Training: New to NTA

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NTA 12th Global Workshop
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Outline

Outline

1 Preliminaries

- Training objectives for the week
  - Understand NTA project and estimates
  - Get started on macro controls and age profiles
  - Chance to ask questions
- Introductions
  - Who are you? What are your NTA objectives?
  - Your data: What you have, what you need to find
    - Population counts
    - National accounts
    - Household surveys and administrative records

1 Preliminaries

- Does everyone have access to the NTA wiki? (www.ntaccounts.org)

- Resources to learn more on the NTA wiki
  - NTA "course"
  - Link to NTA manual
  - Link to 2012 comparative volume

Outline

1 Preliminaries

2 NTA motivation and goals

3 NTA features and organization

4 Data and basic methods

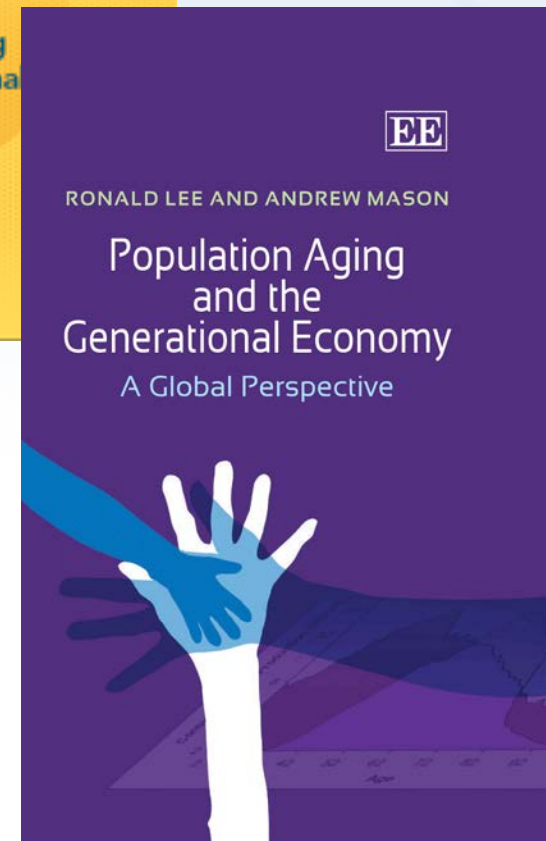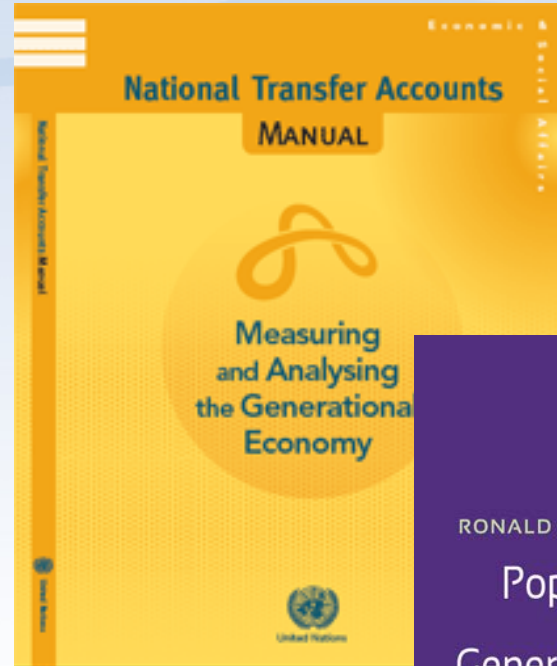5 Steps to complete NTA

6 Extensions to "basic" NTA

7 Lab exercise

2 NTA motivation and goals

- Measuring the generational economy
  - How we produce, consume, share, and save resources by age
  - Research network of teams in more than 60 (?) countries
- Motivating questions
  - How do changes in population age structure impact economies and economic growth?
  - How does the economic life vary by age?
  - How does the intergenerational economic system affect the economy and prospects for growth?

