PUBLIC FINANCE MANAGEMENT SYSTEMS AND RISK MODELLING IN TURKISH TREASURY
OUTLINE
Public Finance Management Systems
• Payment Process
• Information Systems and Its Counterparts

Risk Modelling
• Objectives of the Public Debt Strategy Model
• Model Building: The Conceptual Model
• Data Collection
• Coding
• Illustrative Results
PUBLIC FINANCE MANAGEMENT SYSTEMS
Some Basic Facts About
Turkish Treasury Public Finance Management Systems

• Developed Fully Inhouse
• Change Management Integration
• Role Based Access Control
• Enhanced Security Measures
PAYMENT PROCESS (SUMMARY)

CASH MANAGEMENT

FRONT OFFICE

Weekly, monthly, quarterly projections

Back Office

Borrowing Information

DEBT INFORMATION

Domestic Financing Information System (DFIS)

Weekly projections

Payment List

ACCOUNTING DEPARTMENT

Payment Order

ACCOUNTING INFORMATION SYSTEM (AIS)

Back Office

Debt Information

Form of remittance
Each journal defines the list of accounting ops. to be held for each transaction.
Each journal defines the list of accounting ops. to be held for each transaction.
External Debt System

Receivable Management System

Domestic Debt System

External Debt To Risk Interface

Receivable To Risk Interface

Domestic Debt To Risk Interface

Risk Analysis
DATA FLOW TO MIDDLE OFFICE - RISK ANALYSIS

Data dissemination:

- Repayment projections on existing debt; principal & interest
- All CGS and GGS debt stock data.
  - Stock tables include data about debt composition by lenders, by instruments and remaining time to maturity of total domestic debt stock.
  - These figures are “primary market” data.
- Repayment of on-lent and guaranteed credits
- Guaranteed and on-lent debt stock
RISK MODELLING
Objectives of the Public Debt Strategy Model: Turkish Case

- 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
Objectives of the Public Debt Strategy Model:
The Strategic Benchmarks
Benchmarks for Liquidity Risk Management

<table>
<thead>
<tr>
<th>Before 2007</th>
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<tbody>
<tr>
<td>Average Maturity of Borrowing</td>
<td>Portion of debt maturing within 12 months</td>
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<tr>
<td>Balance of Treasury cash reserve</td>
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Objectives of the Public Debt Strategy Model: The Strategic Benchmarks
Benchmarks for Market Risk Management

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<td>Fixed-Float Ratio of Borrowing, Average Time to</td>
<td>Portion of debt with interest rate re-fixed within 12 months</td>
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<tr>
<td>Interest Re-fixing</td>
<td></td>
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<tr>
<td>Roll-over ratio of FX debt</td>
<td>Currency composition of debt stock (local vs. foreign)</td>
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<td>Currency composition of FX borrowing</td>
<td>Currency composition of FX-debt</td>
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Model Building: The Conceptual Model

Alternative Strategies (2, 3, ..., m)

Strategy-1 → Scenario-1 → Scenario-n

Cost → Risk

Cost → Risk
Model Building: The Conceptual Model

Conditional Cost-at-Risk (The Tail C@R)

![Graph showing probability density and conditional cost-at-risk](image)
Data Collection

Challenges in Input Modelling:

- Lack of long data series
- Stationarity problems in data
  - Regime changes
  - Financial crises
- Distributional assumptions
  - How to cope with extreme cases (event risk)
Coding

In-house model?
- requires
  - programming skills
  - some capable software platform
- provides
  - flexibility

or commercial software?
- provides
  - professionalism and efficiency in model implementation
- may prove to be
  - less flexible to cope with the government’s needs
  - restrictive in maintenance and upgrading
  - more expensive
Coding: The Public Debt Strategy Model

- Macroeconomic Scenario Generation
- Debt Database
- Alternative Strategies
- Cash Flow Modelling and Borrowing Requirement
- Expected cost & risk of a given strategy
Illustrative Results

Distribution of Interest Costs

Histogram showing the distribution of interest costs in Billion TRY, with a peak around 48 and a spread of values from 42 to 54. The frequency count is indicated along the y-axis.
Illustrative Results: Modelling Analysis

Distribution of Debt Stock Projections

Year

Borç Stoku/GS

Stock/GNP

years
Thank You

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