0.0001
R-squared	0.572848			
Adjusted R-squared	0.530133			
S.E. of regression	0.268467			

See Annex for full data set.
* denotes statistical significance at the 5 percent level.

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[17] See IMF Country Report No. 05/332 of September 2005.

Table I.2. Comparative Analysis of Tax Potential
(2006, in percent of GDP, unless otherwise indicated)

	Tax revenue	Imports of goods & services	Agriculture Production	PPP Real GDP per capita	Tax Revenue Potential	Actual Tax minus Potential
São Tomé & Príncipe	**17.5**	**86.5**	**17.0**	**1,470**	**37.3**	**-19.8**
African countries						
Burkina Faso	12.7	24.6	31.0	1,199	16.4	-3.7
Burundi	17.7	47.9	34.8	356	26.3	-8.6
Gambia	18.6	60.9	32.6	1,238	30.8	-12.3
Mozambique	11.9	50.3	21.7	773	24.4	-12.4
Ghana	20.3	65.0	37.7	1,339	33.5	-13.2
Island economies						
Cape Verde	21.2	53.0	7.0	3,010	22.2	-1.0
St. Kitts and Nevis	23.7	66.8	3.2	13,355	26.6	-2.9
Mauritius	18.1	67.4	5.6	10,465	27.4	-9.2
Madagascar	11.0	41.1	27.5	1,005	22.0	-11.0
Seychelles	36.8	127.9	2.5	15,409	50.1	-13.4

Sources: IMF and World Bank databases.

E. Recommendations for Reforms

15.   **Given the challenges facing São Tomé and Príncipe, including uncertain oil prospects and rising demands to invest in development and reduce poverty, the need for increasing domestic revenue resources is clear.** Drilling for oil has been delayed further, which could push actual production even further than 2014. Despite this uncertainty, public expenditures (particularly current spending) have nonetheless significantly increased by an average of 30 percent per year since 2004, in anticipation of oil revenues. In addition, the country's developmental needs are large thus adding pressure for additional government expenditure.

16.   **Sustained fiscal adjustment based on tax reform and expenditure constraint, will be critical to medium-term macroeconomic stability.** Whether São Tomé and Príncipe becomes an oil producer or not, building a solid non-oil revenue base—less volatile and exhaustible than a natural resource—to finance public expenditures should be viewed as an essential component of sound public financial management. A comprehensive fiscal strategy could include the following:

- **A sustainable reduction in the domestic primary deficit** from 8 percent of GDP in 2007 to 3 percent by 2010—largely through measures to reduce the wage bill in percent of GDP and curtail expenditures on goods and services. Such a reduction could help reduce inflation on a sustainable basis and preserve macroeconomic stability.

- **Complete, submit, and approve the pending revised tax laws.**

- **Reduce tax exemptions.** Rationalization of exemptions would expand the tax net and raise revenue while improving the neutrality of the tax system.

- **Strengthen tax and customs administration**. Initial measures should focus on increasing administrative capacity, including enforcement of tax collection.

- **Eliminate a number of other small taxes**. There are a number of cumbersome and universal stamp duties that yield little revenue. Eliminating these taxes could help simplify the tax system, clear administrative resources for more productive uses, ease the burden on the taxpayer, and reduce tax evasion.

17.   **The authorities' implementation of these measures is currently supported by São Tomé and Príncipe's development partners.** The IMF and the World Bank continue to provide technical assistance and policy advice, along with the support provided by the threshold program provided by the Millennium Challenge Corporation and technical advice from the European Union (EU).

18.   **Fiscal adjustment and reform should be accompanied by a strategy to expand the country's productive base.** Structural reforms are needed to improve infrastructure and lay the basis for private sector development. These include improving the country's ports and utilities, reforming the legal and regulatory system, and enhancing the business environment. Maintaining the momentum of reform will be critical for achieving sustainable results.

Appendix I.1

Cross-Section Analysis of Tax Potential
(2006, in percent of GDP, unless otherwise indicated)

	Tax revenue	Imports of goods and services	Agriculture output	PPP Real GDP per capita	Tax Revenue Potential	Actual Tax minus Potential
Botswana	34.7	29.8	2.0	14,835	12.1	22.7
Angola	38.3	37.9	7.2	4,627	16.6	21.8
Australia	23.9	21.2	3.3	34,533	9.0	14.9
South Africa	27.2	33.0	2.5	9,113	13.5	13.8
Denmark	30.6	43.9	1.8	35,896	17.5	13.1
Turkey	24.2	34.1	12.9	8,593	16.2	8.0
Brazil	11.3	11.7	0.0	9,081	4.6	6.7
Barbados	31.6	64.4	3.6	18,146	25.8	5.8
Argentina	14.2	18.8	9.0	12,046	9.4	4.8
Peru	13.5	19.1	6.6	7,081	9.0	4.5
Jamaica	27.3	59.5	5.1	7,432	24.2	3.1
Lesotho	43.3	97.8	17.2	1,215	41.7	1.6
Zambia	16.2	29.6	16.1	1,241	15.1	1.1
Poland	16.5	41.3	4.5	14,884	17.1	-0.7
Cape Verde	21.2	53.0	7.0	3,010	22.2	-1.0
Swaziland	28.2	71.4	10.9	4,671	30.1	-1.8
Ireland	25.0	67.8	2.5	40,669	26.9	-1.9
Tunisia	21.3	54.3	11.3	6,934	23.6	-2.3
Egypt	13.7	33.7	14.9	5,094	16.4	-2.8
India	10.2	23.3	17.5	2,406	13.0	-2.9
St. Kitts and Nevis	23.7	66.8	3.2	13,355	26.6	-2.9
Burkina Faso	12.7	24.6	31.0	1,199	16.4	-3.7
Armenia	14.3	36.3	19.4	4,326	18.5	-4.2
Albania	17.3	46.5	22.8	5,808	23.1	-5.8
Burundi	17.7	47.9	34.8	356	26.3	-8.6
Mauritius	18.1	67.4	5.6	10,465	27.4	-9.2
Madagascar	11.0	41.1	27.5	1,005	22.0	-11.0
Ethiopia	13.0	36.5	48.1	724	24.9	-11.9
Gambia	18.6	60.9	32.6	1,238	30.8	-12.3
Mozambique	11.9	50.3	21.7	773	24.4	-12.4
Jordan	24.2	94.7	2.7	4,606	37.3	-13.1
Ghana	20.3	65.0	37.7	1,339	33.5	-13.2
Seychelles	36.8	127.9	2.5	15,409	50.1	-13.4
São Tomé & Príncipe	**17.5**	86.5	17.0	1,470	**37.3**	-19.8

