Analytical Tools for Debt Management Strategies: Cost at Risk Methodology

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Outline

- Analytical Tools for Debt Management Strategies
  - Why do we need a model?
  - Cost-at-Risk Methodology
    - Practice in Turkish Treasury
  - Challenges and Limitations of Modelling
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Why do we need a model for Determining Debt Management Strategies?

- Assess the sensitivity of public debt to market movements
- Help quantify the costs and risks associated with alternative financing strategies:
  - Provide assistance in developing the strategic guidelines
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Setting the Benchmarks

The Need to Define Overall Objectives of Debt Management

The Need for Performance Measurement

Formulation of a Benchmark Strategy to serve as a guideline
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Modeling of Strategic Benchmarks: Cost-at-Risk (C@R) Approach

- Aims to identify probable limits within which the costs of debt may fluctuate (the degree of market risk) for a given strategy.
- Serves as a tool for comparison of alternative borrowing strategies in terms of expected costs and risks.
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Modeling of Strategic Benchmarks: Cost-at-Risk (C@R) Approach

- Macroeconomic Scenario Generation
- Debt Database
- Alternative Strategies
- Expected cost & risk of a given strategy

Cash Flow Modelling and Borrowing Requirement
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Stochastic Model: Turkish Debt Simulation Model

- Modifications based on changing market conditions and instrument set in 2003, 2007 and 2010
- Cost Metrics:
  - Cash-based interest expenditures
  - Level of debt stock
  - Level of inflation adjusted debt stock
- Risk Metrics: Conditional cost-at-risk (C@R)
- Platform: Matlab
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Stochastic Model: Turkish Debt Simulation Model

Illustrative Results

Distribution of Interest Payments

Distribution of Debt Stock Projections

Billion TRL

Frequency

CC@R

Stock/GDP

Years


20 30 40 50 60 70 80 90

Borç Stoku/GSMH (%)

Illustrative Results

Stochastic Model: Turkish Debt Simulation Model

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Stochastic Model: Turkish Debt Simulation Model

Strategic Benchmarks for 2013-2015: The direction we would like to move

- Keeping a certain level reserve of cash: Reduce liquidity risk
- Borrowing mainly in TL in domestic cash borrowing: Reduce currency risk
- Using fixed rate TL instruments as the major source of domestic cash borrowing and decreasing the share of debt which has interest rate refixing period less than 12 months: Reduce interest rate risk
- Increasing the average maturity of domestic cash borrowing taking market conditions into consideration and decreasing the share of debt maturing within 12 months: Reduce refinancing risk
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Modelling of Strategic Benchmarks: Complementary Analyses

- Supplemental analysis for liquidity risk management
  - Level of Liquidity Buffer
  - Debt Concentration Indicators
  - Currency composition of FX reserves
- Data analysis and modelling for volatility and co-variance of FX rates
- Evolution of yield curves
Results

Interest Composition of Central Government Gross Debt (%)

Fixed
Floating


0 25 50 75 100

48,8 53,8 50,1 54,0 55,7 56,9 53,4 56,0 59,2 59,8 59,0

51,2 46,2 49,9 46,0 44,3 43,1 46,6 44,0 40,8 40,2 41,0

Interest Composition of Central Government Gross Debt (%)

Fixed
Floating
Results

Currency Composition of Central Government Gross Debt (%)

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<th>Year</th>
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<td>2013 May</td>
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Results

Percentage of Domestic Debt Maturing within 12 Months

May
Results

Percentage of TL Debt Refixed within 12 Months

May 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013

93,7 86,3 80,0 80,2 72,7 75,6 78,3 71,6 67,0 70,3 67,5

May 65,0 70,0 75,0 80,0 85,0 90,0 95,0 100,0
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Challenges in Model Development

- **Institutional Capacity**: Committed and skilled staff, IT systems
- **Financial Resources**: For training, consulting and software expenses
- **Input Modeling**: Lack of long data series, stationarity problems in data (regime changes, financial crises)
- **Management Support**: (probably the most important one)
Decision makers need to understand

- the nature and outputs of the model
- the main assumptions
- the limitations
- robustness of recommendations

and consider

- the macroeconomic framework
- the market outlook
- other considerations of the front offices
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Limitations of Modelling

Models that give insights are useful for policy makers. However,

- The policy problem is more complex than the standard formulation of the objective acknowledges, especially since “risk” is multidimensional.
- Scenario generation options may not enough to cope with extreme cases (event risk)
- Modelling works always need to be combined with expert judgments and common sense to make a forward looking analysis
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