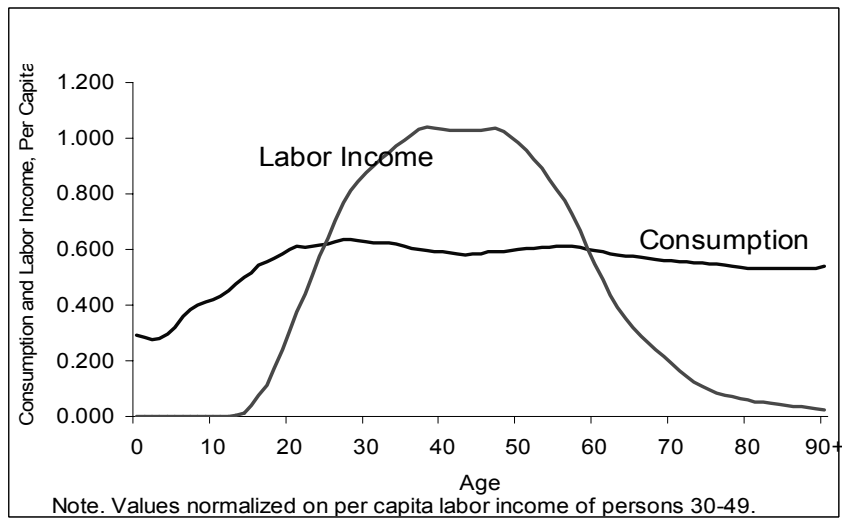


The Lifecycle Deficit: A Review

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The Economic Lifecycle (per capita)



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Assumptions

- ▶ Per capita age profiles are estimates of per capita values by single year of age.
- ▶ All consumption and labor production can be assigned to individuals
- ▶ This assumes away pure public goods, 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.
- ▶ 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.

Private Consumption

- ▶ Standard approach of allocating household consumption among the members did not provide reasonable results
 - Engel method: food share is used to measure households' well-being
 - Rothbarth method: welfare measured by expenditure on adult goods per adult
- ▶ Alternative method (NTA)
 - Estimate education and health consumption directly
 - Estimate private capital consumption (rental value of owner occupied housing + flow of services from durables)
 - Allocate other consumption indirectly (using Equivalence Scale)

Allocating Private Education Consumption

$$C_j^{edu} = \sum \alpha(a)E_j(a) + \sum \beta(a)NE_j(a)$$

- Private education consumption is regressed on the number of enrolled (E) and non-enrolled (NE) in each age group.
- The age groups included will vary with the country and its enrollment rates.
- Use unsmoothed profile.

Allocating Private Health Care Consumption

- ▶ Often very complex in part due to various source of financing, which includes
 - Private out-of-pocket expense
 - Private insurance
 - Public sector
- ▶ Available sources of data vary across countries.
- ▶ There are differences between NHA and NTA
 - E.g. NHA document expenditures rather than consumption. Thus it includes profits of insurance companies.
- ▶ Estimate using one of four approaches.

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Approach 1: Method based on individual utilization measures from expenditure survey data

$$C_j^{health} = \sum \alpha(a)IN_j(a) + \sum \beta(a)OUT_j(a)$$

- ▶ Private health consumption is regressed on the number of members using inpatient services (IN) and outpatient services (OUT) in each age group.

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Approach 2: Based on age profile of per capita utilization measures

$$C_j^{health} = \sum \beta(a)U(a)M_j(a)$$

$$C_j^{health} = \sum \beta_0 U(a)M_j(a) + \sum \beta_1 a U(a)M_j(a) \\ + \sum \beta_2 a^2 U(a)M_j(a)$$

- ▶ Private health consumption is regressed on the number of members (M) and per capita utilization measure by age (U)
- ▶ Could be linear (the former) or non-linear (the latter)

Approach 3: Based on non-parametric iterative method

- ▶ Assign health expenditure equally to each household member and then tabulate the per capita profile.
- ▶ The per capita profile is then used as weights to allocate health expenditure to household members producing a new per capita profile.
- ▶ Repeat until the weights do not change much.
- ▶ Unlike regression approach, it does not produce negative coefficients for some age groups.