Sources: IMF and World Bank databases.

II. SÃO TOMÉ AND PRÍNCIPE—POLICY MIX TO ACHIEVE PRICE STABILITY [1]

A. Introduction

1. **Achieving price stability remains one of the key challenges for the authorities in São Tomé and Príncipe (STP).** In recent years, rising prices for food and fuel and significant foreign currency inflows stemming from oil bonuses complicated the conduct of monetary policy in São Tomé and Príncipe. The oil bonuses financed domestic government spending and substantially increased base money growth, which required active sterilization by the central bank—Banco Central de São Tomé and Príncipe (BCSTP). However, liquidity has sometimes not been sufficiently mopped up due to BCSTP's concerns over the modest level of foreign currency reserves and inadequate coordination with the Treasury. Moreover, the problem has been exacerbated by high euro-rization and weak financial intermediation of the country, which severely limit the effectiveness of conventional monetary instruments such as interest rates.

2. **Inflation has proven stubborn to reduce due to several important factors.** São Tomé and Príncipe is a very small, open economy, importing most goods from Europe. As such, the inflation rate has been affected by the dynamics of external factors such as international prices for fuel and food products. At the same time, domestic factors such as monetary, exchange rate, and fiscal policies have also played an important role. For example, the two recent spikes in the inflation rate were in years when the government sharply increased its expenditures. Against this background, this chapter examines the role of external and domestic factors in determining inflation in STP. Then, it discusses policy options to achieve price stability in the country.

3. **The remainder of this chapter is organized as follows**: Section B reviews inflation developments in São Tomé and Príncipe. Section C discusses the inflation model and presents model estimations. Section D reviews developments of base money and money overhang; Section E examines the role of sterilization and fiscal policy. Finally, Section F draws conclusions.

B. Inflation Developments

4. **Inflation rose sharply in the first half of 2006 and the second half of 2007, after hovering between 10 and 15 percent.** Between 2001 and 2003, the 12-month annual inflation rate remained around 10 percent per year (Figure II.1). However, in early 2006, the inflation rate started accelerating sharply, reaching over 26 percent in mid-2006, mainly as a result of fiscal overruns in the run-up to elections. Thereafter, inflation declined for a short period, reflecting the authorities' efforts to reduce fiscal imbalances and to curb liquidity

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[1] Prepared by Carlos Fernandez Valdovinos and Misa Takebe.

growth. However, it accelerated again to a historical peak of 34 percent by March 2008, largely reflecting rising import prices for food and fuel, and depreciation of the dobra especially against the euro, the main invoicing currency for imports.

Figure II.1. CPI Growth Rate (year-on-year changes)

Sources: São Tomé and Príncipe authorities and IMF staff estimates.
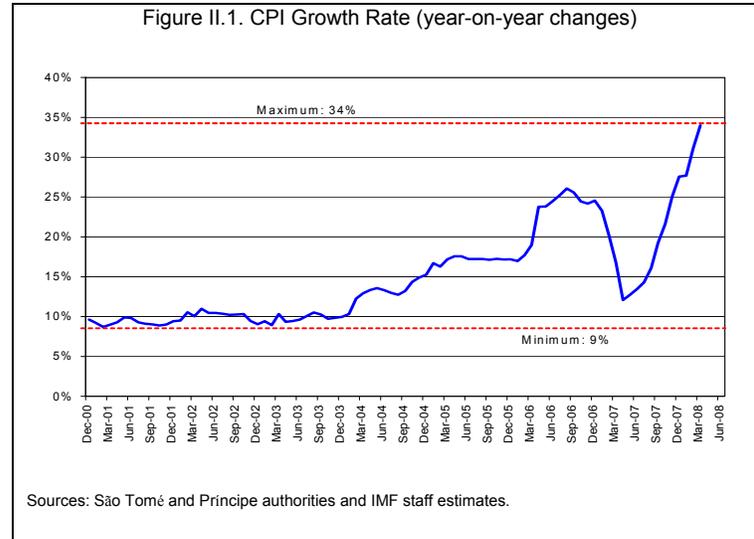
5.   **The average inflation rate between 2003 and 2007 in STP was well above that of the Sub-Sahara Africa (SSA) region (excluding Zimbabwe)**. The average rate in STP at

around 16 percent was not only almost double the regional average of 8.1 percent during the period, but was also one of the highest in the region. Similarly, when comparing with countries at similar levels of development, inflation in STP was the second highest after Zambia among low-income countries in the region (Figure II.2).

