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Debt Planning and Risk Assessment: The Brazilian Experience

by

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The views expressed are those of the author and do not necessarily reflect the views of UNCTAD

G E N E V A

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Goals and Strategic Planning Process

Institutional Infrastructure

Cost and Risk Management – 1st and 2nd Phases

Cost and Risk Management – 3rd Phases

Concluding Remarks

Annex

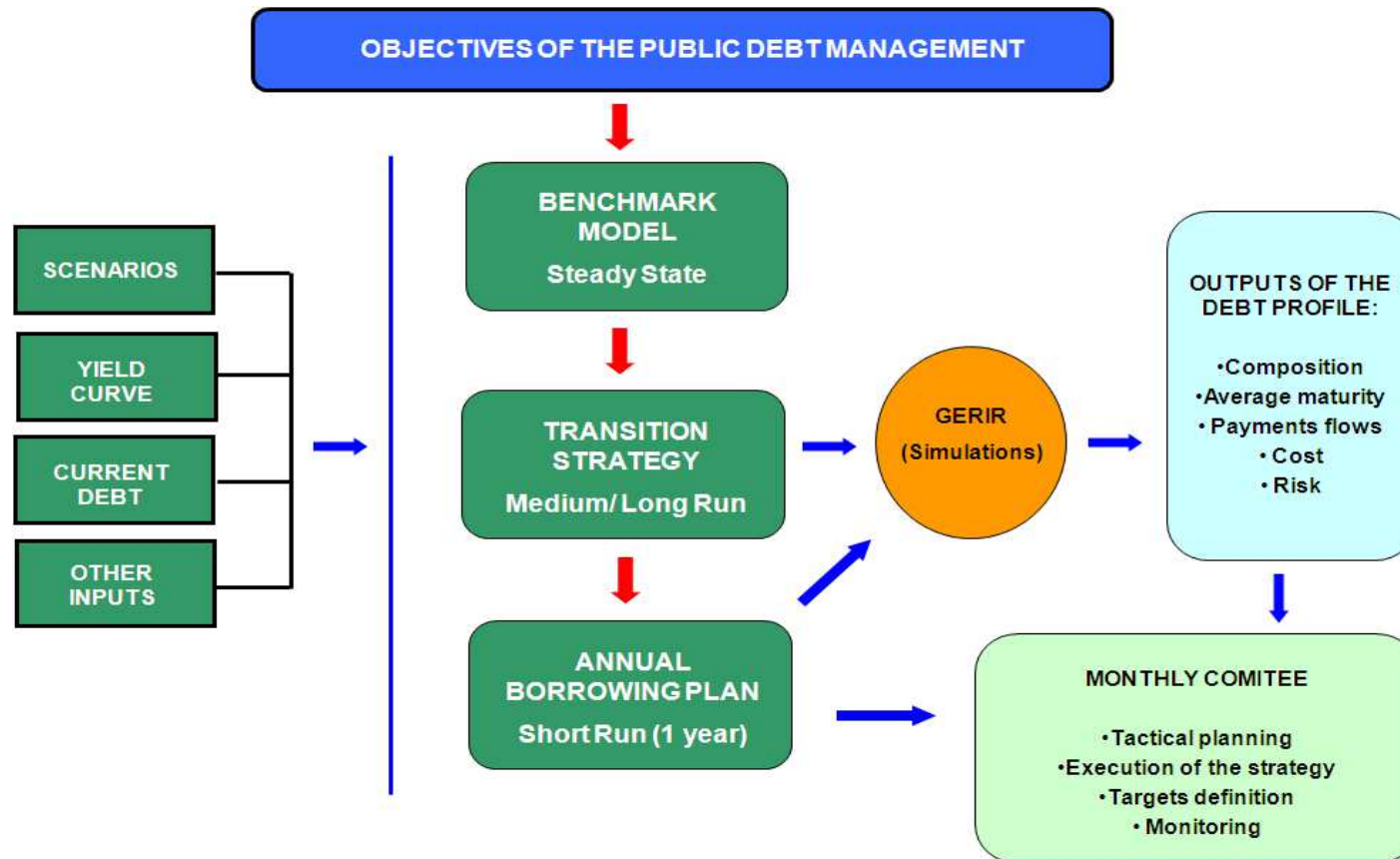
Goals of the Federal Public Debt management

Minimize long-term borrowing costs, with maintenance of prudent risk levels; at the same time, seek to contribute to smooth operation of the public bond market.

