Macro-Fiscal Framework

PRMED Training

DSA at Subnational Level Training, Brasilia, December 5-9, 2011
PRMED in collaboration with LAC PREM
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Outline

• Introduction and basic concepts
• Key assumptions
• Revenues and Expenditures
• Borrowing
• Sensitivity analysis
• Conclusions
Introduction and basic concepts

• Linkages between a DSA and a Macroeconomic Framework at the national level

• Elements of a Macroeconomic Framework at the national level

• Sub-national Macroeconomic Framework
Baseline Scenario (Be realistic!)

Ingredients for the baseline scenario...

• Macroeconomic projections (key variables)
  » Country’s capacity to repay

• PPG external and domestic debt stocks and flows
  » Fiscal Balance
  » Balance of Payments
  » New borrowing assumptions

• Macroeconomic projections and the change in PPG external and domestic debts are linked through the Fiscal Balance
Macroeconomic Framework and the Fiscal Sustainability Analysis

- GDP
- Govt Revenue
- Govt Expenditure (Cg + Ig)
- Fiscal Balance
- Domestic Borrowing
- External Borrowing
- BOP
- Rest of the World

Monetary and Exch. Rate Policy

Sound Economics for Growth and Poverty Reduction

THE WORLD BANK
Medium Term Macroeconomic and Fiscal Framework

Key variables

- Fiscal:
  - Revenues, Expenditures
  - Overall and Primary balance
  - External and domestic financing

- BOP:
  - Current account balance,
  - Financial accounts, of which external borrowing and amortization
  - Change in NFA and international reserves

Years
- 10 years of actual data: e.g. 2001-10
- 3-5 years of projections
  - Considerations to average maturity of debt
  - Economic cycle
  - Structural changes

- GDP, Population and Prices
  - Real GDP, GDP deflator and Inflation rates
  - Exchange rates
  - Interest rates (foreign, domestic)
  - Population

- Monetary Survey
  - Net foreign assets, Reserves
Sub-national Macroeconomic Framework

- Piggybacking on the national framework projections for the debt decomposition
  - Inflation rates
    - domestic and foreign
  - Exchange rate
  - National GDP $Y^*$
    - used to calculate shared revenues and transfers from central government
  - Foreign interest rates
  - Domestic interest rate (unless spreads available)
Sub-national Macroeconomic Framework 1/3

• Specific Sub-national framework needed for
  – Sub-national GDP
  – Population

  – Medium term fiscal framework
    • Revenues
    • Expenditure
    • Overall balance/Financing
      – Domestic borrowing
      – External borrowing

  – Market variables
    • Regional spreads
### Sub-national Macroeconomic Framework 2/3

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<td>(In billions of LCU)</td>
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<td>Nominal national GDP</td>
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<td>3,507.7</td>
<td>5,850.0</td>
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<td>Nominal S-GDP</td>
<td>158.3</td>
<td>261.8</td>
<td>453.8</td>
<td>512.8</td>
<td>579.5</td>
<td>654.8</td>
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<td>Real national GDP growth (%)</td>
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<td>7.1%</td>
<td>7.6%</td>
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<td>Real S-GDP growth (%)</td>
<td>4.94%</td>
<td>4.1%</td>
<td>6.6%</td>
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<tr>
<td>CPI Inflation, Ave. (%)</td>
<td>4.0%</td>
<td>6.0%</td>
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<tr>
<td>GDP Deflator (Index 2001/02=100)</td>
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<td>122.7</td>
<td>154.9</td>
<td>162.6</td>
<td>170.8</td>
<td>179.3</td>
<td>188.3</td>
<td>197.7</td>
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</table>

### Fiscal Balance
(In billions of LCU)

| I. Revenue | 26.1 | 55.4 | 94.9 | 112.4 | 124.6 | 138.3 | 153.5 | 170.8 |
| Own tax revenue | 9.7 | 17.8 | 35.6 | 40.4 | 45.4 | 51.1 | 57.5 | 65.0 |
| Own non-tax revenue | 1.6 | 6.5 | 6.3 | 6.8 | 7.4 | 8.0 | 8.6 | 9.3 |
| Share of central tax | 1.5 | 10.1 | 15.5 | 23.3 | 26.3 | 29.8 | 33.8 | 38.4 |
| Grants from the center | 13.2 | 20.9 | 37.5 | 41.9 | 45.5 | 49.4 | 53.6 | 58.1 |

