Debt Sustainability Framework for Low-Income Countries (LICs)

Instructor: Machiko Narita, IMF
Unit 1:

Overview
Lecture 1: Objectives and structure
Lecture 2: What is the LIC DSF?
Lecture 3: Relationship to IMF/WB policies and facilities
Unit 1 Lecture 1:

Objectives and Structure
Learning objectives

✔️ What is debt sustainability framework (DSF) for low income countries (LICs)?
- Specific features
- How it is used

✔️ How to use the LIC DSA template?
- Input
- Output
- Analysis (Judgments)

✔️ DSAs in practice (country example)

Publicly available

Developia
Structure of this Course

Unit 1-2: What is the LIC DSF?

Unit 3-9: How to use the LIC DSA template?

Unit 10: DSAs in practice (country example)
Learning objectives:

- What is the LIC DSF?
- How to use the LIC DSA template?
- DSAs in practice (country example)

Part 3 is designed to be practical and hands-on
Unit 1 Lecture 2:
What is the LIC DSF?
What is the LIC DSF?

☑️ Analytical framework to assess debt vulnerabilities

☑️ Developed by IMF and WB staff

☑️ Country coverage:
  📌 Countries eligible to
    - Poverty Reduction and Growth Trust (PRGT) facilities
    - International Development Association (IDA) resources

Choose to use the MAC DSA if the country has durable and substantial access to market financing.
History of the LIC DSF

2005: introduction of the Framework

2006 review: implications of debt relief under the Multilateral Debt Relief Initiative (MDRI)

2009 review: reforms of the Fund’s facilities for LICs

2012: comprehensive review of the Framework

Almost 500 DSAs produced for 73 different LICs
LIC DSF

From the video: LIC DSF consists of External and Public DSAs. External DSA plays an important role in the LIC DSF, as the PPG external debt has been the largest component of debt for many low-income countries.
What is specific to the LIC DSF?

- **Concessionality of debt**
  - Lower interest rate
  - Grace period
  - Long maturity etc.

- **Long projection horizon**
  - 20 years

- **External risk rating**

**PPG external debt**

- An explicit assessment of external debt distress
- PPG debt has been the largest part of debt in many LICs

Favorable terms

To capture long maturity and grace period of concessional loans and investment returns
How is the LIC DSF used?

**By IMF and WB**
- Policy advice
- Input to IMF debt limits policy and WB non-concessional borrowing policy

**By creditors**
- Guidance on lending and grant-allocation decisions
  - Including IDA

**By borrowers**
- Input to their medium-term debt management strategy
How are DSAs produced?

Macroeconomic framework → LIC DSA template → Assessment of risks

Projections & assumptions

- DSA is only as good as the macroeconomic framework
- Projections and assumptions must be
  - Realistic
  - Consistent with the policies of the country authorities
  - Consistent with each other
SUMMARY

☑ LIC DSF is an analytical framework to assess debt vulnerabilities

☑ ... considering LIC economies’ characteristics

كوك Concessionality of debt
كوك Long projection horizon
كوك External risk rating

☑ DSA is only as good as the macroeconomic framework
Unit 1 Lecture 3:

Relationship to IMF/WB policies and facilities
Relation to policies that limit debt accumulation

From the video: Results of LIC DSF are used to inform the IMF’s debt-limits policy in Fund-supported program. LIC DSF also is an input to World Bank’s IDA grant allocation and IDA’s non-concessional borrowing policies.
The objective of IMF’s DLP is to ensure debt sustainability over the medium-term while allowing adequate external financing.

For LICs, a PC limiting PPG external borrowing is near universal and is informed by the assessment of a country’s risk of external debt distress in the LIC DSF.

From the video: Concessional financing has historically been excluded from such limits. That is to say, only non-concessional financing is subject to the limits. (PC= performance criterion.)
Flexibility introduced in 2009 includes a menu of options for nonconcessional borrowing.

Options available to a particular country are determined by:
- debt vulnerabilities as assessed in the DSA
- macroeconomic and public financial management capacity

Under the current policy, nonconcessional borrowing is allowed if it does not exacerbate or create debt vulnerabilities.
LIC DSF and IDA’s grant allocation

World Bank’s IDA is designed to provide relief to the most indebted countries.

Under the IDA’s grant allocation framework, eligibility is determined by the assessment of a country’s risk of external debt distress, assessed in the external DSA.

- Low risk: IDA loans
- Moderate risk: eligible for a 50-50 blend of IDA loan and grant
- High: eligible for full IDA grant financing
LIC DSF and World Bank’s NCBP

IDA’s nonconcessional borrowing policy (NCBP) aims at helping preserve benefits of debt relief and grants provided.

Nonconcessional borrowing ceilings:
- NCB ceilings in Fund programs
- Separate ceilings that World Bank agrees with its members if no Fund program

Non-observance of NCBP can lead to reduction of IDA allocations or hardening of the terms: depends on debt sustainability concerns
When is the DSA produced?

**IMF and WB:**

- At least once every calendar year
- In specific situations
  - Request for IMF financing
  - Any modification to/or request for a waiver for non-compliance with a PC related to debt limits
  - Non-concessional borrowing beyond levels assessed in the most recent DSA

Article IV consultation, program review/request

Could result in more than one DSA in the same calendar year
SUMMARY

✓ LIC DSF used as input for setting and monitoring non-concessional borrowing limits under IMF’s DLP and IDA’s NCBP

✓ WB IDA’s grant allocation framework reflects risk rating of external debt distress as assessed in the LIC DSA
Unit 2: Concessionality of Debt
Lecture 1: Present value of debt

Lecture 2: Grant element

Lecture 3: Debt burden indicators in the External DSA
Unit 2 Lecture 1:

Present Value of Debt
What is present value?

Q: Is it fair if I borrow $100 from you and give you back $100 one year later?

A: No, because there are opportunity costs, such as interest-earning potential.
**What is present value?**

Present value is a future amount of money that is discounted to reflect its current value.

<table>
<thead>
<tr>
<th>Year</th>
<th>Nominal Value</th>
<th>Present Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>t</td>
<td>$100</td>
<td>$100</td>
</tr>
<tr>
<td>t+1</td>
<td>$100</td>
<td>$100/(1 + \beta) (= $95.2)</td>
</tr>
<tr>
<td>t+2</td>
<td>$100</td>
<td>$100/(1 + \beta)^2 (= $90.7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\beta=5%$</td>
</tr>
</tbody>
</table>

\[ \beta = 5\% \]
Present Value of Debt

Present value of debt is the sum of all future debt service payments discounted to the present.

\[ PV_t = \frac{DS_{t+1}}{(1+\beta)} + \frac{DS_{t+2}}{(1+\beta)^2} + \frac{DS_{t+3}}{(1+\beta)^3} + \ldots \]

- \( DS_t \) is the debt service payment at time \( t \) and \( \beta \) is the discount rate.
- \( DS = \) Principal payment + interest payment.

PV is what you have to pay on the loan in the present value.
**Present Values of Debt**

**Example:**

Consider a one year loan of $100 at an interest rate $i$

<table>
<thead>
<tr>
<th>Year $t$</th>
<th>Nominal Value of Principal Payment</th>
<th>Nominal Value of Interest Payment</th>
<th>Nominal Value of Debt Service</th>
<th>Present Value of Debt Service</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Year $t+1$</td>
<td>$100$</td>
<td>$i \times 100$</td>
<td>$100 + i \times 100$</td>
<td>(\frac{100 + i \times 100}{1 + \beta})</td>
</tr>
</tbody>
</table>

\[
P_{V_t} = \frac{100 + i \times 100}{1 + \beta}
\]
Nominal and Present Values of Debt

Example (continued):

<table>
<thead>
<tr>
<th>Nominal Value of Debt</th>
<th>Present Value of Debt</th>
</tr>
</thead>
<tbody>
<tr>
<td>$100</td>
<td>($100 + i$100) (\frac{1}{1+\beta})</td>
</tr>
</tbody>
</table>

- NV of debt is what you borrow
- PV of debt is what you pay

... on the loan in the present value
Nominal and Present Values of Debt

Example (continued):

\[
PV_t = \frac{\$100 + i \cdot \$100}{(1 + \beta)} = \$100 \cdot \frac{(1 + i)}{(1 + \beta)}
\]

- If \( i = \beta \), \( PV_t = \$100 \) (Nominal value of the loan)
- If \( i < \beta \), \( PV_t < \$100 \)
- If \( i > \beta \), \( PV_t > \$100 \)

What you pay | What you borrow
Nominal and Present Values of Debt

In general:

✓ If \( i = \beta \), the present value of debt (PV) is equal or close to its nominal value (NV).