Guidelines

- Lengthening of average maturities and reduction in the percentage of FPD maturing in 12 months;
- Gradual substitution of floating rate securities by fixed rate or inflation-linked securities;
- Improvement in the External Federal Public Debt - EFPD profile through issuances of benchmark securities, the anticipated buyback program and structured operations;
- Incentives to the development of the forward interest rate structure for federal public securities on the domestic and external markets; and
- Expansion of the investor base.

The process of debt planning in Brazil is in a sophisticated stage....



... but, it is a result of a long process of institutional advances and of a simultaneous development of the technical framework

Goals and Strategic Planning Process

Institutional Infrastructure

Cost and Risk Management – 1st and 2nd Phases

Cost and Risk Management – 3rd Phases

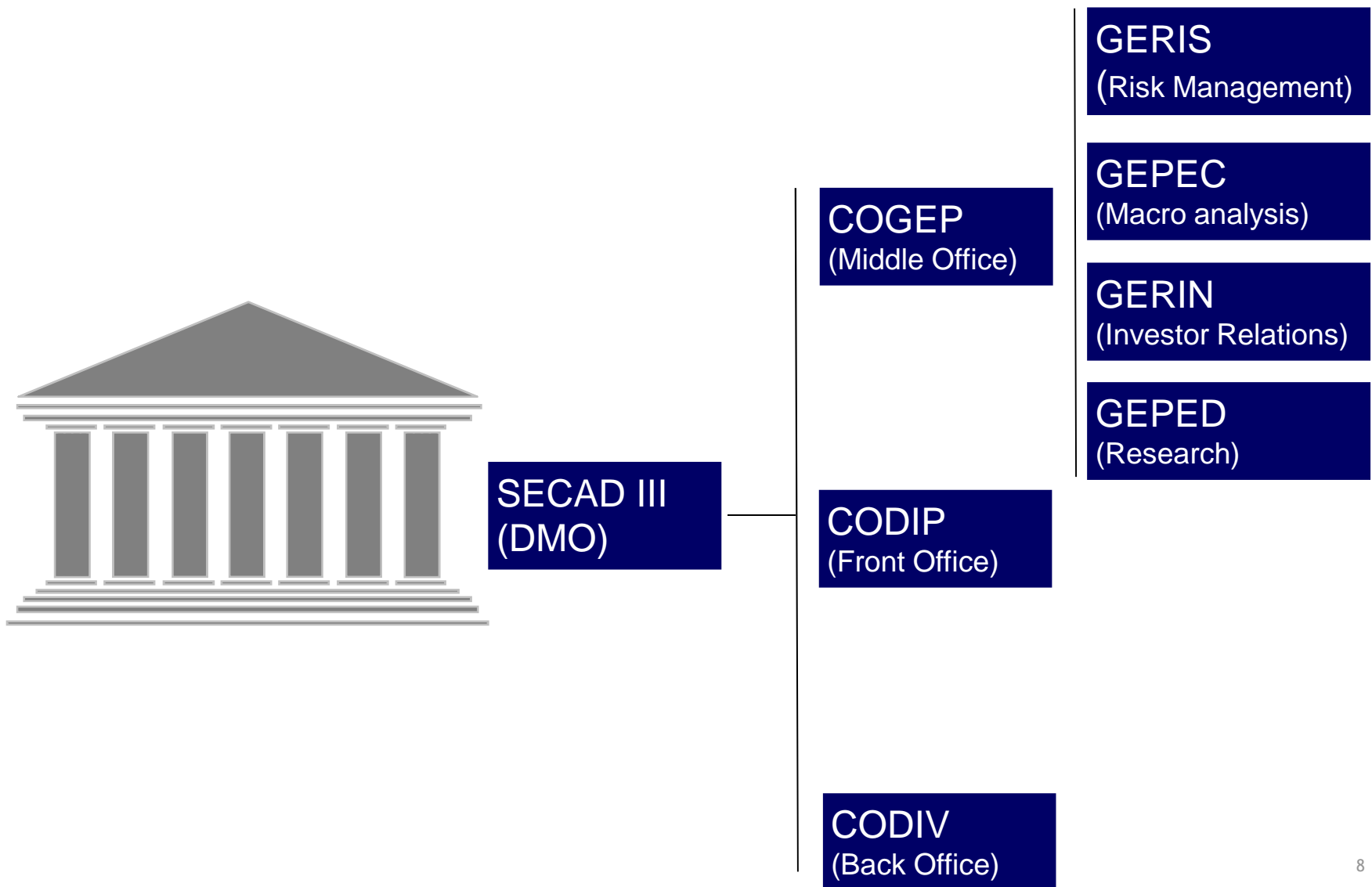
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Institutional Advances

