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Assessing Fiscal Risks in Bangladesh

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I N T E R N A T I O N A L M O N E T A R Y F U N D

**IMF Working Paper**

Asia Pacific Department

**Assessing Fiscal Risks in Bangladesh**

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**Abstract**

This paper identifies, quantifies, and assesses fiscal risks in Bangladesh. By performing sensitivity analysis and using stochastic simulations, it measures risks arising from shocks to GDP growth, the exchange rate, commodity prices, and interest rates. It also analyzes specific fiscal and institutional risks, such as those related to the pension system, the issuance of guarantees, the state-owned commercial banks, and the external borrowing and debt management strategy. The paper finds that fiscal aggregates are particularly sensitive to shocks to commodity prices and exchange rates. Other factors that could affect fiscal aggregates are the unfunded pension system and the limited institutional capacity.

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## I. INTRODUCTION

Fiscal risks are factors, often outside a government's control, that can cause a country's fiscal aggregates to differ from forecasts. As noted in Cebotari et al. (2009), these differences can be large, and may result from a variety of shocks such as deviations of macroeconomic variables from expectations (e.g. shocks to economic growth, interest rates, exchange rate, and the terms of trade), natural disasters, calls on government guarantees, and also from institutional weaknesses. The 2008-09 global crisis and its aftermath illustrated that the materialization of fiscal risks can lead to significant fiscal liabilities.

This paper assesses fiscal risks in Bangladesh. First, it presents a framework to identify and classify the different sources of fiscal risks in Bangladesh. Second, it assesses the sensitivity of the fiscal balance and the public debt to particular macroeconomic shocks and conducts stochastic analyses of the impact of such shocks on the public debt-to-GDP ratio. Third, it evaluates the impact of specific sources of fiscal risks such as those originating from contingent liabilities and the pension system. Finally, it assesses risks that emerge from the government's institutional capacity limitations, such as budget forecasting errors, external debt management, and data discrepancies. Based on this analysis, the paper also proposes measures to mitigate some of the most severe risks Bangladesh faces.

Results suggest that, in Bangladesh, a variety of factors may cause the fiscal outturns to diverge from forecasts. The fiscal balance is particularly sensitive to shocks to macroeconomic variables such as commodity prices and exchange rates. Additionally, specific factors, such as calls on government guarantees or the recapitalization of state-owned banks could negatively impact fiscal aggregates. Results also highlight the impact of risks derived from the unfunded pension system and the limited institutional capacity.

The paper draws on two strands of the literature: fiscal risks and debt sustainability. Regarding the former, results are consistent with Cebotari et al. (2009), who building on experience from different countries, conclude that macroeconomic shocks and calls on contingent liabilities often have major implications for fiscal sustainability. In addition, Hemming et al. (2006) assess the impact of guarantees and other instruments on debt. They argue that greater use should be made of scenario analysis to stress test debt projections under alternative assumptions about calls on guarantees.

The paper also builds on an extensive literature on debt sustainability and its determinants.<sup>2</sup> When debt rises (in particular the external portion) beyond certain thresholds, a country's fiscal balances become more vulnerable to shocks, as explained by Obstfeld and Rogoff (1996), leading in extreme cases to debt crises. Celasun et al. (2006) study debt sustainability in emerging economies, and find that an explicit quantification of risks could help in designing consolidation strategies. Furthermore, debt sustainability is of particular relevance for low-income countries, given that they generally present high vulnerability to exogenous

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<sup>2</sup> See Chalk and Hemming (2000), Melitz (1997), Gali and Perotti (2003), Wyplosz (2005), Celasun et al. (2006).

shocks, political instability, and weak institutions, and their debt structure is usually denominated in foreign currency.<sup>3</sup>

The rest of the paper is organized as follows. Section II presents the main framework for analyzing fiscal risks. Section III assesses the impact of macroeconomic risks, by quantifying budget sensitivity to different shocks, and conducting stochastic analyses (fan charts) for the path of public debt. Section IV deals with different contingent and policy-specific risks facing Bangladesh. Section V concludes.

## II. A FRAMEWORK FOR ANALYZING FISCAL RISKS

As mentioned above, fiscal risks are the government's exposure to short- to medium-term variability in the levels of revenues, spending, and the values of public assets and liabilities relative to forecast. It is helpful to organize fiscal risks into a framework that differentiates between: (a) general economic risks, such as those arising from shocks to macroeconomic variables (e.g. commodity prices, GDP growth, exchange rates); (b) specific fiscal risks, mainly from contingent liabilities, whether explicit or implicit; and (c) structural or institutional risks, such as weak institutional capacity and spending rigidity.<sup>4</sup> These risks are then assessed vis-à-vis their impact on the budget and the debt stock (Figure 1).

General economic risks operate through a variety of channels, such as shocks to GDP growth, inflation, the exchange rate, interest rates and commodity prices. These shocks affect expenditures (e.g. through the subsidy bill), revenues, and consequently the stock and dynamics of public debt.

Realizations of contingent liabilities (that is, obligations triggered by an uncertain event), can also create substantial fiscal risks. A contingent liability can be explicit or implicit. In the first case, the conditions are clearly stipulated in policies or legal obligations, while in the second case the obligation arises from the expectation that the government will provide support should a particular event occur.<sup>5</sup> Fiscal risk analysis has traditionally focused on explicit contingent liabilities arising from contractual or legal obligations of the government. However, it is clear that non-contractual commitments are also critical for fiscal sustainability (Cottarelli, 2013), particularly those emanating from the financial sector. A particular feature of implicit contingent liabilities is that their hidden and/or uncertain nature may tempt governments to avoid dealing with them in a timely fashion. However, this may exacerbate the problem when they are eventually realized, as the size of the liabilities may have grown in the meantime.

Structural or institutional weaknesses can also create policy risks and constrain the effectiveness of fiscal risk management. Coordination problems between different levels of government can impede the government's ability to implement the desired fiscal policy or hamper the ability to respond to shocks. Limited capacity to identify and manage fiscal risks can exacerbate a country's exposure to existing fiscal risks. When policymakers lack good