| II. Primary expenditure | 27.1 | 66.1 | 109.3 | 116.8 | 128.8 | 142.1 | 156.3 | 173.9 |
| Non-plan primary expenditure (net of interest) | 19.5 | 34.1 | 69.6 | 72.7 | 80.0 | 88.0 | 96.8 | 108.4 |
| Plan expenditure | 4.8 | 14.0 | 23.6 | 25.5 | 28.0 | 30.8 | 33.9 | 37.3 |
| Net capital expenditure | 2.8 | 18.0 | 16.1 | 18.5 | 20.8 | 23.3 | 25.6 | 28.1 |
| III. Interest expenditure | 5.1 | 8.1 | 13.4 | 14.3 | 15.6 | 17.3 | 19.0 | 21.3 |
| IV. Primary balance (I-II) | (1.1) | (10.7) | (14.5) | (4.3) | (4.2) | (3.8) | (2.8) | (3.0) |
| V. Overall balance (IV-III) | (6.1) | (18.8) | (27.8) | (18.6) | (19.8) | (21.1) | (21.8) | (24.4) |

### Memorandum items:

<table>
<thead>
<tr>
<th></th>
<th>Primary balance-to-SGDP %</th>
<th>Overall balance-to-SGDP %</th>
<th>Tax rate subnational %</th>
<th>Tax rate national %</th>
<th>Coparticipation rate %</th>
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<tbody>
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<td></td>
<td>-0.7%</td>
<td>-3.9%</td>
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<td>-0.4%</td>
<td>-2.9%</td>
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## Sub-national Macroeconomic Framework 3/3

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<tr>
<td><strong>Financing (In billions of LCU)</strong></td>
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<td>Gross borrowing / Gross financing needs</td>
<td>6.1</td>
<td>18.8</td>
<td>27.8</td>
<td>18.6</td>
<td>19.8</td>
<td>21.1</td>
<td>21.8</td>
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<td>Amortization</td>
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<td>13.6</td>
<td>22.1</td>
<td>25.2</td>
<td>13.5</td>
<td>26.6</td>
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<tr>
<td><strong>Debt (In billions of LCU)</strong></td>
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<td>Debt Outstanding and Disbursed (DOD)</td>
<td>42.0</td>
<td>106.8</td>
<td>167.7</td>
<td>186.3</td>
<td>206.0</td>
<td>227.1</td>
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<td>New debt - Mkt loans - Gross issuance</td>
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<td>-</td>
<td>-</td>
<td>26.2</td>
<td>20.0</td>
<td>28.6</td>
<td>29.9</td>
<td>30.4</td>
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<tr>
<td>New debt - NSSF - Gross issuance</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>17.5</td>
<td>13.3</td>
<td>19.1</td>
<td>19.9</td>
<td>20.2</td>
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<tr>
<td>DOD 2001/02 - 2009/10 - Principal payments</td>
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<td>13.6</td>
<td>22.1</td>
<td>25.2</td>
<td>9.3</td>
<td>19.3</td>
<td>16.2</td>
<td>9.6</td>
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<td>DOD 2001/02 - 2009/10 - Interest payments (est.using int.rate av)</td>
<td>5.1</td>
<td>8.1</td>
<td>13.4</td>
<td>14.3</td>
<td>11.9</td>
<td>11.1</td>
<td>9.3</td>
<td>8.4</td>
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<tr>
<td>DOD 2001/02 - 2009/10 - Interest rate (% average, implicit)</td>
<td>- 8.9%</td>
<td>9.1%</td>
<td>8.5%</td>
<td>8.3%</td>
<td>8.3%</td>
<td>8.2%</td>
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<td>New debt - Mkt loans - Principal payments</td>
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<td>5.8</td>
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<td>New debt - Mkt loans - Interest payments</td>
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<td>3.2</td>
<td>4.9</td>
<td>6.5</td>
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<td>New debt - NSSF - Interest payments</td>
<td>1.7</td>
<td>3.0</td>
<td>4.7</td>
<td>6.5</td>
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<td><strong>New borrowing assumptions:</strong></td>
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<tr>
<td>New debt - Mkt loans - Share of gross borrowing (%)</td>
<td>60.0</td>
<td>60.0</td>
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<tr>
<td>New debt - NSSF - Share of gross borrowing (%)</td>
<td>40.0</td>
<td>40.0</td>
<td>40.0</td>
<td>40.0</td>
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<tr>
<td>New debt - Mkt loans - Interest rate (% average, implicit, floating rate)</td>
<td>7.5%</td>
<td>7.5%</td>
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<td>7.5%</td>
<td>7.5%</td>
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<tr>
<td>New debt - NSSF - Interest rate (% average, implicit, floating rate)</td>
<td>10.0%</td>
<td>10.0%</td>
<td>10.0%</td>
<td>10.0%</td>
<td>10.0%</td>
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<tr>
<td>New debt - Mkt loans - Maturity of newly issued instruments (years)</td>
<td>8.0</td>
<td>8.0</td>
<td>8.0</td>
<td>8.0</td>
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<tr>
<td>New debt - NSSF - Maturity of newly issued instruments (years)</td>
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<td>20.0</td>
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<td>20.0</td>
<td>20.0</td>
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<td><strong>Memorandum items:</strong></td>
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<tr>
<td>Debt-to-SGDP %</td>
<td>26.6%</td>
<td>40.8%</td>
<td>36.9%</td>
<td>36.3%</td>
<td>35.6%</td>
<td>34.7%</td>
<td>33.6%</td>
<td>32.7%</td>
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<tr>
<td>Debt service-to-revenue (%)</td>
<td>39.1%</td>
<td>37.4%</td>
<td>35.1%</td>
<td>23.3%</td>
<td>31.8%</td>
<td>30.7%</td>
<td>27.8%</td>
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<tr>
<td>Debt service-to-own revenue (%)</td>
<td>121.4%</td>
<td>99.8%</td>
<td>97.5%</td>
<td>64.0%</td>
<td>85.9%</td>
<td>81.8%</td>
<td>73.2%</td>
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**Note:**