Figure II.2. Average Inflation Rates in Low Income Countries in SSA, 2003-2007 (in percent)
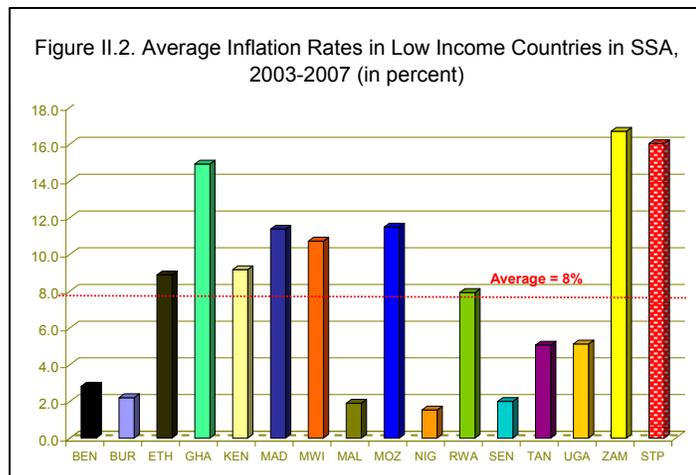
6.   **Among the main components of the CPI, food price was the most volatile** (Appendix II.1 in Table 1). The average and median of annual inflation rates were similar across the main categories of the CPI during the period of 2001-2007. However, the standard deviation of food price inflation exceeded that of non-food price inflation by about 75 percent. During the period, the annual increase in the international price for fuel products was 18.4 percent on average, while food products prices increased on average at an annual rate of 7.5 percent. During the same period, the average depreciation of the dobra against the euro as well as the increase in liquidity were also quite high, suggesting the crucial role of exchange rate and monetary factors in explaining inflation.

C. Inflation Model

7.   **The econometric model tries to quantify the role of domestic and external factors in explaining inflation in STP.** As highlighted before, several factors could explain the dynamics of inflation in the country. First, inflation depends on developments in international prices for food and fuel products, which are mostly imported in STP. Second, domestic policies (monetary, exchange rate, and fiscal policies) also play an important role. For example, the annual growth rate of dobra base money reached a high of 50.6 percent at end December 2007. Historically, the increase in liquidity had not only driven a higher rate of inflation, but also led to a depreciation of the dobra (Figure II.3).[2] Following this analysis, the following model was estimated using monthly data from January 2004 to February 2008:
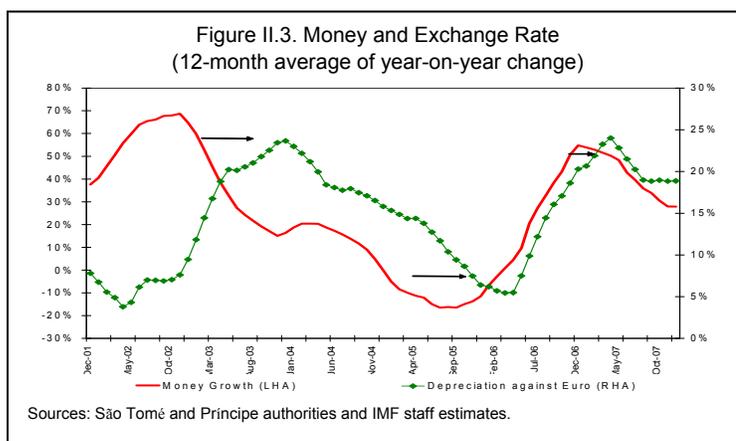
Figure II.3. Money and Exchange Rate
(12-month average of year-on-year change)

Money Growth (LHA)   Depreciation against Euro (RHA)

Sources: São Tomé and Príncipe authorities and IMF staff estimates.

$$INF(j)_t = \alpha + \beta \sum_i \Delta Money(j)_{t\text{-}n} + \gamma \sum_j \Delta Euro(j)_{t\text{-}n} + \delta \sum_j \Delta Oil(j)_{t\text{-}n} +$$
$$+ \varphi \sum_j \Delta Food(j)_{t\text{-}n} + \varphi \sum_j \Delta Real(j)_{t\text{-}n} + \varepsilon_t$$

 where,

$INF(j)_t$ is the average monthly inflation rate at time t during the last j months;

$\Delta Money(j)_{t\text{-}n}$ is the average monthly growth of money at time $t\text{-}n$ during the last j months;

$\Delta Euro(j)_{t\text{-}n}$ is the average monthly depreciation rate of the dobra against the euro at time $t\text{-}n$ during the last j months;

$\Delta Oil(j)_{t\text{-}n}$ is the average increase in the index for the international price of oil at time $t\text{-}n$ during the last j months;

$\Delta Food(j)_{t\text{-}n}$ is the average increase in the index for the international price of food products at time $t\text{-}n$ during the last j months; and

$\Delta Real(j)_{t\text{-}n}$ is the average monthly growth in the index of real economic activity at time $t\text{-}n$ during the last j months. [3]

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[2] A more detailed review of exchange rate developments can be found in Democratic Republic of São Tomé and Príncipe – Selected Issues and Statistical Appendix (IMF, 2006) and Democratic Republic of São Tomé and Príncipe – Recent Economic Development and Selected Issues (IMF, 2000).