✓ If \( i < \beta \), PV is typically smaller than NV.

✓ If \( i > \beta \), PV is typically larger than NV.
Discount Rate

LIC DSF uses a single discount rate of 5 percent

Decisions of the Executive Boards of the IMF and WB in Oct 2013

Rate will remain unchanged until further revision

For more information, see IMF press release (Oct 11, 2013)
PV of debt is the sum of all future debt service payments discounted to the present.

PV of debt is typically lower than its nominal value (face value) if the interest rate is lower than the discount rate.

Discount rate is set at 5 percent until the next review by the IMF/WB Executive Boards.
Unit 2 Lecture 2:

Grant Element
Recall:

✓ Present value of debt can differ from its nominal value (face value)

Q: if $i < \beta$, is the present value of debt higher or lower than its nominal value?

A: PV is lower than NV.
Interpretation

Q: What does it mean if PV is lower than NV?

Recall that ...

- NV of debt is what you borrow
- PV of debt is what you pay

\[ PV_t = \frac{DS_{t+1}}{(1 + \beta)} + \frac{DS_{t+2}}{(1 + \beta)^2} + \frac{DS_{t+3}}{(1 + \beta)^3} + \cdots \]

A: Your total future payment is cheaper than what you borrow in the present value

That is, there is some concession
Factors that affect concessionality

☑️ Contractual interest rate $i$

☑️ Maturity
   - The number of years required to service the loan

☑️ Grace period
   - The period when no principal payment is required

☑️ Frequency of payments
From the video: In this example, the maturity is 5 years. The grace periods are 2 years because there are no principle payments scheduled in the first two years. The frequency of payments is annual because we are paying in each year.

<table>
<thead>
<tr>
<th>Nominal Value of Principal Payment</th>
<th>Nominal Value of Interest Payment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year t</td>
<td>−</td>
</tr>
<tr>
<td>Year t+1</td>
<td>−</td>
</tr>
<tr>
<td>Year t+2</td>
<td>−</td>
</tr>
<tr>
<td>Year t+3</td>
<td>$P_{t+3}$</td>
</tr>
<tr>
<td>Year t+4</td>
<td>$P_{t+4}$</td>
</tr>
<tr>
<td>Year t+5</td>
<td>$P_{t+5}$</td>
</tr>
</tbody>
</table>

**Maturity = 5 years**

**Frequency = annual**

Grace period = 2 years
Implications for Concessionality

Suppose \( i < \beta \).

- The longer the maturity is, ...
- The longer the grace period is, ...
- The lower the payment frequency is ...

the higher the concessionality is.

In this situation, everything lowers PV, meaning...
Grant Element

The degree of concessionality of a loan:

\[ GE = \frac{(NV - PV)}{NV} \cdot 100 \]

- NV = Nominal value of the loan
- PV = Present value of the loan

A loan is typically considered to be concessional if its GE is equal to or larger than 35 percent
From the video: This is one of the output charts of the External DSA. It shows the assumption on the grant element of the new borrowing in the next 20 years. In this case, the grant element for the future borrowing is around 15%.

Source: DSA for Bangladesh (June 2013)
Concessionality of a loan is affected by various factors.

Grant element measures the degree of concessionality of a loan.
Unit 2 Lecture 3:
Debt Burden Indicators in the External DSA
Debt Burden Indicators in the External DSA

**Solvency**
- PV of PPG external debt to GDP
- PV of PPG external debt to exports
- PV of PPG external debt to revenue

**Liquidity**
- PPG external debt service to exports
- PPG external debt service to revenue

PPG = Public and Publicly Guaranteed

*From the video:* For the solvency indicators, we are looking at the present value of debt instead of the nominal value of debt. Do you remember why we want to look at the present value of debt instead of the nominal value of debt? Yes, it is because we want to consider the concessionality of debt in assessing debt sustainability.
Output charts of the External DSA

a. Debt Accumulation
b. PV of debt-to-GDP ratio
c. PV of debt-to-exports ratio
d. PV of debt-to-revenue ratio
e. Debt service-to-exports ratio
f. Debt service-to-revenue ratio

Source: DSA for Kenya (2013)
Indicative Thresholds

✓ Demarcate “danger zones” where the risk of debt distress is elevated

uales External risk rating

✓ Empirically estimated by IMF and WB staff

For more information on the estimation, see IDA (2012) and IMF (2012) listed in the reference
# PPG external debt thresholds

Indicative thresholds depend on the quality of the country’s policies and institutions.

<table>
<thead>
<tr>
<th>Policy performance category (CPIA)</th>
<th>PV of PPG external debt in percent of</th>
<th>PPG external debt service in percent of</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GDP</td>
<td>Exports</td>
</tr>
<tr>
<td>Weak</td>
<td>30</td>
<td>100</td>
</tr>
<tr>
<td>Medium</td>
<td>40</td>
<td>150</td>
</tr>
<tr>
<td>Strong</td>
<td>50</td>
<td>200</td>
</tr>
</tbody>
</table>
CPIA index

Country Policy and Institutional Assessment (CPIA) index is used in determining the country’s policy performance category.

CPIA index Consists of 16 indicators in:

1. Economic management
2. Structural policies
3. Policies for social inclusion and equity
4. Public sector management and institution

Annually compiled by the WB for all IDA-eligible countries.
Policy Performance Categories

LIC DSF uses the CPIA index to determine the country’s policy performance category.

<table>
<thead>
<tr>
<th>Policy performance category</th>
<th>3-year moving average of the CPIA index (X)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weak</td>
<td>$X \leq 3.25$</td>
</tr>
<tr>
<td>Medium</td>
<td>$3.25 &lt; X &lt; 3.75$</td>
</tr>
<tr>
<td>Strong</td>
<td>$3.75 \leq X$</td>
</tr>
</tbody>
</table>
Incorporating Remittances

Remittances should be incorporated when they are large

- Remittances-GDP ratio > 10 percent
- Remittances-exports ratio > 20 percent

(Average of the ratios in the latest three years)

<table>
<thead>
<tr>
<th>Policy performance category (CPIA)</th>
<th>PV of PPG external debt in percent of</th>
<th>PPG external debt service in percent of</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GDP + Remittances</td>
<td>Exports + Remittances</td>
</tr>
<tr>
<td>Weak</td>
<td>30 → 27</td>
<td>100 → 80</td>
</tr>
<tr>
<td>Medium</td>
<td>40 → 36</td>
<td>150 → 120</td>
</tr>
<tr>
<td>Strong</td>
<td>50 → 45</td>
<td>200 → 160</td>
</tr>
</tbody>
</table>
SUMMARY

- Debt burden indicators in the LIC DSF
- Indicative thresholds for external PPG debt
- Concessionality is taken into account
- Remittances should be incorporated when they are large
Unit 3:

LIC DSA Template
Lecture 1: Structure of the template

Lecture 2: Country information

Lecture 3: Data and projections (Overview)
Unit 3 Lecture 1:
Structure of the template
LIC DSA template

✓ Produces charts and tables for external and public DSAs

✓ ... using data for a country of interest

✓ Publicly available from the IMF website

From the video: The LIC DSA template is an Excel file that produces charts and tables for external and public DSAs. It is publicly available from the IMF website.
LIC DSA template structure

Input – INSTRUCTIONS

- Data -Input
- Input_Out_Debt
- SDR
- Customized Scenarios

Background sheets

- Calculations of baseline scenario and stress tests
- Probability approach
- CPIA

Outputs

- Panel charts
- Baseline tables
- Stress tests tables

For external and public DSAs

Output – INSTRUCTIONS
Let’s get started

- e-DSA version of the LIC DSA template
  - LIC DSA Template (eDSA).xlsm
  - Available on our course site

- Same as the actual template but it ...
  - Recognizes Developia as a country
  - Has a data sheet “Developia-Data”
Memo

✓ Open the template (Excel) → enable macros
✓ “Start” sheet: you can choose language
✓ “Developia-Data” sheet:
  Contains data for Developia, which comes from its macro framework
  Has been added to the template for this course
  When you conduct DSAs for your country, you need to prepare these series or get them from your colleagues responsible for macro-fiscal forecasting
LIC DSA template is publicly available from the IMF website

There are input, output, and background sheets in the template
Unit 3 Lecture 2: Country Information
Main input to the template

- “Data-Input” sheet
  - Country information
  - Data and Projections

- “inp_Out_Debt” sheet
  - PPG external debt projections
    - Assumptions on new borrowing
    - Scheduled debt service payments
      - For main creditor

- IMF program, IDA operation etc

- 20 years
Go to the template (Excel)