- Historical data reflects past fiscal years.
- Projection data is speculative and based on current trends and assumptions.
- The table includes key indicators such as financing, debt outstanding and disbursed, new debt issuance, and various assumptions for future periods.
- Memorandum items provide additional context on key ratios such as debt-to-SGDP and debt-service-to-revenue.
Key Data Sources

- IMF: World Economic Outlook
  - GDP Growth
  - Inflation (domestic and foreign)

- IMF or World Bank reports, Economist Intelligence Unit
  - Fiscal variables and balances
  - Balance of Payment
  - NFA and international reserves
  - Expected financing

- National Debt Management Office/Central Bank
  - Domestic Yield Curves

- ECB, Fed, major CB
  - Foreign currency yield curves

- National Statistical Office for historical data
  - Population
  - National/Regional GDP
  - National government data

- Rating Agencies and Business/Financial News Agencies
  - S&P, Moody’s, Fitch
  - Reuters (Europe)/Thomson Reuters Datastream, Bloomberg (America),
  - Provide information on ratings and spreads at national and subnational level
Key aspects: S-GDP

- Sub-national GDP is the scaling variable

- The base for own-revenues and revenue sharing arrangements (in/outflows)
  - Proxy tax base
  - Economic cycle

- One of the determinants of current expenditures

- Per capita S-GDP may determine size of general-purpose transfers
  - Income redistribution
National Fiscal System

• Local or sub-national taxes need to be viewed in context of overall national fiscal system of public expenditures and financing

• National governments typically have comparative advantage in revenue raising, while sub-national have comparative advantage in public service delivery

• Expenditure and revenue functions need to be assigned to levels of government and imbalances have to be filled with transfers
Expenditure and Revenue Assignment

• Conceptually, begin by assigning expenditure functions to sub-national governments

• Then, determine financing
  – Own source revenues including taxes and fees
  – Transfers
  – Debt financing

• All sub-national governments must confront a hard budget constraint
Key aspects: Revenues

• Own-source revenue: sub-national defines both the definition of taxable bases and rate structure of the revenue source

• Surcharges or piggybacking on central taxes: (bounded) degree of control over the tax rate, but not the base

• Revenue sharing arrangements: bases and rates are defined by the central government

• Intergovernmental grants: general purpose; special purpose
Tax Revenues

• Very few absolutes
  – Taxes with large and elastic bases—such as income taxes—should be assigned to the central government as the best instruments for both macroeconomic stabilization and income redistribution

  – Higher level should have taxes which could distort location of economic activity

  – Higher level should have taxes that are difficult to administer locally—e.g., economies of scale in administration
Sub-National Tax Revenues

- Personal Income Tax
- Corporate Income Tax
- User fees and charges
- Property Tax
- Sales and Excise Tax
- Value-Added Tax
- Resource Tax
Example 1: Property Tax

• Pros
  – Immobile tax base
  – Visible
  – Stable yield
  – Linked to benefits

• Challenges
  – Difficult administration
    • Set up well-functioning cadastres
    • Can discourage property transfers
  – Often low yield
Example 2: Personal Income Tax

• Pros
  – Buoyant revenues
  – Visible (increases accountability)
  – Cost-effective if piggybacked on national taxation