[3] Monthly real economic activity was approximated by monthly real imports in US dollar terms.

The model was also estimated using six-month moving averages of variables up to three lags. In addition, two alternative definitions of money were used: currency in circulation ($Curr(j)_{t-n}$) and dobra base money ($BM(j)_{t-n}$).[4]

8.   **As expected, the results of the model show that there is a positive relationship between international prices for food and fuel products and inflation, and their effects on the CPI are significant** (Table II.1). Also, the pass-through to prices from lagged depreciation has the expected positive sign and the short-term elasticity is not small (the coefficients are 0.39 under the dobra base money model and 0.32 under the currency in circulation model). In addition, the results confirm that inflation is a monetary phenomenon in STP— liquidity increases create upward pressures on prices. Moreover, the models using

Table II.1. OLS Estimation Results						
Money variable = dobra base money						
	Coefficients (A)	Robust t-statistics	Average growth (B) (in percent) 1/	Contribution (A) * (B) (in percent) 1/ 2/		% of Total Inflation
C	0.01	10.41	---	0.65		
DBM6(t-1)	0.06	4.05	2.75	0.16	Domestic	32%
DEURO6(t-3)	0.39	8.63	2.32	0.89	Domestic	
DOIL6(t-1)	0.12	7.87	3.35	0.39	Exogenous	49%
DFOOD6(t)	0.28	8.27	4.31	1.22	Exogenous	
DREAL6(t-1)	-0.01	-1.45	12.36	---	---	
Adjusted R-squared	0.88					
Akaike Criterion	-8.88					
Schwarz Criterion	-8.56					
Money variable = currency in circulation						
	Coefficients (A)	Robust t-statistics	Average growth (B) (in percent) 1/	Contribution (A) * (B) (in percent) 1/ 2/		% of Total Inflation
C	0.01	9.68	---	0.76		
DCURR6(t-1)	0.05	5.28	4.98	0.27	Domestic	30%
DEURO6(t-3)	0.32	6.44	2.32	0.74	Domestic	
DOIL6(t-1)	0.08	4.72	3.35	0.27	External	53%
DFOOD6(t)	0.34	12.16	4.31	1.48	External	
DREAL6(t-1)	-0.01	-2.27	12.36	-0.18		
Adjusted R-squared	0.90					
Akaike Criterion	-9.07					
Schwarz Criterion	-8.75					
1/ At the end of February 2008.						
2/ The six-month moving average inflation rate at the end of February 2008 was 3.1%.						

currency in circulation seem to have a slightly better fit to the data. Finally, the proxy for real economic activity has the expected negative sign but it is statistically significant only in the model using currency in circulation.[5]

9.   **Results show that both external and domestic factors account for a sizable part of recent increases in inflation rates.** The econometric results presented above could be used to estimate the contributions of external and domestic factors to inflation. The decomposition of inflation at the end of February 2008 can be seen in the last column of Table II.1. On the one hand, domestic factors (growth in dobra base money and the depreciation against the euro) accounted for about 30 percent of total inflation. On the other hand, external factors (increases in the international prices for fuel and food products) were more important, accounting for around 50 percent of total inflation. These conclusions are robust across different models.[6]

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[4] Only the statistically significant lags are presented in this section.

[5] The weak statistical significance of real economic activity could be explained by the poor measurement of the variable employed to approximate GDP.

[6] In order to test the robustness of the model, the same regression was run using nine-month moving average variables. The results were similar as shown in Appendix I.1 Table 2.

D. Development of Base Money and Money Overhang, 2000 - 2007

10.   **On BCSTP's balance sheet, unlike the standard case, base money is the difference between positive net foreign assets (NFA) and *negative* net domestic assets (NDA).** The model in Section C suggested that domestic factors, especially growth of base money, has a significant impact on inflation. This section first analyzes what drove growth of base money by examining the BCSTP's balance sheet, which has a unique structure, and then discuss developments of money overhang. Between 2000 and 2007, the BCSTP held negative NDA, because its NDA with commercial banks has been small and the government kept large deposits at the central bank. BCSTP's financing to the government has thus been through government drawdown of its own deposits. This trend became more significant after oil signature bonuses started flowing into government accounts in mid-2005.

11.   **Between 2000 and 2007, the country experienced two sharp spikes in base money growth, both caused by a large reduction in NDA** (Figure II.4). Since the BCSTP has negative NDA, an increase in base money is caused by a *decrease* in its *negative* NDA and/or an increase in its NFA. The spikes in early-2006 and late-2007 were mainly caused by large decreases in NDA when the government substantially withdrew from its deposits of oil signature bonuses from the BCSTP in order to increase public expenditure.

Figure II.4. Base Money and Net Domestic Assets of the BCSTP

— Total base money growth (LHS, year-on-year, in percent)
— Share of banks' foreign currency reserves in total base money (in percent, RHS)

Change in net domestic assets (year-on-year, in billion dobras, scale in reverse order)

Sources: São Tomé and Príncipe authorities and IMF staff estimates.