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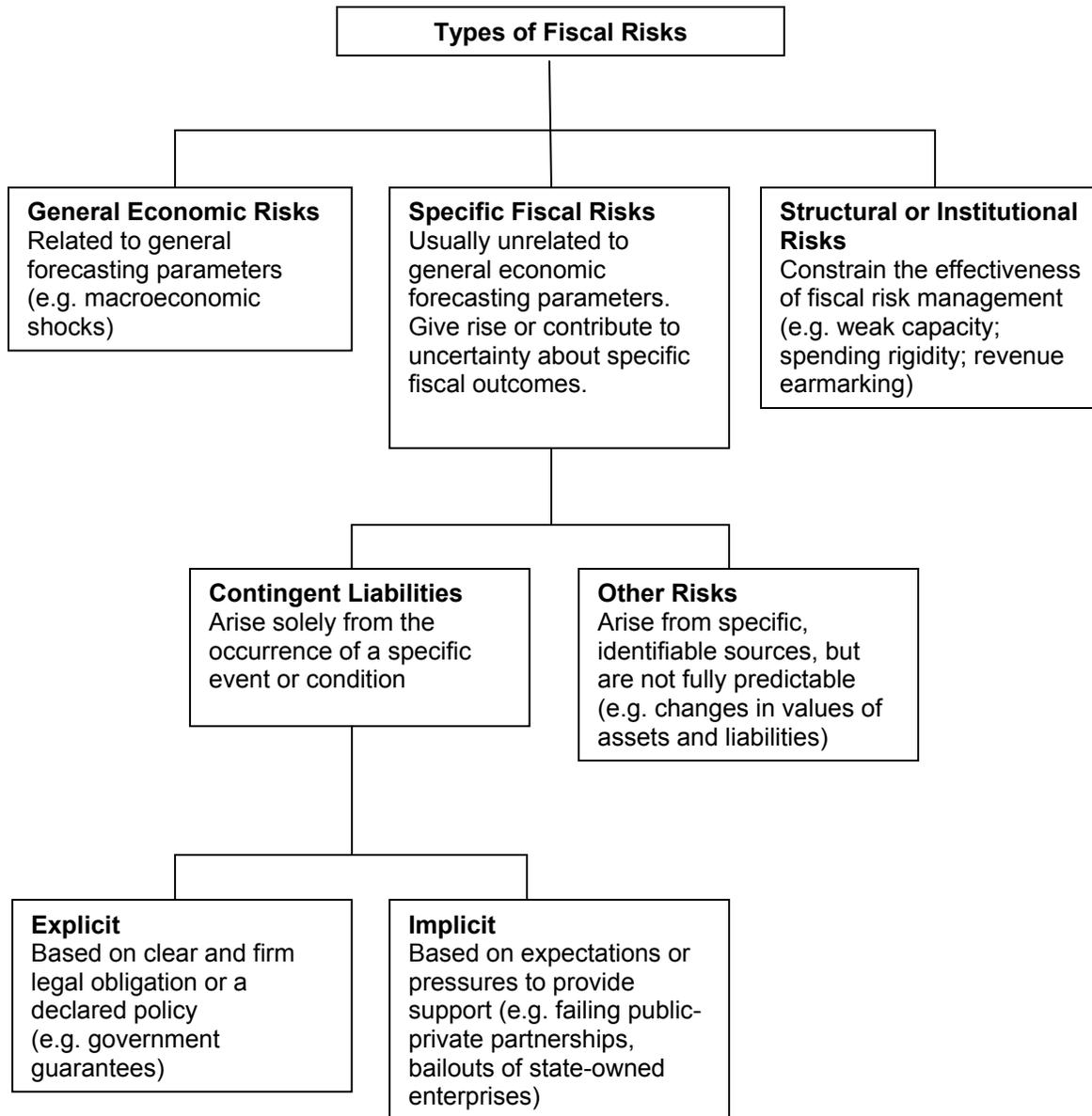
<sup>3</sup> See Barkbu et al. (2008).

<sup>4</sup> See Budina and Petrie (2013).

<sup>5</sup> For an analysis of the fiscal implications of contingent liabilities, see Brixi and Schick (2002), Irwin (2003), and Hemming (2006).

information, fiscal management becomes more difficult, increasing the likelihood of policy errors. As noted by Budina and Petrie (2013), this situation can be compounded if the institutions and actors responsible for the specific risk management functions are not clearly identified, if those responsible lack the necessary authority, or if budgeting systems undermine effective management.

**Figure 1. Types of Fiscal Risks**



The framework outlined above will guide the identification in this paper of fiscal risks in Bangladesh.

### III. MACROECONOMIC RISKS AND BUDGET SENSITIVITY IN BANGLADESH

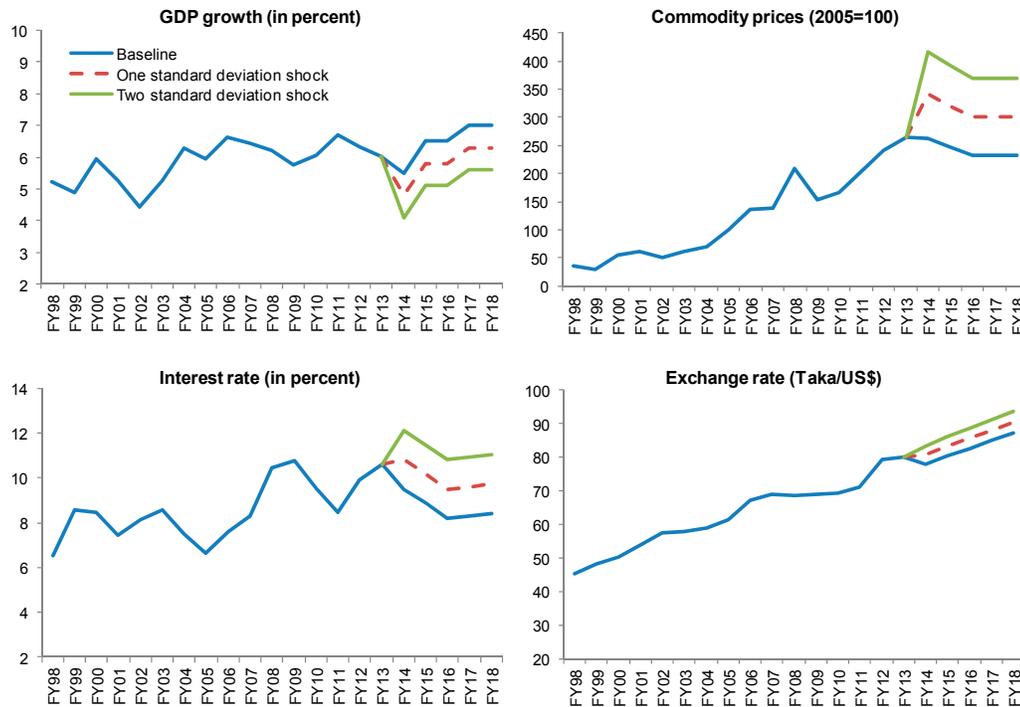
Macroeconomic shocks (e.g. shocks to GDP growth, commodity prices, and interest rates) can be a source of significant risks to both the budget at any point in time and the evolution of public debt in Bangladesh. This section assesses the sensitivity of the fiscal balance and public debt to particular macroeconomic shocks and conducts stochastic analyses of the impact of such shocks on the public debt-to-GDP ratio.<sup>6</sup>

#### A. Sensitivity Analysis

Bangladesh's fiscal aggregates are sensitive to variations in a number of macroeconomic variables, including commodity prices, exchange rates, interest rates, and GDP growth. Shocks to these variables thus impact on fiscal performance, and some of these variables have been particularly volatile in the past few years.

This section examines the impact on fiscal outcomes of changes in the forecast values of key variables. The analysis focuses on one standard deviation permanent shocks to commodity prices (oil and urea), the exchange rate, the domestic interest rate, and GDP growth introduced one at a time (Figure 2).<sup>7</sup> The shocks are assumed to take place from the start of FY14. The near- and medium-term effects of the shocks are illustrated through their impact on the overall fiscal balance and total public debt (deviations from baseline) in Table 1.

**Figure 2. Shocks to Macroeconomic Variables**



Source: IMF Staff calculations

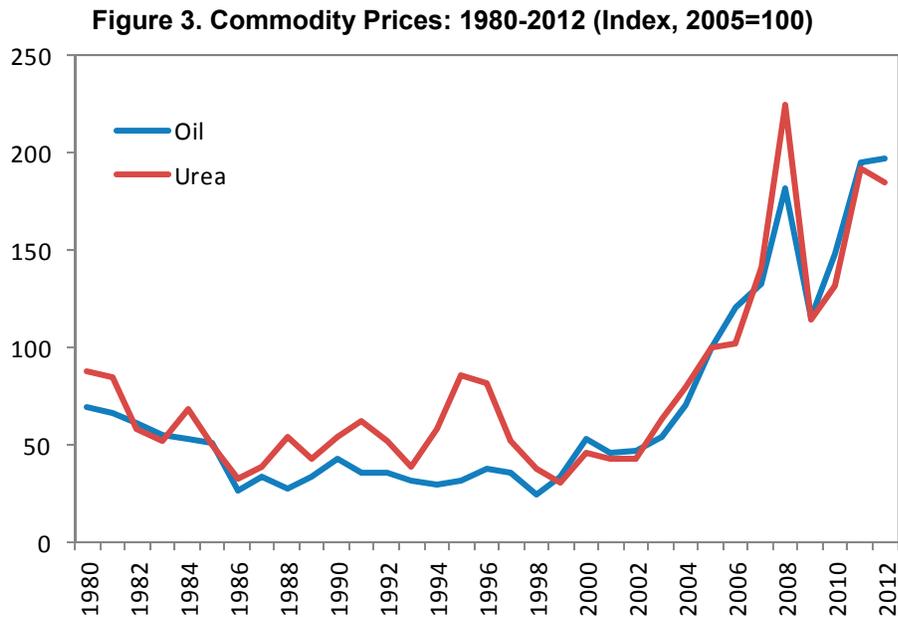
<sup>6</sup> The analysis uses FY96-base GDP. It is to be noted that the Bangladesh authorities have started publishing a rebased GDP series, with FY06 as base year. Nominal GDP in FY13 was about 16 percent higher under the rebased series compared to FY96-base GDP.