• Challenges
  – May create or aggravate horizontal imbalances (rich vs. poor regions)
  – In areas where average incomes are below threshold, insufficient yield as most people would not pay
  – If levied at different rates among jurisdictions, it may create distortions if people are mobile.
Effective Tax Rate Approach

- Observed data for the effective tax rate of a tax category
  - Effective tax rate = tax revenues/tax base
- Forecast the tax base
- Revenue = [Tax base]*[Effective tax rate]
- Key assumptions: Unchanged tax base structure, tax system, and compliance

<table>
<thead>
<tr>
<th>Type of tax</th>
<th>Proxy base</th>
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<tbody>
<tr>
<td>VAT, Excises, Sales</td>
<td>Private consumption</td>
</tr>
<tr>
<td>Individual income tax</td>
<td>GDP</td>
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<tr>
<td>Corporate income tax</td>
<td>Corporate profits or GDP</td>
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<tr>
<td>Other taxes</td>
<td>GDP</td>
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</table>
Tax Elasticity Approach

\[
\text{elasticity of tax revenue} = \frac{\text{percent change in tax revenues (under an unchanged tax system)}}{\text{percentage change in the tax base}}
\]

- If GDP is a proxy for actual tax base, then

\[
\varepsilon = \frac{\Delta AT / AT}{\Delta GDP / GDP}
\]

- Where:
  - \(AT\) is the tax receipts from an unchanged tax system, and
  - \(\Delta\) the change during a period.
Other revenues 1/2

- Other revenues are a small proportion of revenues at the national level
  - Except in resource rich countries

- Are an important source of revenues at the sub-national level
  - Revenue-sharing, often used to close vertical fiscal imbalances
  - They can be based on either individual taxes or total tax collection

- Transfers also correct vertical imbalances between the spending responsibilities and tax revenues devolved to the local level
  - General purpose
  - Special purpose
Three key factors in the design of intergovernmental revenue sharing and fiscal transfers
- Size of the pool available for distribution
- Rules for distributing revenues and transfers
- Conditionality

Three possible ways to determine distribution of intergovernmental fiscal revenues/transfers
- Fixed proportion of central government revenues or some other “macro” basis, for example, as a percentage of gross domestic product
- On an ad hoc basis, that is, in the same way as any other discretionary budgetary expenditure
- On a formula-driven basis, for instance, as a proportion of specific local expenditures

Institutional setting is key to determine the reliability of a flow of intergovernmental revenues and transfers
Key aspects: Expenditures

- Vertical fiscal imbalances are covered mainly by transfers from central government

\[ VFI = 1 - \frac{SNG\text{ own revenue}}{SNG\text{ own spending}} \]

Source: Eyraud and Lusinyan, 2011
Key aspects: Expenditure

• Decentralization of expenditure usually precedes that of revenues

• Central government influence on key expenditure is usually high

• Definition of expenditure
  – Economic classification
    • Recurrent expenditure
      – Interest
    • Capital expenditure
  – Functional classification
Economic Classification

- Compensation of employees/Wages and salaries
- Goods and services
- Interest payments
- Transfers (to municipalities/horizontal tr.)
- Pensions
- Unemployment
Functional Classification: Share of Sub-National Government Spending

Expenditure Shares and Powers

- Power of SNGs over their own budget is limited
  - difficulties to set spending priorities or to enforce pending cuts

Bach, Blöchliger, Wallau, (OECD, 2009)

Spending power indicators: 1 lowest; 10 highest
• Two main categories of expenditures:
  – Discretionary
    • Depend on government policies
    • Some discretionary expenditures are entitlements that depend on business cycle
  – Non-discretionary
    • Interest payments
    • Determined by law: Social security payments, unemployment benefits, pensions
Discretionary Expenditures

• Wages and salaries
  – Number of employees is influenced by institutional reforms in government sector
  – Prices can be forecasted from GDP deflator

• Goods and services
  – Volumes
  – Prices
Interest Payments

• The forecast of interest payments depends on
  – Stock and composition of debt outstanding prior to the forecast year
  – Change in debt stock and composition during the forecast year
  – Interest rates
  – Exchange rates

• Change in the debt stock depends on
  – Overall budget position in the forecast year
  – Amortization due on debt stock

