Presentation Outline

I. Why do we need sub-national fiscal and debt sustainability analyses?

II. World Bank DPL—Objectives and Constraints

III. Background and Context

IV. Performance in Key Areas

V. Fiscal and Debt Sustainability Analyses

VI. Main Conclusions
I. Why do we need sub-national fiscal and debt sustainability analyses?

- At the central government level, specific policy-dependent thresholds (for LIC external debt) or other well understood criteria for debt sustainability guide World Bank and IMF analyses of fiscal and debt sustainability.

- However, at the sub-national (SN) level, objective criteria for assessing fiscal and debt sustainability are less well understood.

- Furthermore, SNs face many policy and other constraints that central governments do not—e.g., rules constraining borrowing practices, limited sources of finance, debt and fiscal limits, limits on own revenue sources, earmarked transfers, volatility of transfers, etc.
I. Why do we need sub-national fiscal and debt sustainability analyses?

- These and many other specificities of SN finance require the methodology and approach to fiscal and debt sustainability assessments to be highly customized, both in terms of the inputs (e.g., macroeconomic conditions, revenue and expenditure assumptions, relevant fiscal and debt limits), as well as with regard to alternative and shock scenarios.

- This course aims to present a series of robust methodologies and highly customizable approaches and tools that have been developed within the World Bank and used to assess fiscal and debt sustainability in the context of Bank analytical work and lending operations (e.g., Brazil, Argentina, India).
II. World Bank DPL—Objectives and Constraints

• The 2009 “*Fiscal Sustainability, Human Development, and Competitiveness Development Policy Loan*” (*DPL*) was designed to assist the state of Rio de Janeiro (RJ) in efforts to improve fiscal management, competitiveness, and social service delivery in the context of a temporary fall in revenues associated with the financial crisis.

• The government requested a **single-tranche stand-alone DPL (US$485 million)** to help close a projected financing gap for 2010 brought about by a reduction in revenues, mainly from lower oil royalties, state taxes, intergovernmental transfers, and increased expenditure on infrastructure.
II. World Bank DPL—Objectives and Constraints

• Policies supported by the DPL relate to the government’s MT reform program, including:
  – Improve tax administration, budget procedures and financial management;
  – Improve quality and efficiency of the business registration process;
  – Increase quality and efficiency of the education system; and,
  – Increase access to and efficiency of the health system.

• The DPL satisfied all criteria for engagement with sub-national governments, as agreed under the World Bank’s “Country Partnership Strategy”, which requires Bank lending to be consistent with credit ceilings specified in the state’s fiscal adjustment program, and subject to National Treasury approval.
III. Background and Context

• Until the late 1990s, expansionary fiscal policies by Brazilian states, and a lack of effective controls over their borrowing practices resulted in frequent debt crises.

• On three separate occasions—1989, 1993, and 1997—, the Federal Government had to assume and reschedule debts of several important states.

• The largest operation took place in 1997, when the Federal Government restructured R$ 200 billion—about 12% of national GDP—in debts owed by 25 states, including Rio de Janeiro.
III. Background and Context

A. 1997 Bailout—Program of Fiscal Adjustment (PAFs)

- The 1997 refinancing operation refinanced the state’s debts for 30 years.
- Refinanced debt—“intra-limite” debt—carries a real interest rate of 6%, with the nominal value rising with inflation (i.e., inflation-indexed debt).
- Debt service is capped at 13% of NCR; anything above that is recapitalized and added to the intra-limite stock. At the end of the contracts in 2028, if there are residual debt balances, the State must pay off the remainder within 10 years.
- The bailout resulted in three-year rolling Programs of Fiscal Adjustment (PAFs), which set annual targets for indebtedness, primary balances, personnel spending, tax revenue, and public investment, and included structural reforms such as privatization and other public sector modernization initiatives.

The 2008-2010 PAF included the following targets:

| PAF Targets                  |  
|------------------------------|---
| Debt / NCR                   | <238%  
| Primary Balance              | R$ 2.1 B  
| Personnel Expenditures / NCR | <60%  
| Revenue Collection           | R$ 21 B  
| Current Expenditures / NCR   | <36%  

B. 2000 Fiscal Responsibility Law (FRL)

In 2000, a Fiscal Responsibility Law was enacted, enshrining hard budget constraints, and explicitly prohibiting refinancing operations between levels of government to address moral hazard created by frequent bailouts in the past.

