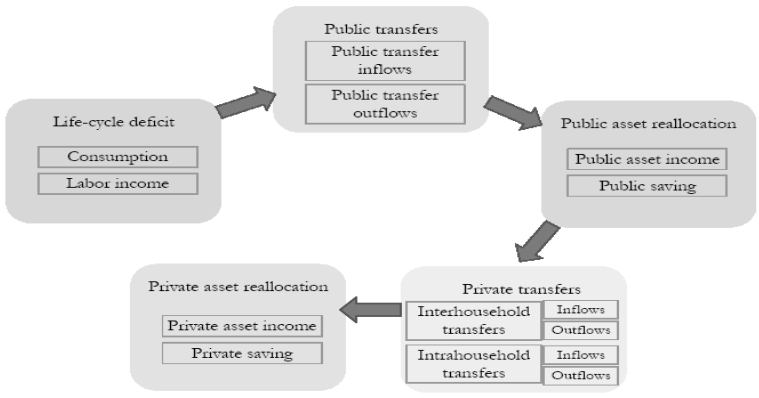
Analyzing the Household and Estimating Income

Sang-Hyop Lee
University of Hawaii at Manoa

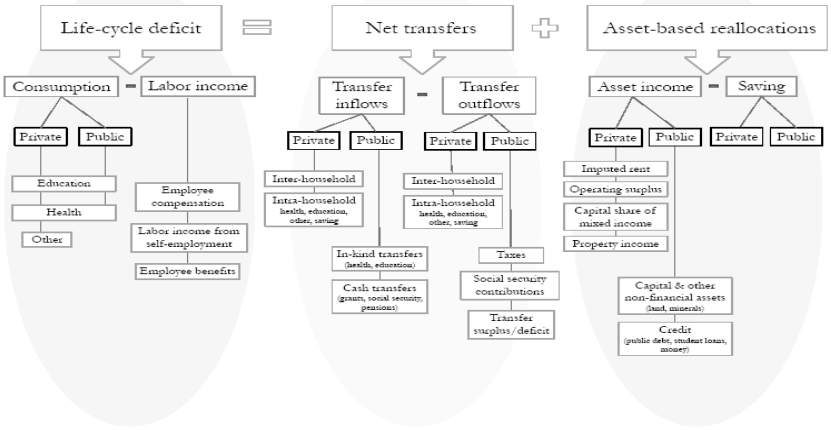
Seminar and Training Workshop on NTA
Organized by NUPRI and TDRI
December 16-25, 2010, Thailand

Flow Chart



At each step, smoothe age profile (where applicable), and adjust using aggregate controls. Refer to the manual for more detail.

By components



Assumptions

- Per capita age profiles are estimates of per capita values by single year of age (0-90+).
- All consumption and labor production can be assigned to individuals
- This assumes away economies of scale and other important features of consumption and production.

General Rule

- Estimate the per capita age-profile for the variable using household survey data or administrative records.
- Smooth it (education consumptions are not smoothed).
- Use population data to construct a preliminary aggregate age-profile.
- Adjust the aggregate profile and the per capita profile to match a control total taken from National Income and Product Accounts or some other source.
- However, detailed estimation method could vary across countries depending on available data.

General Rule: Equation Version

1. Estimate per capita age profile

2. Multiply by the population

$$X^{p}(a) = \beta \bar{X}^{p}(a) N(a)$$

$$\beta = X^{p}_{NIPA} / \sum_{a} \bar{X}^{p}(a) N(a)$$

3. Adjust to National Income and Product Account (NIPA) total.

General Rule: Numerical Version

- Labor income from household survey– estimated in the following way
  - Calculate per capita
  - Use population data to multiply by age
- Labor income (NIPA) : 5,581 billions NT$
- Labor income (Survey): 4,419 billions NT$
- Coefficient of adjustment β = 1.26

Variables from the Household Survey (Exercise handout)

- NTA Variables
  - Labor income
  - Asset income
  - Consumption
- Individual/household characteristics
  - Household roster (HHH)
  - Household member by age
  - School enrollment
  - Health expenditure utilization

Labor Income from Household Surveys

- Labor income includes
  - The compensation of employees
    . Wages and salaries
    . Fringe benefits including employers' social contributions
    . Deferred payments
  - Labor's estimated share (2/3) of mixed income (self-employment income) (Gollin 2002 JPE)
- Does not include in-home activities which does not produce market goods or services (e.g. childrearing)