• Forecast of interest must be simultaneously determined with a forecast for new borrowing.
Interest Payments

\[
\text{InterestPayments}_t = \\
\left[ \text{ExtDebt} \left( \$ \right)_{t-1} + \frac{1}{2} \text{ForBorrow} \left( \$ \right)_t - \frac{1}{2} \text{ForAmt}_t \right] \ast i_{ft} \ast e_t \\
+ \\
\left[ \text{DomDebt}_{t-1} + \frac{1}{2} \text{NewBorrow} + \frac{1}{2} \text{DomAmt}_t \right] \ast i_{dt}
\]

- Effective interest rate

\[
\text{EffIntRate}_t = \frac{\text{InterestPayments}_t}{\text{Debt}_{t-1}}
\]
Sub-National Borrowing

- State and local debt and guaranteed debt for quasi-public agencies have been growing in importance
  - Examples: India, Brazil, China

- Subnationals account for 50% or more of public investment
  - Bolivia, China, Czech, France, Indonesia, Latvia, Peru, Poland, Serbia, Slovak, Ukraine
Factors Critical to Sustainable Subnational Borrowing

• The sovereign’s macroeconomic fundamentals will continue to be vital to the fiscal sustainability of SNGs

• Sovereign rating as a binding constraint for sub-sovereign ratings (Fitch, Moody’s, S&P)

• Macroeconomic cycles and subnational credit market development
  – Recent global financial crisis and subnational credit market
  – With the gradual withdrawal of fiscal stimulus packages and the ending of monetary easing, pressures on SNGs’ fiscal space could increase through various channels, such as reduced fiscal transfers and higher borrowing costs

• Risks from unregulated subnational borrowing in unstable macroeconomic environment
Macroeconomic Fundamentals (cont)

- Correlation Between Sovereign and Subsovereign Ratings of European Countries

Source: Canuto and Liu 2010, based on S&Ps
Available Financing

• Foreign vs domestic interest rates

• Foreign exchange repayment capacity
  – Available foreign exchange reserves at the national level
  – Access to those reserves

• Access to international markets

• Guarantee of the Central Government
Domestic Financing

- Commercial Bank Financing
  - Interest rates
  - Alternative lending opportunities

- On-lending from Central Government
  - Terms of on-lending
  - Foreign exchange risk

- Non-Bank Financing
  - Interest rates
  - Alternative investment assets
  - Confidence
  - Must be consistent with overall demand for domestic assets
Subnational Borrowing Control Rules

<table>
<thead>
<tr>
<th>Approach</th>
<th>Market Discipline</th>
<th>Cooperative Approach</th>
<th>Rules-based Controls</th>
<th>Administrative Controls</th>
</tr>
</thead>
</table>
| Advantages | • Emphasis on self-control  
• Monitoring by credit rating agencies | • Promotes dialogue  
• Enhances responsibility of subnational policymakers | • Transparent 
• Avoids bargaining | • Potential central government (CG) control  
• Better terms and conditions  
• Useful for foreign borrowing |
| Preconditions | • Comprehensive, timely, and reliable information  
• Developed financial markets  
• No access to privileged financing  
• No previous history of bailouts | • Constitutional underpinnings  
• Culture of fiscal discipline  
• Existence of institutions for cooperative decision-making or strong bargaining position of central government | • Sound and credible rules (e.g., well defined, transparent, and flexible)  
• Clear coverage and full information needed | • Ability of CG to effectively monitor and implement controls |
| Examples | Canada  
Australia | Argentina’s bilateral pacts  
Austria  
Denmark  
DSPs in EU countries | Brazil  
Chile  
Spain  
United States | China  
France  
Japan  
United Kingdom |

Sensitivity Analysis

- Fiscal sustainability analysis should account for uncertainty linked to projections of economic variables

  - Econometric techniques if historical data available
    • Stochastic simulations

  - Stress tests
    • Deterministic
    • Alternative scenarios

  - Discussion of fiscal risks
    • Pension funds
    • Banks
    • SPV, SOEs
    • Arrears (a.k.a. floating)
    • Judiciary decisions

  - Constraints to fiscal adjustments
    • Revenue
    • Expenditure
Conclusions

• Sub-national fiscal sustainability analysis needs
  – Macroframework
  – Medium term Fiscal Framework

• Consistent with the national macroframework
  – Exchange rate, inflation rates
  – Shared revenues, transfers, expenditures
  – Borrowing costs

• The subnational fiscal framework needs detailed assumptions
  – Own revenues
  – Rules governing transfers and borrowing
  – Spending power
  – Financing assumptions

• Sensitivity analysis to account for uncertainty

• Importance of the institutional settings which shape fiscal and debt management policies of subnational and national governments
References

– Bach Steffen, Hansjörg Blöchliger, and Dominik Wallau [2009], The Spending Power of Sub-Central Governments, *OECD*.