<sup>7</sup> Permanent shocks are defined as permanent deviations with respect to the baseline.

## Commodity prices

Bangladesh's fiscal position is sensitive to certain commodity prices; in particular oil and urea, which tend to move together (Figure 3) and whose volatility has recently increased.<sup>8</sup> Shocks to these prices operate through both the revenue and expenditure sides. On the revenue side, an increase in commodity prices would result in a rise in import-related tax revenues, which in total account for over 30 percent of tax collections.<sup>9</sup> On the expenditure side, the same shock would translate into an increase in the subsidy bill; in particular, payments related to fertilizers (urea) and fuel subsidies, such as those to Bangladesh Chemical Industry Corporation (BCIC) and Bangladesh Petroleum Corporation (BPC).<sup>10</sup> Consumption of fuel and urea is subsidized in Bangladesh.<sup>11</sup> In FY13 total subsidies were around 3.1 percent of GDP, of which energy related subsidies reached roughly 1.7 percent of GDP, and fertilizer subsidies around 1 percent of GDP.

The impact on revenues, due to the rise in import-related tax collections, is not enough to offset the much larger effect on expenditures, and therefore the overall effect is negative. The analysis suggest that a one standard deviation increase in the prices of oil and urea (roughly a 30 percent price increase) would reduce the overall fiscal balance (that is, increase the fiscal deficit) by around 0.6 percent of GDP on average each year with respect to the baseline. It would also lead to a cumulative increase in the stock of debt of around 3.1 percent of GDP over five years with respect to the baseline.



Sources: Bangladesh Authorities and IMF Staff calculations.

<sup>8</sup> Urea is used as a basic input in the production of rice fertilizers.

<sup>9</sup> For simplicity, this analysis assumes zero elasticity of commodity import volumes with respect to prices.

<sup>10</sup> The analysis here assumes that the authorities do not adjust retail energy or fertilizer prices, so the fiscal balance absorbs the entirety of the shock. This is clearly a worst-case scenario.

<sup>11</sup> For the purposes of this analysis, it is assumed that shocks to oil prices are transmitted one to one to international fuel prices.

## Exchange rate

While the exchange rate has been very stable in the past few years in Bangladesh, a shock to the exchange rate would affect the fiscal balance and debt stock through a variety of channels.<sup>12</sup> A depreciation in the Taka/US\$ exchange rate has an impact on domestic prices, and through them on nominal revenues and expenditures. Beyond that, depreciation has a direct impact on both revenues and expenditures. In the case of revenues, the impact is associated with import-related taxes. On the spending side, the main items affected are: (1) the fertilizer subsidy bill; (2) payments to BPC for oil imports (constant volumes assumed); (3) the externally financed portion of the Annual Development Program (capital spending); and (4) interest payments on external debt.<sup>13</sup> Additionally, there's a valuation effect on external debt: the nominal Taka equivalent value of public debt denominated in foreign currency would move at a one-to-one rate with exchange rate changes.

Results show that a permanent 10 percent depreciation in the Taka/US\$ exchange rate would reduce the overall fiscal balance (that is, increase the deficit) by around 0.8 percent of GDP on average yearly with respect to the baseline and increase the stock of debt by around 6.6 percentage points of GDP over five years.

## Domestic interest rate<sup>14</sup>

Interest expenses are a small share of total fiscal expenditures in Bangladesh. Therefore, shocks to interest rates have a limited impact: a one standard deviation rise in domestic interest rates (130 basis points) would reduce the overall fiscal balance by around 0.3 percent of GDP with respect to the baseline and push up the stock of debt by around 1.3 percentage points of GDP over five years.

## GDP growth

In terms of its direct impact, economic growth mainly affects the revenue side of fiscal aggregates in Bangladesh, including VAT (import and domestic), import tax, supplementary duties, and income tax. As is standard in studies for other developing and emerging market countries, and following IMF (2009), this paper assumes the elasticity of revenue with respect to growth to be equal to one and the elasticity of expenditure with respect to growth to be equal to zero.<sup>15</sup>

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<sup>12</sup> The exchange rate has been very stable in Bangladesh, and therefore shocks measured in terms of one standard deviation are small. This study will focus on the impact of a more realistic large shock: a 10 percent depreciation, which is slightly below the largest depreciation over the past ten years.

<sup>13</sup> Following Ahmed and Islam (2004), this paper assumes a low pass-through from exchange rate movements to inflation, specifically a coefficient of 0.2.

<sup>14</sup> Shocks to interest rates on external debt are not assessed in this paper as interest payments on external debt are low in Bangladesh, reflecting the prevalence of concessional external debt.

<sup>15</sup> These assumptions are admittedly simplistic: the elasticity of revenue could be higher than one, as some types of revenue (for instance, income taxes) tend to move more than proportionately with income; while some expenditures (for instance, social transfers) may well increase when growth falters, even in Bangladesh.

Results show that a one standard deviation decline in GDP growth (around 0.7 percentage points) would reduce the overall fiscal balance by around 0.1 percent of GDP with respect to the baseline and push up the stock of debt by around 0.5 percent of GDP over five years.

The relatively small effect is the reflection of two factors: (a) a small tax base: tax revenue collection in Bangladesh is among the lowest in the world, at around 9 percent of GDP; and (b) the low volatility of growth in the past few years, which implies that shocks to growth measured in terms of one standard deviation are small. Of course, the tail event of a larger, more sustained shock to growth would produce a larger deterioration in fiscal aggregates.

**Table 1. Budget Sensitivity to Macroeconomic Shocks, 2014–18**  
(Deviation from baseline, in percent of GDP)

	FY14	FY15	FY16	FY17	FY18
<b>Scenario A (30 percent increase in commodity prices, or 1 SD)</b>					
Overall Balance	-0.9	-0.8	-0.6	-0.4	-0.4
Total Debt	0.9	1.8	2.4	2.8	3.1
<b>Scenario B (10 percent depreciation in exchange rate)</b>					
Overall Balance	-0.9	-0.9	-0.8	-0.6	-0.6
Total Debt	3.6	4.6	5.4	6.0	6.6
<b>Scenario C (130 basis points increase in domestic interest rate, or 1SD)</b>					
Overall Balance	-0.2	-0.2	-0.3	-0.3	-0.3
Total Debt	0.2	0.5	0.7	1.0	1.3
<b>Scenario D (0.7 percent decrease in real GDP growth, or 1SD)</b>					
Overall Balance	-0.1	-0.1	-0.1	-0.1	-0.1
Total Debt	0.1	0.2	0.3	0.4	0.5

Sources: Bangladesh Authorities and IMF Staff calculations.

