UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

UNCTAD

Eighth UNCTAD Debt Management Conference

Geneva, 14 - 16 November 2011

Optimal Uses of Risk Management Techniques

by

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8th UNCTAD Debt Management Conference

November 15th, 2011

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Process to design and implement a risk management strategy

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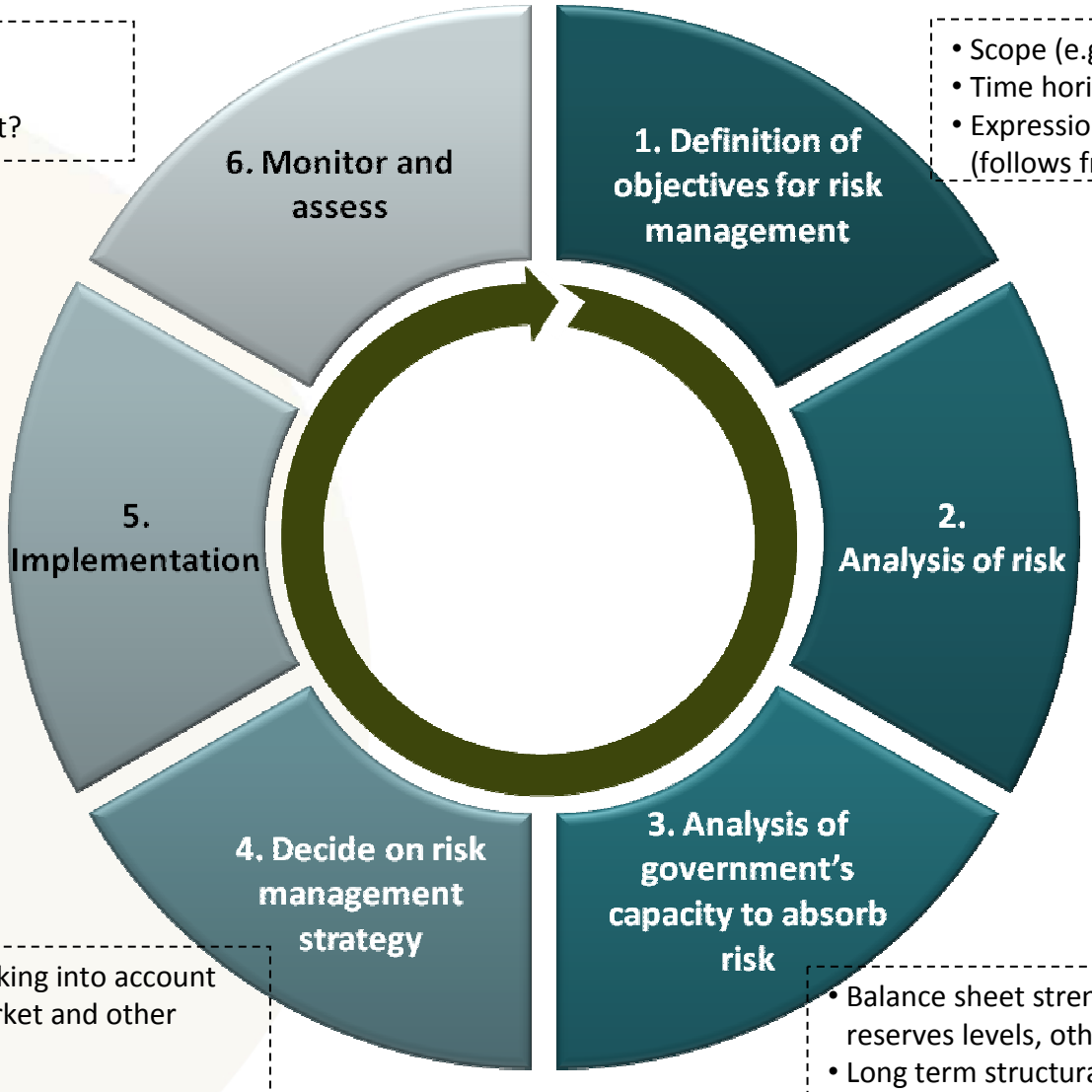

- Scope (e.g. central government only?)
- Time horizon
- Expression of objective function (follows from the "problem")

- Risk Identification
- Application of methodologies/models for quantifying risk,
- Identification of natural hedges

- Balance sheet strength: debt levels, net worth, reserves levels, other financial assets
- Long term structural factors: e.g. projected structural fiscal balance, demographics
- Fiscal and financial flexibility: access to financing, investor base diversity, level of budgetary rigidities

- Evaluate alternatives taking into account cost-risk trade-offs, market and other constraints.
- Decide on strategy:
  - Risk avoidance (policy changes)
  - Risk retention
  - Risk transfer to third parties

- Choice of specific instruments
- Implement policy change

- Evaluation of implementation
- Were objectives met?