The FRL includes the following key limits:

<table>
<thead>
<tr>
<th>Personnel Expenditures</th>
<th>FRL Limits</th>
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</thead>
<tbody>
<tr>
<td>&lt;60% NCR</td>
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</table>

<table>
<thead>
<tr>
<th>Net Consolidated Debt</th>
<th>FRL Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;200% NCR</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Debt Service</th>
<th>FRL Limits</th>
</tr>
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<tbody>
<tr>
<td>&lt;11.5% NCR</td>
<td></td>
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</table>

*The FRL serves as the key benchmark for fiscal sustainability.*
III. Background and Context

- 2003 – 2006: fiscal performance was characterized by fiscal deficits and low positive primary balance.
- 2006 – 2008: primary balances improved substantially such that total fiscal balances moved from deficit to a surplus of more than R$2 billion.
IV. Performance in Key Areas

- Fiscal adjustment efforts focused on limiting the growth of current expenditures, including salaries as well as goods and services.
- Current expenditures (ave. 95% of total exp.) increased by 22%.
- Capital expenditures (ave. 5% of total exp.) increased by 60%, with investment growing by 87% over the period.
- Current expenditures were composed mainly of social and wage expenditures (26%), G&S (26%), and transfers to municipalities (20%).
- Social and wage expenditures increased the most (30%), followed by transfers to municipalities (27%), and operating costs (20%).
Strong revenue performance and consistent fiscal adjustment led the net consolidated debt / revenue ratio to fall from 202% in 2003 to 160% in 2008.

As a result, RJ is in compliance with the FRL (i.e., net consolidated debt / NCR < 200%).
Evolution of Amortization and Interest Payments on the Debt

IV. Performance in Key Areas

- Debt service has been growing modestly, mainly from interest payments. As per the FRL, debt service is capped at 11.5% of NCR.
- Hence, as NCR has grown, so has debt service in nominal terms. However, the ratio of debt service to NCR has decreased from 12% in 2003 to 8% in 2008.
IV. Performance in Key Areas

Evolution of Fiscal Responsibility Law Indicators (%NCR)

<table>
<thead>
<tr>
<th></th>
<th>Personnel Expenditures</th>
<th>Net Consolidated Debt</th>
<th>Debt Service</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personnel Expenditures</strong></td>
<td>&lt;60% NCR</td>
<td>47.2%</td>
<td>38.9%</td>
</tr>
<tr>
<td><strong>Net Consolidated Debt</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Debt Service</strong></td>
<td></td>
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V. Fiscal and Debt Sustainability Analysis

A three-step approach was used to develop the sustainability analysis:

1. Assess fiscal and debt sustainably under a baseline scenario (w.r.t. FRL indicators).

2. Assess the impact of the proposed DPL on fiscal and debt sustainability.

3. Use alternative scenarios and shocks to assess risks to fiscal sustainability under the baseline scenario and when the loan is included.
V. Fiscal and Debt Sustainability Analysis

1. Debt Sustainability under the Baseline Scenario

Assumptions:

• **Revenues:** driven by sales taxes and capital revenues, as well as revenues from oil royalties.

• **Expenditures:** driven by personnel expenditures and purchases of goods and services.

• **Fiscal Balances** (primary, overall, and the gross operating balances): expected to record surpluses for the projected period, thus creating fiscal space for increased State Investments.

• **Risks to Outlook:** The main risks to the outlook include the potential for a deterioration of fiscal balances over the medium term, related to potential volatility of key variables—i.e., the exchange rate, GDP growth, inflation, oil and gas receipts, etc.
V. Fiscal and Debt Sustainability Analysis

1. Debt Sustainability under the Baseline Scenario

Sustainability

• The baseline scenario suggests a comfortable situation, with positive primary balances and aggregates well within the limits of the FRL and other constraints.

• Revenue growth is higher than expenditure growth after 2014, and the overall increase in debt for 2008-2019 is about 2.5% (well below the limits).
V. Fiscal and Debt Sustainability Analysis

1. Debt Sustainability under the Baseline Scenario

V. Fiscal and Debt Sustainability Analysis

2. Impact of the Proposed DPL (under the baseline scenario)

• **NCR**: The DPL will be counted as an extraordinary transfer in 2010, and thus increase NCR in 2010.

• **Primary Balance**: The DPL will increase the primary balance from 2010 onward.

• **Debt Service and Debt Dynamics**: The DPL will increase the stock of debt and future debt service requirements (after 2010), but the key indicators will all remain below the FRL indicators.
V. Fiscal and Debt Sustainability Analysis

2. Impact of the Proposed DPL (under the baseline scenario)

- **Operating Balance**: The DPL will increase the gross operating balance in 2010, allowing the government additional fiscal space.
- **Public Investment**: The DPL will allow for an increase in public investment, causing the share of investment/NCR to increase from 9 to 11 percent (the state is prohibited from using external financing to increase personnel expenditures).
V. Fiscal and Debt Sustainability Analysis

3. Risk Analysis

Approach

- The risk analysis assesses the impact of uncertainty re. macro variables: i.e., exchange rate, GDP, oil revenues, and inflation.
- The analysis consists of assessing the impact of stochastic shocks to the on projected fiscal and debt aggregates.
- Also assessed is the impact of simultaneous random shocks on the fiscal and debt aggregates by performing Monte-Carlo simulations, drawing shocks from specific probability distributions.
V. Fiscal and Debt Sustainability Analysis

3. Risk Analysis

Results

• The risk analysis finds that the fiscal situation is sustainable, including after the addition of the World Bank DPL.