## B. Stochastic Analysis of Debt Dynamics

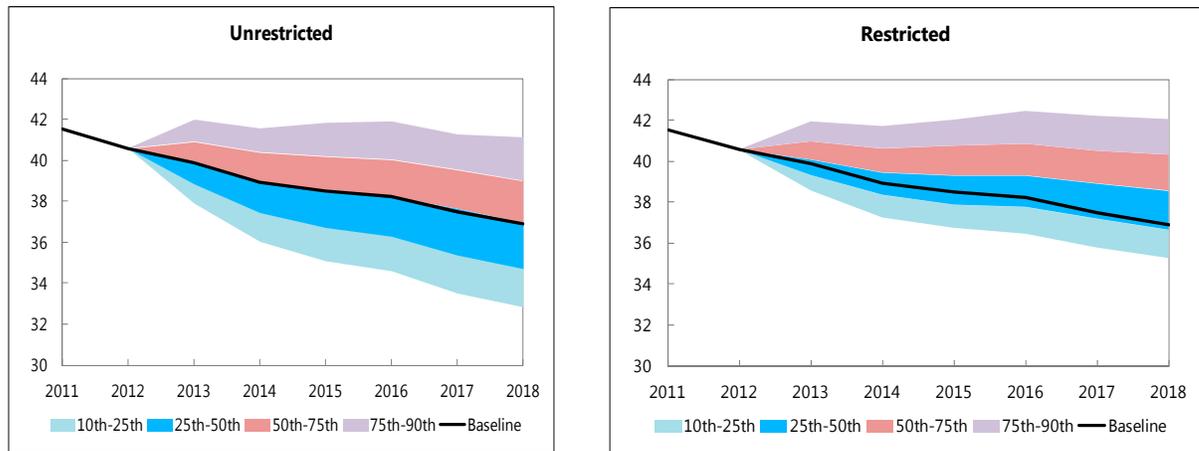
In some cases, macroeconomic shocks do not hit an economy in isolation but occur simultaneously. In crisis episodes (tail events), a negative shock to real GDP may occur in parallel with a shock to the exchange rate, interest rates, and inflation. The cumulative impact of such shocks on public debt may be significant.

Using fan chart analysis, this section illustrates the frequency distribution of projected public debt-to-GDP ratio paths generated by shocks to key macroeconomic variables. Fan charts are a tool to depict the possible evolution of the public debt ratio over the medium term and to visually assess fiscal risks from macroeconomic shocks. Sample statistics based on historical data (1996-2012) for the real GDP growth rate, the effective real interest rate on government debt, the primary balance, and the real exchange rate are used to generate the sample means and the variance-covariance matrix that defines a joint normal distribution of these macroeconomic variables. Draws for each one of the variables from the joint normal distribution are used to generate the shocks--calculated as the value drawn minus the sample mean-- that are applied to the baseline projections for each of the macroeconomic variables. These “shocked” series of macroeconomic variables are then introduced into the debt dynamics equation to calculate a distribution of projected debt paths (see Annex 1 for details on the derivation).

The results suggest that Bangladesh remains at a low risk of debt distress. After a combined shock to key macroeconomic variables, there is a 50 percent probability that the debt-to-GDP

ratio remain between 36 and 40 percent (Figure 4, left-hand side). If the draws were restricted to only negative shocks (e.g., only draws of negative primary balance; see Figure 4, right-hand side), then the probability of higher debt levels would increase. Even under these assumptions, debt levels would remain below reasonable thresholds, such as the 42 percent of GDP average low-income country debt in 2012 (for low-income Asian countries, the average for 2012 was 48 percent).

**Figure 4. Evolution of Debt-to-GDP Ratio**



Sources: Bangladesh Authorities and IMF Staff calculations.

#### IV. SPECIFIC FISCAL RISKS FACING BANGLADESH

Fiscal risks in Bangladesh do not only arise from disturbances to general economic variables: they also arise from specific sources such as the realization of contingent liabilities. This section assesses the impact on fiscal aggregates of the hypothetical realization of all government loan guarantees and contingent liabilities from the state-owned banks. It also examines the potential long-term impact from the unfunded pension system.

##### A. Government Loan Guarantees

The government of Bangladesh customarily provides guarantees against loans contracted by the different state-owned financial and non-financial enterprises. Most loans finance the implementation of diverse public policies and programs. If the contracting organization fails to pay the loan in time, the guarantees are invoked and the liabilities for payment are passed on to the government. Consequently, these guarantees could eventually turn into outright government debt.

The stock of government guarantees issued before FY04 was mainly related to agricultural programs. From that year until FY12, the issuance of guarantees was very small and still related to agricultural credit. In FY12 there was a steep increase in guarantees, mainly those provided to state-owned commercial banks (SOCBs) for lending to non-financial public enterprises, in particular BPC. As a result, the stock of government guaranteed debt (both external and domestic) rose from around 3.5 percent of GDP in FY04 to 5.7 percent of GDP (Taka 592 billion) by end-June 2013 (see Table 2), of which guarantees provided to SOCBs represented around 30 percent of the total.

**Table 2. Government of Bangladesh Guarantees valid beyond June 2013, in Tk. billion.**

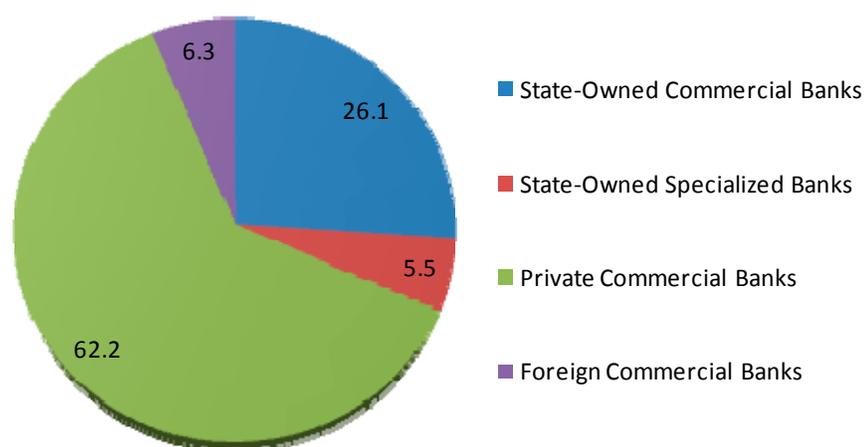
	FY04 and previously signed	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	Stock at end- June 2013	Stock at end- June 2013 (in percent of GDP)
Agricultural Credit	59.3	1.3	0.0	7.0	0.0	7.0	2.0	0.0	0.0	0.0	76.6	0.7
Oil (BPC)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.8	245.6	67.2	341.6	3.3
Air (BIMAN)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	21.0	14.6	0.0	35.6	0.3
Power	27.8	5.3	0.0	0.0	0.0	0.0	0.0	0.0	33.6	15.4	82.2	0.8
Trade	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	1.8	2.1	0.0
Miscellaneous	34.9	0.0	0.0	6.1	0.0	0.2	12.4	0.0	0.0	0.2	53.8	0.5
<b>Total</b>	<b>122.0</b>	<b>6.6</b>	<b>0.0</b>	<b>13.1</b>	<b>0.0</b>	<b>7.2</b>	<b>14.4</b>	<b>49.8</b>	<b>294.1</b>	<b>84.6</b>	<b>591.8</b>	<b>5.7</b>
<i>of which</i>												
SOCB	9.1	0	0	0	0	0	12.38	0	159.73	1.76	183.0	1.8

Sources: Bangladesh Authorities and IMF Staff calculations.

Risks emanating from government guarantees are sizable. Should they materialize in full, they could noticeably increase Bangladesh's public debt.