Asset income from Household Surveys

- Capital income
  - Capital share of mixed income (income from business, farm, and self-employment)
  - Operating surplus (imputed rent from owner occupied housing)
- Net property income
  - Interest
  - Other property income (rent, dividends)

Households vs. Individuals

- Consumption and income measurement are individual level
- But a lot of data are gathered from household
  - Allocating household consumption household income to individual household members is a critical part of estimation
  - Adjusting using aggregate (macro) control

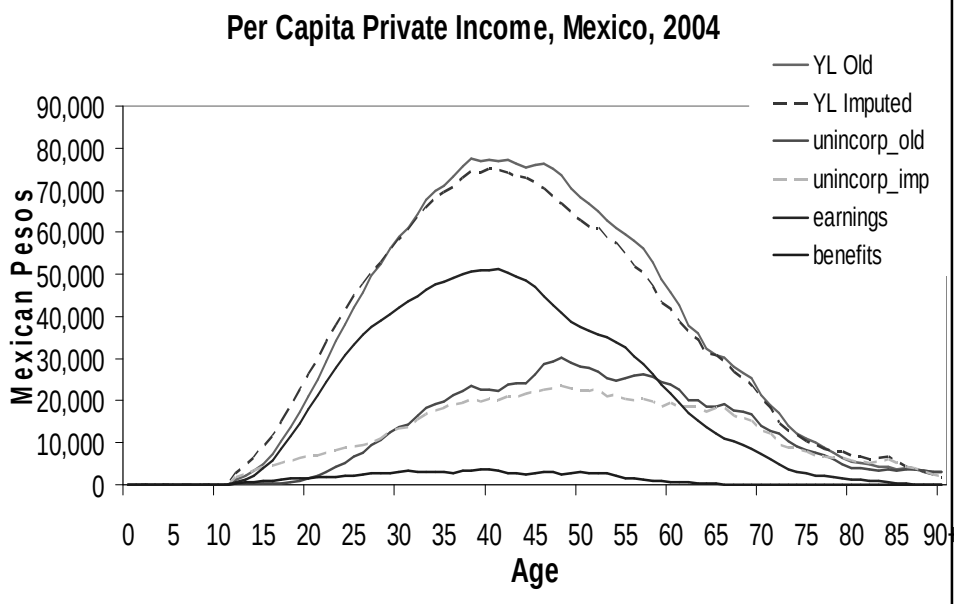
Imputing Labor Income for Unpaid Family Workers

- Estimate using the age profile of earnings of *employees* as a share to allocate household self-employment income to self-employed workers including unpaid family workers.
  - Example: Two-third of this household's self-employment income equals 30. Then,

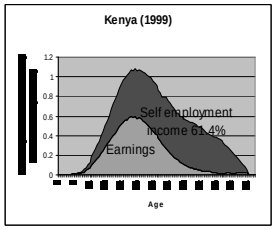
Age	Earnings per employee	Imputed
18 (unpaid)	200	10
44 (self emp.)	400	20

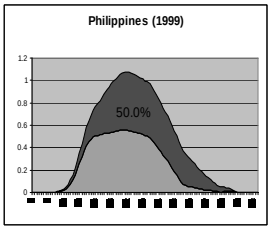
Exercise: Stata program

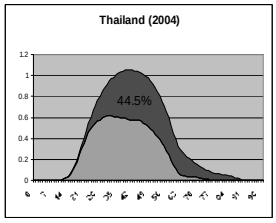
```
recode age (90/max = 90)

recode wage (.=0)
recode self_income (.=0)

gen wage_earner=(ocup==1| ocup==2)
gen self_employed=(ocup==3| ocup==4)

egen mean_wage=mean(wage), by(age)
gen YLE=mean_wage

replace mean_wage=0 if self_employed~=1
egen hhwage=sum(mean_wage), by(hhid)

egen hh_YLS=sum(self_income), by(hhid)

gen YLS=(mean_wage/hhwager)*hh_YLS*2/3
recode YLS .=0

table age [aw=weight], c(mean YLE mean YLS)
```