- In 1992, the National Treasury started to issue federal public bonds in regular auctions
- In 1999, informally, as a working group, and in 2001, formally, the new public debt management model was implemented based on the DMO structure, setting the National Treasury in line with international best practices
 - Back Office: Registering, controlling, payment and monitoring domestic and external debt budget.
 - Middle Office: Development of **medium and long term strategies, risk management**, monitoring macroeconomic aspects and domestic and external investor relations.
 - Front Office: Development of short term strategies, related to securities issuances in the domestic and external markets. Domestic market auctions and external issuances.

Organization Chart



Goals and Strategic Planning Process

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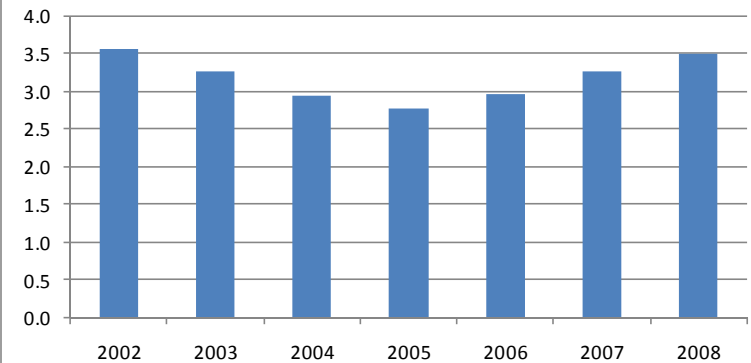
1st Phase - Central Government Asset and Liability Management - ALM

- In 2000, the first Annual Borrowing Plan was released, aiming at improving the transparency regarding the public debt financing strategy
- The Annual Borrowing Plan 2002
 - guidelines based on an Asset and Liability Management model
 - ALM as a tool to map and manage risks of the public debt portfolio
 - ALM: a dynamic analysis of assets and liabilities that takes into consideration the public debt management strategy and the macroeconomic policies enforced by the government
 - the basic premise for outstanding debt immunization is the balancing between the characteristics of assets and liabilities
- Refinancing and market risks are at the center of mitigation policies developed by the National Treasury
 - four main market risk categories: inflation, exchange rate, floating rate, and fixed rate
 - eight categories of time to maturity (refinancing risk)