12.   **In addition, the two abrupt increases in base money were partly brought about by large increases in bank foreign currency reserves.** Since the beginning of 2005 deposits denominated in foreign currencies have substantially increased for two reasons: more foreign capital started flowing into the country in the expectation of oil prospects and the dollarization/eurorization of the banking system progressed along with the depreciation of the dobra. In response, commercial banks had to increase their foreign currency reserves at the BCSTP to meet the mandatory reserve requirements. Between 2005 and 2007, bank foreign currency reserves increased by 269 percent on average per year, reaching 40 percent of total base money at the end of 2007 (Figure II.4).
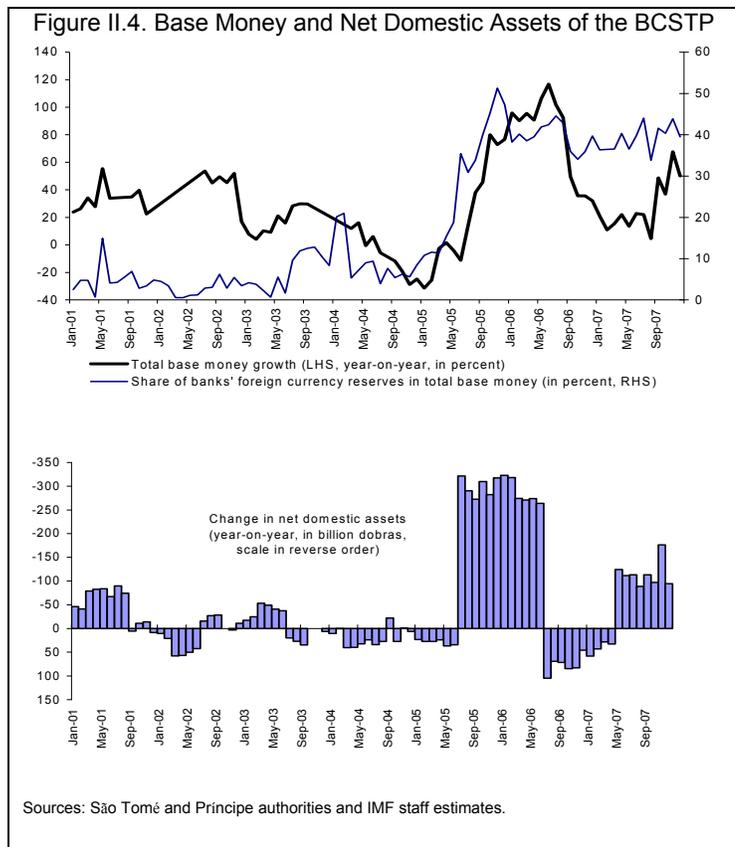
13.   **Moreover, empirical analysis shows that there were two outstanding money overhangs in early-2006 and late-2007, in which the budget use of oil bonuses played a significant role** (Figure II.5)**.** Since public expenditure affects both supply and demand for money, it is important to examine not only money supply but also excess money supply to understand monetary development in STP. Based on empirical analysis in Appendix II.2, significant money overhangs were distinguished in the first half of 2002, the first half of 2006, and the second half of 2007. Those periods especially the latter two, coincided with high inflation. The analysis also identified the Granger causality between money overhang and withdrawal from the government's deposits at the BCSTP, particularly after the government started using oil signature bonuses.[7]
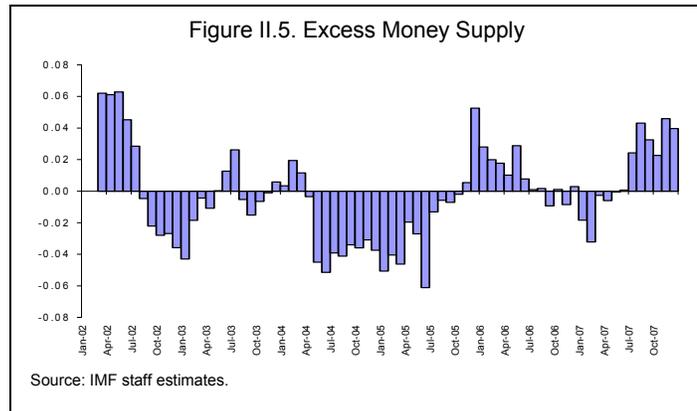
Figure II.5. Excess Money Supply

Source: IMF staff estimates.

E.   Sterilization and Fiscal Policy

14.   **In the short term, sterilization can be an effective tool to contain excess liquidity arising from fiscal expansion using oil signature bonuses, if fully utilized by the BCSTP.** As described in Section D, the budget use of oil signature bonuses appears to have a substantial impact on developments of money overhang. During the period of money overhang in 2006 and 2007, STP budget deficits were largely financed by oil signature bonuses. Such financing should have little effect on base money growth as long as it is fully sterilized. In other words, base money does not increase if a reduction in negative NDA (withdrawal of oil bonuses from government accounts at the BCSTP) is fully offset by a reduction in NFA (sterilization by the BCSTP). In 2006, the BCSTP did some sterilization particularly toward the end of the year, which helped reduce money overhang. However, in 2007, sterilization was limited compared to 2006. Foreign exchange sales through auctions went down to $2 million in 2007 from $7 million in 2006. As a result, base money continued to grow, creating a money overhang, while the NIR considerably over-performed toward the end of 2007. If sterilization had been adequate and timely, the growth of base money should have tapered off, while foreign reserves would have stayed above the targets. The BCSTP could have used foreign exchange auctions more often to actively sterilize the excess liquidity arising from the budgetary use of oil signature bonuses.

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[7] See Appendix II.2 for detailed empirical analysis.