Analyzing risk: first, need to define both cost and risk

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- Examples of cost measures
  - Nominal interest payments
  - Interest cost adjusted for unrealized capital gains/losses (e.g. FX)
  - Interest cost as a percentage of revenues
  - Total debt as a percentage of GDP
- Risk may be defined as the difference between the expected cost (baseline case) and the cost under a negative scenario (using a deterministic approach)
- Degree of vulnerability to market risk can be measured by a range of metrics
  - Debt maturing within 1 year
  - Average time to maturity
  - Debt with interest rates re-fixing within 1 year
  - Average time to re-fixing
  - Currency mismatch between financial assets and liabilities
  - Etc.
- Different cost and risk measures provide different information - do not rely on one cost and risk measure

Many debt managers use models to help analyze risk

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What is a model?

- A simplified representation of a more complex system
- Designed to shed some insights on a problem that one is analyzing

Why is it useful?

- Allows analysis of different strategies under alternative scenarios for future interest rates and exchange rates
- Maintain integrity across different scenarios/strategies
  - "Apples to apples" comparison
- Forces discipline in the process: systematic analysis and examination of possible states of the world
- Gives deeper insight into the trade-offs and supports the identification of options and constraints

Different approaches to modeling risk

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- **Two key types of model for debt management:**
  1. Deterministic models/scenario analysis
     - Known inputs (macro and market): few; arbitrarily chosen
     - Determine particular outcomes, NOT probability of different outcomes
  2. Stochastic models
     - Some or all inputs and outcomes are random variables: not specific values but can take on multiple values according to a specified probability distribution
     - Results in a range of possible events with different probabilities of occurring: risk
     - Statistical performance measures are assessed, summarizing strategies' performance against distribution of scenarios

Key difference: handful of ad hoc scenarios vs. multiple probabilistic scenarios

Deterministic vs. stochastic models

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	Deterministic	Stochastic
Simplicity	✓	×
Quick analysis of specific scenarios; "story telling"	✓	×
Internal consistency	×	✓
High number of shocks	×	✓
Key challenges	• Determining which shocks to examine	• Data requirements • Distributional assumptions • Stability of estimated relationships

A deterministic model always useful for stress testing, and a good place to start

Integrating risk analysis into the strategy development process

- A cost-risk model will not provide an “optimal” debt portfolio, rather it provides systematic information to help the decision-making process
- When designing the model, it is important to take into account all of the relevant risks
- The choices made about inputs to the model will determine the outputs, e.g. choice of shock scenarios or sample period for rate volatility
- Most countries tailor risk analysis to their own circumstances
- The World Bank and IMF jointly have developed a framework and analytical tool to help countries design a medium-term debt management strategy (MTDS)

Implementing a risk management strategy: techniques

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- Adjust the composition of debt by refinancing maturing debt with new instruments that move the portfolio towards the desired risk profile.
  - Pace of change will depend on the maturity profile – may be regarded as too slow
  - Is simple to implement – not resource intensive, operational risk more limited
- Repay debt before it matures through "buy backs"
  - Accelerates the pace at which the portfolio may be moved towards the desired risk profile
  - Allows "benchmark" bond outstandings to be increased at a faster pace
  - Will require a larger gross financing program
  - Requires more resources and skills, e.g. analysis of fair value for repurchase prices, running reverse auctions, maintaining a continuous program
  - There may be accounting (e.g recognizing additional expenses by buying debt above par), systems and legal issues to resolve
  - May be judged as too expensive, particularly for sizable proportions of bond issues

Implementing a risk management strategy: techniques (2)

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- Debt switch or exchange operations
  - Similar to buyback operations, but new debt is issued at the same time
  - Reduces the timing mismatch between debt repurchase and new issuance (and therefore the resulting interest rate risk)
- Use of assets to hedge the "undesirable" debt (immunization)
  - Is an alternative if the debt can't be repurchased at a reasonable cost
  - Requires a sophisticated operation to manage assets on an on-going basis
  - Will result in credit exposure and/or cost-of-carry
  - There may be additional accounting, systems and legal issues to resolve
  - May best be combined with the use of swap transactions

Implementing a risk management strategy: techniques (3)

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- Use of swap transactions
  - A stand-alone contract involving an exchange of cash flows that allows the risk characteristics of existing debt to be transformed
  - Commonly used in OECD countries (especially interest rate swaps), but less so in developing countries
  - Requires more resources and skills
  - There are accounting systems and legal issues to resolve
  - Need to ensure that all stakeholders understand the transactions (e.g. parliamentary oversight committees, auditors)
  - Credit risk must be managed (both by the government and the financial intermediary). Usually managed through exchange of collateral.
  - May becoming more difficult and expensive to use because of regulatory change

Selection of risk management techniques

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- First and foremost, the techniques used will be governed by a clearly articulated debt management strategy. Objective is to implement the strategy.