NTA example – Economic lifecycle

United States, 2011
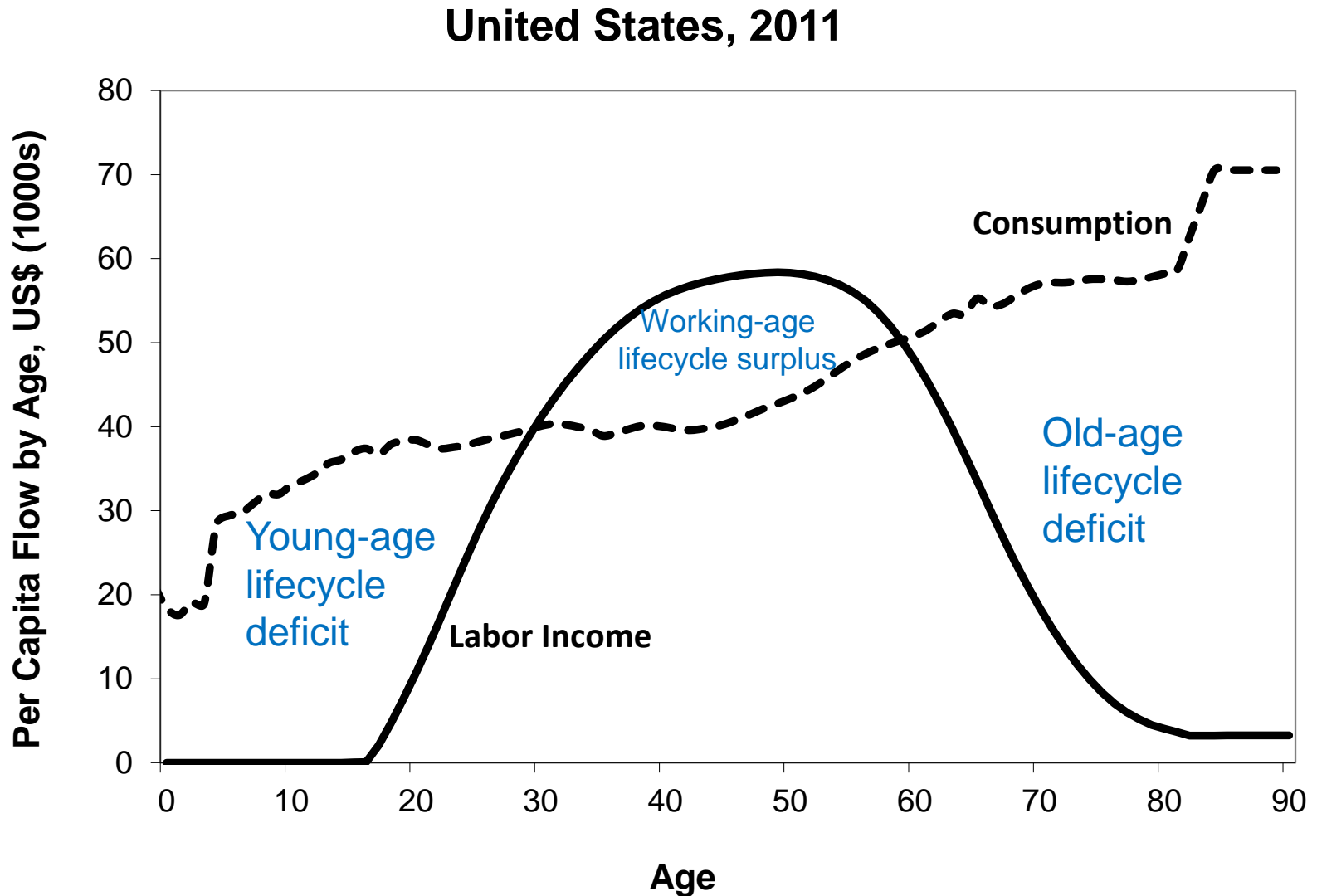
NTA example – Reallocations
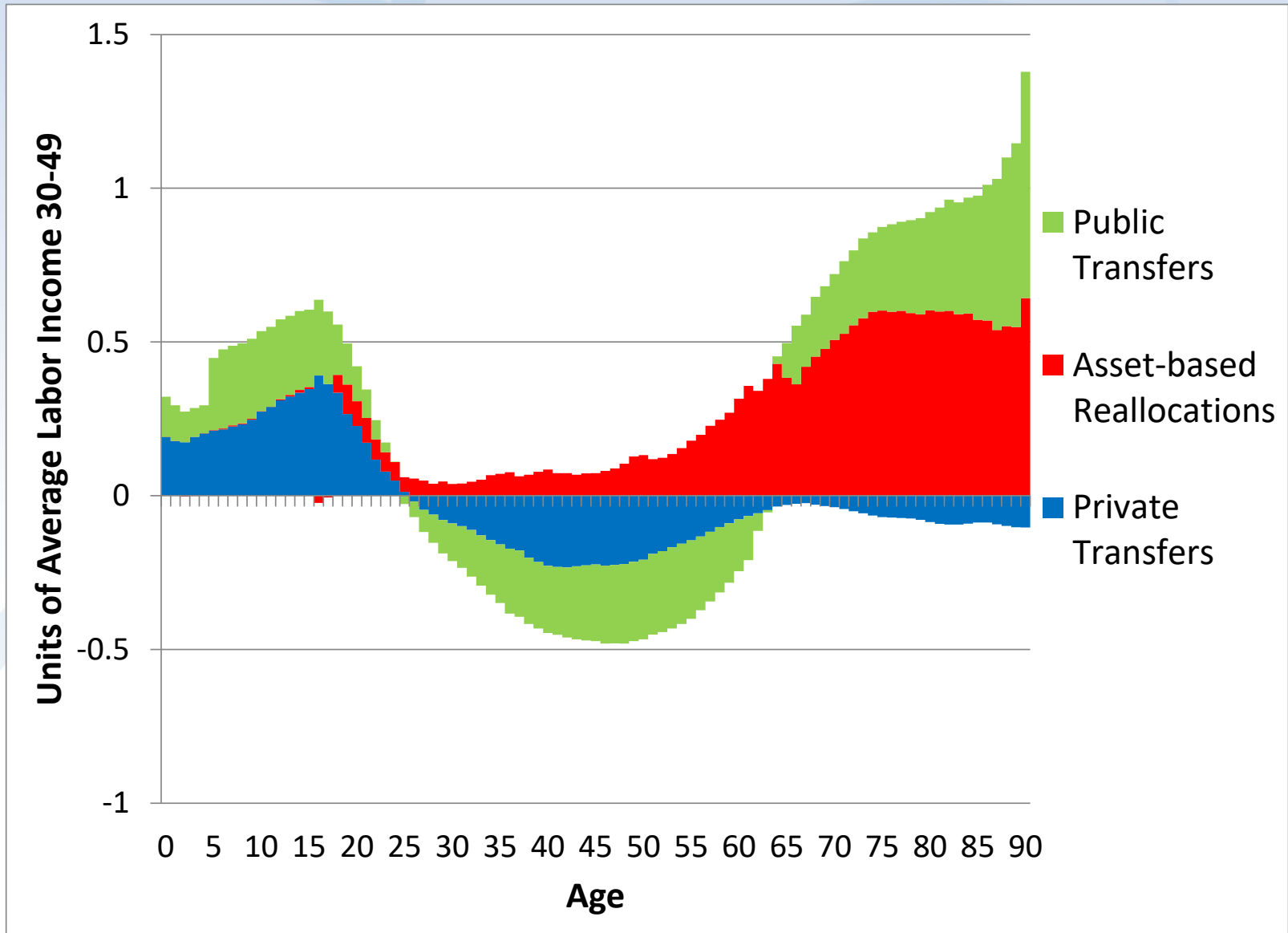
Example of change over time (US total consumption)
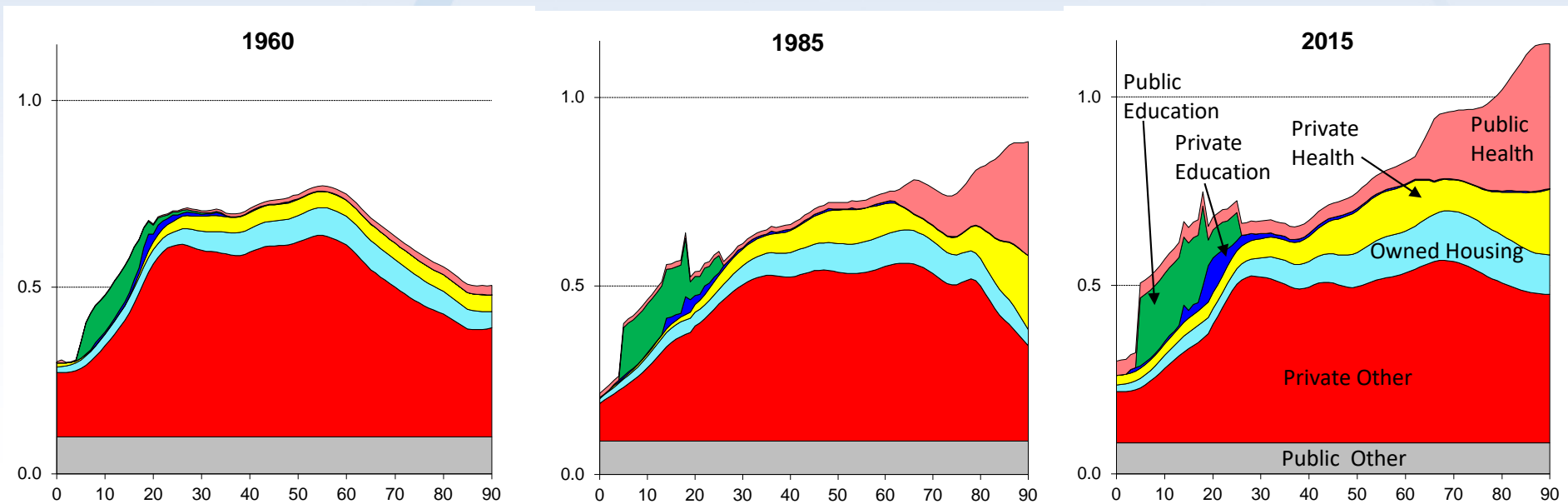
In units of average labor income, ages 30-49

2 NTA motivation and goals

- What do we learn from NTA?
  - Are support systems sustainable?
  - Does the generational economy impact growth?
  - Changing age patterns?
- Example: demographic dividends
  - First DD: Age structures favorable to production
  - Second DD: Age structures favorable to capital
    - Older populations have more assets, on average
    - Fertility decline can mean greater HK investment per child

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3 NTA features and organization

- What is an age profile?
  - A schedule of age-specific average flow amounts
  - Based on a flow measure or proxy indicator from
    - A household survey
    - A government report
    - Other NTA age profiles
    - NTA assumptions

US 2009

(chart showing *Labor Income* (red) and *Consumption* (blue), with y-axis "Age Group Average ($1000s)" from 0 to 60, and x-axis "Age" from 0 to 80)

  - Smoothed over age
  - Adjusted up or down so that aggregate flow matches an aggregate estimate from national accounts
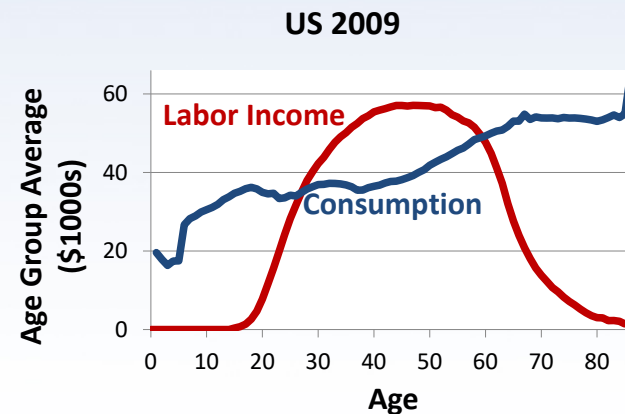
3 NTA features and organization

- NTA age profiles disaggregate national accounts' current account by age
  - Will eventually include asset revaluation and wealth accounts
- NTA is generally consistent with the System of National Accounts (SNA) except:
  - SNA tracks by sector (corporate, government, household) but NTA is always from the individual perspective
    - Government, corporate, and household flows imputed to the individuals who "own" those institutions
  - SNA does not include intra-household transfers, that is an innovation of NTA
  - Some changes in SNA aggregates

The flow account identity

- Inflows
  - Labor income
  - Asset income
  - Transfer inflows

- Outflows
  - Consumption
  - Saving
  - Transfer outflows

$$\underbrace{Y^l(a) + Y^a(a) + \tau^+(a)}_{\text{Inflows}} = \underbrace{C(a) + S(a) + \tau^-(a)}_{\text{Outflows}}$$

$$\underbrace{C(a) - Y^l(a)}_{\text{Lifecycle Deficit}} = \underbrace{\underbrace{Y^a(a) - S(a)}_{\text{Asset-based Reallocations}} + \underbrace{\tau^+(a) - \tau^-(a)}_{\text{Net Transfers}}}_{\text{Age Reallocations}}$$

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3 NTA features and organization

- Reallocations are classified by economic form and mediating institution

A Classification of NTA Reallocations.			
	Asset-based Age Reallocations		
	Capital and Other Non-Financial Assets	**Credit**	**Transfers**
Public	Public infrastructure Public land and sub-soil minerals	Public debt Student loans Money	Public education Public health care Unfunded pension plans
Private	Housing Consumer durables Factories, Farms Private land and sub-soil minerals Inventories	Consumer credit	Familial support of children and parents Bequests Charitable contributions
Source: Mason, Lee et al. (forthcoming); adapted from Lee (1994).			

3 NTA features and organization

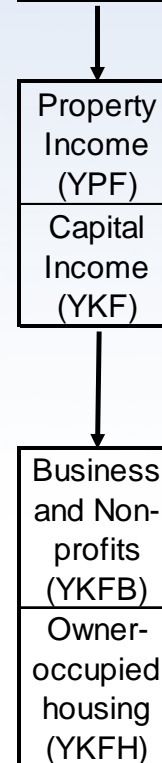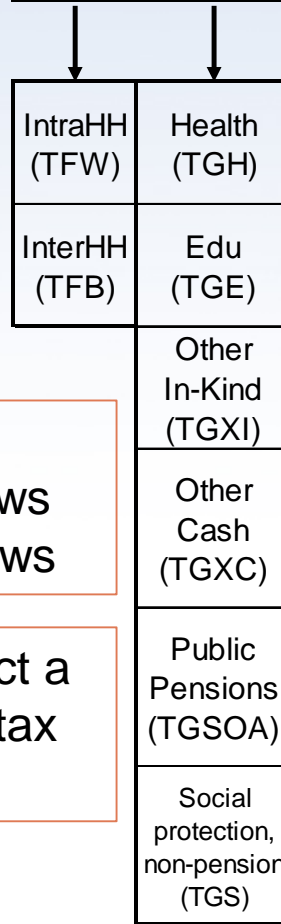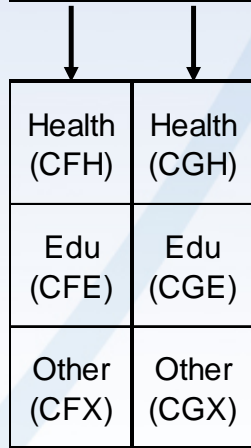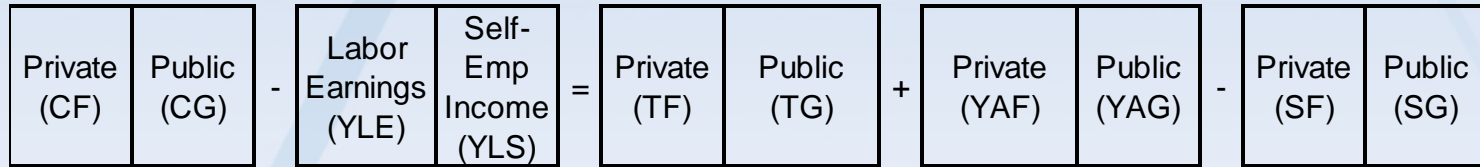- Asset-based reallocations allow for inter-temporal exchange
  - Save now, spend later
  - Go into debt and spend now, repay later
  - Invest now, spend flow of returns in future
- Transfers involve no explicit quid pro quo
  - May involve implicit obligation, e.g., transfers between children and parents
  - Transfers must balance (inflows = outflows) but may also include net transfers to or from Rest-of-World

Organization of accounts

| Life Cycle Deficit (LCD) | = | Reallocations (R) |

| Life Cycle Deficit (LCD) | = | Transfers (T) | + | Asset-Based Reallocations (RA) |

| Consumption | - | Labor Income | = | Transfers (T) | + | Asset Income (YA) | - | Net Saving (S) |

| Private (CF) | Public (CG) | - | Labor Earnings (YLE) | Self-Emp Income (YLS) | = | Private (TF) | Public (TG) | + | Private (YAF) | Public (YAG) | - | Private (SF) | Public (SG) |

Health (CFH)	Health (CGH)			IntraHH (TFW)	Health (TGH)		Property Income (YPF)
Edu (CFE)	Edu (CGE)			InterHH (TFB)	Edu (TGE)		Capital Income (YKF)
Other (CFX)	Other (CGX)				Other In-Kind (TGXI)		
					Other Cash (TGXC)		Business and Non-profits (YKFB)
					Public Pensions (TGSOA)		Owner-occupied housing (YKFH)
					Social protection, non-pension (TGS)		

Transfers have inflows and outflows

Also collect a full set of tax profiles

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4 Data and basic methods

- Data: Population, national accounts, household surveys, administrative data

1. Population estimates

  - Single year of age to 90+

  - Evaluated for quality

  - Can use UN World Population Prospects if problems with national estimates

  - Significant non-household population?