• Since the portion of foreign-denominated debt is small, the impact of the exchange rate on the debt dynamics is not significant.

• The impact of the different scenarios for royalties revenues does not change the positive sustainability result.

• The state is likely to remain below FRL requirements, even when subject to a combination of stochastic shocks.
V. Fiscal and Debt Sustainability Analysis

3. Risk Analysis
V. Fiscal and Debt Sustainability Analysis

3. Risk Analysis

- **Personnel Expenditures (% of NCR)**
  - Probability:
    - 0.1
    - 0.5
    - 0.9
    - 0.25
    - 0.75

- **Investment as a share of NCR**
  - Probability:
    - 0.1
    - 0.5
    - 0.9
    - 0.25
    - 0.75
V. Fiscal and Debt Sustainability Analysis

3. Risk Analysis

![Graphs showing personnel expenditures and investment as a share of NCR over time with different probability scenarios.](image-url)
VI. Main Conclusions

- Fiscal and debt sustainability at the subnational level require careful consideration of the specific nuances and constrains faced by SNs.
- In the absence of clear criteria for assessing “sustainability” at the SN level, other factors must guide the analysis.
- Constraints on revenue and expenditure will differ from region to region.
- Tools used for such analyses should be flexible and customizable.
- Central macroeconomic (baseline) forecasts are crucial.
- A region-specific probabilistic approach to risk analysis is usually warranted.
- Clear objectives will help to guide the analysis—e.g., assess the impact on pre-defined variables (e.g., FRL limits) of a specific operation (e.g., DPL) or alternative to the baseline (e.g., accelerated investment program).
Subnational Debt Sustainability Analysis

Case Study – DSA using Analytica
Rio de Janeiro, Brazil
Rio de Janeiro: Issues of Interest

• Defining sustainability at sub-national level:
  – Customized, in terms of inputs, alternative shocks and scenario
  – Adapted to SN structure of revenues and expenditures and borrowing structure and limitations
  – Rio de Janeiro: The Fiscal Responsibility Law

• Defining alternative scenarios and values for uncertain variables:
  – Joint shocks to macroeconomic variables that affect budget and debt variables
  – Extra-limit debt scenarios: With and without World Bank loan

• Modeling SN specific features:
  – Sub-module for revenues from royalties from oil and gas extraction
Rio de Janeiro - Basic Model

- Developed to assess sustainability issues linked to the 2009 DPL for US$ 485 million
- Loan expected to help close a projected financing gap in year 2010, linked to expected decreased revenues (mainly from royalties) and increased expenditures (mainly in infrastructure)
Macro – Sub Model

- Main risk to outlook from deterioration to fiscal balances, linked to macro volatility
Budget Variables

Gross Operating Balance: \( \text{GOB}_t = \text{TR}_t - \text{CE}_t \)
Primary Balance: \( \text{PB}_t = (\text{TR}_t - \text{iR}_t) - (\text{TE}_t - \text{iE}_t) \)
Overall Balance: \( \text{OB}_t = \text{TR}_t - \text{TE}_t \)
Gross Financing Needs: \( \text{GFN}_t = \text{DS}_t - \text{PB}_t \)
Revenues

Dynamics is a commonly used formula for calculating current, “t” values of variables as a function of their past values.

Analytica formula:
\[ \text{Taxes} = \text{dynamic(Initial\_taxes, Taxes[time-1]*Taxes\_growth)} \]

Which translates to:
\[ \text{Taxes}_1 = \text{Initial\_taxes} \]
\[ \text{Taxes}_2 = \text{Taxes}_1 \times (1 + \text{Taxes\_growth}_2) \]
\[ \ldots \]
\[ \text{Taxes}_t = \text{Taxes}_{t-1} \times (1 + \text{Taxes\_growth}_t) \]

<table>
<thead>
<tr>
<th>State VAT growth</th>
<th>ICSM =</th>
<th>( (1 + \text{Inflation_ipca}) \times (1 + \text{Real_gdp_growth_rate}) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPVA growth</td>
<td>IPVA =</td>
<td>( (1 + \text{Inflation_ipca}) \times (1 + \text{Crescimento_real}) )</td>
</tr>
<tr>
<td>Other Taxes growth</td>
<td>Other =</td>
<td>( (1 + \text{Inflation_ipca}) \times (1 + \text{Real_gdp_growth_rate}) )</td>
</tr>
</tbody>
</table>
Royalty Revenues