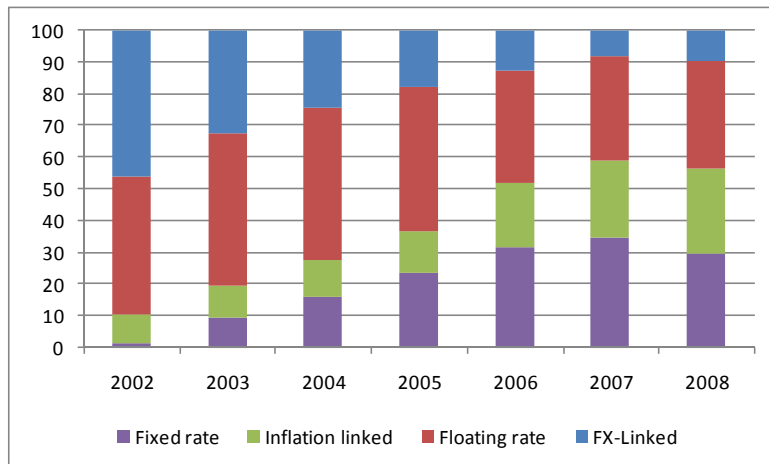
Changes in the FPD profile

- Reduction of the market risk
- Reduction of the refinancing risk

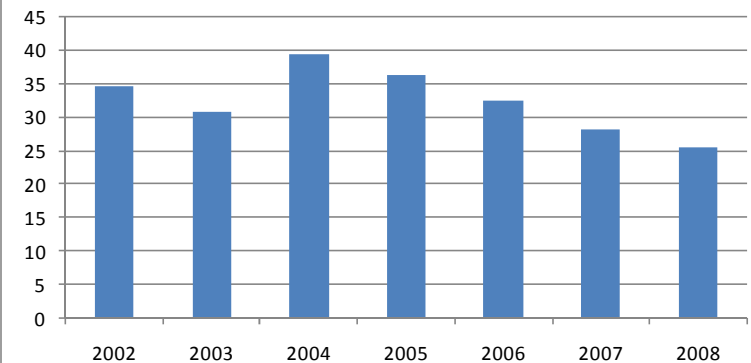
Duration of the FPD



FPD composition



% Due in 12 months



2nd Phase - Stress Test over Interest and FX-Rate

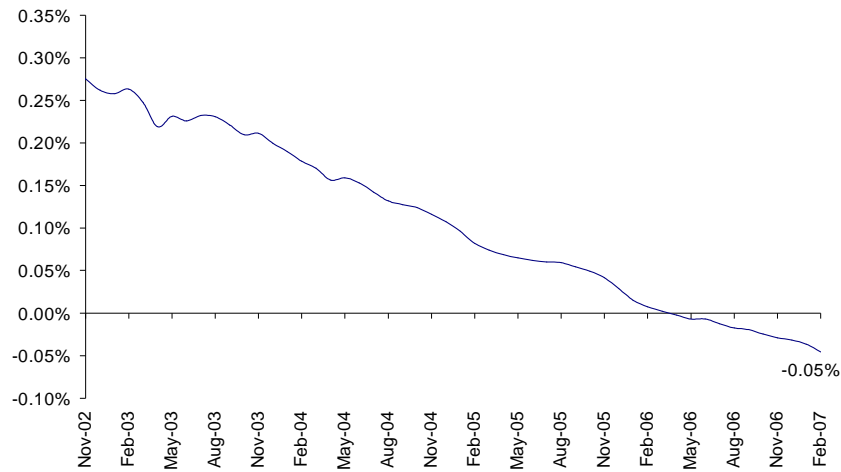
Indicators	Share of DPF (%)						Stress impact (R\$ billion)					
	2003	2004	2005	2006	2007	2008*	2003	2004	2005	2006	2007	2008*
Floating rate	46.5	45.7	43.9	33.4	31.0	28.5	69.59	68.36	65.72	50.00	46.40	42.66
Exchange rate	32.4	24.2	17.6	12.7	9.0	8.0	223.38	166.74	121.27	87.51	62.01	55.12
Total	78.9	69.9	61.5	46.1	40.0	36.5	292.97	235.10	186.98	137.50	108.42	97.78

Note: Stress tests consider 3-standard deviation shocks on the interest rate (7,8 percentage points) and *Real* devaluation (56,6%), persisting for a year.

- The stress analysis demonstrates that the impact in the Federal Public Debt - DPF of a shock of extreme ratios and substantial persistence (i.e., at least one year) in the interest rates and exchange rates would be only 4.7% of the GDP at the end of 2008;
- If we take into account that, since mid 2006, the level of international reserves is superior to the Federal Government total debt indexed to exchange rate, one can say that the foreign exchange risk is null. In this case, the total impact would be merely 1.6% of the GDP.