15.   **For adequate and timely sterilization, close coordination between the Treasury and the BCSTP is crucial.** The BCSTP needs information not only on total public expenditure but also on foreign-currency public expenditure in order to conduct effective sterilization. The BCSTP has two options for sterilization: auctions in the market and direct sales to the government. The BCSTP has full control over the timing and the amount of sales at auctions but very little control over direct sales to the government because the BCSTP is required to sell foreign currencies to the government in response to budgetary needs.[8] Moreover, while in 2007 auctions accounted for only 11 percent of total sales, direct sales to the government comprised over 60 percent. Thus, it is very important that the Treasury and the BCSTP exchange information on expected domestic- and foreign-currency expenditure, in order to enable the BCSTP to determine the timing and amount of sterilization and set auction schedules based on a more accurate forecast of foreign currency sales to the government.

16.   **In fact, inadequate coordination between the Treasury and the BCSTP brought about the BCSTP's hesitation over active sterilization in late-2007**. As described above, the BCSTP makes projections of direct sales to the government based on foreign-currency expenditure schedule provided by the Treasury and conducts auctions accordingly. However, in late-2007, some of the projected foreign-currency expenditure did not materialize on schedule and the information was not immediately known to the BCSTP and was therefore not reflected in the BCSTP's auction schedule. As a result, the BCSTP's auction fell short of what was needed to adequately bring down liquidity growth arising from the budgetary use of oil bonuses.

17.   **Although sterilization can be effective in containing liquidity in the short term, continuous sales of foreign exchanges cannot be a sustainable option for STP over the long term.** At the end of 2007 gross international reserves (GIR) covered 6.5 months of imports, but a significant portion was not available for sterilization (Figure II.6). In particular, GIR includes the National Oil Account, bank

Figure II.6. Import Cover of Foreign Reserves [1/]

NIR excld NOA
NIR excld NOA and banks' foreign currency deposits
NIR excld NOA, banks' and gov's foreign currency deposits
Gross official reserves

1/ In months of imports of goods and services excluding oil project-related imports in a subsequent year.
Sources: São Tomé and Príncipe authorities and IMF staff estimates.

foreign currency reserves, and government foreign currency deposits. None of these items could be used for sterilization because the BCSTP does not own them. Once all those items are excluded, the import coverage rate of net international reserves (NIR) declines to

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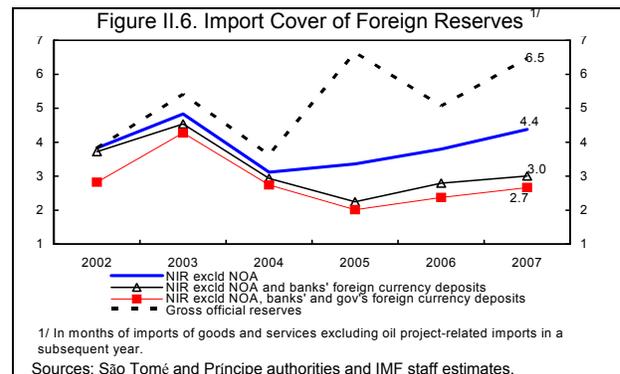
[8] Foreign currency public expenditures include transfers to the Joint Development Agency, debt service payments, and foreign scholarship payments. Some of these expenditures are strictly on schedule, others are not.

2.7 months. This level of usable foreign reserves is not considered high enough to make sterilization a main liquidity control tool over the long term. Given such limited room for sterilization, the government must rely on fiscal discipline to support the BCSTP's efforts to contain liquidity.

F. Concluding Remarks

18.   **Sao Tome and Principe's recent experience shows that external factors as well as domestic policy factors (namely monetary, exchange rate and fiscal policies) matter for price developments.** The empirical results presented in this chapter indicate that the recent upward trend in inflation was heavily influenced by external factors (increases in the international prices for food and fuel products). At the same time, significant short-term price volatility can also be explained by domestic policy factors: high rates of money growth, steep depreciation of the dobra against the euro, and expansionary fiscal policy. Overall, changes in external factors accounted for around half of recent inflation and changes in domestic policy factors accounted for a third.

19.   **The policy mix to achieve price stability requires effective control of money supply and fiscal restraint.** Money overhangs were caused by expansionary uses of oil bonuses and insufficient sterilization. Better coordination of fiscal and monetary policies will be crucial to reduce inflation on a permanent basis. On the monetary side, the BCSTP should increase its sterilization operations in the short run, including more frequent auctions, especially to sterilize increases in liquidity arising from budgetary uses of oil bonuses. However, continuously selling foreign currency to mop up market liquidity is unsustainable as it weakens the external position of the country, given the limited foreign exchange reserves at the central bank. Therefore, on the fiscal side, fiscal discipline should be tightened to avoid sharp increases in discretionary expenditures, which, in turn, could support the BCSTP's efforts to contain liquidity.

20.   **As in other developing countries, operational targets for monetary policy need to be considered, taking into account STP's specific circumstances.** Weak financial intermediation limits the effectiveness of some monetary instruments such as short term interest rates. The central bank should therefore rely on restraining the growth of the relevant monetary aggregates to control inflation. In the case of STP, reserve money may not be the best target because of significant volatility of commercial bank reserves in foreign currencies. Better alternatives to guide the stance of monetary policy include currency in circulation and dobra base money. Both of these monetary aggregates can be useful targets for medium-term monetary policy in STP.