“Input- INSTRUCTIONS” sheet: you can print it out and have it as your reference

“Data-Input’ sheet (“MAIN ASSUMPTIONS” part):

- Select Developia and review CPIA, thresholds, etc.
- Specify MDRI, IMF program, IDA operation, IDA status
- Minimum concessionality requirement:
  It is 35 percent unless a different requirement is specified in the Technical Memorandum of Understanding (TMU) of the ongoing IMF program.
From the video: “Data-Input” sheet of the LIC DSA template.
Main input to the LIC DSF includes country information, data and projections, and PPG external debt details

“Input-INSTRUCTIONS” sheet

“Data-Input” sheet: country information
Unit 3 Lecture 3:

Data and Projections
(Overview)
Data and Projections

“Data-Input” sheet

- Debt
  - Debt outstanding
  - Interest payments
  - Principal payments (amortization)

- BOP

- Fiscal Accounts

- GDP and exchange rates

From the video: In “Data-Input” sheet of the LIC DSA template, we need to populate debt, BOP, fiscal accounts, GDP and exchange rate.
Memo

✔ “Data-Input” sheet (“DATA” section) (Excel)

✔ We need to populate available historical data for the past 10 years and projections for the next 20 years

✔ Specify the first year of projection

✔ Debt, BOP, Fiscal, GDP, and exchange rate
From the video: In “Data-Input” sheet of the LIC DSA template, we need to populate data in cells highlighted in yellow.
“Data-Input” sheet: “DATA” section

Populate historical data for the past 10 years and projections for the next 20 years

“Developia-Data” sheet

Debt, BOP, Fiscal, GDP, and exchange rate series

Specify the first year of projection
Unit 4:

Data and Projections for the Template
Lecture 1: Guidance on Debt Data
Lecture 2: Debt series
Lecture 3: Other series
Unit 4 Lecture 1:

Guidance on Debt Data
Debt data for the LIC DSF

- Coverage of public sector debt
- External vs. domestic debt
- Gross vs. Net debt

From the video: As we saw in the template, we have to populate many debt series – external debt, domestic debt, public debt, and private debt. So there are many definitions we have to be clear about. And also, you may wonder whether we need to look at the gross debt or net debt. This video will provide some guidance on these questions.
Coverage of public sector debt

- Should be as broad as possible
  - Central government
  - Regional and local governments
  - Central bank
  - Public enterprises

- Should be consistent with the coverage of the fiscal accounts

From the video: For example, if you present your fiscal tables for central government in the IMF Annual Consultation meetings, then we want to present the DSA for the central government as well, to be consistent.
External vs. Domestic debt

LIC DSF basically uses the residency basis

- Residency of the creditor
  - External debt: owned by non residents
  - Domestic debt: owned by residents

  e.g. when govn’t bonds are traded in the secondary market

- If the residency basis is not possible...
  - Domestically-issued debt as a proxy for domestic debt
  - Currency of denomination

DSA write-up should disclose which definition is used
Gross vs. Net debt

Gross debt
- Total stock of outstanding liabilities

Net debt as a complementary measure
- When govn’t has a significant amount of assets that could be quickly liquidated to service debt
Public sector should be as broad as possible

External and domestic debt are often defined based on the residency of the creditor

Gross debt should be used for the LIC DSF while net debt can be also presented when relevant
Unit 4 Lecture 2:
Debt series
Coverage of the public sector

Central government (CG)
- CG debt and CG guaranteed debt
- CG fiscal accounts

External vs. Domestic debt
- Residency of the creditor

Gross debt
- Not a significant amount of liquid assets
Memo

- “Data-Input” sheet (“DATA” section) (Excel)
- Let’s populate PPG debt outstanding
  - “Developia-Data” sheet which contains data and projections for Developia
- If some data are not available, leave them blank
From the video: In “Data-Input” sheet, let’s populate PPG debt outstanding from “Developia-Data” sheet which contains data and projections for Developia. Please pay attention to the units and scale of this series, too.
SUMMARY

☑ “Data-Input” sheet: “DATA” section

☑ Debt definitions for Developia (to be stated in the write-up)

☑ Populate available historical debt data and projections for 20 years (“Developia-Data” series)
Unit 4 Lecture 3:

Other series
Other series

- Debt series
- BOP series
- Fiscal accounts
- GDP and exchange rates
Fiscal year vs. Calendar year

☑ Both are fine in the LIC DSA

☒ Should be clearly stated in the write-up

☒ Should be consistently used throughout the DSA
“Data-Input” sheet (“DATA” section) (Excel)

- BOP series (line 48-56)
  - BPM 5 or 6 to check definitions
  - If you hover over red flags, you’ll see hints, comments, or additional information

- Fiscal accounts (line 58-68)
  - GFSM (’86 or ’01) to check definitions

- GDP and exchange rate (line 70-74)

Before populating them, ...

- Check if debt series are FY basis or CY basis => FY basis
- How about BOP series? => CY basis
- We want to be consistent!
Fiscal year vs. Calendar year

For Developia,

- Fiscal year (FY): July–June
- Calendar year (CY): January–December
Construct FY data

If monthly (quarterly) data are available, we can construct FY

\[ Y_{FY\ 2014} = Y_{Jul,\ 2013} + Y_{Aug,\ 2013} + \ldots + Y_{Jun,\ 2014} \]

or

\[ Y_{FY\ 2014} = Y_{Q3,\ 2013} + Y_{Q4,\ 2013} + Y_{Q1,\ 2014} + Y_{Q2,\ 2014} \]
Approximate FY data

If monthly (quarterly) data are **NOT** available, we can approximate FY

\[ Y_{FY\ 2014} = \frac{1}{2} Y_{CY\ 2013} + \frac{1}{2} Y_{CY\ 2014} \]
Memo

✔️ For Developia, we use the FY basis.

✔️ However, BOP series are available only in the CY basis and monthly or quarterly data are NOT available.

✔️ “Developia-Data” sheet (Excel)

👉 Approximate FY current account balance and use it on “Data-Input” sheet

👉 Assessment quizzes will ask you to do the same for imports
Memo

From the video: In “Developia-Data” sheet, let’s approximate FY current account balance and use it on “Data-Input” sheet.
“Data-Input” sheet: “DATA” section

Populate BOP, fiscal, GDP, and exchange rate series

Use CY or FY consistently within the LIC DSF
Unit 5:

PPG external debt projections
Lecture 1: Overview
Lecture 2: Input and Output
Lecture 3: SDR information
Unit 5 Lecture 1:
Overview
"Inp_Out_Debt" sheet

Objective: construct projections of

- PPG external debt (MLT)
- outstanding, interest due, and amortization due

Input: Need to populate

- Debt services on "old" debt
- New disbursements ("new" debt)
- Contract terms of "new" debt

MLT = Medium and long term

What we wanted in "Data-Input" sheet

by major creditor
“Old” and “New” debt

“Old” debt

- Outstanding of the debt disbursed before the first year of projection

“New” debt

- New disbursements after the first year of projection

From the video: The new disbursements can come from a new contract or existing contracts. What matters is the timing of the disbursements.

Including new disbursements from both existing and new contracts
Example

First year of projection: FY2014

Creditor A

- Debt outstanding of 30 million at end FY2013

- Debt service schedule

Old debt

New debt

- 20 million will be disbursed in the next 5 years

- Disbursement schedule

- Contract terms
Memo

✓ “Inp_Out_Debt” sheet (Excel)
✓ “Assumptions on new external debt” section

Specify major creditors

If there are more than 2 additional creditors in each category, aggregate some creditors and put average contract terms (e.g. “Other Multilateral”)

Specify contract terms by creditor (using historical experience as reference)

=> GE will be automatically calculated for each creditor
From the video: Specify assumptions on new external debt on the “Inp_Out_Debt” sheet.
SUMMARY

✓ "Inp_Out_Debt" sheet

✓ ... produces projections for PPG external debt (MLT) series

✓ ... requires assumptions on contract terms, debt services from old debt, and new disbursements schedule

✓ Contract terms by creditor
Unit 5 Lecture 2:
Input and Output
Memo


Descriptors of creditors are automatically filled as you specified in “Assumptions on new external debt” section.

E.g. You can find “Raccoonia” under “Non-Paris Club” as you specified.

Recall: “old debt” = outstanding debt at the end of the last year of data period (in our case FY2014)

Populate estimated annual debt service payments on old debt for each creditor (Use the same units as in “Data-Input” sheet.)