4 Data and basic methods

2. National accounts data (in SNA format)

- List of main SNA tables given in the manual, need tables by sector

- Which government agencies produce your accounts? How do they publish the results? What is available in international databases?

- Will probably also need:
  - Government expenditure records
  - Entries for your country in the International Monetary Fund's Government Finance Statistics (GFS) publications

4 Data and basic methods

3. Household surveys

- Income and expenditure surveys give direct measures or indicators of relative age patterns

- May need to supplement with specialized surveys (older people, institutionalized population)

4. Administrative data

- Government reports on public program participation by age

- May give monetary flows

- May only have participation indicators

4 Data and basic methods

- Necessary features of household surveys and administrative records:
  - Nationally representative
  - Designated household head/householder
  - Sufficient sample size
  - Household roster by age, sex, work/school status
  - Includes necessary indicators
    - Income by source (including work, government benefits, gifts, interest and dividend income, etc.)
    - Expenditure by type (amounts paid for consumption, taxes, gifts, etc.)

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How to calculate an age profile

1. Calculate the macro control from national accounts
2. Identify a measure or proxy indicator for the flow
    1. From household survey
        - Use individual-level data if available
        - Otherwise allocate household amount to individuals in the household
    2. From administrative records
    3. On *a priori* grounds (i.e., assumed or calculated from other age profiles)
3. Calculate single-year age group averages
    - May have to adjust for any missing populations (i.e. persons not represented in survey or administrative records)
4. Smooth
    - Evaluate to ensure that no real variation has been eliminated
5. Adjust to controls
    - Evaluate adjustment factor to test the validity of the age shape

4 Data and basic methods

- Smoothing
  - Friedman's supersmoother is preferred method, R "supsmu" or Stata ado file for "supsmooth"
  - Reduces noise from sampling
  - Smooth lowest-level components only
  - Beware of eliminating "real" features of the age pattern
    - Peaks/valleys, elbows, zeros
  - False negative values should be replaced with zeros
  - Details and examples in manual appendix

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4 Data and basic methods

- Macro control adjustments

a:	age a, single years ranging from 0 to ω
$N(a)$:	population count, age a
X:	macro control (i.e. national total, all ages combined)
$x(a)$:	per capita age pattern, age a
$\tilde{x}(a)$:	per capita NTA age profile, age a
$\tilde{X}(a)$:	aggregate NTA age profile, age a

Scale Factor Calculation: $\quad \theta = X \,/\, \sum_{a=0}^{\omega} x(a)N(a)$

$$\tilde{x}(a) = \theta x(a)$$

Apply Scale Factor:

$$\tilde{X}(a) = \tilde{x}(a)N(a)$$

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5 Steps to complete NTA

Gather Data

- Identify available surveys, administrative records, national accounts, and population data
- Choose base year in which all necessary data are available
- Obtain data permissions and copies of datasets
- Evaluate data quality, coverage, usability

Lifecycle Accounts

- Calculate macro controls for components of consumption and labor income (some teams prefer to calculate all macro controls at this stage)
- Estimate age patterns from administrative and survey data
- Smooth, adjust to controls, and evaluate

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5 Steps to complete NTA

Public Age Reallocation

- Calculate macro controls for public reallocations (taxes, transfers, asset income, and saving)
- Estimate age shapes for these variables from administrative and survey data
- Smooth, adjust to controls, and evaluate

Private Age Reallocation

- Calculate macro controls for private reallocations (transfers, asset income, and saving)
- Estimate age shapes for inter-household transfers, asset income, and saving from survey data
- Smooth, adjust to controls, and evaluate
- Estimate components of intra-household transfers from already estimated profiles and sharing algorithm
- Smooth, adjust to modified controls, and evaluate
- Estimate private saving as the balancing item

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5 Steps to complete NTA

- Review and evaluate all estimates
  - See manual for list of checks
- Document estimates on the wiki
- Upload data and documentation in the wiki database

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6 Extensions to "basic" NTA

- Further disaggregate NTA age profiles by other characteristics
  - Socioeconomic status
  - Gender
  - Geography (region, urban-rural, etc.)
- National Time Transfer Accounts
- Wealth accounts
- Bequests
- Policy-relevant analyses and indicators

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7 Lab exercise and macro controls

7 Lab exercise

- Macro control spreadsheet
  - Old template but still does a good job at giving the general methods
  - Example data are provided, unfortunately the OECD's online national accounts portal is completely different now, so you can't just download in the same format
- Stata code example to create a few age profiles using US data