## B. State-Owned Banks

The weak balance sheets of state-owned banks (SOBs) represent a tangible fiscal risk (contingent liability) for the Government of Bangladesh. There are eight SOBs in Bangladesh, comprising 4 commercial banks and 4 specialized banks (development banks). As a whole, they represent around 32 percent of banking system's assets, or roughly 24 percent of GDP (Figure 5). These banks account for the majority of the outstanding non-performing loans (NPLs) in the banking sector. It is to be noted that lending to state-owned enterprises, even to loss-making ones, does not give rise to NPLs, as nearly all of these loans are guaranteed by the government.

**Figure 5. Composition of Banking System Assets (In percent of total, as of Dec. 2012)**

Sources: Bangladesh Authorities and IMF Staff calculations.

The SOBs have come under renewed stress since 2012, reflecting different factors such as a slowdown in economic activity, increasing competition, and weak internal governance (recent financial frauds highlighted significant weaknesses in oversight, internal controls, and risk management in SOBs). As of end-2013, the capital shortfall at these banks, compared to the regulatory minimum, stood at about 2.5 percent of GDP.<sup>16</sup>

### **C. The Pension System**

There are two potential sources of fiscal risks arising from Bangladesh's current pension arrangements. First, there are those associated with the civil servants' retirement scheme and the General Provident Fund. A more hypothetical long-term risk arises from potential pressures from the absence of an organized pension system for workers in the private sector, whether formal or informal.

#### **Civil Servant Retirement Scheme**

As in other South Asian countries, the government of Bangladesh provides its own employees with a noncontributory, defined benefit pension, including survivor benefits. Civil servants are eligible to receive a pension at the age of 59.<sup>17</sup> Pensions depend on the length of the public service. The civil servants' salary structure is divided into 20 grades or categories, with the basic salary ranging between Tk 5,000 and Tk 40,000 and an average of Tk 20,000. After 25 years of service (or at the age of 59) a civil servant is entitled to a pension of 80 percent of his/her prorated last basic salary (with proration based on years of service if less than 25), half of it as pension payment every month and the other half in a lump sum.

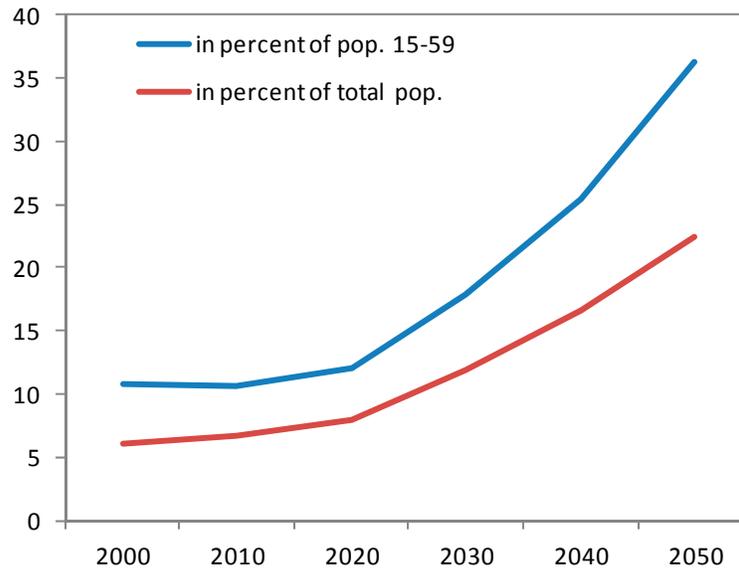
Pension spending on the Civil Servant Retirement Scheme (CSRS) is captured in fiscal aggregates under current expenditures. In FY13 the government assigned Tk 60 billion to the pension bill (0.57 percent of GDP).

Bangladesh currently employs roughly 1.2 million civil servants, of which around 35,000-40,000 retire every year. However, demographic trends will drive up the number of retirees per year, with an impact on pension expenditures. Current United Nations projections estimate that the elderly (individuals aged 60 years and above) will more than triple as share of Bangladesh's total population by 2050, from the current 6 percent (Figure 6). And, as the figure shows, the increase in the ratio of elderly population to working-age population (known as the old-age dependency ratio) is even more dramatic.

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<sup>16</sup> The estimates adjust for (a) past due loans shown as "valuation adjustments" in the balance sheets of the state-owned commercial banks; and (b) additional loan loss provisions that would arise from an assumption of no recovery of the NPLs. This is therefore a conservative estimate. Capital shortfall estimates are a moving target: as the NPLs and capital change, so do the estimates.

<sup>17</sup> See Kim and Bhardwaj (2011). The retirement eligibility age increased from 57 to 59 in 2011.

**Figure 6. Actual and Projected Population Over 60**

Source: United Nations, World Population Prospects.

To estimate the potential fiscal impact (via spending on the CSRS) from expected changes in demographics, it is helpful to decompose pension spending to GDP into three factors:

$$\frac{\text{Spending}}{\text{GDP}} = \underbrace{\left( \frac{\text{Pop}_{60+}}{\text{Pop}_{15-59}} \right)}_{\text{old-age dependency ratio}} * \underbrace{\left( \frac{\left( \frac{\text{Spending}}{\text{pensioners}} \right)}{\left( \frac{\text{GDP}}{\text{Pop}_{15-59}} \right)} \right)}_{\text{benefit ratio}} * \underbrace{\left( \frac{\text{pensioners}}{\text{Pop}_{60+}} \right)}_{\text{eligibility ratio}}$$

The first term is the old-age dependency ratio. The second term is the benefit ratio, defined as the ratio spending per pensioner to GDP per worker, which provides a measure of the generosity of pension benefits. Absent any changes in the benefits formula, this ratio is assumed to remain constant at its value as of end-2013 (about 1.32). And the final term is the eligibility ratio, defined as the ratio of the number of individuals receiving a pension to the population age 60 and older, which provides a measure of pension system coverage. This is assumed to be constant at 0.04 (civil service pensioners were 4 percent of the elderly population at end-2013), under the assumption that the covered population (in this case civil servants) and eligibility condition for a pension (such as the retirement age or minimum years of service) will not change over time.

Based on these parameters, pension spending is projected to increase from 0.5 percent of GDP today to 0.9 percent of GDP in 2030, and to around 1.8 percent of GDP in 2050 in line with the expected acceleration of aging after 2030 (Table 3).

**Table 3. Projected Evolution of Pension Spending due to Population Aging, 2013–2050**

	average 2010-2012	2013	2020	2030	2040	2050
Old age dependency ratio (population 60 and older per population 15-59)	0.11	0.11	0.12	0.18	0.25	0.36
benefits ratio (spending per pensioner relative to GDP per worker)		1.32	1.32	1.32	1.32	1.32
Elegibility ratio (pensioners per population 60 and older)	0.03	0.04	0.04	0.04	0.04	0.04
Spending (in percent of GDP) <sup>1/</sup>	0.53	0.53	0.60	0.90	1.27	1.81

Sources: United Nations, World Population Prospects (UNWPP), Bangladesh Authorities and IMF Staff calculations.

Note: Old age dependency ratio is based on UNWPP data and projections, while benefits and eligibility ratios are calculated for 2013 and then assumed to remain constant. Spending and GDP measured in billion Tk and population aggregates in millions.

<sup>1/</sup> Pension for retired government employees and their families.