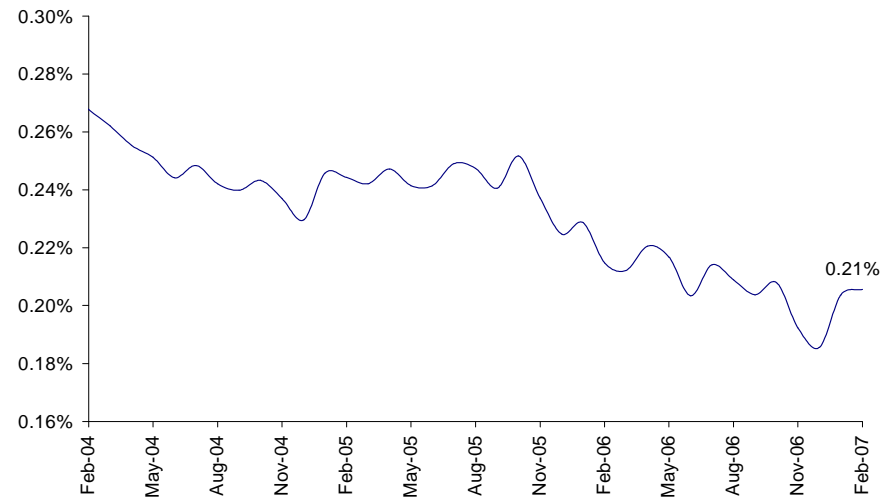
2nd Phase – Sensitivity analysis

Impact of 1% FX devaluation on Net PS Debt/GDP



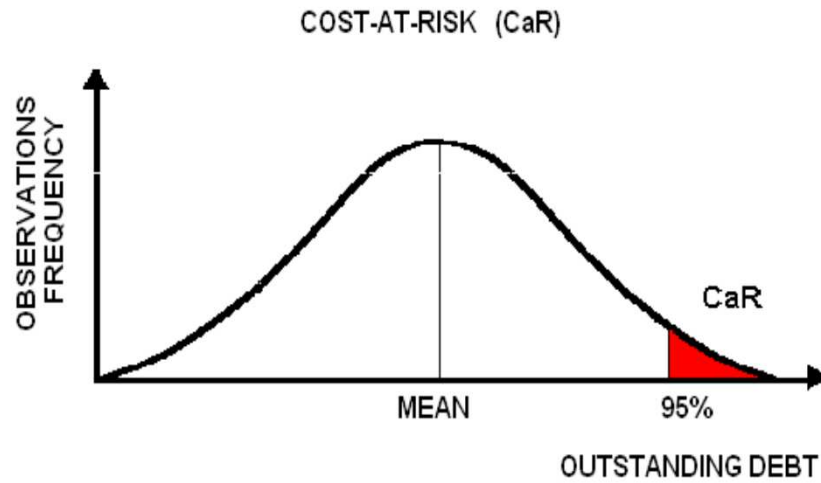
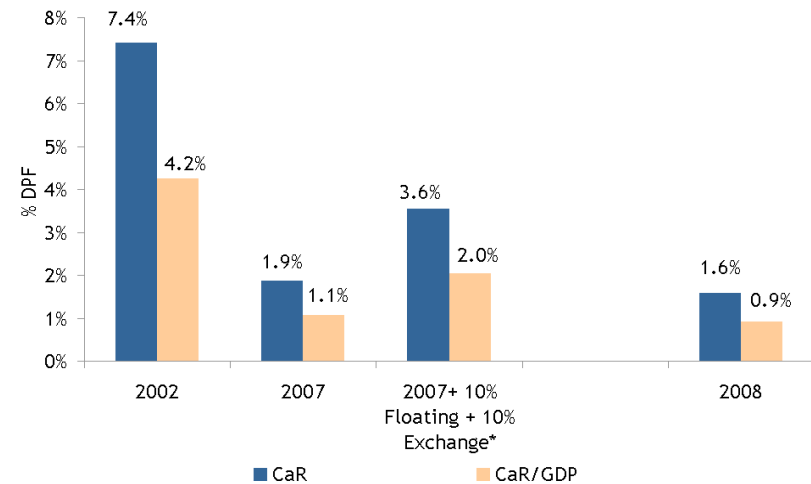
Source: National Treasury

Impact of 1% SELIC change on Net PS Debt/GDP*



Source: National Treasury

*In 12 months

2nd Phase – Stochastic analysis
Schematic Summary of the CaR Definition

Relative Cost-at-Risk of DPF*


* Considers the 2007 share for Floating and Exchange Rates plus 10 percentage points. The 2008 projected composition is estimated as the midpoint value of the target ranges of the PAF 2008.