Total debt services (line 54): if the breakdown between interest payments and principal payments (line 55-56) is not available, leave principal payments (line 55) as blank. This means that all debt service payments are interest payments. This is most pessimistic or conservative scenario for DSA.
Memo


- Recall: “new debt” = disbursements after the end year of data period (in our case FY2014)
- Populate estimated volumes of new disbursements from each creditor

“Inp_Out_Debt” sheet: “B: Output” section

- Projections of interests and amortization for new debt by creditor (line 99-139)
- Projections of interests and amortization for total PPG external debt (MLT) (line 213-215), which are used in “Debt-Input” sheet
- Let’s confirm (e.g. amortization in 2014 (cell G214)): Formula>Trace dependents
Memo

From the video: “Inp_Out_Debt” sheet of the LIC DSA template.

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Formula: =F55+F120+E206
SUMMARY

"Inp_Out_Debt" sheet

Input

- Contract terms on new debt
- Debt services for old debt
- Disbursements from new debt

Output

- Projections of outstanding, interests, and amortization for PPG external debt (MLT)
Unit 5 Lecture 3:
SDR information
Special Drawing Right (SDR)

- **SDR** is an international reserve asset
  - Created by the IMF in 1969 to supplement its member countries' official reserves

- SDR information by country is available at the [IMF website](https://www.imf.org/en)
Memo

✓ “SDR” sheet (Excel)

* Allocation, holdings, and interest payments in the end year of data period (FY2014)

* SDR info by country is available at the IMF website (IMF Members' Financial Data by Country)

* Leave expected drawdown/reconstitution as blank unless there is a certain plan
“SDR” sheet

Populate SDR allocation, holdings, and interest payments in the end year of data period

Leave expected drawdown and reconstruction as blank unless there is a certain plan
Unit 6:

Output from the External DSA
Lecture 1: Baseline scenario and Stress tests

Lecture 2: Results from the baseline scenario

Lecture 3: Consistency checks
Unit 6 Lecture 1:
Baseline scenario and Stress tests
Output from the External DSA

Paths of debt burden indicators of PPG external debt

- Baseline scenario
- Stress tests

For the next 20 years
Baseline scenario and Stress tests

**Baseline scenario**
- Deemed to be the most likely
- ... based on the assumptions and projections that we populated as input

**Stress tests**
- Gauge the sensitivity of the baseline scenario to shocks and changes in assumptions

*From the video:* "Stress tests" are the scenarios under different assumptions.
Stress tests

- **Standardized stress tests**
  - Applied to all countries, regardless of their circumstances
  - Calibrated to each country using 10 years of historical data

- **Customized scenarios**
  - Country-specific vulnerability

Magnitude of shocks
Caveat

Stress tests constitute a partial-equilibrium analysis

Macroeconomic adjustment process triggered by a shock is not taken into account
Given the inputs populated in the template, the “Output-INSTRUCTIONS” sheet tells us which charts and tables we need to look at.

Developia is in a “Borderline case”. So, we should look at:

- “Out-Table baseline-External” sheet (Excel)
- “Out-Panel chart-External” sheet (Excel)
- “Out-Stress tests-External” sheet (Excel)
- “Out-Panel Chart-prob” sheet (Excel)

Unit 8 will explain what a “borderline case” is.
Output from the External DSA:

- Paths of debt burden indicators from ...
  - Baseline scenario
  - Stress tests

... and compared with their indicative thresholds to determine the external risk rating

Stress tests constitute a partial-equilibrium analysis
Unit 6 Lecture 2:
Results from the baseline scenario
Understanding the evolution of external debt

- Identified financing needs
  - Trade deficits
  - Other CA outflows
  - Identified net debt-creating flows

- Other factors
  - Non-debt financing
  - Unidentified financing needs
  - Residuals
Identified net debt-creating flows

- (+) CA deficit (excluding net interest income)
- (-) Net FDI inflow
- (+/-) Endogenous debt dynamics
  - (+) Increase in interest rate
  - (+) Slowdown of GDP growth
  - (+/-) Price and exchange rate changes

Non-interest CA deficit not covered by FDI

(as we look at debt-GDP ratio)

D/GDP
Residuals

- Non-debt financing
  - Exceptional financing
    - Arrears, debt relief etc.
  - Drawdown of foreign assets
    - Foreign reserves etc.

- Unidentified financing needs
  - Unregistered imports
  - Unregistered remittances
### Memo

**Table xx. Development: External Debt Sustainability Framework, Baseline Scenario, 2011-2034**

#### Key macroeconomic assumptions

<table>
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<td>Real GDP growth (in percent)</td>
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<td>2.6</td>
<td>3.5</td>
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<td>4.6</td>
<td>4.7</td>
<td>4.9</td>
<td>5.1</td>
<td>5.1</td>
<td>4.7</td>
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<td>GDP deflator in US dollar terms (change in percent)</td>
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<td>9.4</td>
<td>-6.0</td>
<td>6.1</td>
<td>5.6</td>
<td>1.5</td>
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<td>1.6</td>
<td>1.5</td>
<td>1.7</td>
<td>2.3</td>
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<td>Effective interest rate (percent) 5/</td>
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<td>1.3</td>
<td>1.3</td>
<td>1.3</td>
<td>1.2</td>
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<td>Growth of exports of G&amp;S (US dollar terms, in percent)</td>
<td>3.7</td>
<td>4.8</td>
<td>5.0</td>
<td>7.4</td>
<td>5.6</td>
<td>8.3</td>
<td>8.7</td>
<td>8.4</td>
<td>8.7</td>
<td>8.4</td>
<td>11.8</td>
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<tr>
<td>Growth of imports of G&amp;S (US dollar terms, in percent)</td>
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<td>4.0</td>
<td>4.1</td>
<td>6.4</td>
<td>4.6</td>
<td>8.2</td>
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<td>8.3</td>
<td>8.7</td>
<td>8.4</td>
<td>11.8</td>
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<td>Grant element of new public sector borrowing (in percent)</td>
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<td>42.1</td>
<td>40.9</td>
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<td>21.7</td>
<td>21.8</td>
<td>21.6</td>
<td>21.7</td>
<td>21.8</td>
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<td>20.6</td>
<td>20.7</td>
<td>20.9</td>
<td>21.6</td>
<td>21.9</td>
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<td>21.8</td>
<td>21.6</td>
<td>21.9</td>
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<td>Aid flows (in Billions of US dollars) 7/</td>
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<td>4.3</td>
<td>4.1</td>
<td>4.0</td>
<td>3.3</td>
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<td>2.0</td>
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<td>of which: Grants</td>
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<td>2.6</td>
<td>3.2</td>
<td>2.0</td>
<td>1.7</td>
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<td>1.0</td>
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<td>Grant-equivalent financing (in percent of GDP) 8/</td>
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<td>4.1</td>
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<td>3.2</td>
<td>2.0</td>
<td>1.7</td>
<td>1.3</td>
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</table>

#### Memorandum items, such as remittances-adjusted indicators

- **Nominal GDP** (Billions of US dollars)
- **Nominal dollar GDP growth**
- **PV of PPG external debt (in Billions of US dollars)**
- **PV of PPG external debt in percent of GDP (PPG)**
- **PV of PPG external debt in percent of exports + remittances**
- **PV of PPG external debt in percent of gross exports**
- **PV of PPG external debt in percent of GDP (PPG)**
- **PV of PPG external debt in percent of exports + remittances**
- **PV of PPG external debt in percent of gross exports**
- **Debt service of PPG external debt (in percent of exports + remittances)**

### Notes

1/ Includes both public and private sector external debt.
2/ Derived as (r - g - ρ(1+g))/(1+g+ρ+gρ) times previous period debt ratio, with r = nominal interest rate; g = real GDP growth rate, and ρ = growth rate of GDP deflator in U.S. dollar terms.
3/ Includes exceptional financing (i.e., changes in arrears and debt relief); changes in gross foreign assets, and valuation adjustments. For projections also includes contribution from price and exchange rate changes.
4/ Assumes that PV of public sector debt is equivalent to its face value.
5/ Current-year interest payments divided by previous period debt stock.
6/ Historical averages and standard deviations are generally derived over the past 10 years. See Appendix 2 for sources of detailed outflows.
7/ Defined as grants, concessional loans, and debt relief.
8/ Grant-equivalent financing includes grants provided directly to the government and through borrowing by the public sector, net of new debt issues.

**Sources:** Country authorities; and staff estimates and projections.
SUMMARY

- Structure of “Out-Table baseline-External” sheet
- Driving factors to the change in external debt
  - Identified flows
  - Residuals
Unit 6 Lecture 3: Consistency checks
Recap

Change in external debt to GDP ratio

- Identified net debt-creating flows
- Residuals

Change in the ratio due to everything that is not listed as “identified flows”

We need to understand what residuals reflect, especially when they are large
Residuals reflect ...

- Exceptional financing
- Drawdown of foreign assets
- Unexplained net debt-creating flows

and

Inconsistencies in the input

- Assumptions in the macro framework
- Units and scales (currency, million vs. billion)
- FY vs. CY

LIC DSA template has consistency check columns

e.g. large financing needs and small borrowing
Outstanding vs. Amortization

- Cell E61 in "Inp_Out_Debt" Sheet –

PPG outstanding at end of data period

Sum of PPG amortization in the 20-year projection period

Difference
- Loans with longer maturities
- Inconsistency

Nominal value

- e.g. 40-year loan
- e.g. principal payments on old loan
- e.g. different units
Financing needs vs. Debt financing

- Line 87 in “Data-Input’’ sheet -

Gross financing needs covered by the public sector:
- Non-interest CA deficit not financed by FDI
- Debt services on external debt
- ...net of Private external financing

PPG external debt disbursements
- e.g. Exceptional financing, drawdown of assets

Difference
- Non-debt financing
- Limited coverage of private debt
- Inconsistency
- e.g. inconsistencies across projections, such as CAB, new debt disbursements
Memo

✓ “Out-Table baseline-External” sheet (Excel)
✓ Review the change in external debt, identified flows, and residuals
  ▶ Net FDI seems to be too large...
  ▶ Residuals are large positive: too much borrowing based on the identified financing needs
=> Let’s figure out what’s going on

✓ “Inp_Out_Debt” sheet (Excel)
✓ Check for principal payments on old loan (cell E61)
  ▶ Check column shows zero => There is no issue or inconsistency between old debt outstanding and its amortization schedule
Memo

- "Data-Input" sheet (Excel)
- Check line for new disbursement to public sector (line 87)
  - It shows a bit large negative numbers in all years
  - Gross financing needs covered by the public sector are always smaller than the disbursement of PPG debt
- Review financing needs (BOP and fiscal accounts)
  - Scale of Net FDI was wrong! Let's correct it.
- Revised check line in "Data-Input" has a smaller discrepancy.
- Revised residuals in "Out-Table baseline-External" is closer to zero
From the video: In “Out-Table baseline-External” sheet, review the change in external debt, identified flows, and residuals. Residuals are large (line 28). So, let’s figure out why.

From the video: In “Inp_Out_Debt” sheet, check for principal payments on old loan (cell E61).

From the video: In “Data-Input” sheet, check line for new disbursement to public sector (line 87).
Debt Accumulation in Developia

Recent discovery of natural resources

Infrastructure investments => Increased PPG borrowing

Stabilized in the long-run
Residual flows of external debt could reflect inconsistencies in the inputs, as well as non-debt financing.

Consistency check columns in the LIC DSA template.
Unit 7: Assessing External Risks
Lecture 1: Standardized stress tests
Lecture 2: Customized scenarios
Lecture 3: External risk rating
Unit 7 Lecture 1:

Standardized stress tests
Recap: Standardized stress tests

- Applied to all countries, regardless of their circumstances
- Size of shocks are calibrated to each country using 10 years of historical data
Output from the External DSA

For each debt-burden indicator

From the video: When you populate necessary input to the template, it will automatically generate the debt-burden indicators under the baseline scenario and the standardized stress test scenarios, which are the historical scenario and most extreme stress test.
Historical Scenario

Key variables are kept at their 10-year historical average

- Real GDP, GDP deflator (growth rate)
- Non-interest CAB, net FDI (in percent of GDP)

Assesses the realism of the baseline scenario

- Deviations from the historical scenario could reflect ...
  - Non-representative event *e.g.* war
  - Structural break *e.g.* natural resource discovery
  - Excessive optimism in the baseline scenario
Most extreme stress test

- Yields the highest level of the indicator in the 10th year among all stress tests:
  - A2. External financing scenario
  - B1. Real GDP growth
  - B2. Exports
  - B3. GDP deflator
  - B4. Other flows (transfers and FDI)
  - B5. Combination of B1 through B4
  - B6. Depreciation

Negative shock in the 2nd and 3rd periods

Assess the sensitivity of the baseline scenario to shocks and changes in assumptions

What if PPG interest rates are higher (permanent)

Table 6 of the guidance note
Additional financing in stress tests

- **Covered by PPG external debt (MLT)**
  - based on the assumed contract terms for new debt ("Inp_Out_Debt" sheet)

- **Other debt are kept unchanged**
  - Private external debt
  - ST PPG external debt
Memo

✓ “Out-Stress tests-External” sheet (Excel)
  Output table shows each debt-burden indicator from the baseline scenario and all stress tests

✓ “Out-Stress tests-External” sheet (Excel)
  Output charts show debt-burden indicators from the baseline scenario and the most extreme stress test
  Footnote states which test was the most extreme stress test for each debt-burden indicator
In the case of Developia, the historical scenario is doing better.

“Out-Panel chart-External” sheet (Excel)
Why?

- Less financing needs in the past
- Smaller non-interest CA deficits
- Higher FDI inflows

“Out-Table baseline-External” sheet

<table>
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<tr>
<th>Change in external debt</th>
<th>Historical Average</th>
<th>Standard Deviation</th>
<th>Projections</th>
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<tbody>
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<td>Identified net debt-creating flows</td>
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<tr>
<td>Non-interest current account deficit</td>
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<tr>
<td>Deficit in balance of goods and services</td>
<td>3.9</td>
<td>1.0</td>
<td>6.4</td>
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<tr>
<td>Exports</td>
<td>11.4</td>
<td>14.2</td>
<td>14.6</td>
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<tr>
<td>Imports</td>
<td>33.0</td>
<td>32.9</td>
<td>32.2</td>
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<tr>
<td>Net current transfers (negative = inflow)</td>
<td>44.4</td>
<td>47.1</td>
<td>46.8</td>
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<tr>
<td>of which: official</td>
<td>-2.2</td>
<td>0.4</td>
<td>-3.3</td>
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<td>Other current account flows (negative = net inflow)</td>
<td>-1.3</td>
<td>-1.2</td>
<td>-0.9</td>
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<td>Net FDI (negative = inflow)</td>
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<td>Contribution from nominal interest rate</td>
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<td>1.7</td>
<td>-1.9</td>
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<td>Endogenous debt dynamics 2/</td>
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<td>Contribution from nominal interest rate</td>
<td>0.2</td>
<td>0.3</td>
<td>0.5</td>
</tr>
</tbody>
</table>
SUMMARY

- Historical scenario
  - Tests the realism of baseline scenario

- Other stress tests
  - Assesses the sensitivity of the baseline scenario to shocks and changes in assumptions

- “Out-Stress tests-External” and “Out-Panel Chart-External” sheets
Unit 7 Lecture 2:

Customized Scenarios
Output from the External DSA

For each debt-burden indicator

to assess country-specific vulnerability
When to consider including customized scenarios

- **☑ High GDP growth**
  - e.g. high dividend growth from an investment project

- **☑ Narrow export base**
  - e.g. Heavy dependent on oil exports

- **☑ Contingent liabilities**
  - e.g. possible cost overrun of an externally financed public project

- **☑ Tail risks**
  - e.g. natural disaster
Developia: Growth Assumption

Baseline scenario assumes:

- Public infrastructure projects
- Spillover effects:
  - High growth in other sectors
  - High exports from other sectors
  - Low import dependency in the long-run

What if there are no such spillover effects?

- Customized scenario
What to do

Alternative projections

Discuss with the macro forecasting team

In the case of Developia

- Real GDP
- GDP deflator
- Exports
- Imports
- External debt

“Customized Scenario-External” sheet
Memo

✓ “Customized Scenario - External” sheet (Excel)

How to specify a customized scenario

✓ Results

✓ “Out-Stress tests - External” sheet (Excel)

✓ “Out-Panel chart - External” sheet (Excel)
Customized scenarios help assess risks that are relevant but not captured by the standardized stress test.

“Customized Scenario - External” sheet
Unit 7 Lecture 3:
External Risk Rating
Determining external risk rating

Debt burden indicators of PPG external debt

Thresholds

Risk Rating

Low
Moderate
High
In debt distress

Baseline and stress tests

Mechanical classification + Judgments
### Risk Rating: Mechanical classification

- **Number of the debt-burden indicators that are above their thresholds**

<table>
<thead>
<tr>
<th></th>
<th>Baseline Scenario</th>
<th>Stress Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Low risk</strong></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Moderate risk</strong></td>
<td>0</td>
<td>1+</td>
</tr>
<tr>
<td><strong>High risk</strong></td>
<td>1+</td>
<td>1+</td>
</tr>
<tr>
<td><strong>In Debt Distress</strong></td>
<td>The country is already experiencing difficulties in servicing debt (i.e. in arrears)</td>
<td></td>
</tr>
</tbody>
</table>
Do you see breaches?

- Baseline: No
- Stress Test: Yes

Mechanically, the external risk rating is ...

Moderate

“Out-Panel chart-External” sheet (Excel)
External risk rating

- Low, medium, high, and in debt distress

... by examining the debt-burden indicators of PPG external debt and their indicators

- Mechanical classification
- Judgments

“Out-Panel chart-External” sheet
Unit 8:
Factors that you must consider
Lecture 1: Factors for judgments

Lecture 2: Probability approach

Lecture 3: Realism of macroeconomic assumptions
Unit 8 Lecture 1:
Factors for Judgments
Nature of breaches

<table>
<thead>
<tr>
<th>Nature</th>
<th>Less worrisome</th>
<th>More worrisome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnitude</td>
<td>Small</td>
<td>Large</td>
</tr>
<tr>
<td>Duration</td>
<td>Short</td>
<td>Long</td>
</tr>
<tr>
<td>Number</td>
<td>Single</td>
<td>Many</td>
</tr>
</tbody>
</table>

Example of judgments:

- A marginal and temporary breach of a threshold could warrant a downgrade.
- A near breach should not be dismissed without careful consideration.

Consider also other country specific factors!
Pace of debt accumulation

Example of judgments:

- A rapid increase may be cause for concern even if it does not cause a breach
  
- Especially for debt-service indicators
Ability to pay not fully captured by the template

- Foreign exchange reserves
- Public sector assets that could be quickly liquidated to service debt

Example of judgments:

If there are such large assets, DSF’s standard indicators may overestimate the vulnerability to debt distress.
Relevance of stress tests (1)

Example of judgments:

- B6 (a 30 percent depreciation) may not be relevant to a country with a longstanding fixed-exchange rate

A single breach in B6 could warrant a downgrade
Relevance of stress tests (2)

Example of judgments:

Many breaches in a country that experienced a war in the past 10 years

- Size of shocks may be too large reflecting the war period
- Present the results as they are, and explain why we need caution in the write-up

non-representative event
In the case of Developia, a near breach in the baseline scenario.

Out-Panel chart-External sheet (Excel)

- Moderate vs. High
Assessment of risks needs to strike a balance between ...

- Mechanical classification
- Judgments

Factors to consider include ...

- Nature of breaches
- Pace of debt accumulation
- Ability to repay not captured in the template
- Relevance of stress tests
Unit 8 Lecture 2:
Probability Approach
Probability approach

- Probability of debt distress

- Complementary tool

  Only when the risk rating is on the border between the two categories

See the reference for technical description of the probability approach
Borderline cases

Largest (near) breach of a threshold falls within its 10 percent band
Largest (near) breach

Debt-to-GDP
Debt-to-exports
Debt-to-revenue
DS-to-exports
DS-to-revenue

Within the 10 percent band
Borderline case (low vs. moderate)

Baseline scenario
Historical scenario
Most extreme stress test
Output from the prob. approach

Debt-to-GDP

Debt-to-exports

Debt-to-revenue

DS-to-exports

DS-to-revenue

No breach => Low risk

Baseline scenario

Historical scenario

Most extreme stress test
Memo

☑ “Output-INSTRUCTIONS” sheet (Excel)

☐ Check if we are in a borderline case

☐ In case of Developia, it is a borderline case

☐ “Out-Stress tests-External” sheet (Excel)

☐ “Out-Panel chart-External” sheet (Excel)

☑ “Out-Panel Chart-prob” sheet (Excel)

☐ Results from the probability approach
Do you see breaches?

- **Baseline:** No
- **Stress Test:** Yes

According to the prob. approach, the external risk rating is ...

Moderate

"Out-Panel Chart-prob" sheet (Excel)
Probability approach focuses on the evolution of the probability of debt distress

Optional and complementary tool in borderline cases

Definition of borderline cases

“Out-Panel Chart-prob” sheet
Unit 8 Lecture 3:
Realism of macroeconomic assumptions
Recap: how are DSAs produced

- DSA is only as good as the macroeconomic framework

- Projections & assumptions must be
  - Realistic
  - Consistent with the policies of the country authorities
  - Consistent with each other
Areas warrant special attention

- Financing terms and mix
- Favorable outlook
- Public investment and growth nexus
- Other realism checks
Financing terms and mix

- Highly concessional (or improved) terms needs to be explained
  - Concessional financing is likely to decrease over time
    - i.e. More market-based financing

- External vs. Domestic borrowing (Public DSA)
  - Share of domestic debt would increase over time as domestic debt markets develop
Favorable Outlook

- Large fiscal adjustments
- High GDP growth
- Large FDI inflows

- Are they historically or regionally large?
- Are they well justified?
Investment and growth nexus

Should be carefully considered and discussed

✓ Investment would promote growth in the long-run

✓ However, assessment of the expected impact is not easy

✓ What should we do?

- Discuss the determinants of growth (e.g. growth accounting)
- Consider evidence from empirical studies
- Conduct more analysis (e.g. models developed by IMF and WB staff)

Annex 2 of the guidance note
Other realism checks

- **Baseline vs. historical scenarios**
  - Large deviations need to be justified
  - Excessive optimism?  
    - e.g. Structural breaks, non-representative events

- **Forecast errors**
  - Were past projections too optimistic?
  - If so, the write-up should...
    - Discuss causes for the major forecast errors
    - Provide a table comparing current and past projections
DSA is only as good as the macroeconomic framework

Areas warrant special attention include ...

- Financing mix and terms
- Favorable outlook
- Public investment and growth nexus
- Other realism checks
Unit 9:

Drawing a Conclusion
Lecture 1: Public DSA
Lecture 2: Overall risk of debt distress
Lecture 3: DSA write-up
Unit 9 Lecture 1:

Public DSA
Recap: LIC DSF

External DSA

External Risk Rating

Public and publicly guaranteed (PPG) external debt

Private external debt (non-guaranteed)

Public DSA

Public domestic debt

Total public debt

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Input and Output of Public DSA

Input

- Data and projections
  - "Data-Input" sheet
  - "Inp_Out_Debt" sheet
- Assumptions on additional financing under stress tests
  - "Inp_Out_Debt" sheet

Output

- Debt-burden indicators from ...
  - Baseline scenario
  - Stress tests
Stress Tests

Standardized stress tests

A1. Historical scenario
A2. Fixed primary balance
A3. Lower real GDP growth

B1. Real GDP growth
B2. Primary balance
B3. Combination of B1 and B2
B4. Depreciation
B5. Other debt-creating flows

Customized scenario

Negative shock in the 2\textsuperscript{nd} and 3\textsuperscript{rd} periods
Debt Burden Indicators in the Public DSA

✓ Solvency

- $PV$ of total public debt to GDP
- $PV$ of total public debt to revenue

Concessionality is considered!

✓ Liquidity

- Total public debt service to revenue

Note: Total public debt = public domestic debt + PPG external debt
Benchmarks for Public Debt

Reference points for a deeper analysis of public domestic debt

Overall risk of debt distress

<table>
<thead>
<tr>
<th>Policy performance category (CPIA)</th>
<th>PV of total public debt in percent of GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weak</td>
<td>38</td>
</tr>
<tr>
<td>Medium</td>
<td>56</td>
</tr>
<tr>
<td>Strong</td>
<td>74</td>
</tr>
</tbody>
</table>
Memo

✓ “Inp_Out_Debt” sheet (Excel)
✓ Financial mix assumption for stress tests
✓ “Customized Scenario-fiscal” sheet (Excel)
✓ Mention that it’s available

✓ “Output-INSTRUCTIONS” sheet (Excel)
✓ Review “Assessment of the Total public debt” section
✓ Quickly go through the output sheets
✓ “Out-Table baseline-Fiscal” sheet
✓ “Out-Stress tests-Fiscal” sheet
✓ “Out-Panel chart-Fiscal” sheet
From the video: In “Inp_Out_Debt” sheet, specify financial mix assumption for stress tests.