		<u>Estimated C after iteration</u>							
<u>Age</u>	<u>True C</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>		
5	10	14.44	11.90	10.83	10.36	10.16	10.07		
35	30	25.00	27.42	28.74	29.40	29.72	29.87		
65	20	22.22	21.54	20.85	20.43	20.21	20.10		
<u>HH No</u>	<u>Id No</u>	<u>Age</u>	<u>HH C</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>
1	1	5	70	23.33	15.69	12.48	11.09	10.49	10.22
1	2	35	70	23.33	27.16	28.76	29.45	29.76	29.89
1	3	35	70	23.33	27.16	28.76	29.45	29.76	29.89
2	1	35	80	26.67	27.69	28.72	29.35	29.69	29.85
2	2	35	80	26.67	27.69	28.72	29.35	29.69	29.85
2	3	65	80	26.67	24.62	22.56	21.30	20.63	20.30
3	1	65	40	20	20.00	20.00	20.00	20.00	20.00
3	2	65	40	20	20.00	20.00	20.00	20.00	20.00
4	1	5	20	10	10.00	10.00	10.00	10.00	10.00
4	2	5	20	10	10.00	10.00	10.00	10.00	10.00

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Approach 4: Based on simple regression

$$C_j^{health} = \sum \beta(a) M_j(a)$$

- ▶ Private health consumption is regressed on the number of household members (M).
- ▶ Could have negative coefficients—replace with zero.
- ▶ The least recommended approach.

Estimating Other Household Consumption

$$\beta(a) = 1 - 0.6 \quad (\text{for } a \leq 4)$$

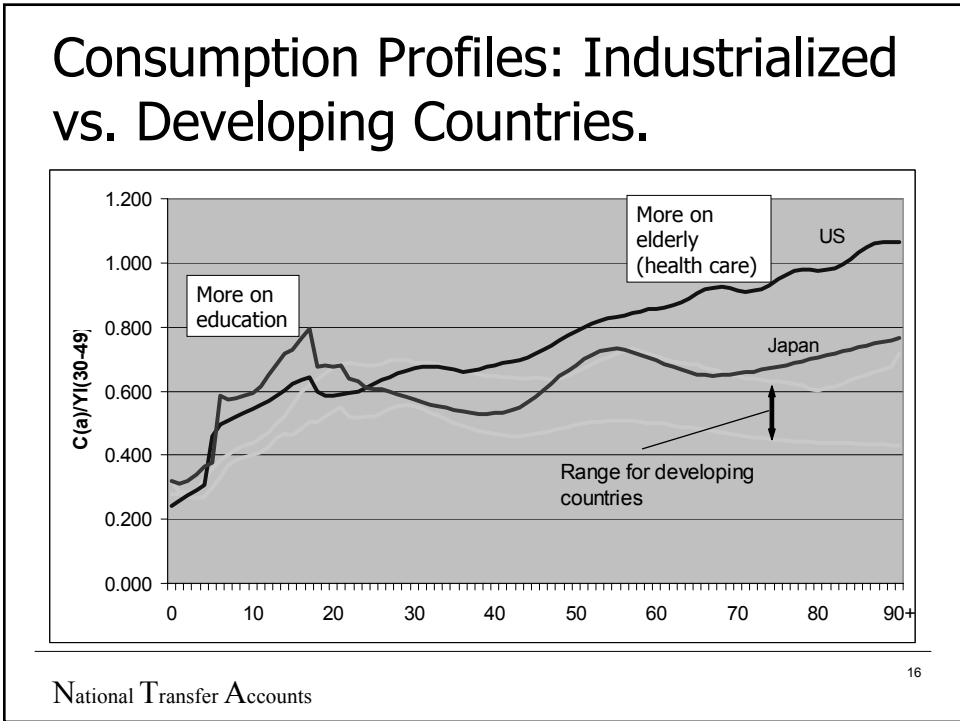
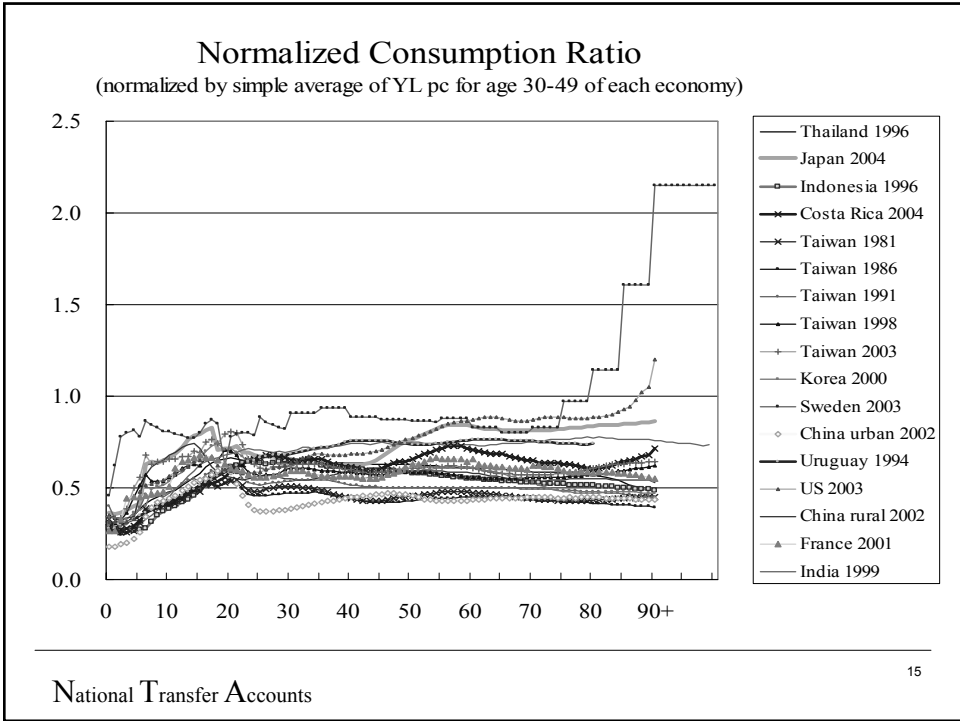
$$\beta(a) = 1 - [0.6 * (20 - a)] / 16 \quad (\text{for } 4 < a < 20)$$