- It is likely that there will be a combination of techniques used, based on relative cost and efficiency (including account for credit and operational risks)

World Bank and other MDB products support governments in managing risk

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Example: IBRD financial products:

- **Flexible loan terms and prepayment provisions**
- **Currency and interest rate conversions, free-standing swaps, caps and collars, and commodity swaps on IBRD debt**
- **Interest rate and currency swaps on non-IBRD debt**
- **Index-based weather hedges**

Benefits:

- ✓ IBRD acts as intermediary between borrower and financial markets
- ✓ Borrower benefits from IBRD's triple-A credit rating
- ✓ Minimal additional system requirements
- ✓ No need to post collateral
- ✓ No exposure to IBRD
- ✓ No credit charges, unlike commercial banks
- ✓ IBRD helps bridge knowledge/systems gap and build capacity to use derivatives

Increased use of IBRD risk management products in recent years

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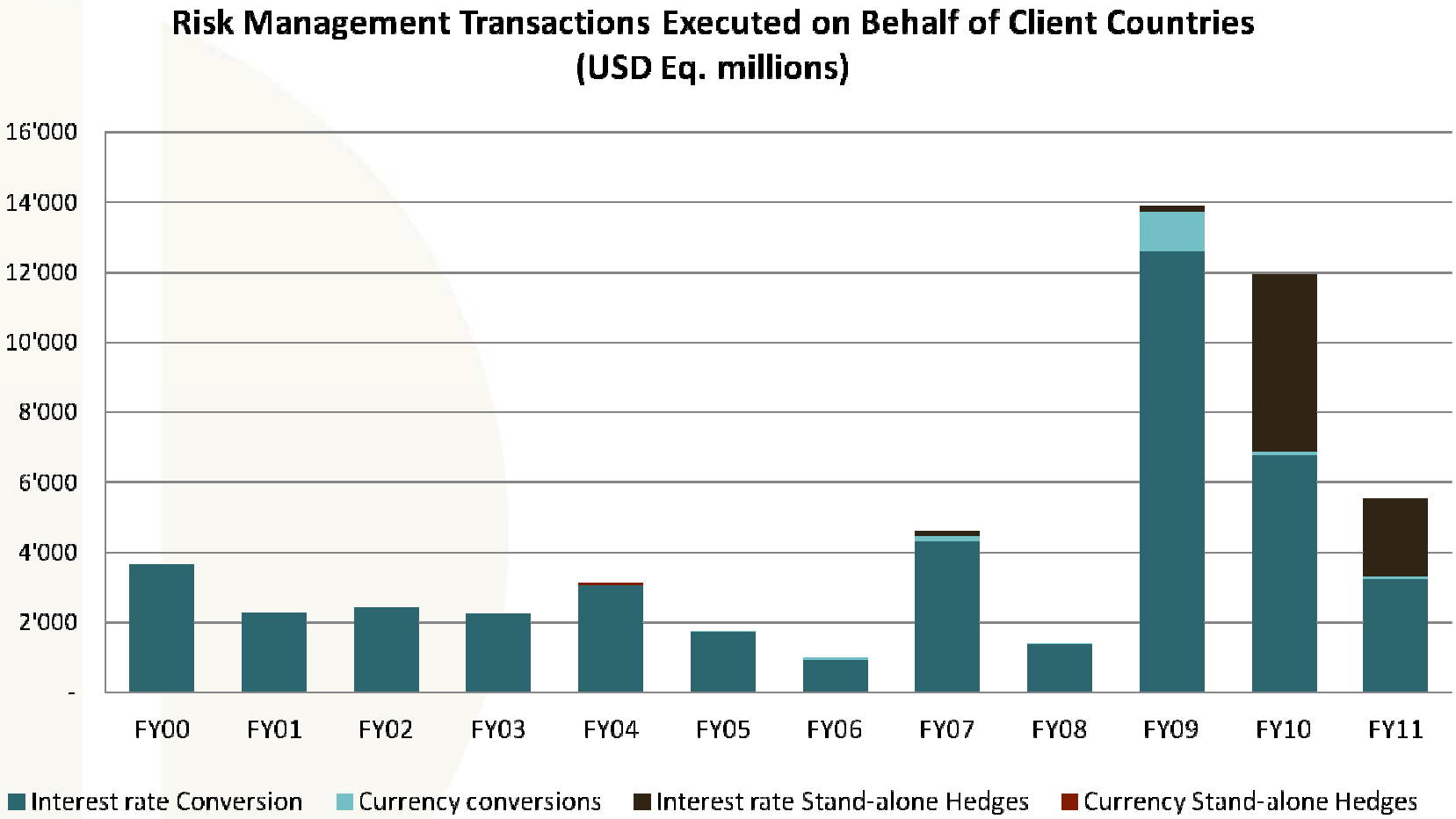

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