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Appendix II.1
Statistics for inflation model

Table 1. Statistical Properties of Key Variables (annual changes in percent, Jan 2001 – Dec 2007)							
	CPI	Food CPI	Non-food CPI	Dobra/ euro rate	Oil Prices[1]	Food Prices[1]	Currency outside banks	Dobra Base Money[2]
Mean	12.9	13.7	14.2	15.2	12.7	5.8	22.8	24.3
Average	14.4	14.6	14.5	14.5	17.2	6.8	25.5	27.1
Std. Deviation	5.4	8.2	5.3	8.1	25.8	9	26.5	29.9

[1] Index for international prices in dollar terms for oil and food products.

[2] Defined as currency outside banks and banks deposits at the Central Bank in Dobras.

Table 2. Results of OLD regression using nine month moving average variables

Money variable = dobra base money

	Coefficients (A)	Robust t-statistics	Average growth (B) (in percent) [1/]	Contribution (A) * (B) (in percent) [1/ 2/]		% of Total Inflation
C	0.01	9.59	---	0.70		
DBM9(t-1)	0.06	2.98	2.13	0.12	Domestic	26%
DEURO9(t-3)	0.28	5.12	1.92	0.55	Domestic	
DOIL9(t-1)	0.11	6.21	3.80	0.43	External	47%
DFOOD9(t)	0.21	4.83	3.70	0.78	External	
DREAL9t-1)	-0.01	-0.92	11.4	---		
Adjusted R-squared		0.80				
Akaike Criterion		-9.20				
Schwarz Criterion		-8.92				

Money variable = currency in circulation

	Coefficients (A)	Robust t-statistics	Average growth (B) (in percent) [1/]	Contribution (A) * (B) (in percent) [1/ 2/]		% of Total Inflation
C	0.01	9.02	---	0.76		
DCURR9(t-1)	0.07	5.38	4.29	0.28	Domestic	26%
DEURO9(t-3)	0.25	4.19	1.92	0.48	Domestic	
DOIL9(t-1)	0.11	5.12	3.80	0.40	External	47%
DFOOD9(t)	0.26	7.98	3.70	0.96	External	
DREAL9(t-1)	-0.03	-3.2	11.4	-0.29		
Adjusted R-squared		0.84				
Akaike Criterion		-9.41				
Schwarz Criterion		-9.13				

1/ At the end of February 2008.

2/ The nine-month moving average inflation rate at the end of February 2008 was 2.7%.

Appendix II.2
Estimation of Money Overhang

1.   Development of money overhang is examined in this appendix in order to further investigate the monetary development of the country. The section D showed that a key factor driving base money growth was an increase in banks foreign currency reserves and the government's withdrawal of oil signature bonuses to finance public expenditure. Since public expenditure affects both supply and demand for money, it is important to examine excess money supply and identify money overhang to understand monetary development in STP. Excess money supply is defined as follows.

$$\ln M^{ex} = \ln M^{s} - \ln M^{d} \quad (1)$$

where M^{ex} is nominal excess money supply, M^{s} is nominal money supply, and M^{d} is nominal money demand.

2.   For this study, the dobra component of base money is used since it has a direct impact on domestic inflation and it avoids the impact from volatile banks foreign currency reserves. Then money demand is defined using the following conventional function with dependent variables of income and opportunity cost.

$$M^{d} = f(Y, ER^{e}) \quad (2)$$

where Y is nominal income, and ER^{e} is the expected opportunity cost.[9]

3.   The study used monthly data for January 2000 through December 2007. Proxies were used for Y and ER^{e} because reliable monthly data do not exist. For Y, the three-month moving average of total imports was used as a proxy in the absence of monthly GDP data. The three-month moving average was used to reduce the effect of the volatile shipping schedule. For ER^{e}, the expected return of the nominal effective exchange rate of the dobra was used. In highly dollarized countries, the expected opportunity cost of local currency is the excess return (or cost) from local-currency-denominated financial products over foreign-currency-denominated financial products. Since STP has few financial products in dobra and the interest rates on those products rarely move, assets are assumed to be allocated based only on the expected return on the exchange rate, which is formed as follows:

$$ER^{e}_{t} = b_{0} + b_{1}ER_{t-1} \quad (3)$$

---

[9] There are many literatures discussing real versus nominal adjustment of money, including a survey of demand for money equations in Judd and Scadding (1982). This chapter used a nominal adjustment model because the result of a real adjustment model is less robust. In addition, it is assumed that the coefficients of log of real income and log of price are the same in order to use the above defined nominal money demand function.

where ER^e is the monthly expected return of the nominal effective exchange rate of the dobra, and ER_{t-1} is the actual return at time t-1.[10]

4.   To determine money demand we used a vector error-correction (VEC) model. For running the VEC model, we looked at several statistical properties (Table 1). Trace test statistics rejected the null hypothesis of no cointegration at the 1 percent significance level; Augmented Dickey-Fuller unit root tests showed that all variables are stationary in their first difference at the 1 percent significance level; Residual Portmanteau tests for autocorrelations rejected the null hypothesis of no autocorrelation at the 1 percent significance level. Given these encouraging statistical properties, a VEC model is estimated as follows with seven lags.[11]

Table 1. Statistical property tests				
Cointegration tests (trace)				
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.4	40.6	29.8	0.002
At most 1	0.1	6.9	15.5	0.584
At most 2	0.0	1.1	3.8	0.295

Trace test indicates 1 cointegrating eqn(s) at the 0.01 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Augmented Dickey-Fuller statistics 1/ 2/		
	Lag length	t-Statistic
d ln M	0	-9.656 ***
d ln Y	2	-7.081 ***
d ER	2	-9.718 ***

1/ Lag length was chosed based on SIC.
2/ *** 1 percent signifiace level

$$\Delta \ln M_t^d = \beta_0 + \beta_1 \sum\nolimits_1^k \Delta \ln Y_{t-k} + \beta_2 \sum\nolimits_1^k \Delta ER_{t-k} + \beta_3 ECM \Delta \ln M_{t-1}^d + \varepsilon_t \quad (4)$$

$$ECM_t \ln M_t^d = \alpha_0 \ln M_t^d - \alpha_1 - \alpha_2 \ln Y_t - \alpha_3 ER_t^e \quad (5)$$

where $\Delta \ln$ is the first difference in logs of the variables, and $ECM \ln M_t^d$ is an error correction term associated with disequilibrium from long-term equilibrium.

5.   The estimation results are shown in Table 2.[12] The cointegrating equation suggests that the long-run estimation of money demand is

$$\ln M_t^d = 0.385 * \ln Y_t + 2.174 * ER_t^e + 12.379 \quad (6)$$

6.   Both dependent variables are statistically significant and show expected signs in the long run. Money demand tends to increase with higher nominal income and appreciation of the nominal effective exchange rate. In the error correction equation, the coefficient associated with the error correction term is statistically significant. The relatively small coefficient associated with the error correction term indicates that the adjustment toward

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[10] Initially, a model of $ER_t^e = b_0 + b_1 \sum\nolimits_{i=1} biER_{t-1-i}$ was considered as in Brissimis and Leventakis (1985). However, only the first lag had strong explanatory power for the future exchange rate based on STP historical data. It was assumed that market participants learned this from their own experience.

[11] The lag was chosen based on the Akaike Criteria.

[12] The estimate shows a modest fit. Conventional R^2 and log-likelihood are 0.4 and 128, respectively.

equilibrium is relatively slow. In both the short- and long-term, the expected return of the exchange rate has a strong impact on money demand as expected.

Table 2. Estimation results of VEC [1/][2/][3/]

Cointegrating Equation		
	Coef.	Std. Err.
LNIM3(-1)	-0.385	-0.123 ***
NEERF1(-1)	-2.174	-0.376 ***
C	-12.379	

Error Correction:		
	Coef.	Std. Err.
CointEq1	-0.064	-0.035 **
D(LM(-1))	-0.057	-0.130
D(LM(-2))	-0.210	-0.129 **
D(LM(-3))	-0.083	-0.126
D(LM(-4))	-0.184	-0.123 *
D(LM(-5))	0.309	-0.126 ***
D(LM(-6))	0.035	-0.130
D(LM(-7))	0.176	-0.128 *
D(LNY(-1))	-0.062	-0.148
D(LNY(-2))	0.145	-0.141
D(LNY(-3))	0.007	-0.142
D(LNY(-4))	0.135	-0.159
D(LNY(-5))	-0.059	-0.140
D(LNY(-6))	-0.128	-0.135
D(LNY(-7))	0.239	-0.143 **
D(ER(-1))	-0.124	-0.068 **
D(ER(-2))	-0.102	-0.060 **
D(ER(-3))	-0.061	-0.052
D(ER(-4))	-0.069	-0.041 *
D(ER(-5))	-0.022	-0.033
D(ER(-6))	-0.024	-0.022
D(ER(-7))	-0.004	-0.013
Constant	0.012	-0.014

1/ the dependent variable is ∆lnM.
2/ * 10% significance level, ** 5% significance level, *** 1% significance level.
3/ LM, LNY, are ER are lnM, lnY, and ER.

7.   The model's estimate suggests that three periods of money overhang can be distinguished between 2002 and 2007 (Figure II.5 in main text)**.** Using above models, there was significant money overhang in the first half of 2002, the first half of 2006, and the second half of 2007. Those periods, especially the latter two, coincide with high inflation.

8.   It is conjectured that the use of oil bonuses by the government played a significant role in the development of money overhang especially in 2006 and 2007. To see what led the development of money overhang, Granger causality tests were used on log differences of three policy elements of base money supply: government deposits, NDA excluding government deposits, and NFA. The NDA

Table 3. Granger causality tests [1/][2/]

Sample period: Jan-01-Dec-07

Null Hypothesis:	F-Statistic	Probability
dln(gov) does not Granger Cause dln(Mex)	1.907	0.069 *
dln(nfa) does not Granger Cause dln(Mex)	1.023	0.440
dln(ndar) does not Granger Cause dln(Mex)	0.696	0.722

Sample period: Jul-05-Dec-07

Null Hypothesis:	F-Statistic	Probability
dln(gov) does not Granger Cause dln(Mex)	6.159	0.020 **
dln(nfa) does not Granger Cause dln(Mex)	3.887	0.059 *
dln(ndar) does not Granger Cause dln(Mex)	0.299	0.589

1/ dln is the first difference in logs of variables, and gov, dnar, dfa, and Mex are government deposits at the central bank, NDA excluding the government's deposits, NFA, and excess money supply.
2/ * 10% significant level, ** 5% significance level.

components were separated into government deposits and other items, because government deposits appear to play a special role as described in Section C. The test result supported the hypothesis that government deposits Granger-caused the excess money supply throughout the period (Table 3). Moreover, the statistical significance of government deposits became more robust after oil signature bonuses started flowing into government accounts in July 2005.