### General Provident Fund

In addition to the CSRS, there is the General Provident Fund (GPF) for civil servants, which is a mandatory, defined contribution system, in which civil servants contribute a minimum of 10 percent of their salaries (there is no upper limit). The notional accounts accrue interest of around 12 percent of the GPF stock at year end. When civil servants retire, they can withdraw the whole amount plus interest. Before retiring, at any point in time, civil servants can borrow up to 80 percent of their cumulative contributions from the fund. As of end-FY13, the GPF stock of contributions amounted to Tk 204 bn, plus Tk 24 bn in interest (roughly 2.2 percent of GDP). Unfortunately, despite its name, the GPF is unfunded: the cash flows it generates are not being saved, but used to finance the deficit.<sup>18</sup> Indeed, GPF is currently generating sizable surpluses (i.e. contributions to the fund minus withdrawals) of around Tk 30 billion. However, as civil servants age and start to retire in larger numbers, the net cashflows may become negative, posing a clear financial risk.<sup>19</sup>

### Potential pressures from the absence of pension coverage for the private sector

Bangladesh does not have a formal pension program for the vast majority of the population. First, most of the workforce (an estimated 89 percent of the total, and an even higher proportion for women) is employed in the informal sector, mainly in agriculture.<sup>20</sup> Also, other than a gratuity benefit at retirement, employees of formal private sector firms do not have access to any formal old-age benefits program. Overall, only around four percent of the population over 60 is covered by the pension system in Bangladesh. The rest rely on their own savings to sustain themselves in retirement.

<sup>18</sup> For more details, see Alam (2012).

<sup>19</sup> Public servants contribute to this fund by a certain percentage of their salary. There is no other source of receipt for this Fund.

<sup>20</sup> See ADB (2010).

The absence of a formal pension scheme for most of the population in Bangladesh might eventually lead to pressures on the government to provide some minimum pension. As a way to illustrate the potential costs involved it would be useful to estimate the costs of setting up a universal scheme. The best way to do this is to draw from international experience.

A number of countries – both developed and developing – have put in place universal pension schemes (See Table 4). These pension schemes can be affordable, simple to administer and have been successful in tackling old age poverty (Willmore, 2007).

**Table 4. Universal Age Pensions around the World**

Country	from year	Qualifying age	Pension (percent of <i>per capita</i> GDP)	Benefits transferred (percent of GDP)
New Zealand	1940	65	46	4.3
Mauritius	1958	60	16	1.7
Brunei	1984	60	10	0.4
Namibia	1990	60	16	0.9
Samoa	1990	65	22	1.4
Nepal	1995	75	10	0.1
Botswana	1996	65	10	0.5
Bolivia	1996	65	26	1.2
Mexico City	2001	70	11	0.2
Kosovo	2002	65	50	2.7

Source: Willmore (2007).

To illustrate how much it would cost to institute a universal pension scheme in Bangladesh, two key parameters need to be taken into consideration:

- Age of eligibility (the age at which people get entitled to the pension; the higher the age, the lower the overall cost of the scheme). The illustrative exercise below considers the costs of universal coverage system under different eligibility ages (over-60, over-65, over-70, and over-75). The number of potential beneficiaries, using 2012 population estimates, ranges from 2.1 to 9.9 million.<sup>21</sup>
- Size of grant, which is the amount provided to beneficiaries. It is common to use the poverty line as a benchmark. In Bangladesh, the poverty line was calculated in 2005 at Tk 861.6 per month. Applying the CPI inflation rate, that poverty line translates into roughly Tk 1,500 per month by end-FY13. As shown in Table 6 a universal pension scheme that provides such an amount would cost between 0.4 and 1.9 percent of GDP, depending on the age threshold.

<sup>21</sup> This exercise takes into consideration the number of people over a certain age in 2012, specifically over ages 60, 65, 70, and 75, and then subtracts the number of retired civil servants.

**Table 5. Fiscal Cost of a Universal Pension Scheme in Bangladesh, 2012**

	Universal pension from age			
	60	65	70	75
Average monthly benefit (in Tk)	1500	1500	1500	1500
Beneficiaries (in millions)	9.9	6.7	4.1	2.1
Fiscal Cost				
in percent of GDP	1.9	1.3	0.8	0.4
in percent of total government expenditures	11.9	8.0	4.9	2.5

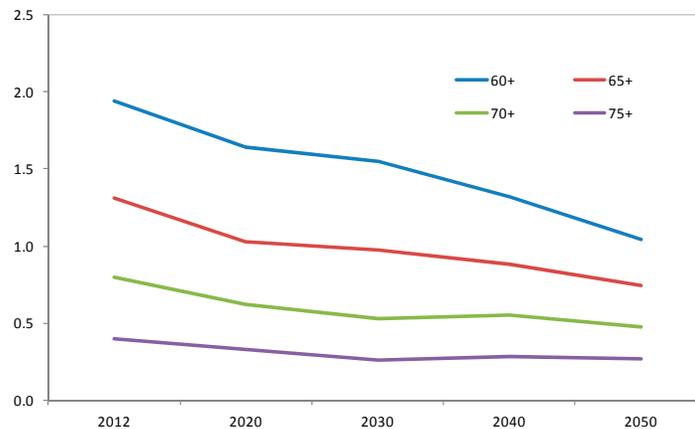
Sources: Bangladesh Authorities and IMF Staff calculations.

Of course, the fiscal cost of a universal pension will increase over time as the population ages.

Assuming a starting poverty line of Tk 1,500, a constant inflation rate of 6 percent (equal to the average for the last 20 years) and a nominal GDP growth of 12 percent, Figure 5 shows the fiscal cost of the universal scheme by age of eligibility (Figure 7.A). Alternatively, it is possible that the poverty line increases faster than inflation over the long term, as the basic needs basket widens with development. Figure 7.B shows that path, allowing the pension per capita to grow in line with GDP per capita. Since the qualifying population is expected to grow as a share of total population, then the total pension spending would grow as a share of GDP. For the most expensive case (60 and over), the fiscal costs would be almost at 7 percent of GDP in the long run.

As stated in previous paragraphs, the costs of different universal pension schemes vary from 1 to 7 percent of GDP in the medium term. To contain these costs, the literature generally suggests: (a) that these schemes should be means-tested to target only the needy; and (b) the design of such programs should aim for benefits that are sufficient to alleviate poverty but low enough to minimize incentives to remain outside of the formal pension system.<sup>22</sup>

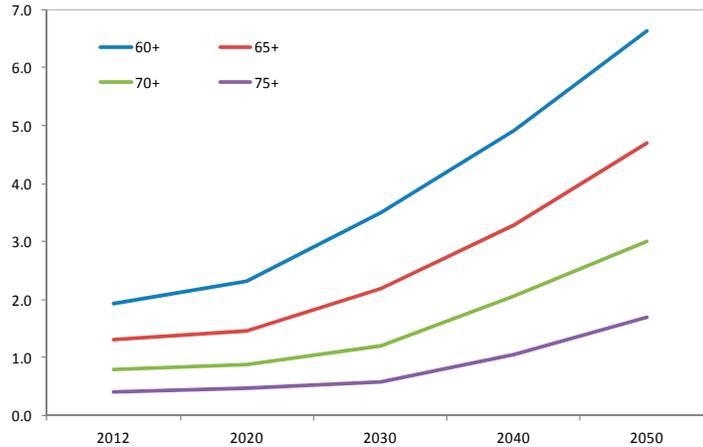
**Figure 7.A. Fiscal Cost of Universal Pension for Different Minimum Retirement Ages, 2012-2050 (Six percent inflation assumed, in percent of GDP)**



Sources: Bangladesh Authorities; United Nations, World Population Prospects, and IMF Staff calculations.

<sup>22</sup> See Cottarelli (2011).

**Figure 7.B. Fiscal Cost of Universal Pension for Different Minimum Retirement Ages, 2012-2050 (With pension increasing at GDP per capita growth rate, in percent of GDP)**



Sources: Bangladesh Authorities; United Nations, World Population Prospects, and IMF Staff calculations.