$$\beta(a) = 1 \quad (\text{otherwise, i.e., } a \geq 20)$$

- ▶ Assumed to be proportional to an equivalence scale that is equal to 1 for adults aged twenty or older, declines linearly from age 20 to 0.4 at age 4, and is constant at 0.4 for those age 4 or younger.

Public Consumption

- ▶ Allocated based on administrative records, and in some cases, survey data.
- ▶ Public education consumption
 - Formal education consumption: estimate by calculating unit cost per student per level.
 - Informal education consumption: estimate by dividing total public informal education consumption by total population by age.
- ▶ Public health care consumption
 - Health care purchased by individuals and reimbursed through public programs: captured in household surveys.
 - Health care provided directly to individuals by government clinics: allocate using administrative records.
 - Collective health services: allocate on a per capita basis.
- ▶ Other public consumption: equally to all members



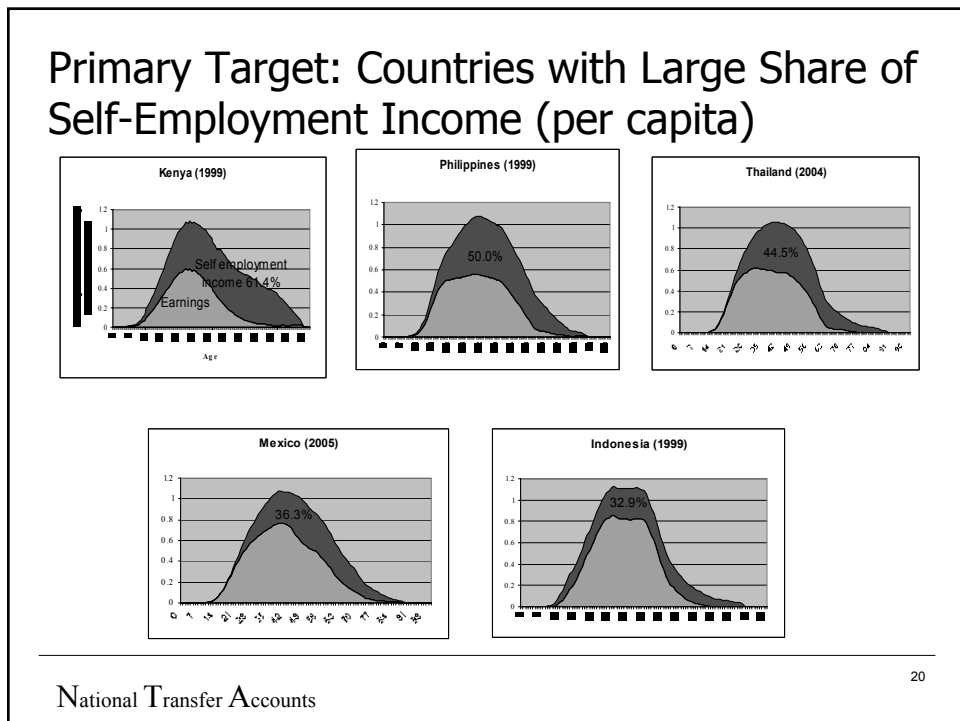
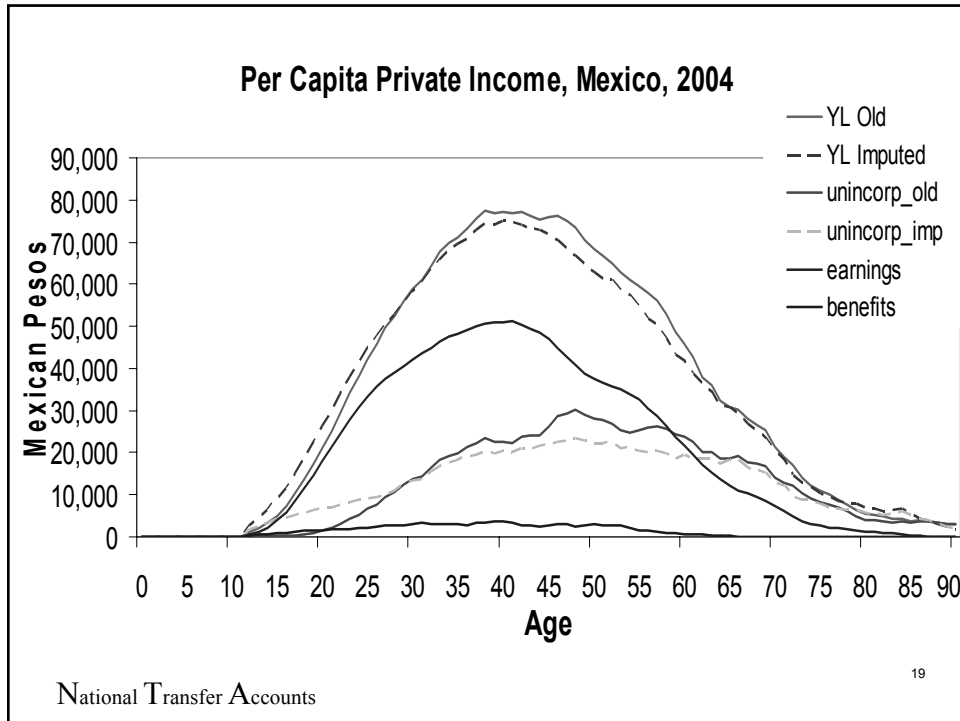
Estimating Labor Income

- ▶ Labor income includes
 - The compensation of employees
 - . Wages and salaries
 - . Fringe benefits
 - . Deferred payments
 - Labor's estimated share of mixed income (self-employment income)
- ▶ Does not include in-home activities which does not produce market goods or services (e.g. childrearing)

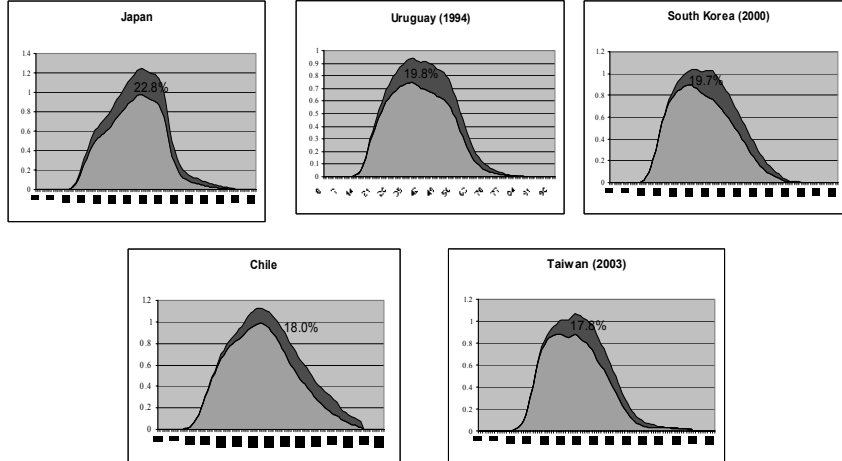
Imputing Labor Income for Unpaid Family Workers