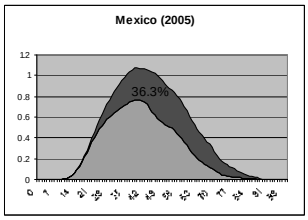



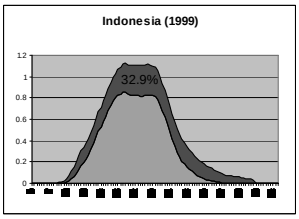
Primary Target: Countries with Large Share of Self-Employment Income (per capita)



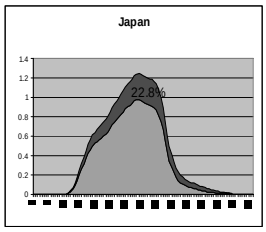


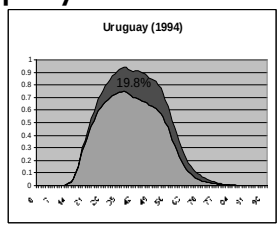


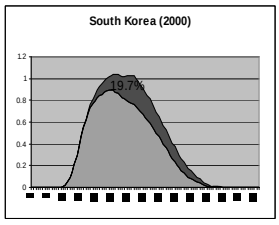


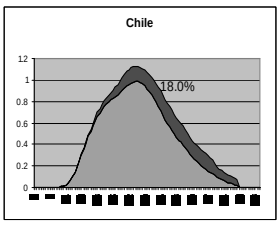


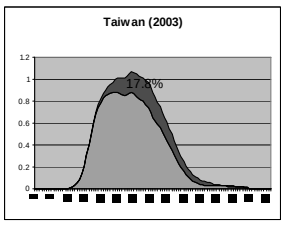
Secondary Target: Countries with Moderate Share of Self-Employment Income

