P R O S T – Pension Reform Options Simulation Toolkit

Tatyana Bogomolova
World Bank
Why Modelling?

• Many factors have to be taken into account when assessing a pension system, and different reform options:
  ✓ Demographic
  ✓ Economic
  ✓ Policy choices/pension system parameters
  ✓ Individuals behavior

• Pension system analysis requires long-term projections

• Useful tool in pension system diagnosis and evaluation of reform options; a tool to organize thinking about pension systems
What is PROST?

• PROST – computer-based toolkit to simulate pension systems over a long timeframe
• Created to support World Bank pension policy dialogue in client countries
• User-friendly, input-output in Excel
• Regular updates with new features
• Individual country and cross-country studies (used in about 100 WB client countries and some cross-country studies)
Key Features of PROST

- Generic, flexible, easily adapted to various country circumstances
- Deterministic cohort-based model: models single year cohorts, tracks them down over time
- Projects coverage, contributions, entitlements, financial flows
- Allows to look at pension system as a whole as well as at individuals
- Addresses all main pension policy dimensions; all policy variables exogenous
- Modeling reforms relatively fast and easy
Input Data and Assumptions

- Demography
  - Population
  - Fertility
  - Mortality
  - Migration

- Economy
  - Macroeconomy (GDP, inflation, interest rates)
  - Labor market (LFPR, unemployment)

- Pension system
  - Pension system data (number of contributors, pensioners, wages, initial pensions)
  - Pension policy
  - Behavior of pension system members (contribution density, retirement pattern)
Input Data: policy variables

- PAYG, non-financial DC, fully funded DC
- Coverage
- Contribution rate, contribution ceiling
- Retirement age, early retirement
- Benefit formula in DB systems (accrual rate, max replacement rate, averaging period, valorization)
- Min, max pension
- Penalties for early retirement
- Pension commutation
- Pension indexation
- Notional interest rate
- Annuity factors
PROST Output

• Demographic projections
  – Population
  – Life expectancy
  – Population dependency ratios

• Pension system demographics
  – Number of contributors
  – Number of pensioners (by pensioner category)
  – System dependency rate
  – Coverage rate

• Pension system finances (PAYG DB, NDC, FFDC)
  – Wages, entitlements
  – Pension system revenues, expenditures, current balance, assets/debt
  – Implicit pension debt in PAYG
  – Equilibrium contribution rate for PAYG DB

• Output for individuals (contributions, benefits, NPV, IRR)
Pension System Diagnosis: policy questions

- Financial sustainability of PAYG systems (financial flows, government liabilities, implicit pension debt, financing gap)
- Adequacy of expected benefits (at retirement, post-retirement, by pensioner category)
- Intra- and intergenerational distributional effects and equity issues
Assessment of Pension Reform Options with PROST

• Impact of reforms on pension system finances and benefits, transition costs

• Types of pension reform
  ➢ PAYG “parametric” reforms (changing contribution rates, retirement age, benefit formula, indexation, etc.)
  ➢ Systemic reforms (fully funded DC, notional DC schemes, any combination of PAYG DB, FF DC and NDC)

• Different transition paths
  ➢ Switching pattern
  ➢ Accrued rights

• Allows to model on-going DC/multipillar schemes