- ▶ 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



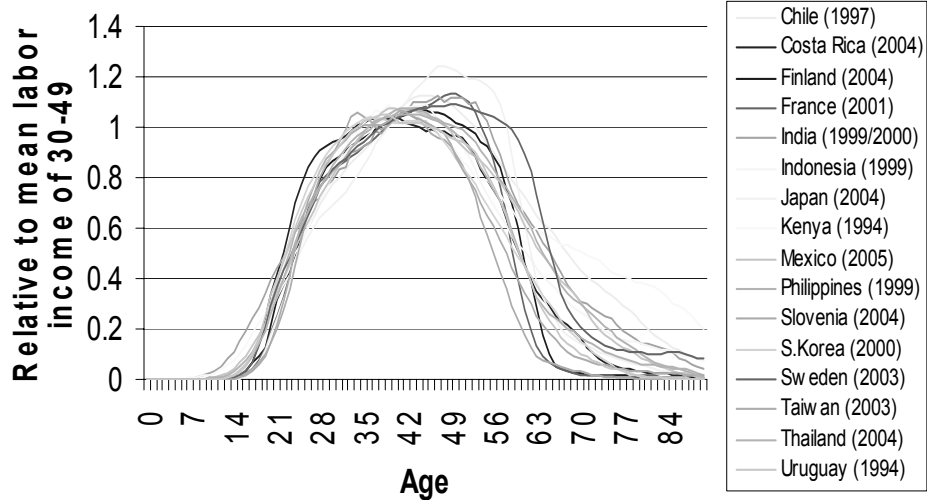
Secondary Target: Countries with Moderate Share of Self-Employment Income



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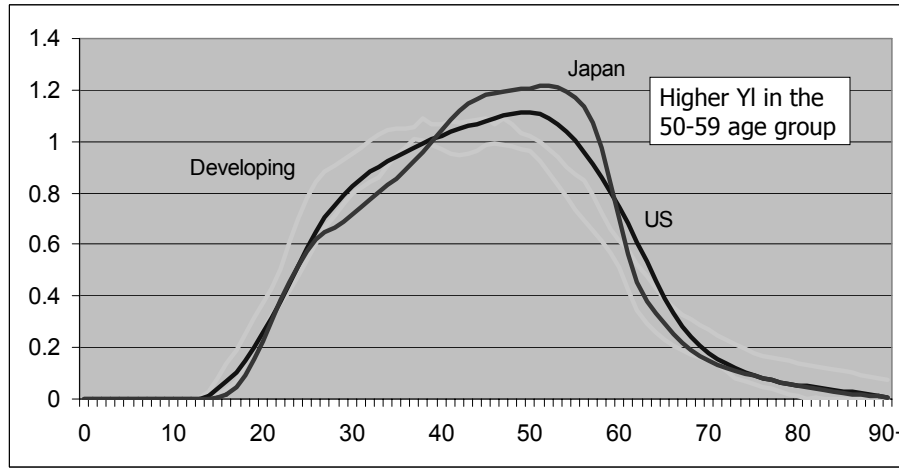
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Per Capita Labor Income Profile



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Labor Income: Industrialized vs. Developing Countries.



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Lifecycle Deficit and Surplus Ages

Country	Year	Early Age	Later Age	Duration
Indonesia	1996	29	58	29
Thailand	1996	26	61	35
Taiwan	1998	24	56	32
Japan	1999	29	61	32
United States	2000	27	59	32
Costa Rica	2004	24	57	33

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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.

Aggregate Controls

- ▶ Adjust the aggregate profile and the per capita profile to match a control total taken from NIPA or some other source.
 - Private consumption: household final consumption expenditure + non-profit institutions serving households' (NPISHs) final consumption expenditure
 - Public consumption: general government final consumption expenditure
 - Earnings + fringe benefits: compensation of employees. NIPA excludes compensation received by non-resident and remittances (on-going discussion)
 - Labor portion of self-employment income: mixed income of household sector

Some Adjustments are Needed

- ▶ In NIPA, prices are market prices; in NTA, prices are basic prices net of indirect taxes (see Beet's presentation for details)
- ▶ In NIPA, private health consumption reimbursed through public health insurance programs (Medicare, NHI) are private health consumption; in NTA it is reclassified as public consumption.
- ▶ In NIPA, non-housing consumer durable consumption is measured by expenditure; in NTA, consumption of it is the flow of services.

The End