From the video: Output of Public DSA are shown in the following sheets: “Out-Table baseline-Fiscal”, “Out-Stress tests-Fiscal”, and “Out-Panel chart-Fiscal” sheets.
Structure of the public DSA

Benchmarks for the total public debt to GDP ratio

Reference point for deeper analysis

Input and output sheets

“Inp_Out_Debt” sheet

“Customized Scenario–fiscal” sheet

“Out–Table baseline–Fiscal” sheet

“Out–Stress tests–Fiscal” sheet

“Out–Panel chart–Fiscal” sheet
Unit 9 Lecture 2:

Overall risk of debt distress
Recap: LIC DSF

External Risk Rating

- Public and publicly guaranteed (PPG) external debt
- Public domestic debt

External DSA

Private external debt (non-guaranteed)

Assessment of the overall risk of debt distress
Overall risk of debt distress

- Flags additional risks that are not captured by the external risk rating
  - Public domestic debt
  - Private external debt
- Assessed based on deeper analysis when indicated as necessary
Deeper analysis: Public domestic debt

✅ When?
- Total public debt to GDP ratio is moving rapidly toward or exceeding its benchmark in the baseline scenario.

✅ How?
- Write-up should discuss ...
  - Trends (how rapid etc.)
  - Financing terms
  - Composition of public debt
  - Contingent liabilities
Deeper analysis: Private external debt

When?
- Private external debt is substantial or projected to grow rapidly

How?
- Discuss risks related with
  - Sudden stops
  - Pressures on exchange rate
Overall risk of debt distress

If significant vulnerabilities are identified

- Public domestic debt
- Private external debt

Example:
Country X faces a moderate risk of debt distress, based on an assessment of public external debt, but a heightened overall risk of debt distress, reflecting significant vulnerabilities related to private external debt.

More examples are available in the guidance note.
Overall risk of debt distress

Flags additional risks that are not captured by the external risk rating

- Public domestic debt
- Private external debt
Key elements

- Background
- Underlying assumptions
- Results
- Conclusion
Background

- Recent developments
  - PPG external debt, total public debt
  - Private external debt, if relevant
  - Debt relief, if relevant

- Scope of debt for DSAs
  - Coverage and definition of debt

- Composition of debt
  - Creditors and concessionality of debt
Underlying assumptions

- Main macroeconomic assumptions
  - Financing needs (CA deficits etc.)
  - Financing sources (FDI, PPG debt etc.)
  - Assets (foreign reserves etc.)

- Main changes to macro projections
- Causes for the major forecast errors
Results

- **External DSA**
  - Projected debt burden indicators
  - Breaches of thresholds, if any
  - Probability approach, if relevant
  - Private external debt, if relevant

- **Public DSA**
  - Projected debt burden indicators
  - Benchmark on public debt to GDP
  - Public domestic debt, if relevant
Conclusion

- External risk rating
  - Mechanical classification
  - Judgments

- Overall risk of debt distress, if relevant
DSA by IMF/WB staff

- At least once every calendar year

- A new DSA is required when...
  - Request for IMF financing
  - Request related to IMF debt limits
  - Request related to IDA non-concessional borrowing policy
Full DSA vs. light update
(IMF/WB staff)

- Full DSA
  - Every three years; or
  - When there is a change
    - External risk rating
    - Overall risk of debt distress

- Light update
Difference

☑ Only difference: the format of write-up

☑ Full DSA:
  - Background; underlying assumptions; results; and conclusion

☑ Light update:
  - Main changes in the underlying assumptions; results; and conclusion
  - Impact of the main changes in assumptions
Key elements in the write-up
- Background; underlying assumptions; results; and conclusion
- Discussions, deeper analysis, judgments are important
- DSAs by IMF/WB staff
  - Full DSA
  - Light update
Unit 10

LIC DSA in practice
Uses a country example to illustrate the application of LIC DSA

Discusses main components

- Background
- Underlying assumptions
- Evolution of external and public debt indicators (baseline and stress test)
- Conclusions (risk rating for external debt distress; overall risk of debt distress)
Country example—Côte d’Ivoire (CIV)

- Staff Report for 2013 Art.IV Consultation and Fourth Review under the ECF
- The DSA was jointly prepared by IMF and WB staff
- This DSA does not reflect features introduced in the new guidance note

From the video: This DSA was prepared based on the previous version of the guidance note, before the current guidance note was published. (ECF=Extended Credit Facility)
CIV-Background

Background:

- External debt is defined on a currency basis
- HIPC completion point in June 2012
- Composition of creditors
- Repayment plan for external arrears
- Domestic debt have increased and been restructured

From the video: Côte d’Ivoire is a member of West Africa Monetary Union; the same practice is followed in DSAs for other West African Monetary Union member countries.

From the video: As a result of HIPC, the debt-to-GDP ratio declined from 54.6% at the end-2011 to 30.5% at the end-2012.

From the video: Main creditors were official bilateral, commercial, and multilateral creditors at end-2012.
CIV—changes in assumptions

The write-up highlights main changes from the previous DSA

- Fiscal revenue and expenditure projections revised downward. Larger primary deficit;
- External borrowing revised down despite a new 10-year Eurobond issue equivalent to US$500 million; and
- Higher external current account deficit

- 5 percent discount rate was used to calculate present values. Previous DSA used 3 percent discount rate.
CIV-Key assumptions

Key assumptions:
- Growth
- Inflation
- External current account deficit, FDI
- Primary fiscal balance
- Eurobond
- Concessional loans

From the video: Let's look at the Box in Cote d'Ivoire's DSA. Growth will be driven by broad-based increase in private investment, supported by public investment in infrastructure and improvement of the business climate. Inflation will remain moderate.

From the video: The primary fiscal balance will remain around 1.5% of GDP. Export performance will remain strong, supported by the expansion in supply, but imports will also increase. The current account deficit will rise, and will be partly financed by higher FDI inflows. Three large loans, including two concessional loans, to finance infrastructure projects and energy projects are incorporated as new borrowing during 2013 through '17.
CIV: External DSA-baseline scenario (cont.)

- A weak performer with a CPIA average rating for 2010–12 of 2.72

- Debt stock indicators will reach peaks in 2014 driven by the Eurobond issue

- PV of debt-to-GDP ratio will rise close to the threshold in 2014

- After 2014, debt stock indicators gradually decline driven by FDI and growth

- All debt stock indicators will remain below thresholds
Figure 1. Côte d’Ivoire: Indicators of Public and Publicly Guaranteed External Debt Under Alternative Scenarios, 2013–33

(a) Debt Accumulation
(b) PV of debt-to-GDP ratio
(c) PV of debt-to-exports ratio
(d) PV of debt-to-revenue ratio
(e) Debt service-to-exports ratio
(f) Debt service-to-revenue ratio

Sources: Country authorities and staff estimates and projections.

1/ The most extreme stress test is the test that yields the highest ratio in 2023. In figure b, it corresponds to a Combination shock in c, to a Exports shock in d, to a Combination shock in e, to a Exports shock and in figure 1 to a Combination shock.
CIV: External DSA-baseline scenario (concluded)

- Debt service indicators will rise over the medium term and will peak in 2024.

- Amortization payments increase in 2020-25 reflecting borrowing in 2013-17 and the Eurobond repayment.

- The Eurobond to be used to lengthen the average maturity of debt and reduce potential rollover risks for domestic debt.

- Debt service indicators will remain below thresholds.

From the video: Compared with the last DSA, external debt-service indicators showed deterioration. This is because the authorities intend to issue the Eurobond to lengthen the average maturity of debt and reduce potential rollover risks for domestic debt.
CIV: External DSA-stress test (cont.)

☑ All debt stock indicators and debt service-to-GDP ratio exceed respective thresholds under stress tests

☑ Risk rating should be moderate unless judgment overrules the result

From the video: Since no debt-burden indicators exceed respective threshold in the baseline scenario, but most indicators do so under the stress test, the risk rating of external debt distress should be moderate, unless judgment overrides the results. (see the output charts in the next slide)
Figure 1. Côte d’Ivoire: Indicators of Public and Publicly Guaranteed External Debt Under Alternative Scenarios, 2013–33

Sources: Country authorities and staff estimates and projections.

1/ The most extreme stress test is the test that yields the highest ratio in 2023. In figure b, it corresponds to a Combination shock in c. to a Exports shock in d. to a Combination shock in e. to a Exports shock and in figure 1. to a Combination shock.
Mitigating factor

A large part of official bilateral credit is French ODA claims that will be refinanced through grants for poverty reduction programs.

Debt service under this mechanism can be reviewed periodically. It potentially offers CIV some flexibility for managing its debt service.

The final rating remains moderate.