Source: National Treasury

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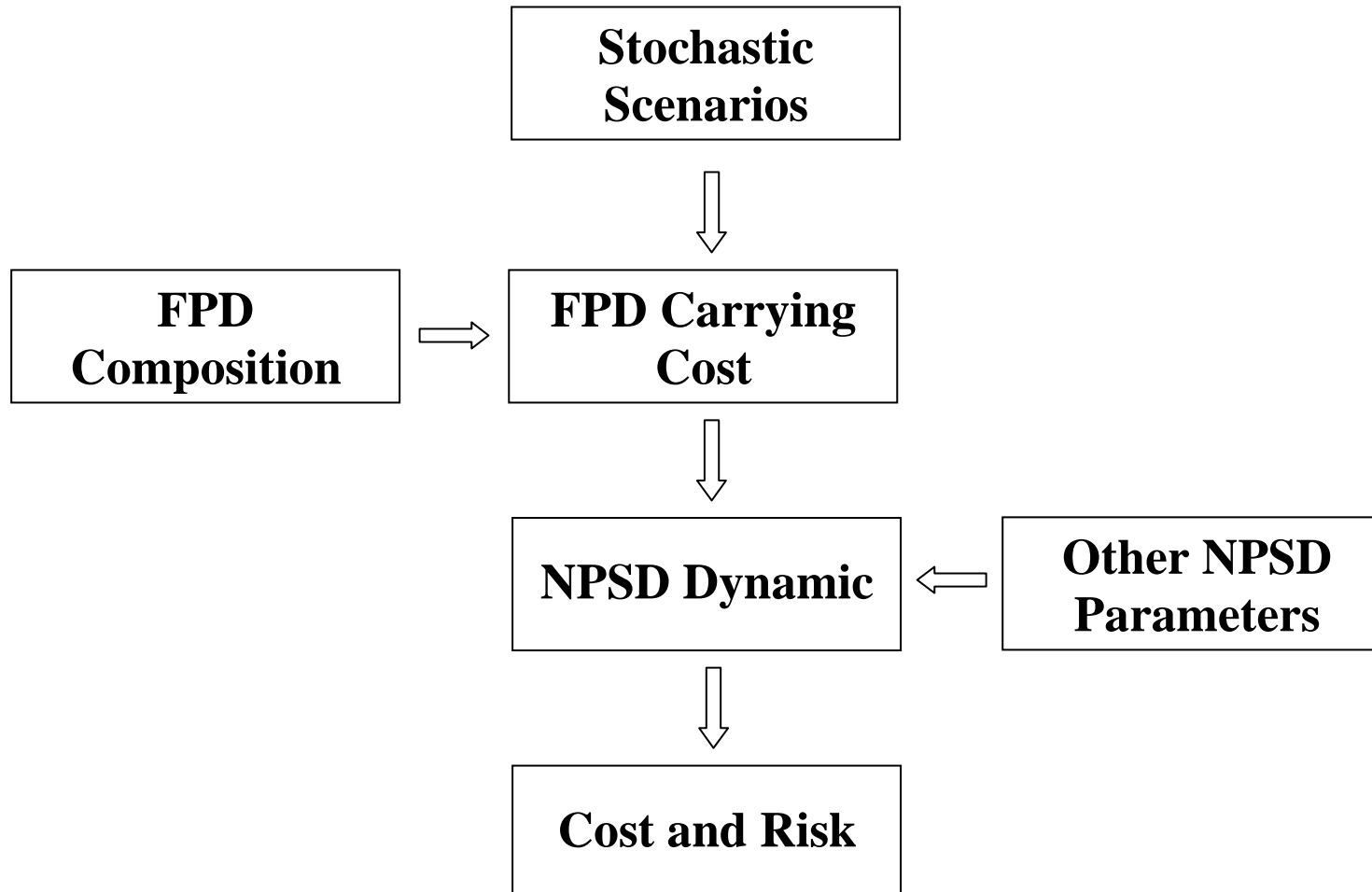
Benchmark model: Searching the optimal composition of the public debt

Motivation

- Public Debt Management: where we want to go ?
- Benchmark (optimal composition): instrument for risk management and for strategic planning
- How to measure the debt manager performance ?

Guidelines (World Bank and IMF)

- According to the Guidelines, the benchmark could work as a powerful management instrument as it represents the debt structure that the government would like to have, based on its expected risk and cost preferences. Thus, the benchmark could guide the debt administrator in his decisions regarding issuance and risk management.