- i.e:

- Royalties_projection\_1 = Initial_royalties
- Royalties_projection\_2 = Aliquota*[((Estimated\_prices\_of\_gas)\_1*(Volume\_of\_gas)\_1 + (Estimated\_prices\_of\_oil)\_1*(Volume\_of\_oil)\_1]
- ...
- Royalties_projection\_t = Aliquota*[((Estimated\_prices\_of\_gas)\_t*(Volume\_of\_gas)\_t + (Estimated\_prices\_of\_oil)\_t*(Volume\_of\_oil)\_t]

- Scenarios for volume of production included (“pre salt scenarios”)
Expenditures

• Total Expenditures:
  – $TE_t = CE_t + INV_t$

• Gross Operating Balance:
  – $GOB_t = TR_t - CE_t$

• Fiscal space for investment ($FS_t$):
  – If $GOB_t > 0$, $FS_t = GOB_t - TOT.AMORT_t - IBRD.to.INV_t$
  – If $GOB_t < 0$, $FS_t = 0$

• Investment:
  – If $FS_t > 0$, $INV_t = FS_t + FECAN_t$
  – If $FS_t < 0$, $INV_t = FECAN_t$ (FECAN_t = 5% Royalties)
Debt Dynamics

- Debt Composition: 
  \[ D_t = D^I_t + D^E_t \]
Debt Dynamics: Intra-Limit Debt

- Initial R$ denominated intralimit debt
- R$ denominated intralimit debt
- Amortization of Intra-limite Domestic Debt (R$)
- Debt service relief
- Capitalized residual
- Debt Service ceiling
- Debt Service on Intra-Limite Domestic Debt (before ceiling)
- Initial Interest Payment on Intra-Limite Domestic Debt
- Interest Payments on Intra-Limite Domestic Debt (R$)
- Interest Payments on Intra-Limite Domestic Debt USD
- Initial USD$ denominated intralimit debt
- USD$ denominated intralimit debt
- Amortization of Intra-limite Domestic Debt (USD)
- Amortization of Intra-Limite Domestic Debt USD (initial values)
Sustainability Analysis: The Fiscal Responsibility Law

• Pre-determined targets (as % of Net Current Revenues) in the following variables:
  – Total net consolidated debt:
    • Use of WB loan for debt restructuring
  – Total debt service:
    • Potential excess debt service to be capitalized into local currency denominated intra-limit domestic debt
  – Total personnel expenditures
Sustainability Analysis: The Fiscal Responsibility Law

1. **Net Current Revenues (NCR)**
   - **Total Net Consolidated Debt**
   - **Total Debt Service (% of NCR)**
   - **Personnel Expenditures (% of NCR)**
   - **Current Expenditure as a share of NCR**

2. **Total Net Consolidated Debt**
   - **Total Net Consolidated Debt (% of NCR)**
   - **Total Debt Service (% of NCR)**
   - **Personnel Expenditures (% of NCR)**
   - **Current Expenditure as a share of NCR**

3. **Total Debt Service**
   - **Total Net Consolidated Debt (% of NCR)**
   - **Total Debt Service (% of NCR)**
   - **Personnel Expenditures (% of NCR)**
   - **Current Expenditure as a share of NCR**

4. **Personnel Expenditures**
   - **Total Net Consolidated Debt (% of NCR)**
   - **Total Debt Service (% of NCR)**
   - **Personnel Expenditures (% of NCR)**
   - **Current Expenditure as a share of NCR**

5. **Current Expense**
   - **Total Net Consolidated Debt (% of NCR)**
   - **Total Debt Service (% of NCR)**
   - **Personnel Expenditures (% of NCR)**
   - **Current Expenditure as a share of NCR**

6. **Total Net Consolidated Debt’s Target**
   - **Total Debt Service’s Target**
   - **Total Personnel Expenditures’ Target**

**Probability of Compliance**
Scenario analysis

- Volumes of production of oil and gas
- Macro variables (Exchange rate, prices indexes, and growth rate of GDP)
- Personnel growth rate
- “Precatorios”
- Use of World Bank Loan
- Distribution of IBRD loan (Investment vs Debt Restructuring)
- Fixed vs flexible LIBOR
Stochastic analysis

• Individual: To growth rate of royalties (Normal distribution)
  – In addition to scenario analysis

• Joint: To macro variables
  – CPI Inflation
  – GPI Inflation
  – Exchange Rate
  – GDP Growth

• Allows for a choice of joint stochastic distribution (Default: Gaussian)

• Joint distribution based on past correlate behavior of selected variables (Matrix of variances and co-variances)
Results: Debt Service (% NCR) Baseline
Results: Gross Financing Needs (%NCR). Baseline
Results: Primary Balance (%NCR).
Baseline
Results: Net Consolidated Debt (%NCR). Baseline