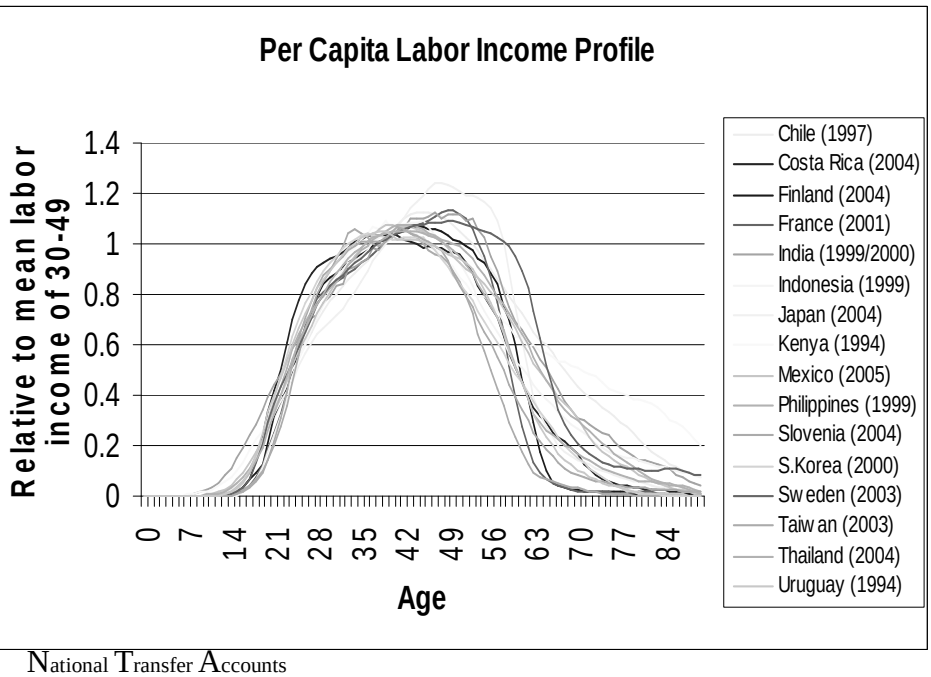






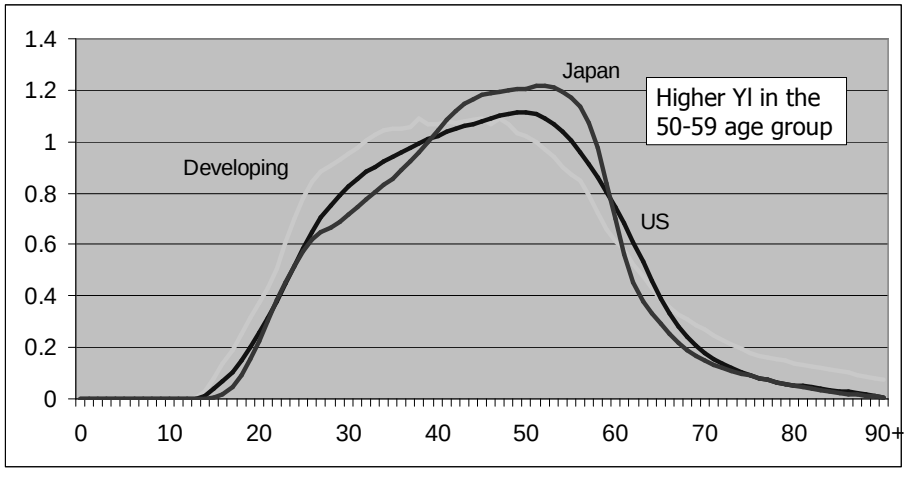






National Transfer Accounts

Labor Income: Industrialized vs. Developing Countries.



18

National Transfer Accounts

"Mechanical" Decomposition of Per Capita Labor Income

$$(\frac{Y}{N})_a = (\frac{L}{N})_a * (\frac{Y}{L})_a \text{ or}$$

$$y_a = l_a * \overline{y}_a$$

- Per capita labor income profile
  = Age specific activity rate x
  Average productivity of workers by age
  (weighted by working hours by age)

- Different from conventional measure of labor income.

LFPR by Age

- Labor force participation by age
  - Children is delaying entry into the labor force
    - Quality-quantity trade-off (Becker and Lewis 1973)
    - Compulsory education policies (Lancaster and Ray 2004)
    - Micro and macro evidences on the trade-off between schooling and child labor (Basu 1999)
  - Older men are withdrawing from the labor force at a younger age.
    - Pay-as-you go retirement pension (Gruber and Wise 1999, 2007)
    - Micro and macro evidences (e.g. Anderson et al. 1999; Borsch-Supan 2000)
  - Women are increasingly participate in the labor market
    - Women's value of time at home declines, and hence reservation wage falls.

Productivity by Age

- Productivity profile of working population
  - Investment on human capital decreases by age (Mincer 1962; Becker 1962)
  - Depreciation of physical and mental ability (Skirbekk 2003)
  - Technological progress (Autor et al. 2003)
- The two factors are related
  - Declining productivity due to depreciation leads a person to retire (Quinn et al. 1990; Dwyer and Mitchell 1999)
- Real world has much more factors
  - Choice of working hours are possible (Hurd 1993)
  - Legal age of work
  - Minimum wage
  - Seniority-based wage system or other wage rigidity

Aggregate Age-Profile

- Use population data to construct a preliminary aggregate age-profile.
  - Population data are available from the UN Pop Division for the period of 1950-2050 and also to 2300 (long term projection).
  - Insure that population data have been adjusted to eliminate age heaping and under-reporting.

Labor Income Macro Control

- Using the terminology of the 1993 UN System of National Accounts, labor income consists of three components
  - *compensation of employees*
  - labor's share of *mixed income*
  - labor's share of *taxes on net production and on imports* (known as *indirect taxes*) less *business subsidies*.

Labor Income Macro Control (cont'd)

- The compensation of employees consists of *wages and salaries* and *employers' social contributions*, including labor income of residents who are working abroad.
- Some of the non-resident remittances are in fact compensation. Individual country teams have to decide what would be the most relevant method for their country (e.g. the Philippines' guest workers)
- Two-thirds of the household mixed income is labor income, which is consistent with the best available information.
  - In some countries, the aggregate control *mixed income* includes the operating surplus (imputed rent) of households. In this instance the operating surplus of households should be subtracted from mixed income before labor's share is estimated.

Indirect Taxes Adjustment

- Some taxes on production and on imports are borne by workers in the form of reduced compensation, by owners of assets in the form of reduced asset income, and by consumers in the form of higher prices.
- In NTA, total labor income should be increased by net taxes on labor, i.e., an estimate of the share of taxes on production and on imports less subsidies borne by labor.

The End
(Exercise Part 1)