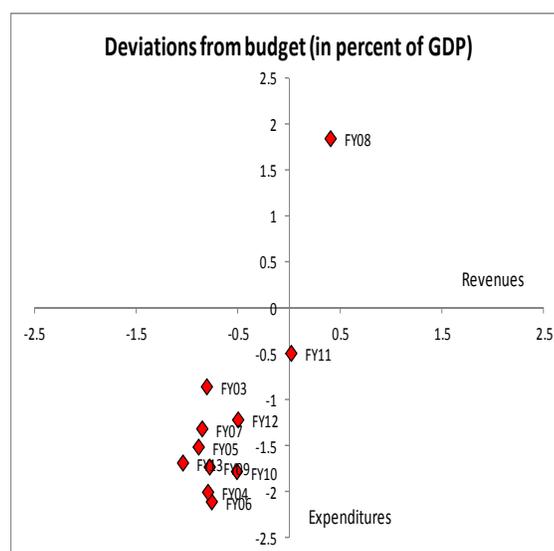
## V. INSTITUTIONAL CAPACITY

Risks to the budget and the public debt also emerge from the government's institutional capacity. This section focuses on three specific areas that may pose risks to fiscal aggregates in Bangladesh: budgeting practices, external debt management, and data discrepancies.

### A. Budgeting Practices and Forecasting

Significant deviations in outturns vis-à-vis budget figures have systematically been observed in recent years in Bangladesh. Consistently, both revenue and expenditure outturns have fallen behind budget target numbers. On average, during the last four years total revenues were below budget target by around 4 percent (0.5 percent of GDP). The highest difference has been in non-tax revenue, with an average deviation of 16 percent (Table 6). Similarly, expenditure outturns fell behind by 8.5 percent vis-à-vis the budget, or around 1.4 percent of GDP. The main driver has been underexecution in capital spending, falling on average around 19 percent below target (Table 6).

Figure 8 shows the revenue and expenditure deviations from budget in percent of GDP for the last 12 years. The horizontal axis shows deviations in revenues and the vertical axis deviations in expenditures. A negative number indicates that the outturn was below what was forecasted at the time of the budget preparation. For 11 of the last 12 years, there was underperformance in both revenues and expenditures.

**Figure 8. Deviation from budget**

The main problem associated with this pattern is that while revenue forecasts in a budget document are merely projections, the expenditure allocations are legal spending authorizations. Thus, if revenues fail to materialize, there is a risk that line ministries may still execute in full their spending envelopes, leading to larger-than-expected fiscal deficits and financing needs.

**Table 6. Differences Between Outturn and Original Budget 2009–12  
(In percent of initial budget)**

	FY09	FY10	FY11	FY12	Average	Median	In percent of GDP	
							Average	Median
Total revenue	-7.0	-4.7	0.0	-4.1	-4.0	-4.4	-0.5	-0.5
Tax revenue	-6.9	-2.3	4.7	-0.6	-1.3	-1.4	-0.1	-0.1
Nontax revenue	-7.2	-14.8	-21.3	-21.3	-16.1	-18.0	-0.3	-0.4
Total expenditure	-10.7	-11.0	-3.3	-8.4	-8.4	-9.6	-1.4	-1.6
<i>of which</i>								
Current expenditure	0.6	-6.8	0.7	-1.8	-1.8	-0.6	-0.2	-0.1
Annual Development Program	-24.1	-16.0	-13.1	-21.1	-18.6	-18.5	-0.8	-0.9
Non-ADP capital spending	-36.5	-16.6	-41.5	-40.1	-33.7	-38.3	-0.5	-0.6

Sources: Bangladesh Authorities and IMF Staff calculations.

Note: Negative numbers reflect outturn smaller than budget target.

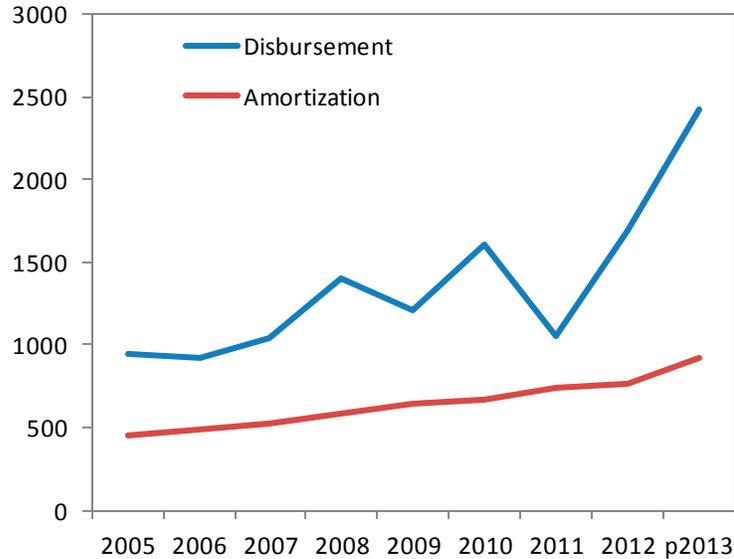
## B. External Borrowing and Debt Management

Efficient debt management strategies are important to mitigate the effects of shocks to fiscal aggregates (i.e. macroeconomic shocks and contingent liabilities) and keep borrowing under control. This is particularly true of external debt, which is more likely suffer from shocks to the exchange rate or international interest rates. While Bangladesh's total public debt remains below 40 percent of GDP, there has been a fast increase in non-concessional external borrowing: the annual average external debt disbursement in FY12 and FY13 is around 180 percent higher than the annual average for the period FY05-FY11 (Figure 9).

Bangladesh's government has taken significant steps toward improving the monitoring and contracting of external debt, including through the creation of a Technical Committee on

Nonconcessional Borrowing. Continued efforts to strengthen the assessment, approval, and monitoring of external loan contracts and guarantees are needed.

**Figure 9. External Debt Disbursement and Amortization (USD millions)**

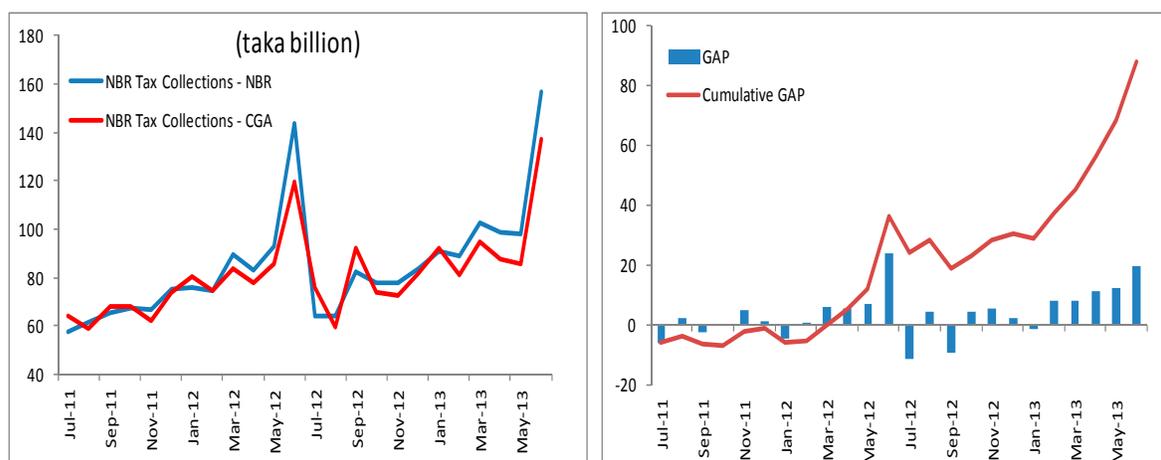


Note: Borrowing by SOEs supported by government guarantees not included.  
Sources: Bangladesh Authorities and IMF Staff calculations.

### Data discrepancies

Problems associated with fiscal data quality and timeliness may also pose fiscal risks. One significant example is the discrepancy between revenue collection data provided by the National Board of Revenue (NBR) and that provided by the Office of the Controller General of Account (CGA). Part of this discrepancy reflects a timing issue. Taxes are registered by the NBR when they are effectively paid, but they are only booked by the CGA when the amount is deposited into the Treasury Single Account (TSA). If the definition of revenue is exactly the same and the only difference was one of timing, at year-end the numbers should be reconciled. However, this is not the case, and the gap between the two reported series is increasing. As shown in Figure 10 the cumulative gap between NBR and CGA over the period FY12-FY13 was roughly Tk 90 billion (almost one percent of GDP), with CGA typically well below the NBR data.

These inconsistencies produce uncertainty for fiscal policy-making and undermine transparency and accountability.

**Figure 10. NBR and CGA Revenue Discrepancies**

Note: the GAP is calculated as NBR Tax Collections as per NBR minus NBR Tax collections as per CGA.

## VI. CONCLUSIONS AND POLICY IMPLICATIONS

Several factors have the potential to drive actual fiscal aggregates away from projections in Bangladesh. These include but are not restricted to, macroeconomic shocks, contingent liabilities, and institutional weaknesses. This section summarizes the paper's key findings and draws policy implications.

The analysis in this paper suggests that the fiscal balance in Bangladesh is sensitive to macroeconomic shocks, in particular those to commodity prices and exchange rates. A one standard deviation increase in commodity prices, or a 30 percent devaluation, may raise the deficit by between 0.6 to almost 1 percent of GDP on average per year when compared to the baseline.

Specific factors, such as calls on government guarantees or increased recapitalization needs of state-owned banks, could also have a significant negative impact. Should they materialize in full, calls on government guarantees and further recapitalization needs could certainly add pressure to the budget and increase Bangladesh's Public debt.

In addition to the most immediate risks of shocks to macroeconomic variables and calls on contingent liabilities, risks arising from the civil servants' pension scheme and the General Provident Fund could materialize in the medium to the long-run. If no changes were made to the system, the fiscal cost of the unfunded pension scheme could increase from 0.5 percent of GDP to about 2 percent of GDP by 2050. Furthermore, if a universal pension system were to be implemented (only four percent of the old age population is covered by the current system), the fiscal cost would raise up to 6 percent of GDP per year, or even higher.

Finally, risks derived from the government's institutional capacity could also take a toll on Bangladesh's fiscal aggregates. Risks for instance emerge from budget practices, the management of external debt, and data discrepancies. Bangladesh has a tradition of overstating expected revenues and expenditures in the budget, which could lead to excessive spending pressures in the short run. Weaknesses in debt management could lead to riskier

debt structures, while data discrepancies produce uncertainty for fiscal policy-making and undermine transparency and accountability.

Policies that could help mitigate the incidence and impact of fiscal risks could include:

- Full integration of risks into government policy decision-making, both in fiscal management and in the design of an integrated asset and liability management strategy in coordination with Bangladesh Bank.<sup>23</sup>
- Building government capacities to analyze and measure fiscal risks.<sup>24</sup> In order to achieve this, a system of treasury cash flow forecasts should be implemented. Even though there are attempts to do so, no formal mechanism is in place yet.
- Improvements regarding debt records and reporting. A key step towards this objective would be the modernization of the National Saving Directorates by linking of the interest rates on the instrument to market or benchmark securities and though making issuance and record keeping electronic.
- Measures to reduce currency risks in the government liability structure. For example, a cap in the amount of foreign denominated debt as well as on foreign denominated government guarantees.
- Publication of a Debt Statistical Bulletin for the total central government debt (external, domestic, and loan guarantees).
- A full set of policies and procedures for issuance of loan guarantees, as well as prioritization and limitation on the amounts of new guaranteed obligations.
- Implementation of a contributory pension scheme for civil servants to replace the current non-contributory regime, and reforms to the GPF via the creation of notional accounts and of an investment fund to accumulate the system's assets. Consideration could also be given to institutionalizing a non-contributory pension regime for the poor, as existing transfer mechanisms to the elderly poor are very low. Additionally, Bangladesh could aim to develop a voluntary defined contribution retirement scheme for all adults regardless of their employment status. These schemes are important sources of long-term investment funds in the domestic financial markets in developed and developing economies.

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<sup>23</sup> The current fragmentation among debt management entities adds costs to any planning strategy by the Ministry of Finance and BB.

<sup>24</sup> The evidence suggests that the introduction of fiscal rules and the setting up of independent fiscal councils to monitor fiscal developments can help reduce fiscal risks (Debrun et al., 2009).

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## Annex 1. Methodology for the Production of the Fan Charts

### Generating a distribution for the debt path

The sample statistics based on the historical data over the period FY96-FY12 are used to define the joint normal distribution (normality assumed for simplicity).

First, a fiscal reaction function depending on the primary surplus, domestic real interest rate, real GDP growth rate, and real effective exchange rate is defined. Second, an unrestricted auto-regression model (VAR) with these four variables is estimated (using Choleski decomposition factorization) to generate projections for each of the four variables using (i) a deterministic projection from the VAR, and (ii) a random shock drawn from a multivariate normal distribution with the same variance-covariance matrix as the one estimated for the in sample errors of the VAR.

The shocks are added to the baseline projected values of the growth, interest rate, exchange rate, and primary balance in the calculation of the debt evolution equation for periods  $t+1$  to  $t+k$  (where  $k$  is length of projection period), to recursively generate the debt to GDP ratio projections, producing 1,000 simulated debt to GDP ratios in each year over which we are projecting.

Once the debt ratio projections are generated, the ratios for each year are ranked from highest to lowest and the correspondent percentile of the 1,000 simulations is assigned to each ratio in each year. 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, and 90<sup>th</sup> percentiles are extracted and used to produce the fan chart. The increasing spread of the distribution over the projection period is due to the increased uncertainty over time, since shocks can compound over the years.<sup>25</sup>

### Debt dynamics

In its most basic form, the evolution of public debt can be characterized in the following way:

$$D_{t+1} = \frac{E_{t+1}}{E_t} (1 + i_{t+1}^f) D_t^f + (1 + i_{t+1}^d) D_t^d - PB_{t+1} + O_{t+1} \quad (1)$$

Subscripts refer to time periods and superscript “ $f$ ” and “ $d$ ”, refer to foreign-currency and domestic-currency denominated debt, respectively.  $D_t^f$  is the stock of foreign currency-denominated debt at the end of period  $t$ .  $D_t^d$  is the stock of local currency-denominated debt at the end of period  $t$ .  $E_t$  is the nominal exchange rate (LC/USD) at the end of period  $t$ .  $i_{t+1}^f$  is the effective nominal interest rate on foreign currency-denominated debt at the end of period  $t+1$ .  $i_{t+1}^d$  is the effective nominal interest rate on domestic currency-denominated debt

<sup>25</sup> Shocks are drawn taking into account only the contemporaneous correlations between variables, but a 90<sup>th</sup> percentile debt ratio path can be considered to reflect the impact of a sequence of bad shocks each year on the public debt ratio.

at the end of period  $t+1$ .  $PB_{t+1}$  is the government fiscal primary balance in period  $t+1$ .  $O_{t+1}$  are other factors, and the stock-flow residual that ensures that the identity holds.

$$\frac{E_{t+1}}{E_t} = (1 + \varepsilon_{t+1}) \quad (2)$$

where  $E_t$  is the nominal exchange rate Taka/US\$ of period  $t$ .

Dividing equation (1) by  $Y_{t+1}$  and replacing (2) into (1)

$$d_{t+1} = \left( \frac{1}{1+g} \right) \left[ (1 + \varepsilon_{t+1}) (1 + i_{t+1}^f) d_t^f + (1 + i_{t+1}^d) d_t^d \right] - pb_{t+1} + o_{t+1} \quad (3)$$

where lower letters represent the contemporaneous ratio to GDP.