Projection Methods for the Annual Trustees Reports

Office of the Chief Actuary
Technical Panel on Assumptions and Methods
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Overview

• The long-range programs used to make projections for the annual OASDI Trustees Report are grouped into four major processes:
  – Demography
  – Economics
  – Beneficiaries
  – Trust Fund Operations and Actuarial Status

• Each major process consists of a number of subprocesses
Overview: Flowchart

Process 1: Demography

Process 2: Economics

Process 3: Beneficiaries

Process 4: Trust Fund Operations and Actuarial Status
Demography – Process 1

• The Demography Process provides estimates of the projected Social Security area population for each year of the 75-year projection period
• Input data is received mainly from other government agencies
• Output data is provided to the Economics, Beneficiaries, and Trust Fund Operations & Actuarial Status Processes
Demography – Process 1

• The Demography Process is composed of eight subprocesses:
  – FERTILITY
  – MORTALITY
  – LPR (Lawful Permanent Resident) IMMIGRATION
  – HISTORICAL POPULATION
  – OTHER-THAN-LPR IMMIGRATION
  – MARRIAGE
  – DIVORCE
  – PROJECTED POPULATION
Demography – Process 1: Flowchart

1.1 Fertility
Inputs: Historical U.S. births and female resident population
Outputs: Historical and projected central birth rates

1.2 Mortality
Inputs: Historical U.S. deaths by cause and U.S. resident population; Medicare deaths and enrollments
Outputs: Historical and projected death probabilities

1.3 LPR Immigration
Inputs: Historical LPR U.S. immigration levels
Outputs: Historical and projected annual LPR immigration and legal emigration levels

1.4 Historical Population
Inputs: Historical U.S. population, undercounts, marital status data, other-than-LPR immigrant population data, and estimates of population in other components of Social Security area.
Outputs: Historical Social Security area population (including starting population); Historical other-than-LPR immigrant population

1.5 Other-than-LPR Immigration
Inputs: Historical levels of the foreign-born population
Outputs: Historical and projected annual Other-than-LPR immigration and emigration levels; projected other-than-LPR immigrant population

1.6 Marriage
Inputs: Historical number of marriages, remarriage data, and consistent population (detailed data for a subset of the U.S. population)
Outputs: Historical and projected central marriage rates

1.7 Divorce
Inputs: Historical number of divorces and consistent population (detailed data for a subset of the U.S. population)
Outputs: Historical and projected central divorce rates

1.8 Projected Population
Inputs: Historical U.S. family data
Outputs: Projected data – Social Security area population

Trustees ultimate assumptions
Fertility
Mortality
LPR Immigration
Other-than-LPR Immigration

Economics, Beneficiaries, and Trust Fund Operations and Actuarial Status
Note: 1.2, 1.3, 1.4, and 1.5 also provide outputs used by these processes
Economics – Process 2

- The Economics Process projects OASDI employment and earnings-related variables, such as the average wage for indexing and the effective taxable payroll.
- Input data is received mainly from the Demography Process and other government agencies.
- Output data is provided to the Beneficiaries and the Trust Fund Operations & Actuarial Status Processes.
Economics – Process 2

• The Economics Process is composed of five subprocesses:
  – U.S. EMPLOYMENT
  – U.S. EARNINGS
  – COVERED EMPLOYMENT AND EARNINGS
  – TAXABLE PAYROLL
  – REVENUES
Trustees Ultimate Economic Assumptions
- Average real wage
- Productivity
- Average hours worked
- Inflation
- Full-employment unemployment rate
- Ratio of OASDI taxable payroll to covered earnings

2.1 U. S. Employment
Inputs: Historical BLS data, population (Demography), disability prevalence rates (from prior TR), life expectancies (from Demography), & economic factors
Outputs: Historical & projected labor force participation & unemployment rates by age and sex

2.2 Class of Worker
Inputs: Historical BLS data, population (Demography), & economic factors
Outputs: Wage workers & self-employed by age and sex

2.3 AWI Series
Inputs: Historical AWI, Wages
Outputs: Historical and Projected AWI

2.4 Average Covered Earnings
Outputs: Projected average covered earnings by type of worker

2.4 Average Taxable Earnings
Inputs: Taxable earnings, covered workers
Outputs: Average taxable earnings

2.4 Taxable Earnings
Inputs: Historical distribution of earnings
Outputs: Taxable wages, taxable SE income & multi-employer refunds

2.4 Effective taxable payroll
Outputs: Effective taxable payroll

2.5 Revenues
Outputs: Short-range payroll tax revenue

2.1 Real & Potential GDP, Nominal GDP
Inputs: Historical NIPA (BEA) data
Outputs: Real, potential, and nominal GDP

2.2 U. S. Wages & Income
Inputs: Historical NIPA (BEA) data & employment (BLS) by sector
Outputs: Wages & SE income by sector

2.3 Taxable Maximum
Inputs: Historical taxable maximum, AWI
Outputs: Historical & projected taxable max.

2.3 Covered Earnings
Inputs: Historical NIPA & covered earnings data by sector
Outputs: Historical & projected covered earnings by type of worker

2.3 Covered Employment
Inputs: Historical U.S. & covered employment data, population including other-than-LPR immigrant population & DACA/DAPA immigrants (Demography)
Outputs: Covered worker rates, covered worker levels, & total employed (all by age, sex, type of worker)

2.3 Average Covered Earnings
Inputs: Historical NIPA & covered earnings data by sector
Outputs: Historical & projected taxable max.