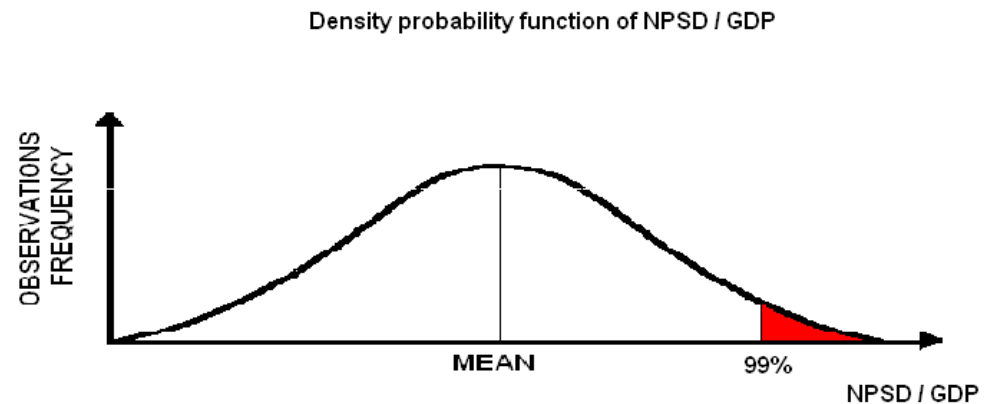
Benchmark model: Searching the optimal composition of the public debt

Looking for the best indicator: Gross or Net Debt? Nominal or Real Debt?

- The Brazilian Public Debt Department decided to consider the relation Public Sector Net Debt (PSND) to GDP the relevant debt to be monitored.
- Why was this indicator chosen?
 - The importance of this indicator for Government decisions regarding economic policy, particularly the tax burden level and the primary balance, is mentioned in various documents as the Memorandum Item of IMF, the annex of fiscal risk of the budget law and the market research FOCUS;
 - International organisms and financing analysts define the PSND to GDP as the main fiscal sustainability indicator;
 - If the Federal Public Debt - FPD increases but the PSND/GDP is maintained stable or in a decrease path (as in the last years) the market will feel comfortable with the public debt sustainability and will not be afraid of financing the liability of the government;
 - To minimize FDP/GDP risks do not necessarily mean minimizing risks of the PSND/GDP, as the isolated analysis of FPD would ignore the structure of the federal government assets. However, the results have not presented great differences, given the strong influence of the GDP on both.

Benchmark model: Cost and Risk Evaluation

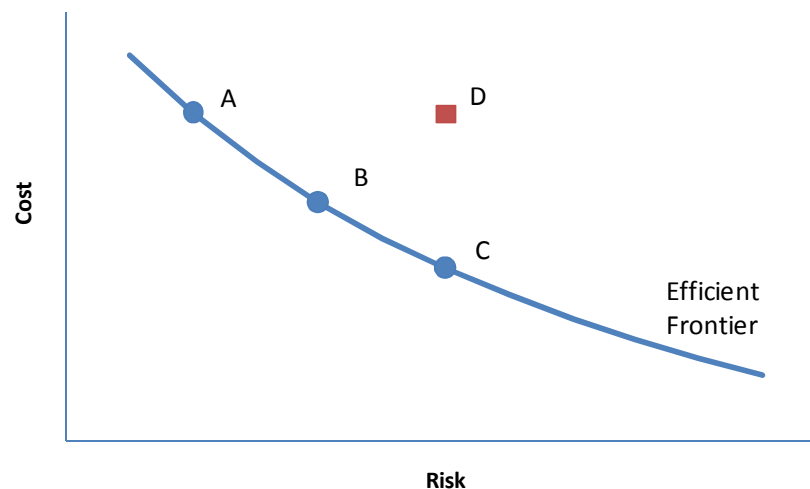
- For each FPD composition, we obtain a distribution of NPSD/GDP ratios
 - Cost:
 - Average of NPSD/GDP at the end of the period of analysis(10 years)
 - Risk:
 - Percentile 99 of the NPSD/GDP distribution at the end of the period of analysis (10 years)
- For each FPD composition, we also obtain the corresponding:
 - FPD Average Maturity
 - Percentage maturing in 12 months



Benchmark model: Cost-Risk Tradeoff

- Optimal portfolio selection
 - Financing efficient frontier
 - Trade-offs performed by the model
- To determine the optimal portfolio (benchmark) it is necessary to choose the risk appetite of the government (society)
- Application of the model to measure performance
 - Efficient criterion based on the efficient frontier

Efficient
Frontier:
Cost-Risk
Tradeoff



Use of not Traditional Financing Analysis Instruments

- The focus on trade-off between cost and risk could lead to the use of traditional financing analysis instruments;
- However there are government peculiar factors that impede the indiscriminate use of the financing theory for the public debt analysis:
 - The government could have more complex objectives than simply reduce costs conditioned to prudent levels of financial risk;
 - Indicators related to cash flow and impacts on the annual budget have implications on the optimum portfolio choice;
 - The size and the nature of the bonds issuance and the composition of the public debt allow government to have a great influence on the prices and, though, on the cost and risk of its financing strategy;
- Brazil, as the majority of the countries, declares as objective of the public debt management the minimization of the long-term costs considering prudent levels of risk; it is also concerned with the secondary market improvement, the enhancement of the investors base, development of the term structure interest rate (reference for public and private bonds prices)

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Concluding remarks: Main lessons

- Essential elements to an effective strategic planning and risk management
 - Well defined (long term) goals and guidelines
 - An appropriated institutional arrangement
 - A good data record
 - These elements are more important than having sophisticated models
- Although modeling can add several benefits to decision-making, the model cannot replace the knowledge and the judgment of the debt manager
- The ability of the government to implement a debt strategy depends on the degree of development of the debt market, as well as the size of the investor base
- So, changes in the debt profile often occur in a gradual fashion, according to the market conditions

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Stochastic Models

- Interest rates: Cox, Ingersoll and Ross – CIR

$$dJ_t = \alpha(J^* - J_t)dt + \sigma_1 \sqrt{J_t} dz_t^1$$

- Inflation and GDP: Geometric Brownian Motion

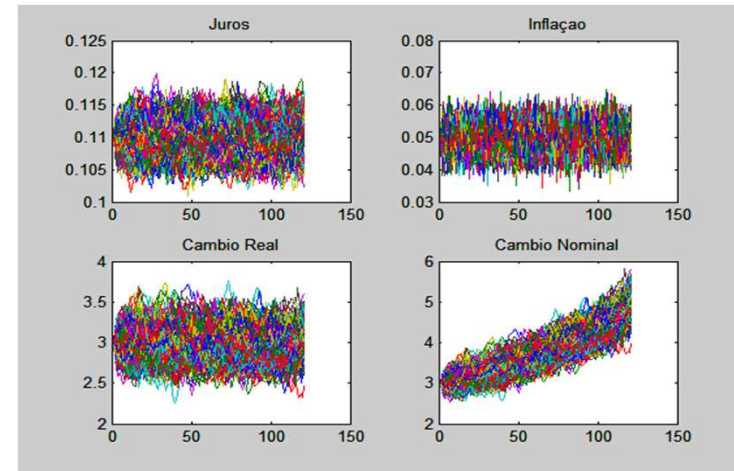
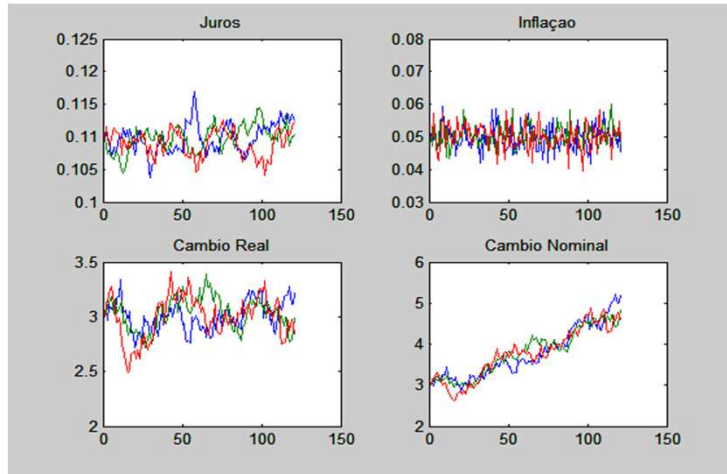
$$dI_t = \mu I_t dt + \sigma_3 I_t dz_t^3$$

- Exchange Rate: Chan, Karolyi, Longsta and Sanders – CKLS

$$dC_t = \beta(C^* - C_t)dt + \sigma_2 C_t dz_t^2$$

Benchmark Studies

Simulating indicator paths



Simulating Debt/GDP paths