From the video: Despite this potential mitigating factor, the risk rating remains moderate.
CIV: Public DSA

- PV of public debt-to-GDP ratio exceeds 40 percent of GDP in 2014
- Benchmarks for the PV of public debt under the new guidance note
- CIV’s CPIA is weak and the benchmark is 38 percent

From the video: So, under the current guidance note, DSA for Cote d’Ivoire would have been required to include a deeper analysis of domestic debt.
CIV—Conclusion

- Risk rating for external debt distress remains moderate

- **Other recommendations:**
  - Sound macroeconomic policies, the selection of sound projects, and prudent debt management
  - Caution is also needed to avoid a bunching of maturities to prevent sizeable peaks in debt service payments
Issues

☑ Several features have been introduced in the new guidance note. Not applied to this example

📍 PV of debt to-to GDP ratio will rise close to the threshold. Under the new guidance note, this would trigger the use of a probability approach

📍 Under the new guidance note, benchmarks for the PV of public debt would trigger a deeper analysis of domestic debt. Need to assess the overall risk of debt distress
Summary

- Construct macro framework and make borrowing assumptions
- Assesses risks, both external and public;
- Write up: background; underlying assumptions; evolution of debt indicators; and conclusions including risk rating and views/comments of the authorities
Final Remarks
What we learned in this course

- What is debt sustainability framework (DSF) for low income countries (LICs)?
  - Specific features
  - How it is used

- How to use the LIC DSA template?
  - Input
  - Output
  - Analysis (Judgments)

- DSAs in practice (country example)
Thank you very much!
Unit 8
Supplemental Lectures:
Public Investment, Growth, and Debt Sustainability: A Model-Based Approach
Lecture 1: The Model

Lecture 2: Examples
Unit 8
Supplemental Lecture 1:
The Model
What this model is

Main reference:
- “Public Investment, Growth, and Debt Sustainability: Putting Together the Pieces,” by Buffie, Berg, Pattillo, Portillo and Zanna.
What this model is

A consistent analytic framework capturing most of the main mechanisms and policy issues for DSAs in LICs by making explicit

- The investment-growth nexus
- The fiscal adjustment
  - Different public debt financing schemes
  - The fiscal policy reactions to ensure debt sustainability
- The reaction of the private sector
How this model can be used

✔ To analyze the macro effects of public investment surges and the trade-offs and potential risks associated with different financing schemes and fiscal policy reactions

✔ To analyze specific country cases and complement the IMF-WB DSF
The model: Putting together the pieces

- Investment-growth nexus
- Fiscal adjustment
- Private sector response

The Pieces
The investment-growth nexus

 Increases in public capital raise growth and output

\[ q_t = A(z_t^e)^\psi (k_t)^\alpha (l_t)^{1-\alpha} \]

- A key assumption is the rate of return on public capital

 There are investment inefficiencies

\[ z_t^e = (1-\delta)z_{t-1}^e + si_{z,t} \]

- Efficiency “s” does not have to be equal to one
Fiscal adjustment

The government budget constraint with concessional (d), external commercial (d_c) and domestic (b) debt

\[ P_t \Delta b_t + \Delta d_{c,t} + \Delta d_t = r_{t-1} b_{t-1} + r_{c,t-1} d_{c,t-1} + r_{t-1} d_{t-1} \]

Borrowing

Interest Payments

+ \[ P_{z,t} i_{z,t} + T_t - h_t P_c t - A_t \]

Expenditures

Taxes

Grants

Given public investment, concessional borrowing, grants, and other expenditures (T)

\[ \text{Gap}_t = P_t \Delta b_t + \Delta d_{c,t} + (h_t - h_o) P_c t \]

Domestic Borrowing

External Commercial Borrowing

Tax Adjustment
Fiscal adjustment

Fiscal reaction function for taxes

\[ h_t = \text{Min}\{\text{ceiling}, h'_t\} \]

\[ h'_t = \alpha_0 + \alpha_1 h_{t-1} + \alpha_2 \frac{\text{Gap}_t}{P_{tc_t}} + \alpha_3 \frac{\text{debt}_t}{GDP_t} \quad \text{with } \alpha_i > 0 \]

- Response to fiscal gaps and debt, but the government prefers to phase-in tax increases slowly
- If the government moves too slowly or if the cap constrains adjustment too much, interest payments will rise faster than revenue, causing the debt to grow explosively
The private sector response

Two types of households: Savers and rule-of-thumb consumers

Crowding out:

- Tax increases lower consumption
- Using domestic resources for public investment reduces the resources available for private investment and consumption
The private sector response

- Firms maximize profits under perfect competition

- Crowding in: more public capital raises marginal product of private capital

- Crowding in vs. crowding out

- In the long run, there is always crowding in if the projects are good

- In the short to medium run, crowding out may dominate, especially if there is not enough foreign financing
A model-based debt sustainability framework putting together

- Investment-growth nexus
  - Public capital in production
  - Investment inefficiencies

- Fiscal adjustment
  - Different debt schemes
  - Fiscal reaction function

- Private sector responses
  - Crowding in
  - Crowding out
Unit 8
Supplemental Lecture 2:
Some Examples
Examples

2 policy examples:

- Unconstrained tax adjustment
- Constrained tax adjustment with external commercial borrowing
Unconstrained tax adjustment

Even when the long run looks ok, transition problems can be formidable when concessional financing does not cover the full cost of the investment program.

The required fiscal (tax) adjustment crowds out private investment and consumption, delaying the benefits of the public investment surge.
Unconstrained tax adjustment

Investment and Borrowing (% of GDP)
Unconstrained tax adjustment

![Graphs showing Investment and Borrowing, Public Capital, Private Capital, and Real GDP Growth (%)]

- **Investment and Borrowing (% of GDP)**
  - Public Investment
  - Concessional Loans

- **Public Capital**

- **Private Capital**

- **Real GDP Growth (%)**

- **Public Debt (% of GDP)**
Unconstrained tax adjustment

- **Investment and Borrowing (% of GDP)**
- **Public Investment**
- **Concessional Loans**

- **Wages**

- **Real GDP Growth (%)**

- **Public Capital**

- **Private Capital**

- **VAT Rate (%)**

- **Consumption**

- **Private Investment**

- **Public Debt (% of GDP)**
Constrained tax adjustment with external commercial borrowing

When concessional financing does not cover the full cost of the investment program, covering the gap with external commercial borrowing can smooth the difficult private sector adjustments, while reconciling the scaling ups with constraints on feasible increases in tax rates.
Constrained tax adjustment with external commercial borrowing
Constrained tax adjustment with external commercial borrowing

**VAT Rate (%)**

- **Total External Public Debt (% of GDP)**
- **Real GDP Growth (%)**
- **Commercial Public Debt (% of GDP)**
- **Consumption**
- **Private Investment**

**Legend:**
- Unconstrained Tax Adjustment
- Constrained Tax Adjustment with Commercial Borrowing
Constrained tax adjustment with external commercial borrowing

- **VAT Rate (%)**
- **Commercial Public Debt (% of GDP)**
- **Total External Public Debt (% of GDP)**
- **Real GDP Growth (%)**
- **Consumption**
- **Private Investment**

**Graphs and Data**

- **Unconstrained Tax Adjustment**
- **Constrained Tax Adjustment with Commercial Borrowing**

---

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Constrained tax adjustment with external commercial borrowing

But this borrowing strategy may be risky, if efficiency is lower...
Constrained tax adjustment with external commercial borrowing

But this borrowing strategy may be risky, if efficiency is lower...

![Graphs showing public capital, commercial public debt, and total public debt with two efficiency scenarios.](image)
Constrained tax adjustment with external commercial borrowing

But this borrowing strategy may be risky, if efficiency is lower...

![](diagram.png)

**Base Case Efficiency**

**Lower Efficiency**

---

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Constrained tax adjustment with external commercial borrowing

But this borrowing strategy may be risky, if efficiency is lower...
Constrained tax adjustment with external commercial borrowing

And it may be risky, if tax adjustment is delayed further....
Constrained tax adjustment with external commercial borrowing

And it may be risky, if tax adjustment is delayed further....
Constrained tax adjustment with external commercial borrowing

And it may be risky, if tax adjustment is delayed further....
Constrained tax adjustment with external commercial borrowing

And it may be risky, if tax adjustment is delayed further....
Other experiments

- Shocks—e.g., to terms of trade, tfp, country risk premium
- Domestic borrowing
- Non-capital government expenditures adjustment
- Natural resources: DIGNAR

G. Melina, S. Yang, and L.F. Zanna (2014), "Debt Sustainability, Public Investment, and Natural Resources in Developing Countries: the DIGNAR Model," IMF WP, forthcoming
SUMMARY

- Examples that illustrate how to use the model-based framework for debt sustainability analysis.
- Examples that illustrate the trade-offs and potential risks associated with different financing schemes and fiscal policy reactions under public investment scaling ups.