2.3 Average Covered Earnings
Outputs: Projected average covered earnings by type of worker

2.2 U. S. Wages & Income
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Beneficiaries, Trust Fund Operations, and Actuarial Status

Short-Range Trust Fund Operations
Beneficiaries – Process 3

- The Beneficiaries Process projects the fully insured and disability insured population, the number of disabled workers and their dependent beneficiaries, the number of retired workers and their dependent beneficiaries, and the number of dependent beneficiaries of deceased workers.

- Input data is received mainly from the Demography and Economics Processes, the Social Security Administration, and other government agencies.

- Output data is provided to the Economics and Trust Fund Operations and Actuarial Status Processes.
Beneficiaries – Process 3

• The Beneficiaries Process is composed of three subprocesses:
  – INSURED
  – DISABILITY
  – OLD-AGE AND SURVIVORS
3.1 Fully-insured (FI) population
Inputs: Covered workers, median earnings, and AWI (Economics), population including other than-LPR immigrant and DACA (Demography), net LPR immigration (Demography), other-than-LPR population attaining DACA status (Demography), earnings distribution, historical FI population (historical and short-range projections).
Outputs: FI population (historical and projected), historical and projected fully insured rates.

3.2 Disability-insured (DII) population
Inputs: Historical DII population.
Outputs: DII population (historical and projected).

3.3 Old-Age beneficiary (OAB) population
Inputs: Historical OAB population, labor force participation rates (Economics), and scheduled reductions for early retirement and increases for delayed retirement.
Outputs: OAB population (projected).

3.3 Auxiliary Beneficiaries of Retired and Deceased Workers
Inputs: Historical auxiliary beneficiaries of retired and deceased workers, SS area population by marital status (Demography), number of children with at least one parent aged 62+ (Demography), number of children with at least one deceased Parent (Demography), average number of children per family (Demography) and other relationships.
Outputs: Auxiliary beneficiaries of retired and deceased workers by type of benefit (projected).

3.3 Widow beneficiary population
Inputs: Historical widow beneficiary population, SS area population by marital status (Demography) and other relationships.
Outputs: Insured and uninsured widow beneficiary population (projected).

Trustees ultimate assumptions
Disability incidence rates
Disability recovery rates
Disability mortality rates

Trust Fund Operations and Actuarial Status
Trust Fund Operations and Actuarial Status – Process 4

- Trust Fund Operations and Actuarial Status Process projects:
  - Average benefits, using a 10% sample of newly entitled worker beneficiaries
  - The annual flow of income from payroll taxes, taxation of benefits, and interest on assets in the trust fund
  - The annual flow of cost from benefit payments, administration of the program, and railroad interchange

- In addition, this Process produces annual and summarized values to help assess the financial status of the Social Security program
Trust Fund Operations and Actuarial Status – Process 4

• The Trust Fund Operations and Actuarial Status Process is composed of three subprocesses:
  – TAXATION OF BENEFITS
  – AWARDS
  – COST
Trust Fund Operations and Actuarial Status – Process 4: Flowchart

4.2 AIME Levels for newly-entitled OABs and DIBs
Inputs: Sample of newly-entitled OABs and DIBs; sample of earnings from CWHS; SS area population (Demography); covered workers, average taxable earnings (Economics); and National Average Wage Index (AWI), Tax Maximum; historical and projected fully insured rates by sex and age, historical and projected beneficiaries (Beneficiaries)
Outputs: Projected AIME distributions for new entitlements

4.3 Benefit payments
Inputs: Starting average benefits, OAB population and DIB population (Beneficiaries), married and divorced aged population (Demography), Cost-of-Living Adjustments and AWI (Economics), post-entitlement factors, assumed benefit relationships between workers and auxiliaries, short-range estimates of benefit payments
Outputs: Scheduled benefit payments during year, average scheduled benefits

4.4 Fraction benefits taxable
Inputs: Historical and projected percent of benefits taxable for the short-range period and estimated percent of benefits taxable with $0 threshold amounts from the Office of Tax Analysis in the Department of the Treasury
Outputs: TOB as a percent of benefits (projected)

4.5 Taxation of benefits (TOB)
Outputs: Taxes on benefits

4.3 Payroll taxes
Inputs: Payroll tax rate, effective taxable payroll (Economics), incurred-to-cash lag factor, short-range estimates
Outputs: Payroll taxes

4.3 Administrative expenses
Inputs: Short-range administrative expenses; total beneficiary population and AWI, assumed increase in productivity (Economics), Trustees ultimate assumptions
Outputs: Administrative expenses

4.3 Railroad interchange
Inputs: Data from Railroad Retirement Board and AWI, covered workers, taxable payroll (Economics), short range estimates of railroad interchange
Outputs: Net payments to RRB

4.3 Interest income
Inputs: Short-range estimates of interest income
Outputs: Interest income, annual yield rate on the OASI, DI, and combined funds

Trust Fund Operations and Actuarial Status
Output: Summarized income and cost rates and actuarial balances; open group unfunded obligations; annual income rate, cost rate and balance; dollar trust fund operations and trust fund ratios
Model Documentation

Descriptions of the methods used in each of the subprocesses, including detailed equations, can be found in the model documentation at: