Population Aging and the Generational Economy: A Global Perspective

Ronald Lee, University of California, Berkeley
Seminar in Economic Demography
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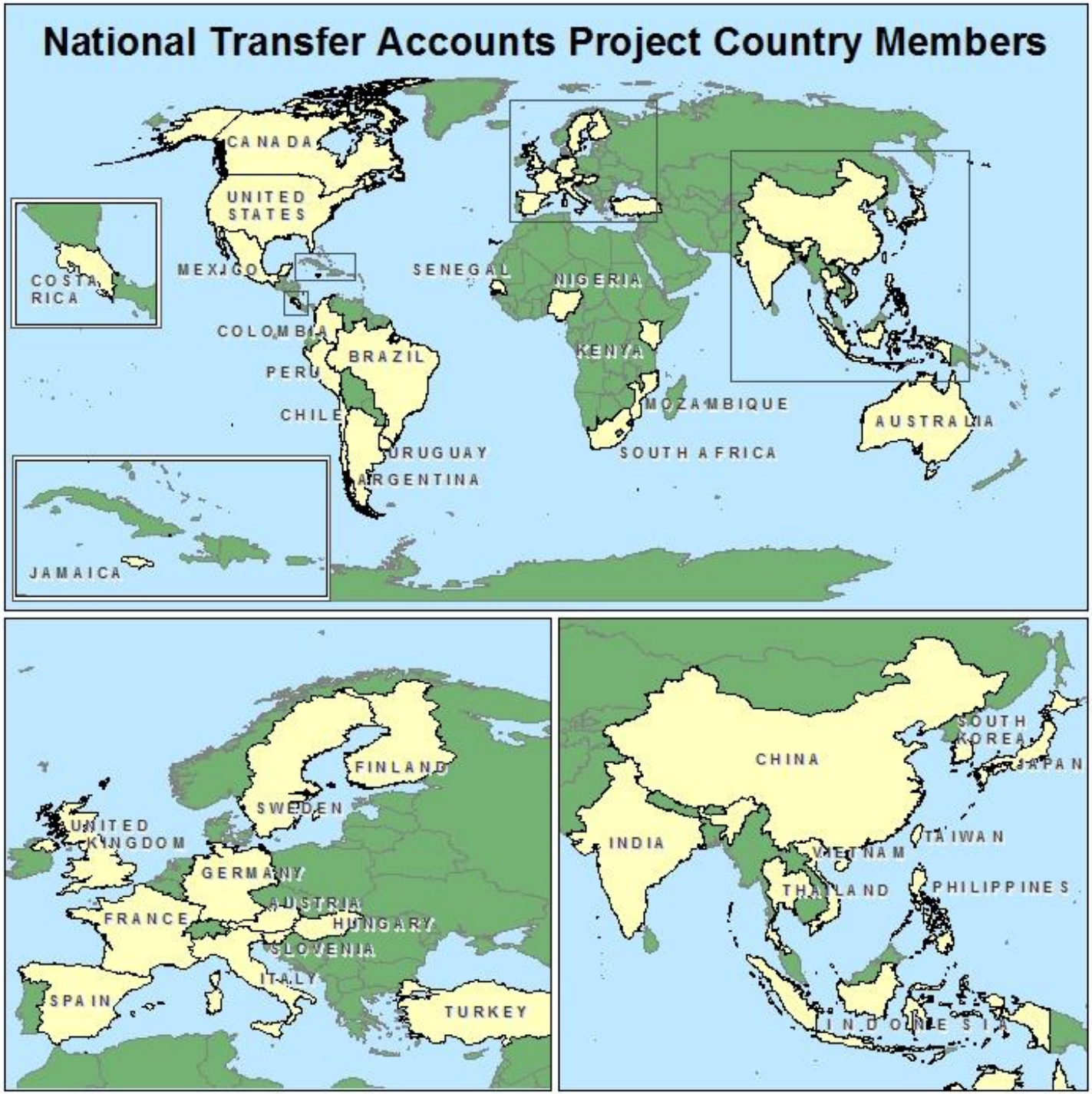
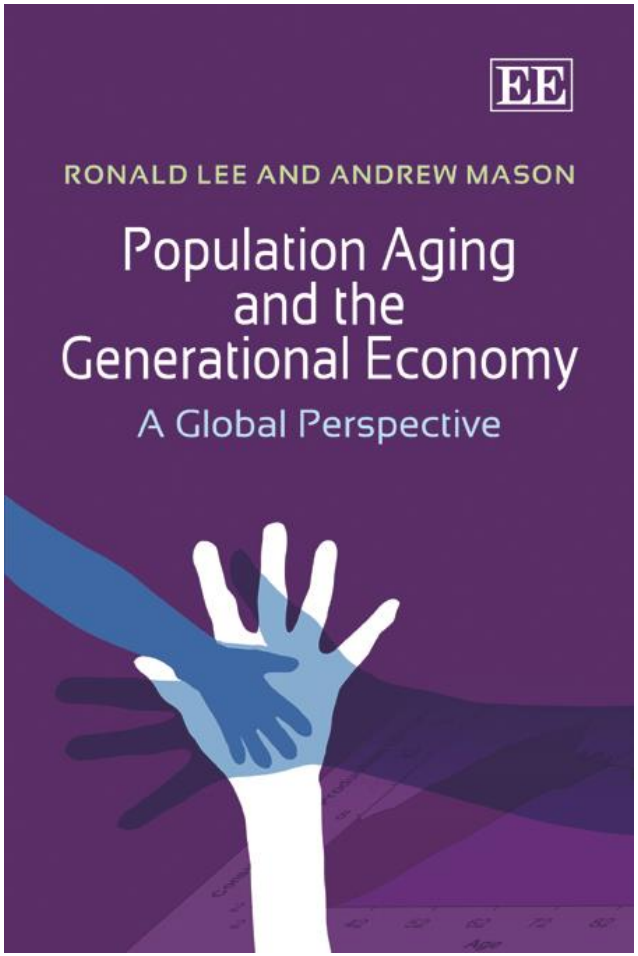
Research support from NIA R37 AG025247.
Grateful to National Transfer Account country teams, Andrew Mason, and Gretchen Donehower

National Transfer Accounts (NTA) project

- Co-directed by Lee (Berkeley) and Mason (East West Center, Hawaii)
- 37 countries, each with own research team (11 more countries will join soon).
  - Training program last July for Jordan and Palestine
  - Training program two weeks ago for Egypt, Cambodia
- Consistent with United Nations System of National Accounts (SNA) by construction
- Based on existing surveys, demographic data, administrative data. Uniform methods.


National Transfer Accounts Project Country Members
CANADA
UNITED STATES
MEXICO
COSTA RICA
COLOMBIA
BRAZIL
PERU
CHILE
URUGUAY
ARGENTINA
JAMAICA
SENEGAL
NIGERIA
KENYA
MOZAMBIQUE
SOUTH AFRICA
AUSTRALIA
FINLAND
SWEDEN
UNITED KINGDOM
GERMANY
AUSTRIA
FRANCE
HUNGARY
SLOVENIA
ITALY
SPAIN
TURKEY
CHINA
SOUTH KOREA
JAPAN
INDIA
TAIWAN
VIETNAM
THAILAND
PHILIPPINES
INDONESIA

Selected results from National Transfer Accounts (NTA) project: **NTAccounts.org**



Free download of book – see NTA website

I will present a selection of empirical results, partly with an emphasis on the US, partly in comparative context.

There is a formal analysis as well, but not for today:

- Ronald Lee (1994) "The Formal Demography of Population Aging, Transfers, and the Economic Life Cycle," in Linda Martin and Samuel Preston, eds., *The Demography of Aging* (National Academy Press, 1994) pp.8-49. http://www.nap.edu/openbook.php?record_id=4553&page=8
- Antoine Bommier and Ronald Lee (2003) "Overlapping Generations Models with Realistic Demography," *Journal of Population Economics* 16:1:135-160.

Flow identity arranged to emphasize life cycle (budget at age x, indivual or cohort)

$$\underbrace{C(x) - Y^{l}(x)}_{\text{Lifecycle deficit}} = \underbrace{\underbrace{\tau^{+}(x) - \tau^{-}(x)}_{\text{Net transfers}} + \underbrace{Y^{A}(x) - S(x)}_{\text{Asset-based reallocations}}}_{\text{Age reallocations}} \qquad (3.1)$$

- NTA estimates these flows, and their subcomponents, public and private.
- Bequests are not yet included.

Start with cross-sectional age profiles of labor income and consumption (left side of flow equation)

- Age profiles
  - Population averages at each age, combining males, females, including 0's
  - Age profiles multiplicatively adjusted to match National Accounts (SNA) totals (given pop age distr)
- For comparative purposes, standardize by dividing each economy's age profiles by its average labor income ages 30-49.

Consumption includes

- Private household expenditures imputed to individuals
- Public in-kind transfers (e.g. education, health care, long term care)

Imputation of hshld consumption expenditure to hshld members

- health and education – if not given directly in survey
  - Each hshld total is regressed on household composition dummies in each country (e.g. on number of enrolled kids by age group)
  - Coefficients used to allocate household totals to individuals within each household
  - Test various methods in countries with richer data
- Remaining household consumption ("Other") is allocated in proportion to assumed equivalent adult consumer weights, same across all countries, pre consumption taxes:
  - .4 for ages 0-4
  - Increases linearly to 1.0 at age 20
  - Tried various other methods, e.g. "adult goods" method; very unstable, poor outcomes. Deaton recommends more or less what we do.
- Calculate average imputed consumption across all individuals in all households at each given age, male and female.

Public in-kind transfers

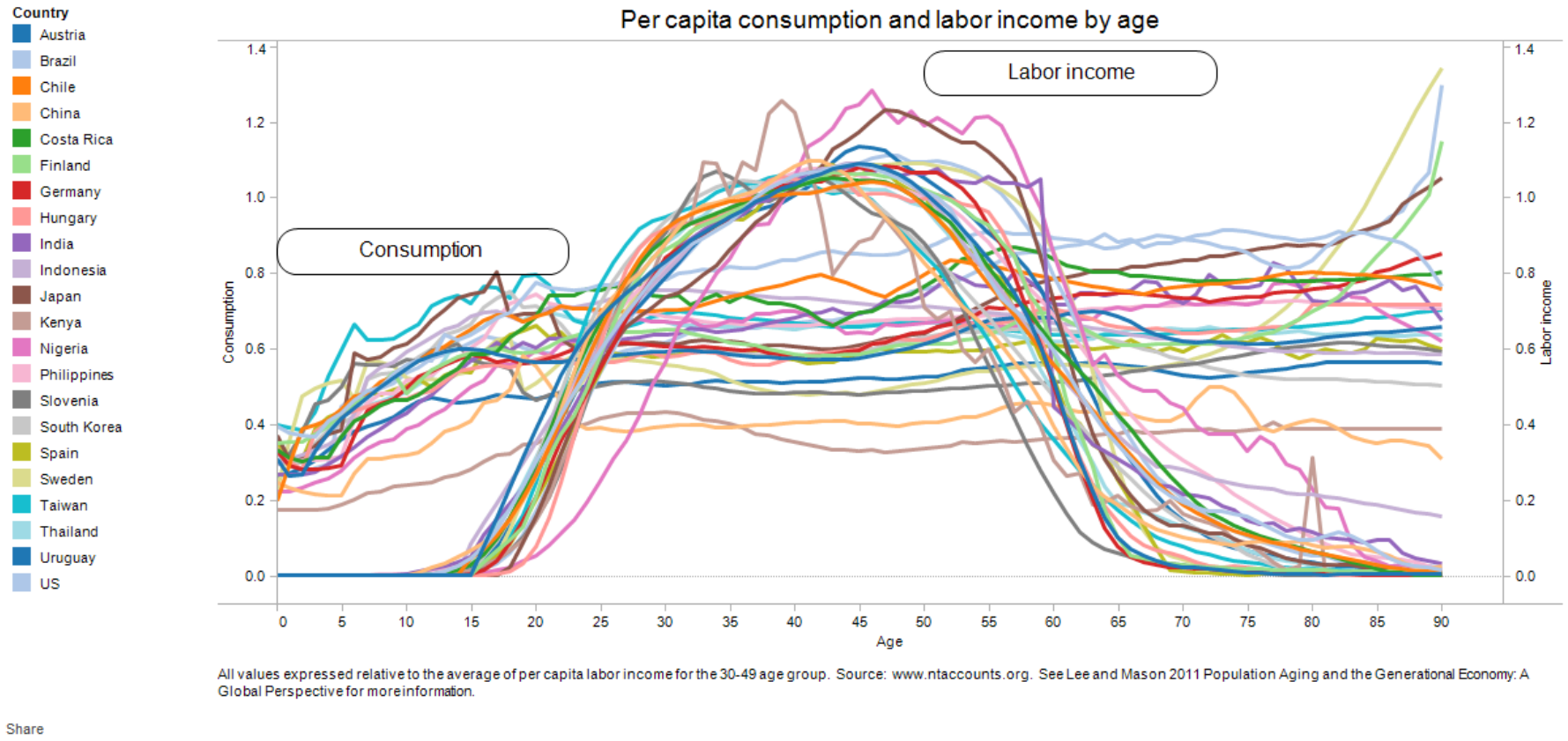
- Education
  - Use administrative data with household surveys in obvious ways
- Health
  - More difficult and error prone
  - Long term care particularly hard
  - Different kinds of data sources by country
- Other in-kind assigned on constant per capita basis
  - Military, most social infrastructure, research etc.
- Tax incidence follows rules of Generational Accounting.
  - Payroll taxes fall on employees
  - Consumption taxes are “paid” by individual consuming, even if it is an infant!

Labor Income

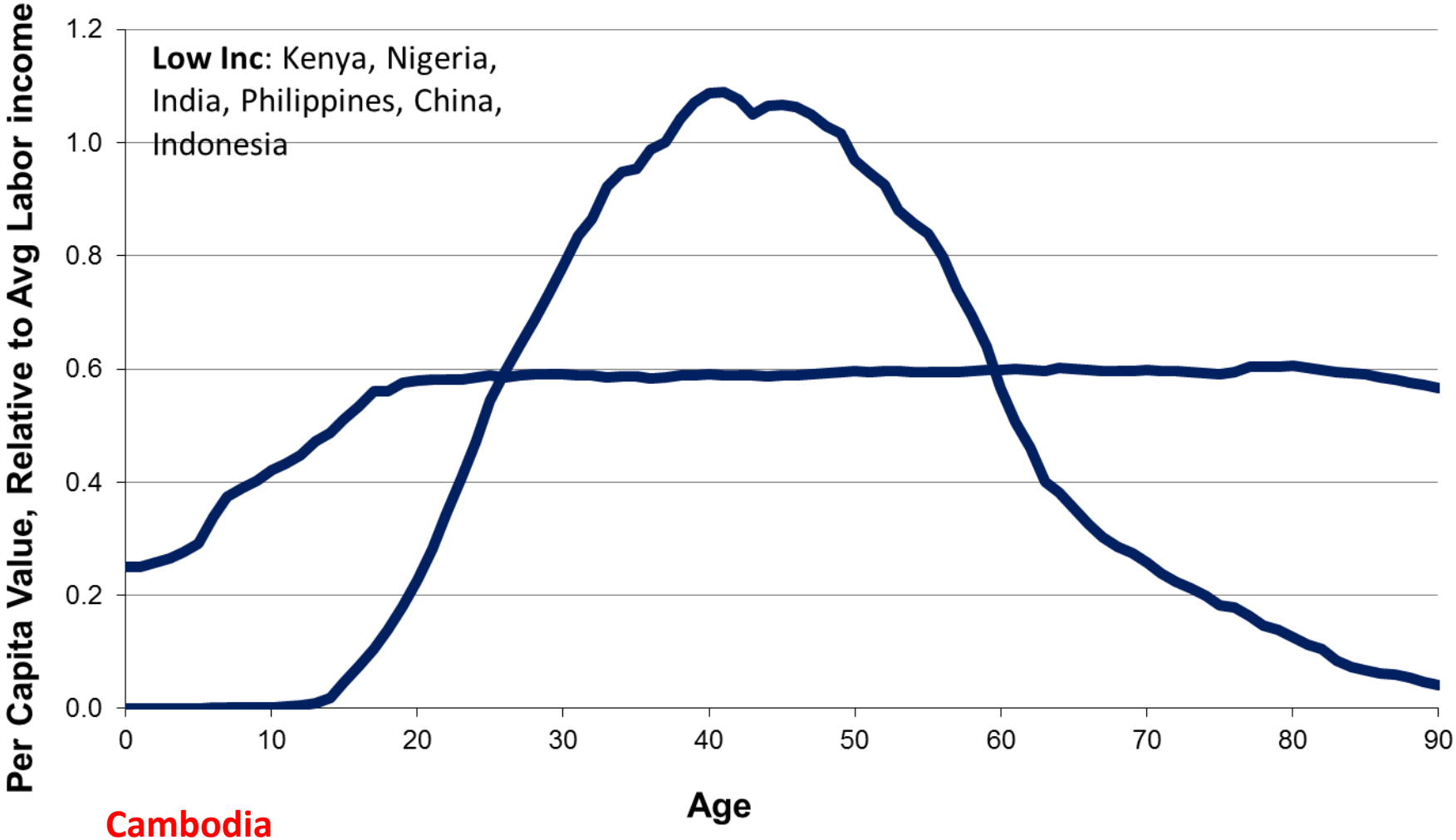
- Wages, salaries, fringe benefits before tax
- 2/3 of self employment income, unpaid family labor (1/3 to assets)
  - Within household 2/3 self-employment income is allocated to members reporting unpaid family labor in proportion to average labor income by employees of the same age
  - Home time spent producing non-market goods and services is not included, consistent with National Accounts (child care, cooking dinner, etc.)
    - We do have a version of NTA that includes time use data and home production.
- Average includes 0's.

1. Consumption and Labor Income in Rich and Poor Countries

Age profiles of NTA labor income and consumption for 22 countries around the year 2000

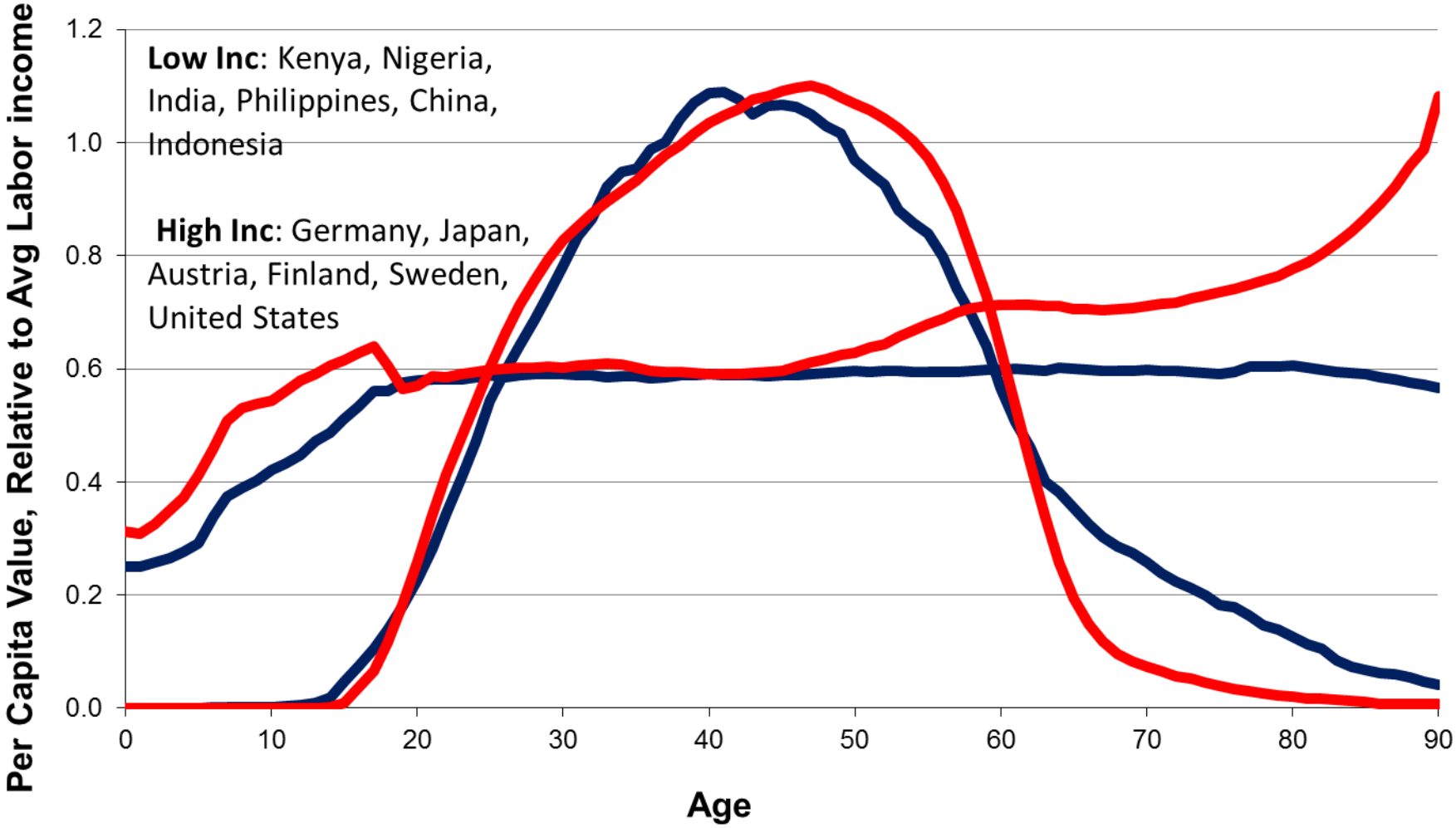


Consumption and Labor Income of Low Income Countries (average of the bottom income quartile of NTA countries)

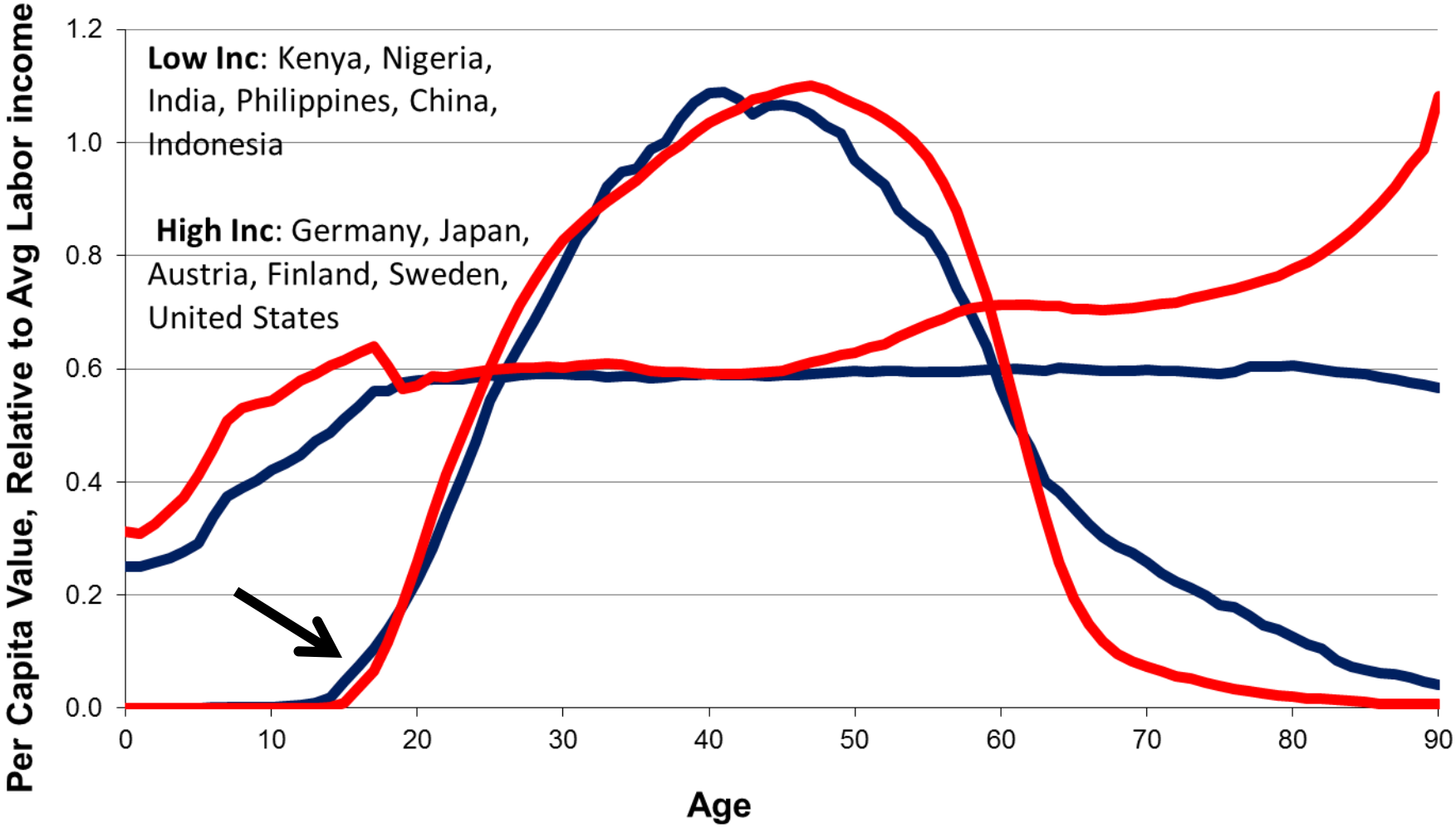


Cambodia

Consumption and Labor Income of High Income and Low Income Countries (averages of the top and bottom income quartile of NTA countries)



Consumption and Labor Income of High Income and Low Income Countries (averages of the top and bottom income quartile of NTA countries)



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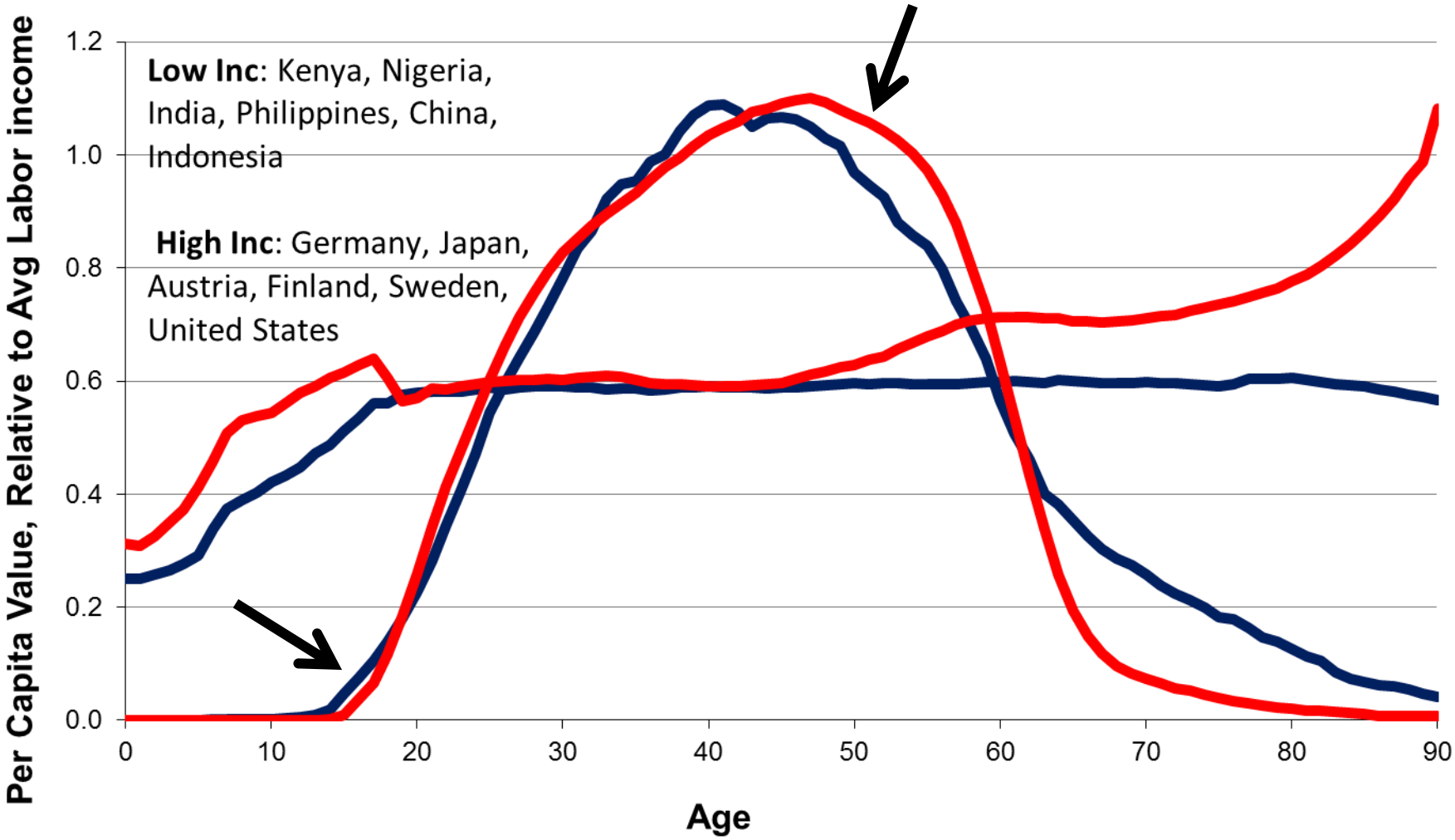
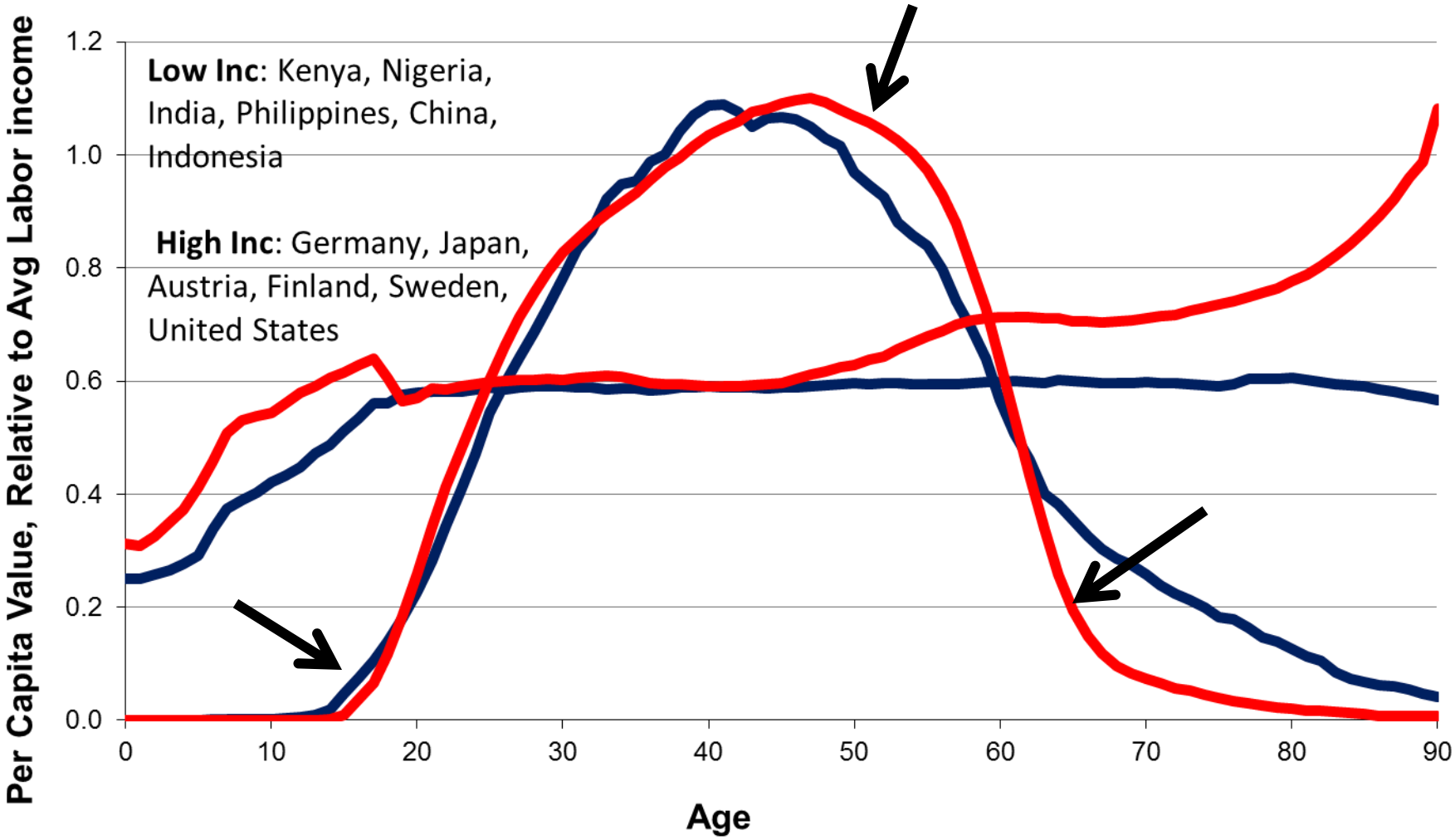


Consumption and Labor Income of High Income and Low Income Countries (averages of the top and bottom income quartile of NTA countries)



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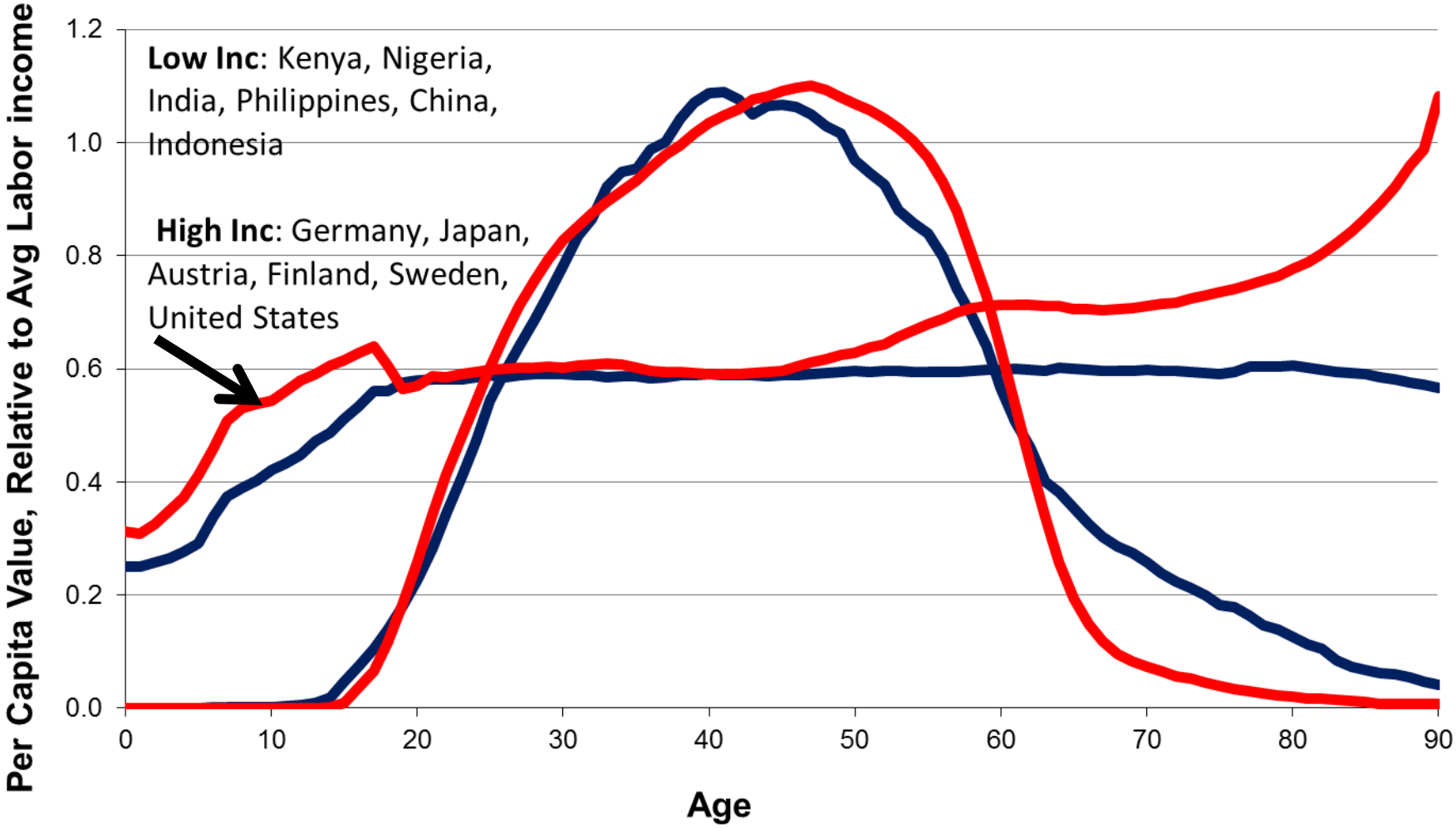

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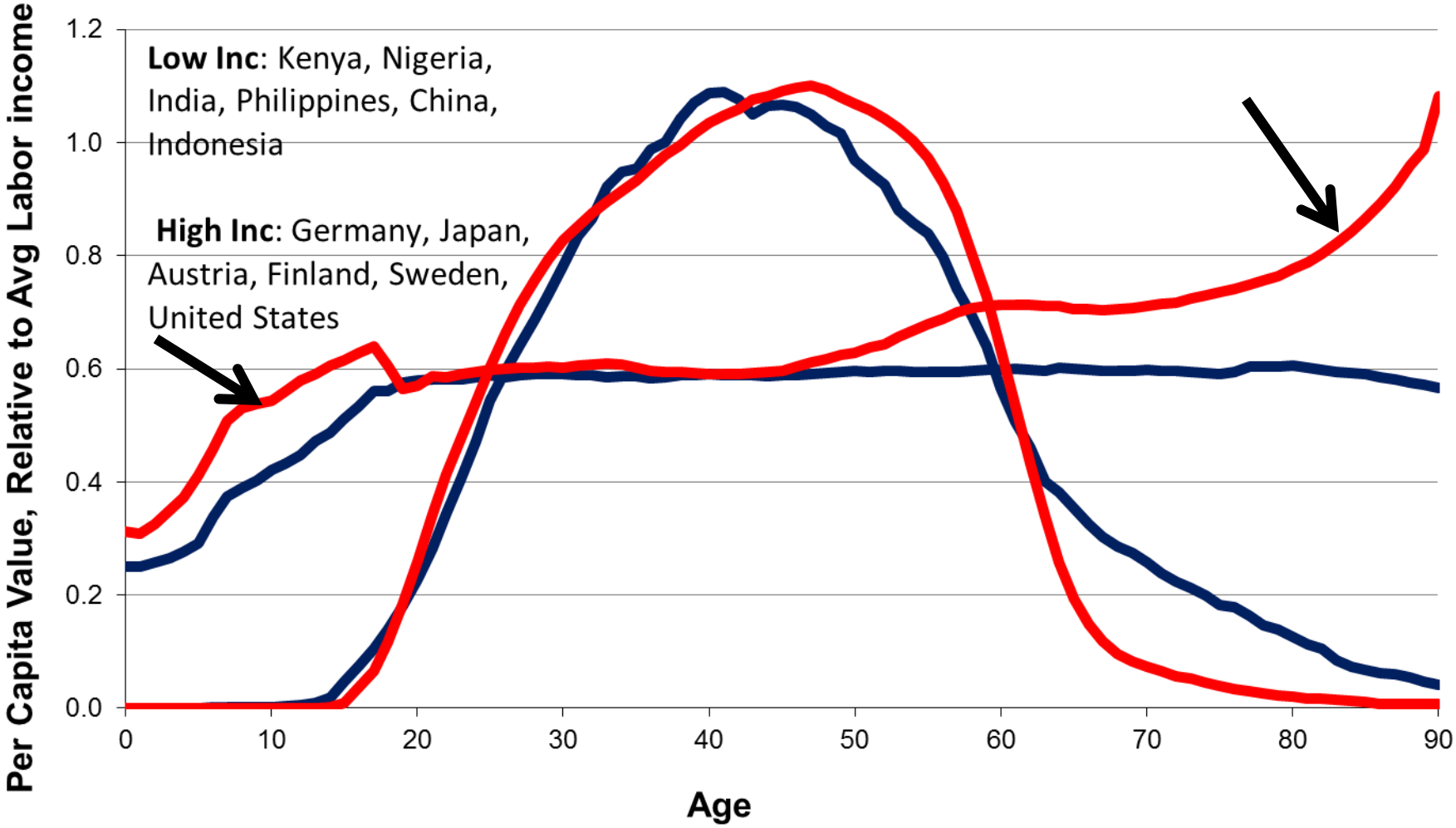
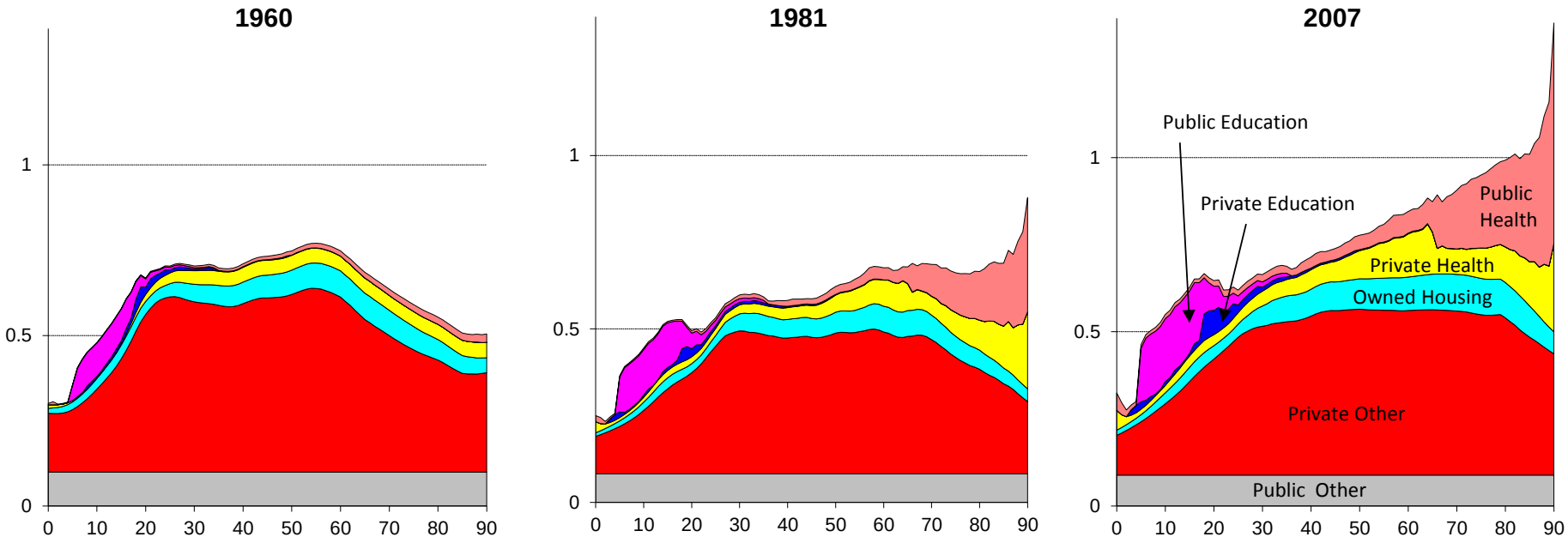


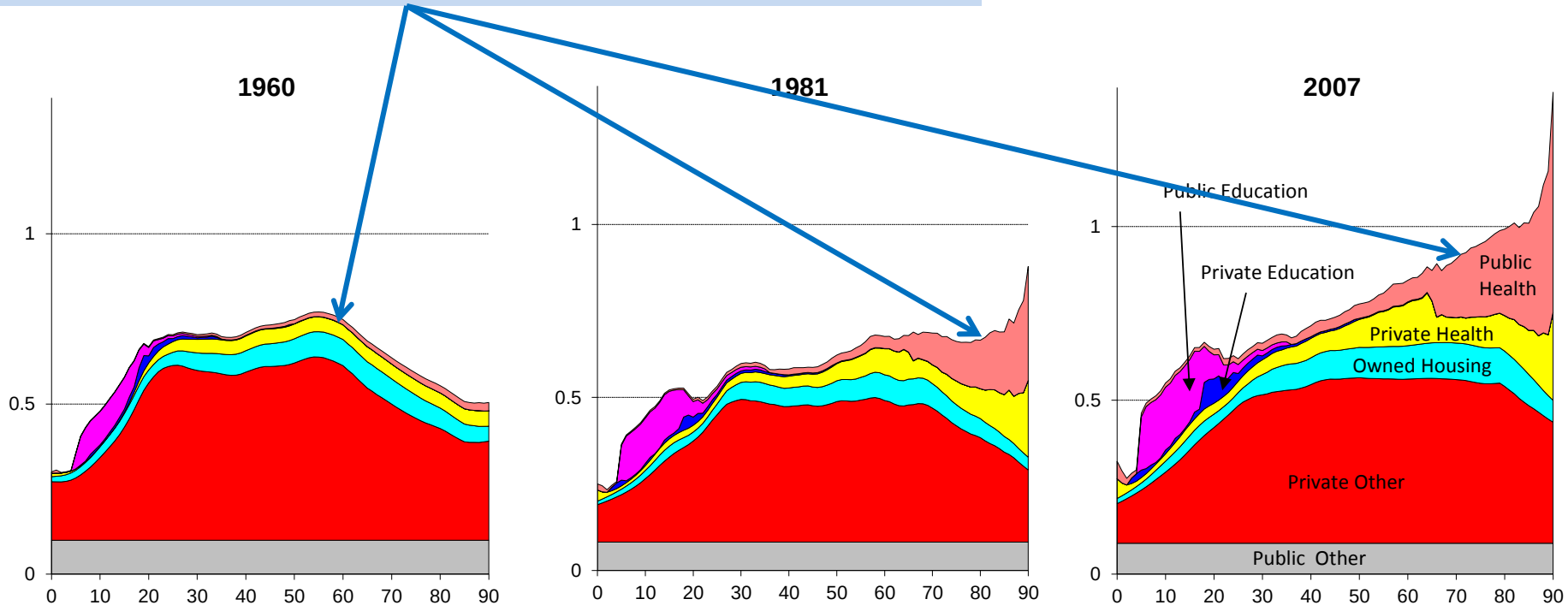
2. US consumption over past half century: 1960, 1981 and 2007 (Ratio to labor income ages 30-49).



Source: US National Transfer Accounts, Lee, Donehower and Miller, 2011

Growth of the Welfare State: US consumption over past half century: 1960, 1981 and 2007 (Ratio to labor income ages 30-49).

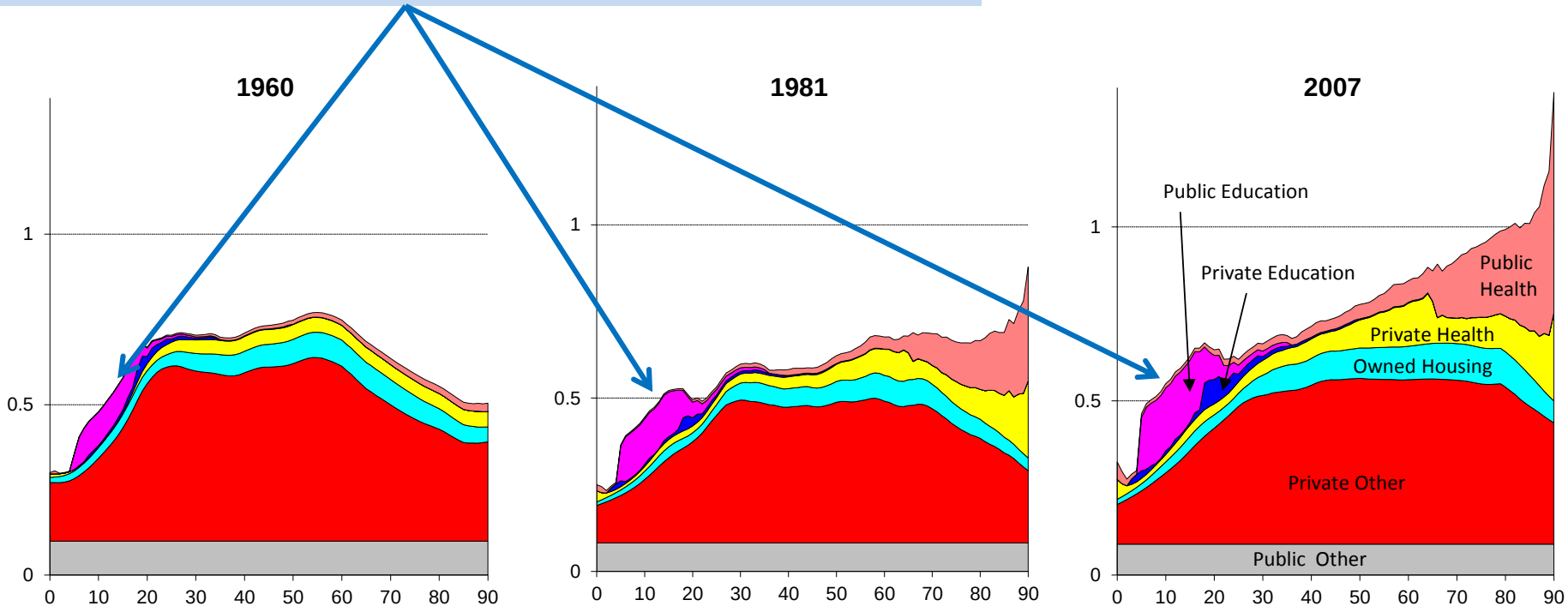
Public spending on health care has risen greatly



Source: US National Transfer Accounts, Lee, Donehower, 2011

Growth of the Welfare State: US consumption over past half century: 1960, 1981 and 2007 (Ratio to labor income ages 30-49).

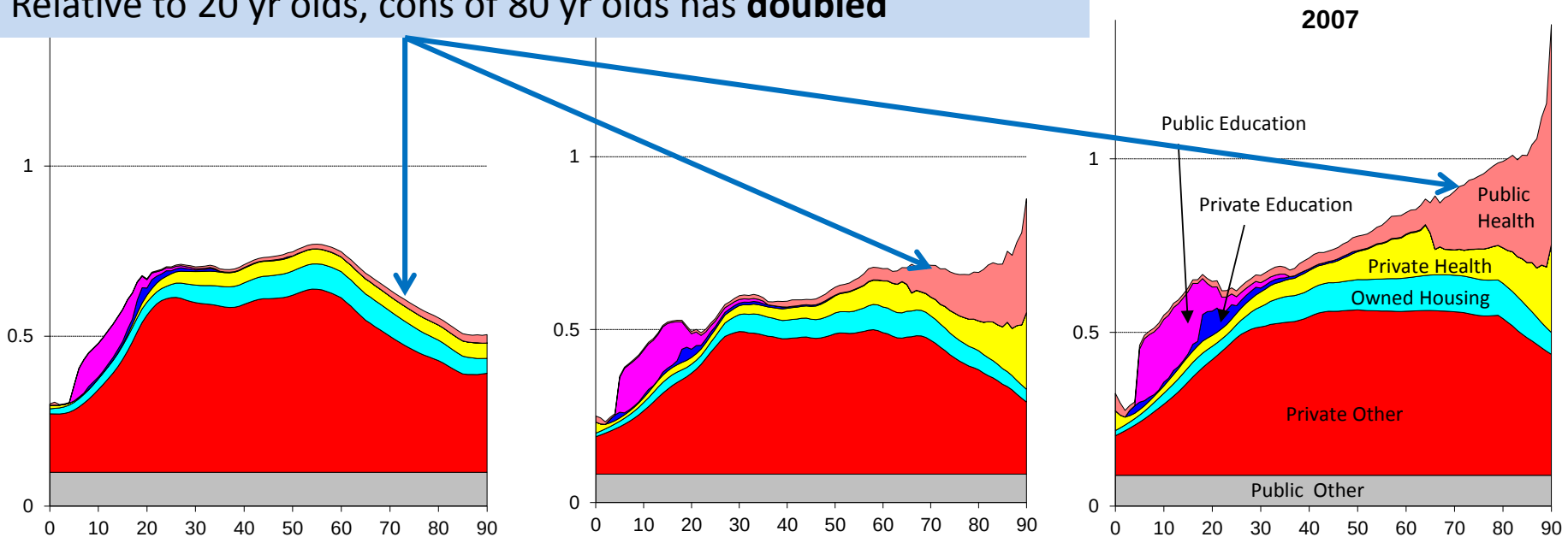
Public spending on education has risen also



Source: US National Transfer Accounts, Lee, Donehower and Miller, 2011

Growth of the Welfare State: US consumption over past half century: 1960, 1981 and 2007 (Ratio to labor income ages 30-49).

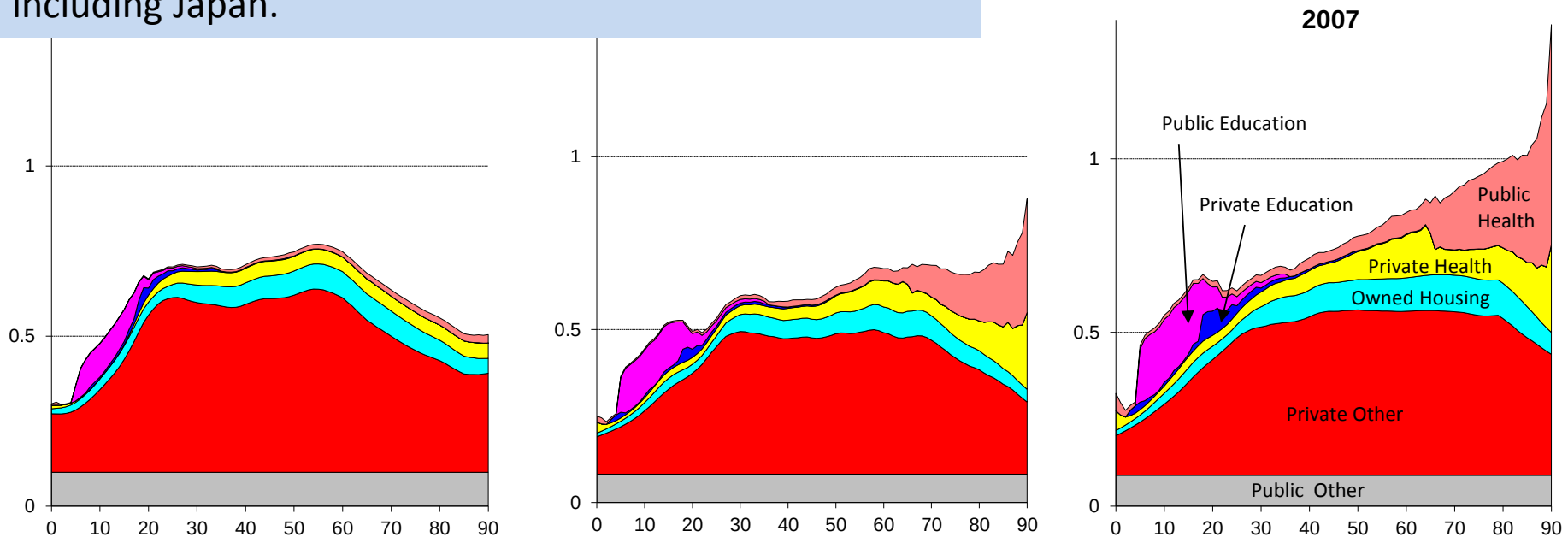
Before, the elderly consumed much less than other adults.
Now, they consume much more than others.
Relative to 20 yr olds, cons of 80 yr olds has **doubled**



Source: US National Transfer Accounts, Lee, Donehower and Miller, 2011

Growth of the Welfare State: US consumption over past half century: 1960, 1981 and 2007 (Ratio to labor income ages 30-49).

This makes population aging more costly
Many other rich industrial nations are similar, probably including Japan.

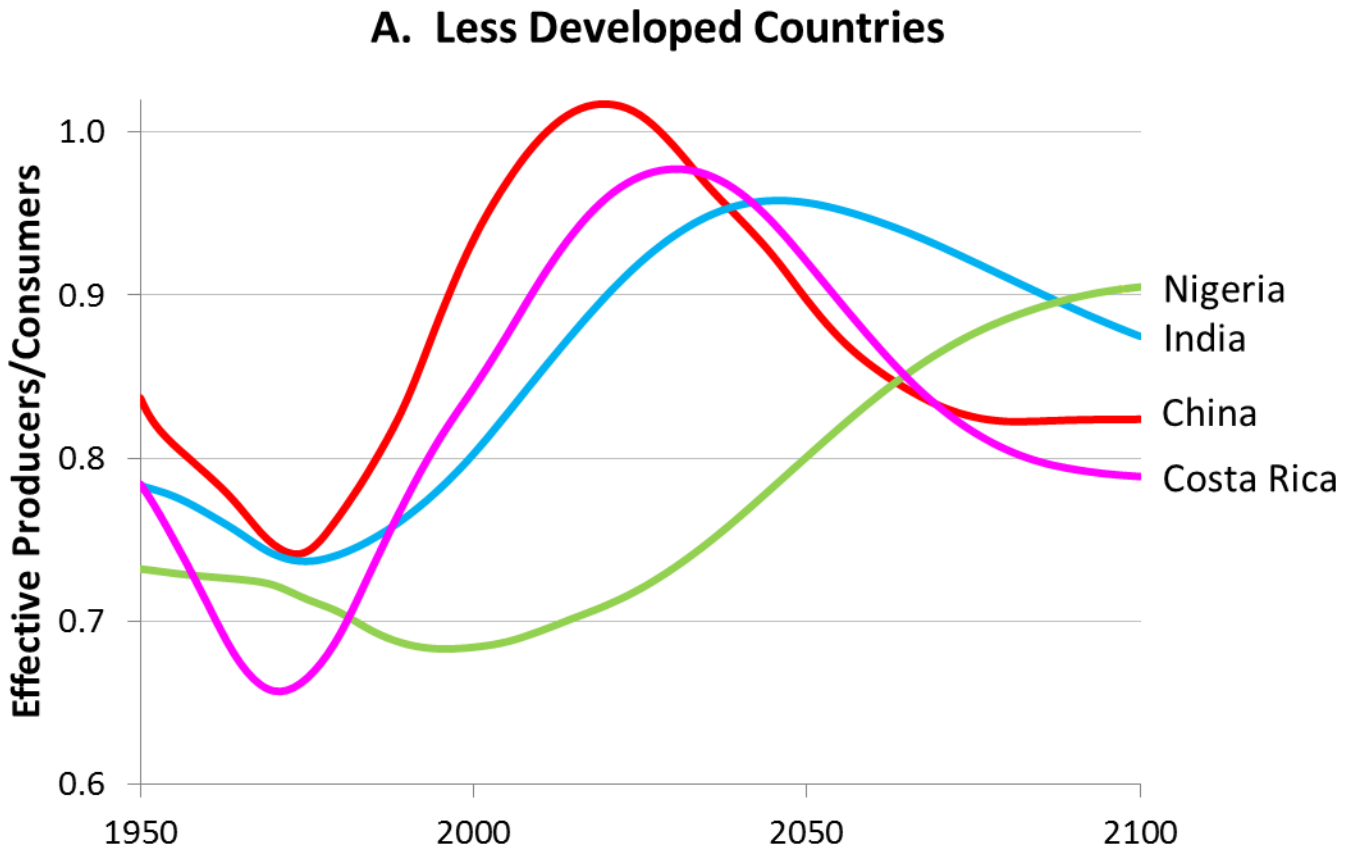


Source: US National Transfer Accounts, Lee, Donehower and Miller, 2011

3. The greatest worry about population aging is falling support ratios

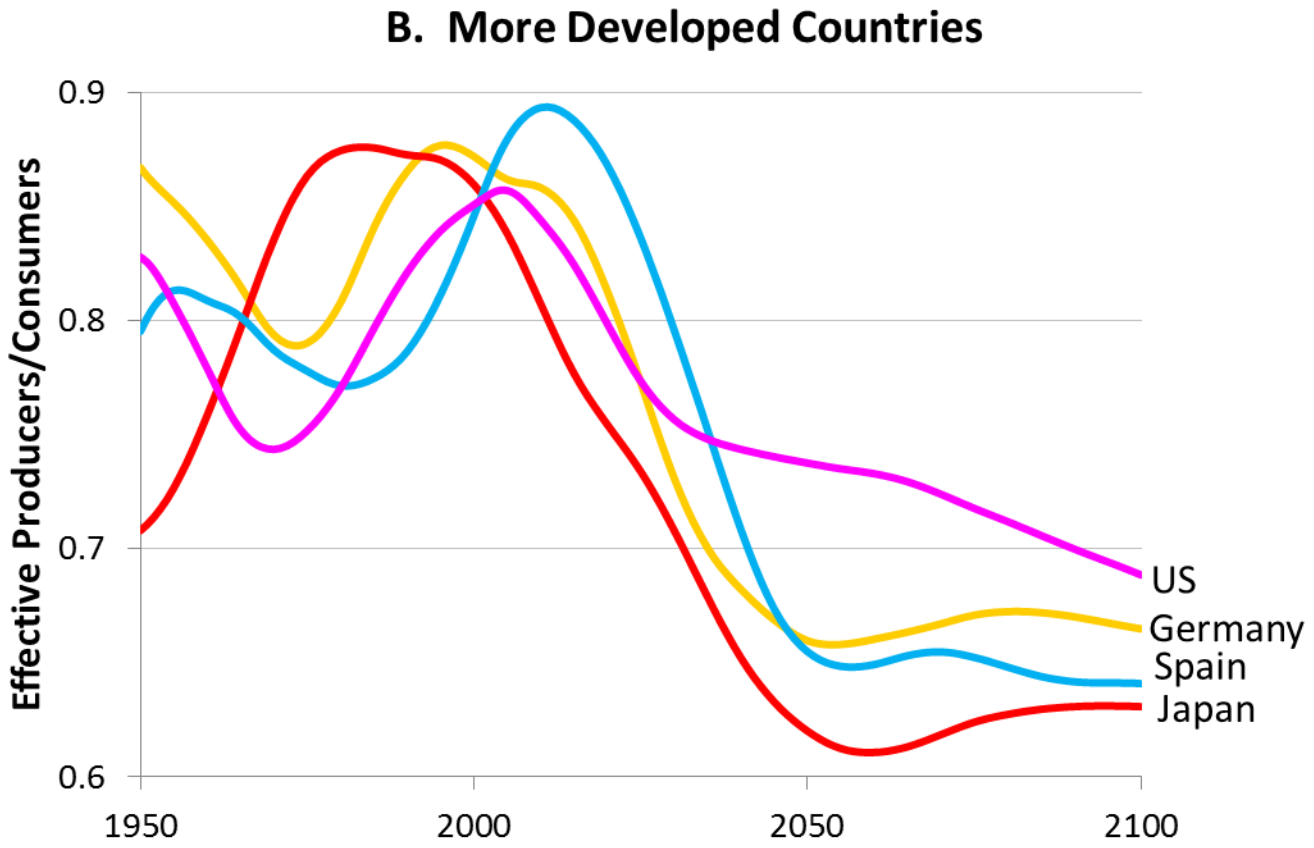
- The support ratio is the population-weighted sum of labor income divided by the population weighted sum of consumption
  - Holding constant the age profiles I just showed
  - Calculate for changing population age distributions
- If productivity growth, saving rates and foreign borrowing are constant, then:
  - consumption per capita will be proportional to this support ratio.
  - Rate of growth of support ratio is rate of change of consumption

Support ratios based on the average poor country profiles and UN 2010 revision



		Annual % Rate of change of support ratio			
		China	India	Nigeria	Costa Rica
Trough to Peak		0.67	0.37	0.27	0.67
Peak to 2100		-0.26	-0.17	na	-0.31

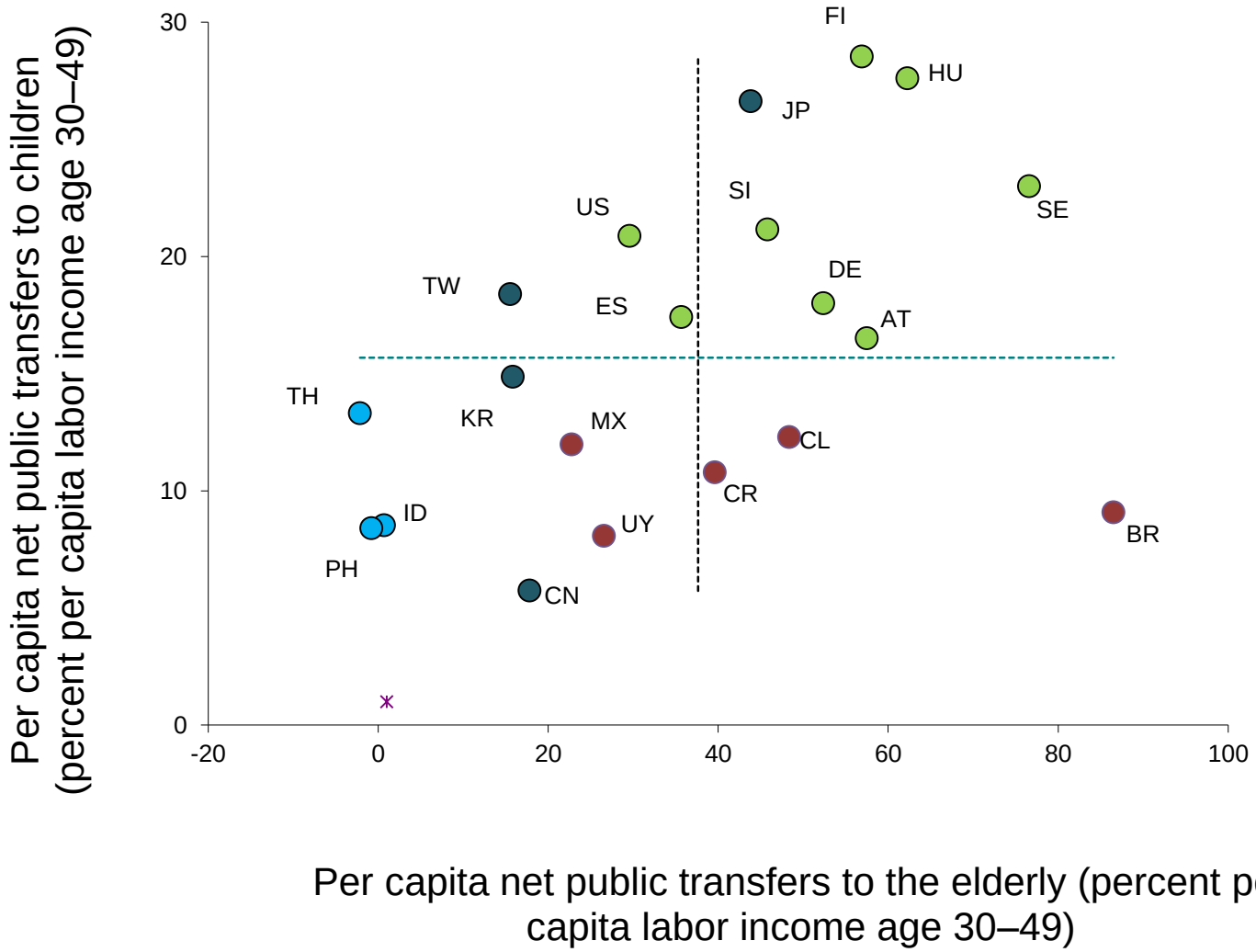
Support ratios based on the average rich country profiles and UN 2010 revision



	Rate of change of support ratio			
	Germany	Japan	Spain	US
2010 to 2050	-0.66	-0.66	-0.78	-0.34

4. Public Transfers to Children and the Elderly in Comparative Context

Per capita net public transfers to children and the elderly: 20 economies around 2000 (lines are medians).



Source: Tim Miller, Ch. 7, Lee and Mason, 2011

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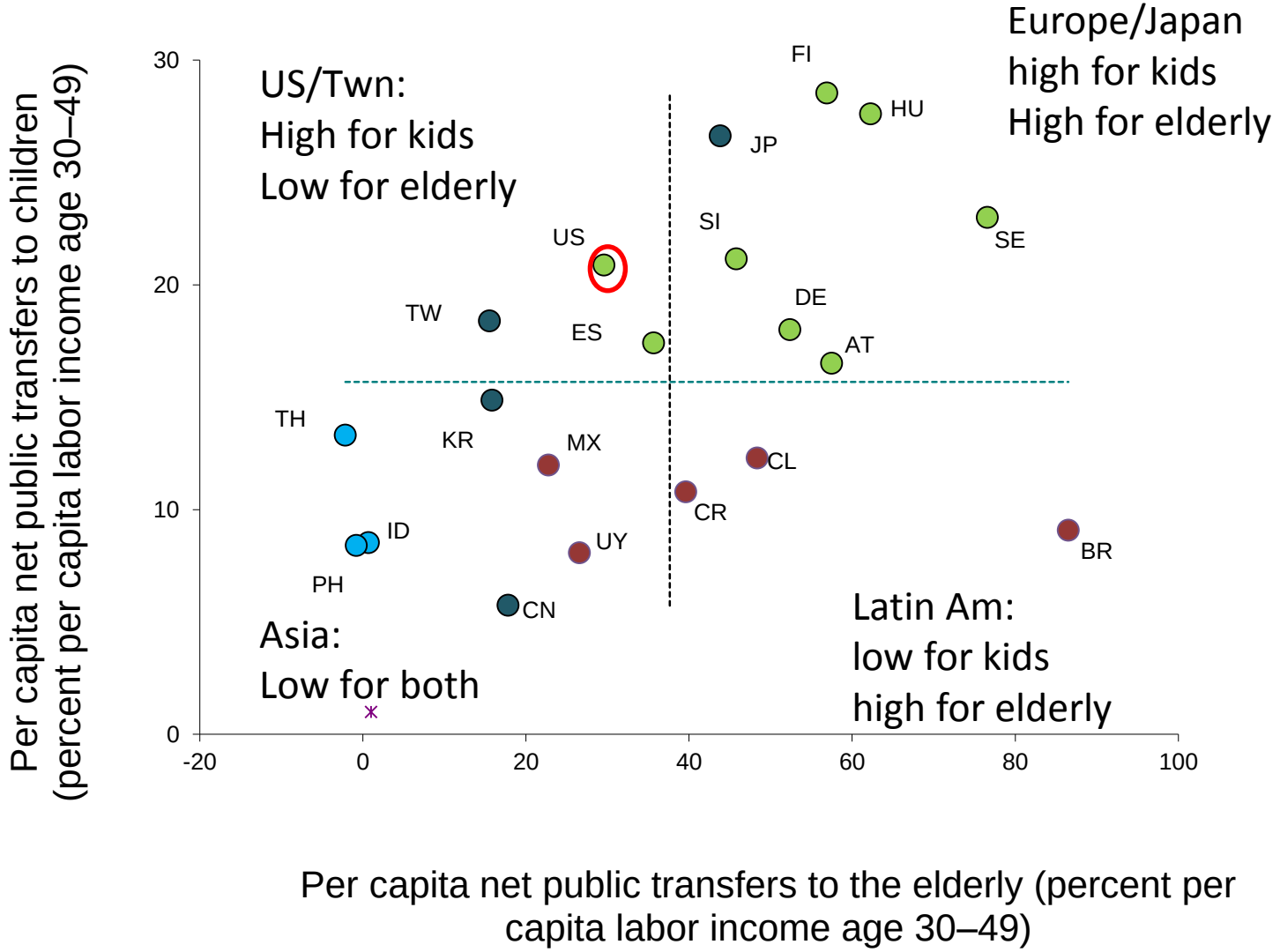
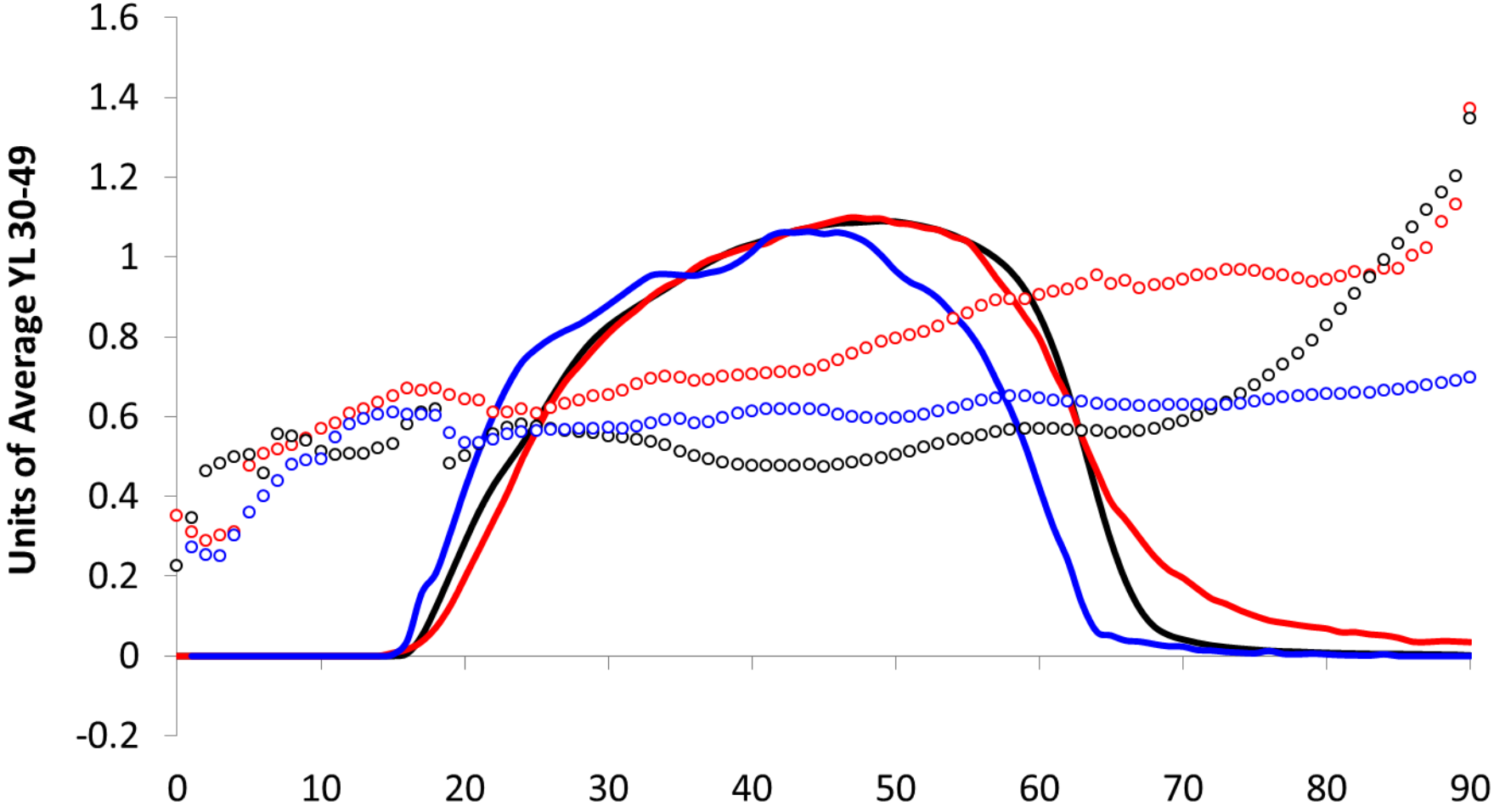


Source: Tim Miller, Ch. 7, Lee and Mason, 2011

5. A closer look at the US, with Austria and Sweden for comparison

Labor Income and Consumption

(Red - US 2003; Black - Sweden 2003; Blue - Austria 2000)



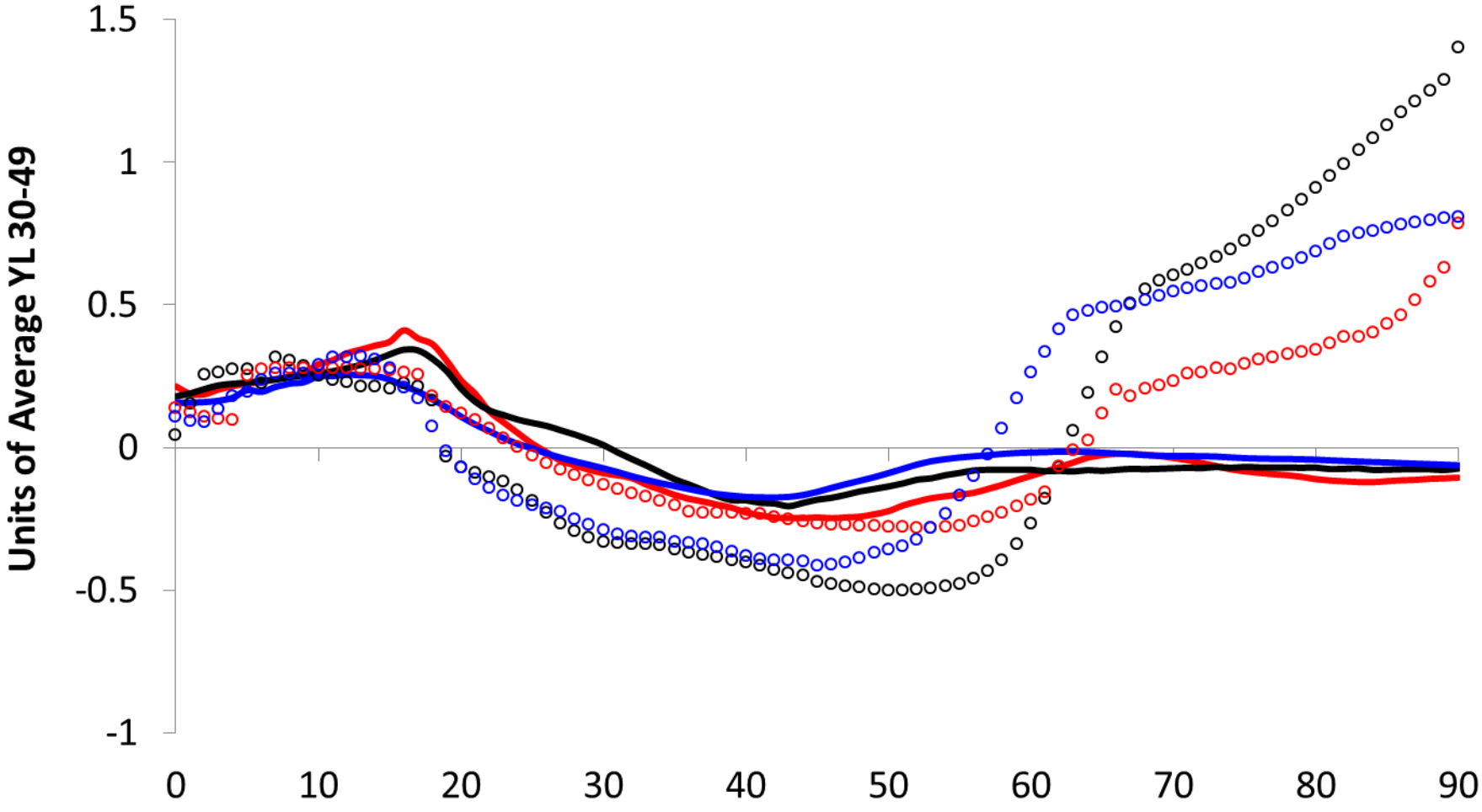
How transfers are estimated

- Net **intra**household transfers at each age in each household are the difference between income received (labor income, asset income and public transfers) and consumption.
- Net **inter**household transfers are estimated from direct survey questions.
- **Currently bequests at death are not included – work in process!**

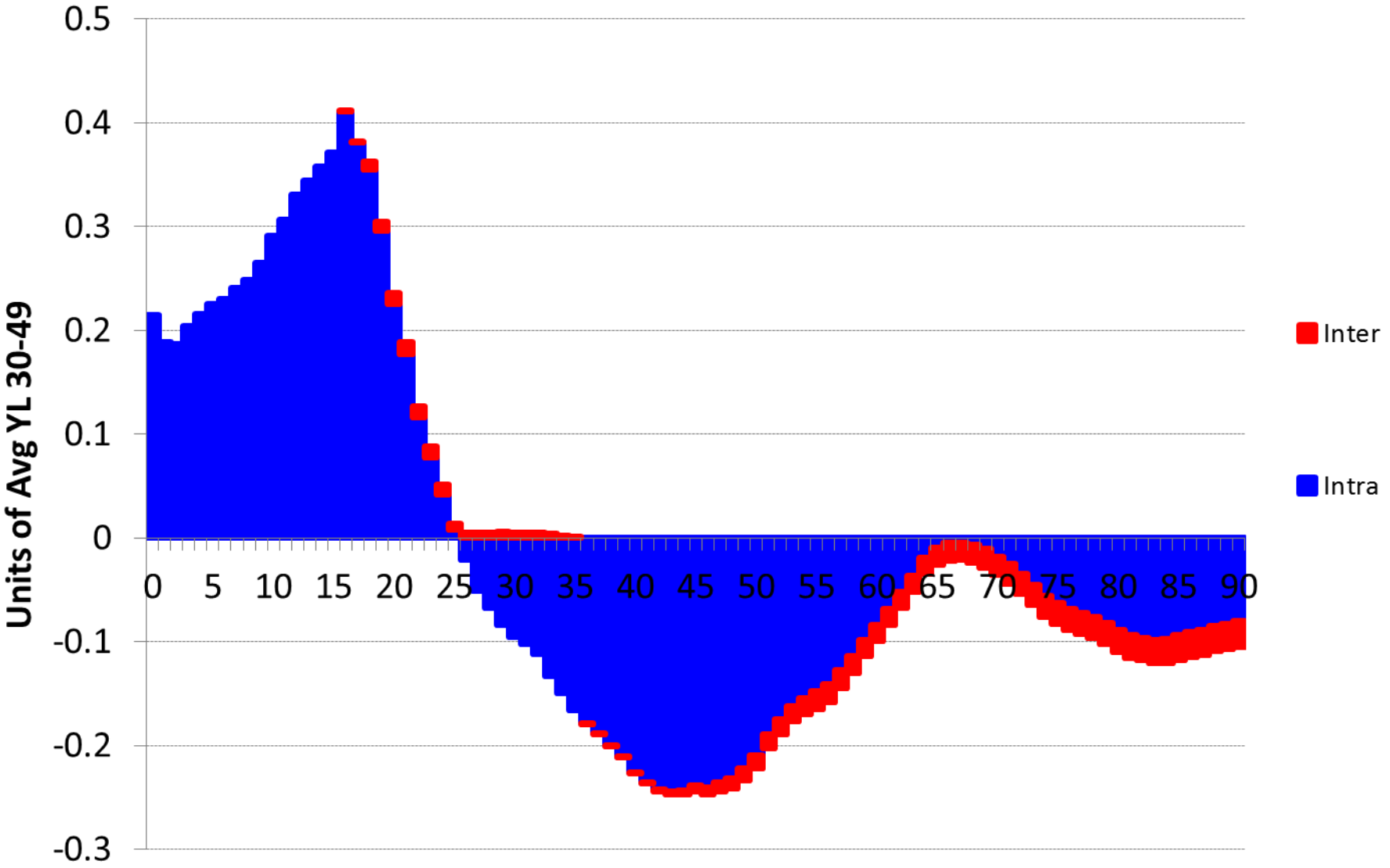
Transfers

(Red - US; Black - Sweden; Blue - Austria)

Circles are public transfers, lines are private transfers)

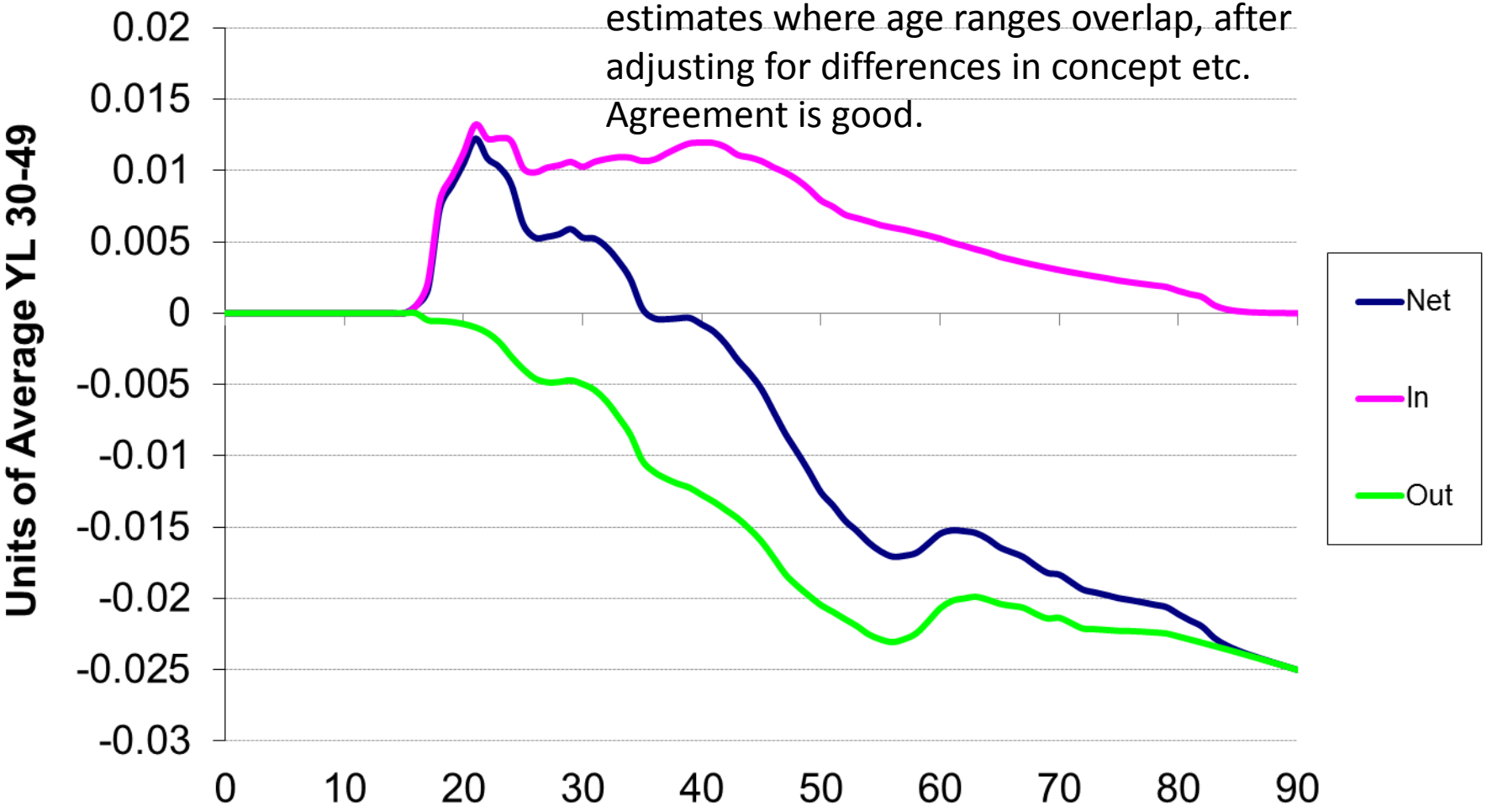


Net Private Transfers US

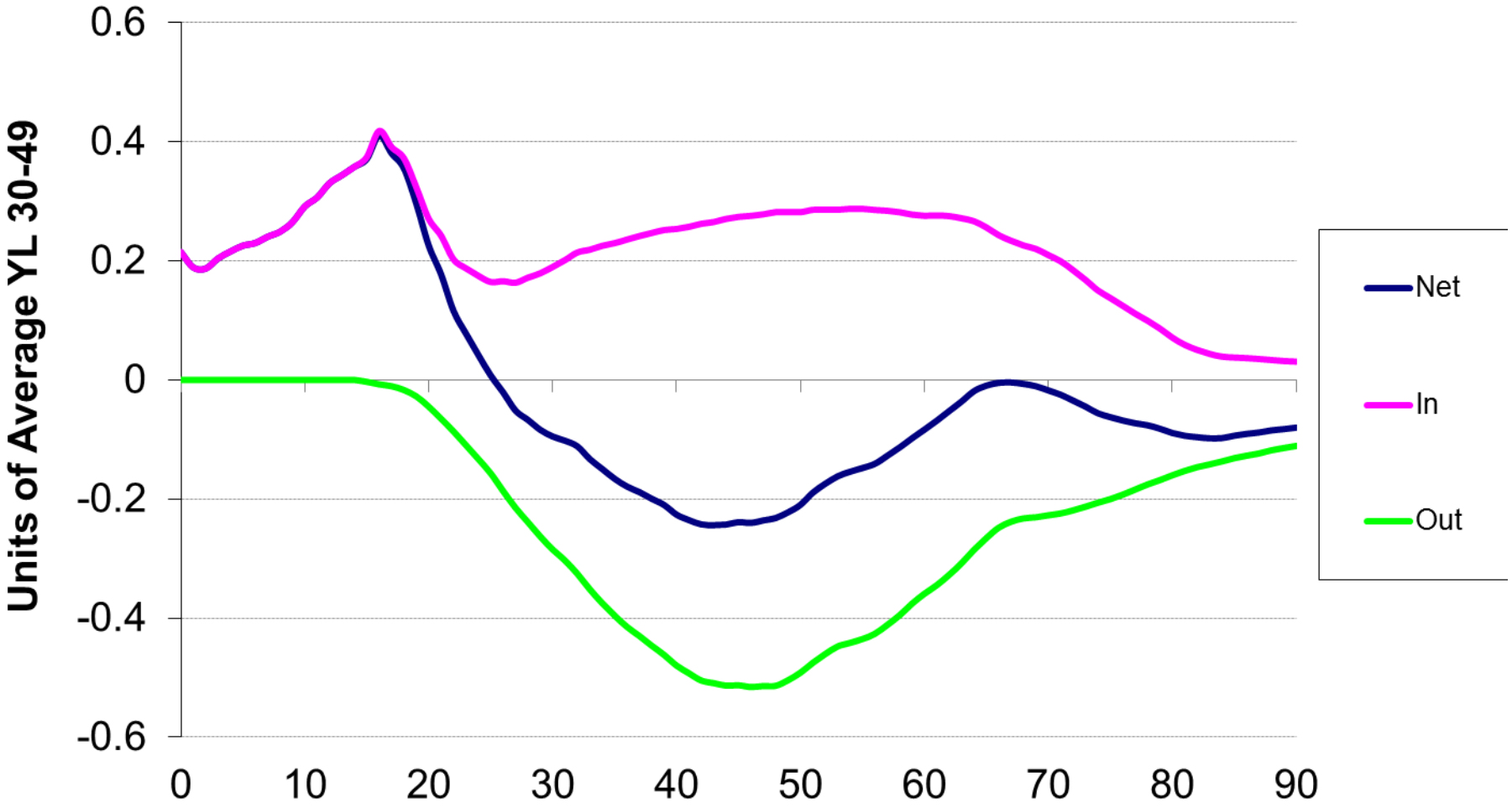


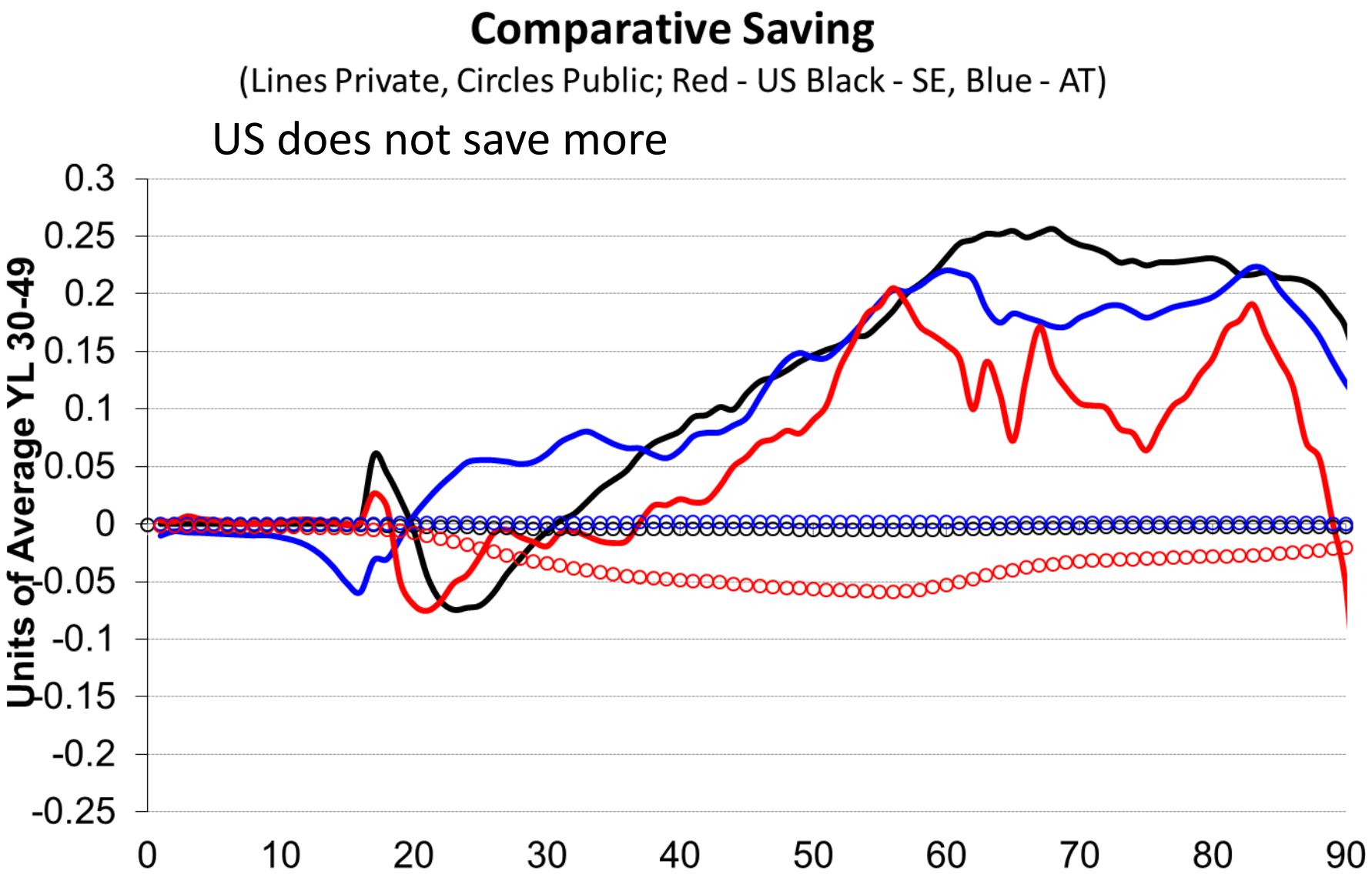
Private Interhousehold Transfers

We checked these estimates against HRS estimates where age ranges overlap, after adjusting for differences in concept etc. Agreement is good.



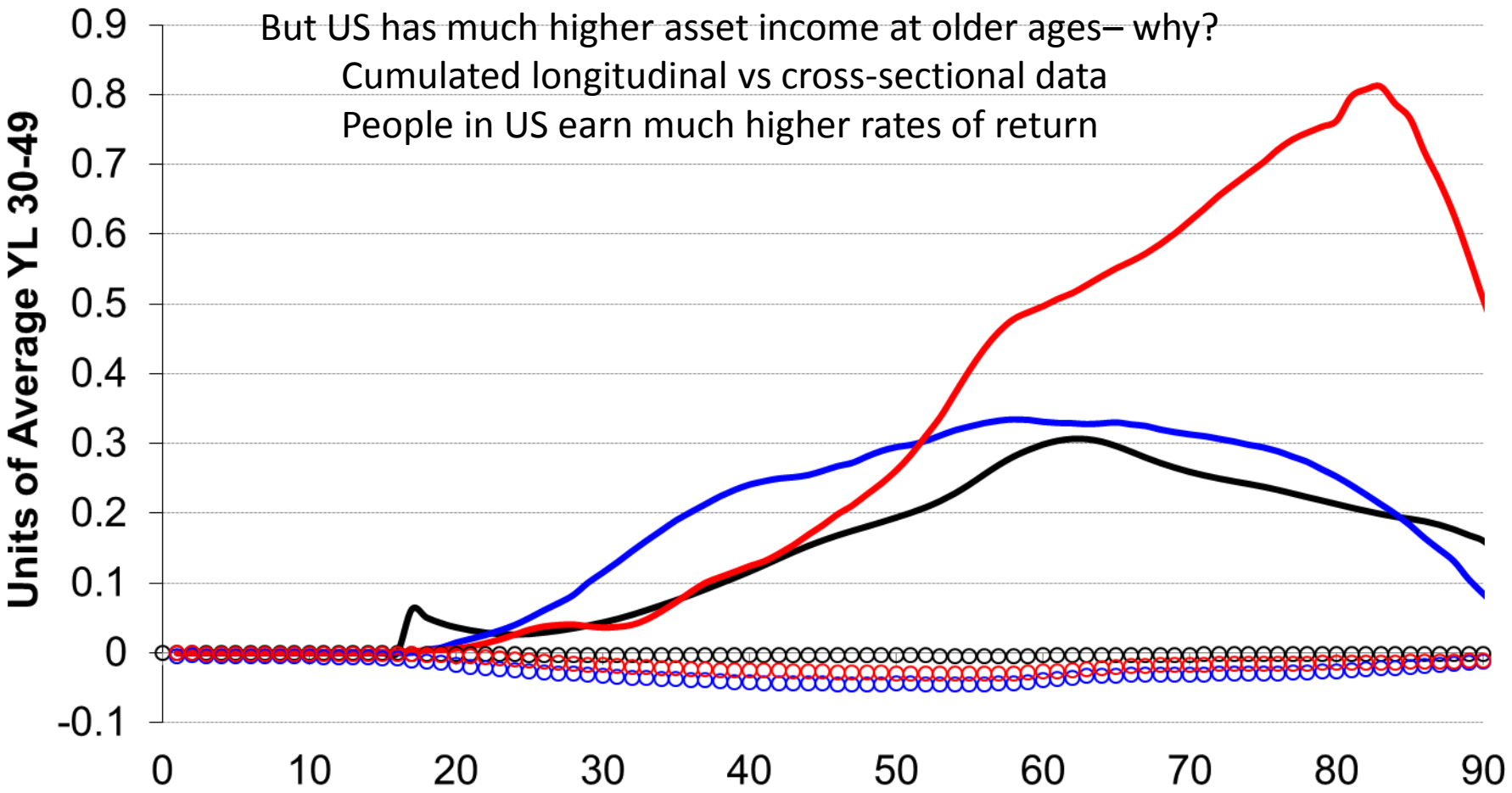
Private Intrahousehold Transfers




Comparative Saving
(Lines Private, Circles Public; Red - US Black - SE, Blue - AT)
US does not save more
Units of Average YL 30-49
0.3
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
-0.25
0
10
20
30
40
50
60
70
80
90

Comparative Asset Income

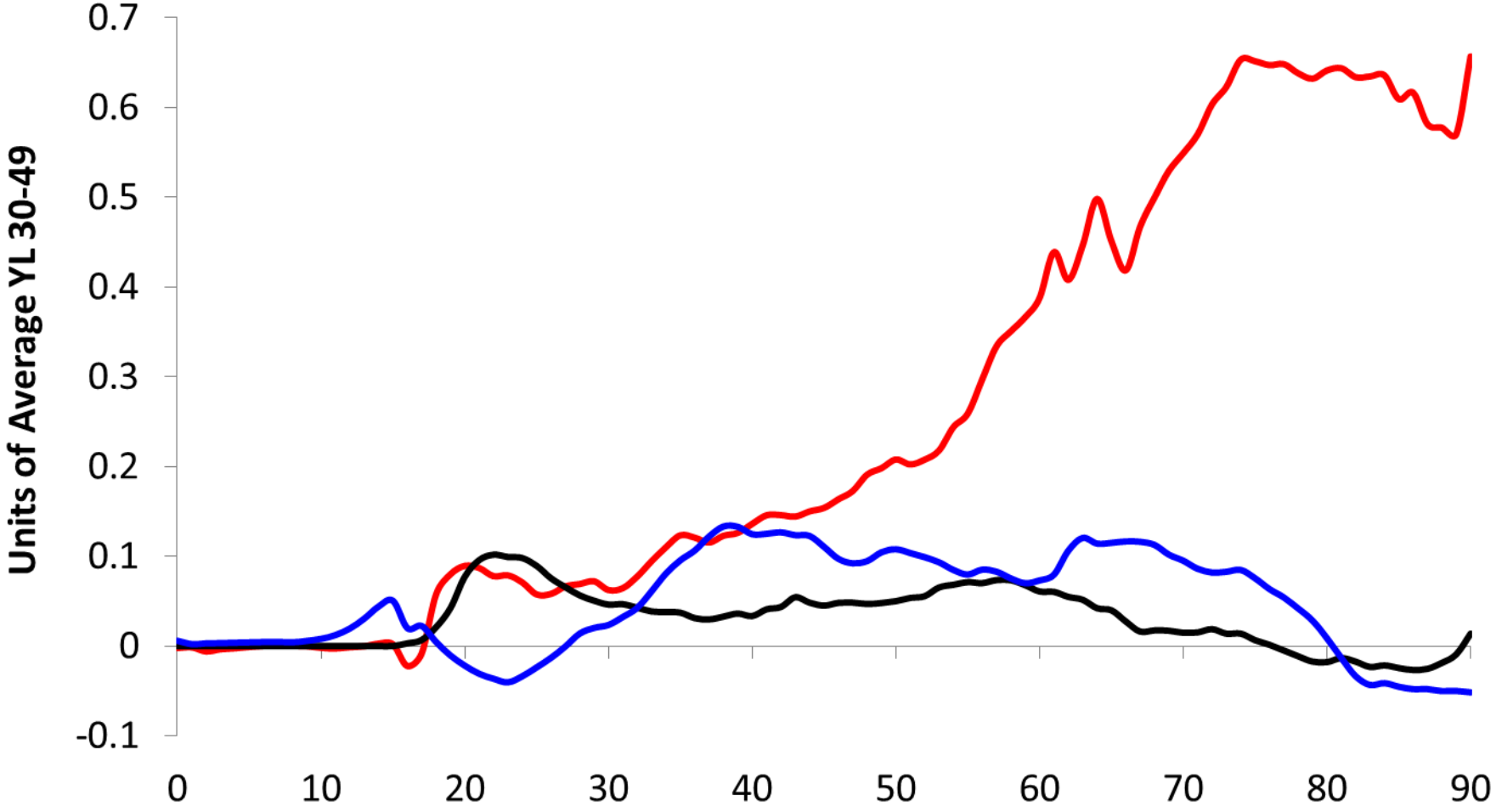
(Lines Private, Circles Public; Red - US, Black - SE Blue - AT)



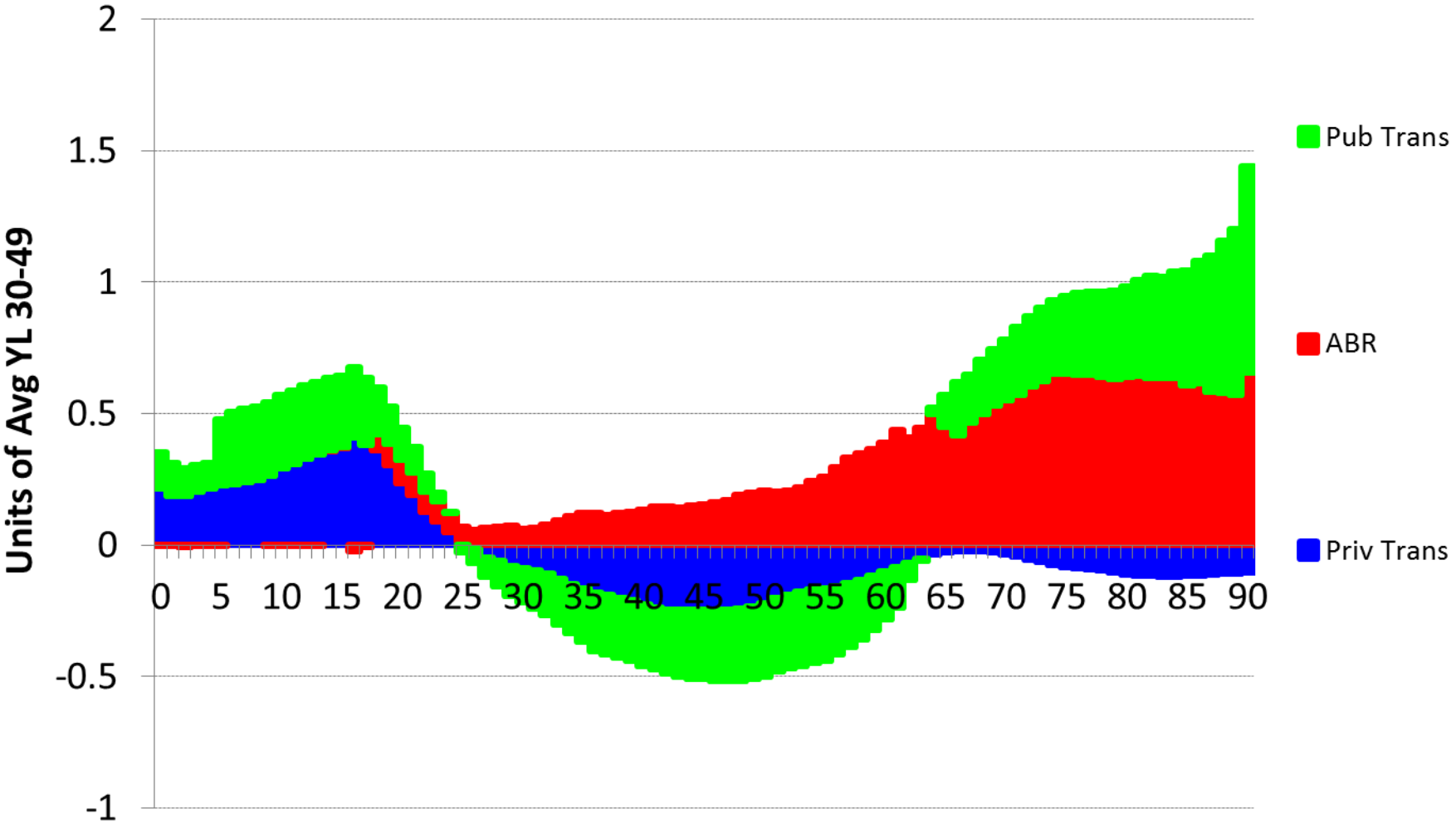
Asset-Based Reallocations

(Red - US; Black - Sweden; Blue - Austria)

= Asset Income – Saving = used to fund consumption

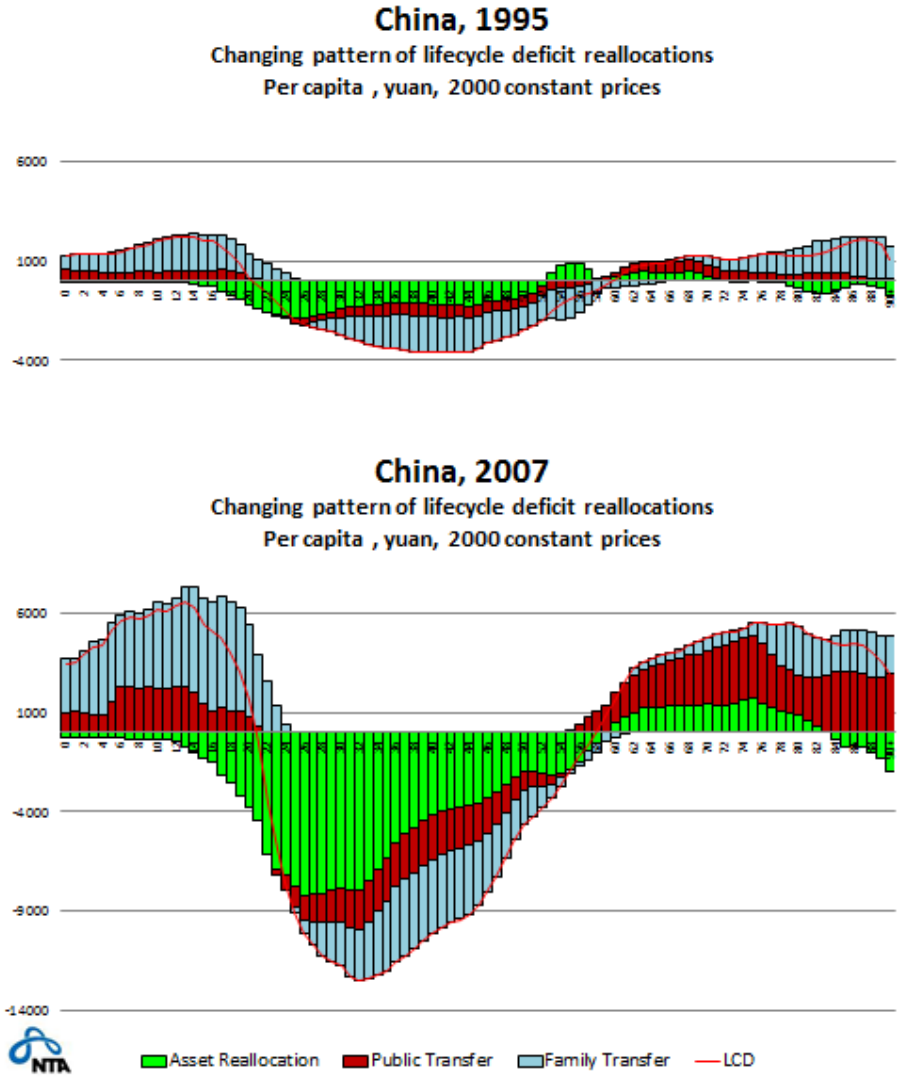


Financing the Lifecycle Deficit
Components at Each Age



Life cycle deficit in China in 1995 and 2007, from Quilin Chen and the China NTA Team

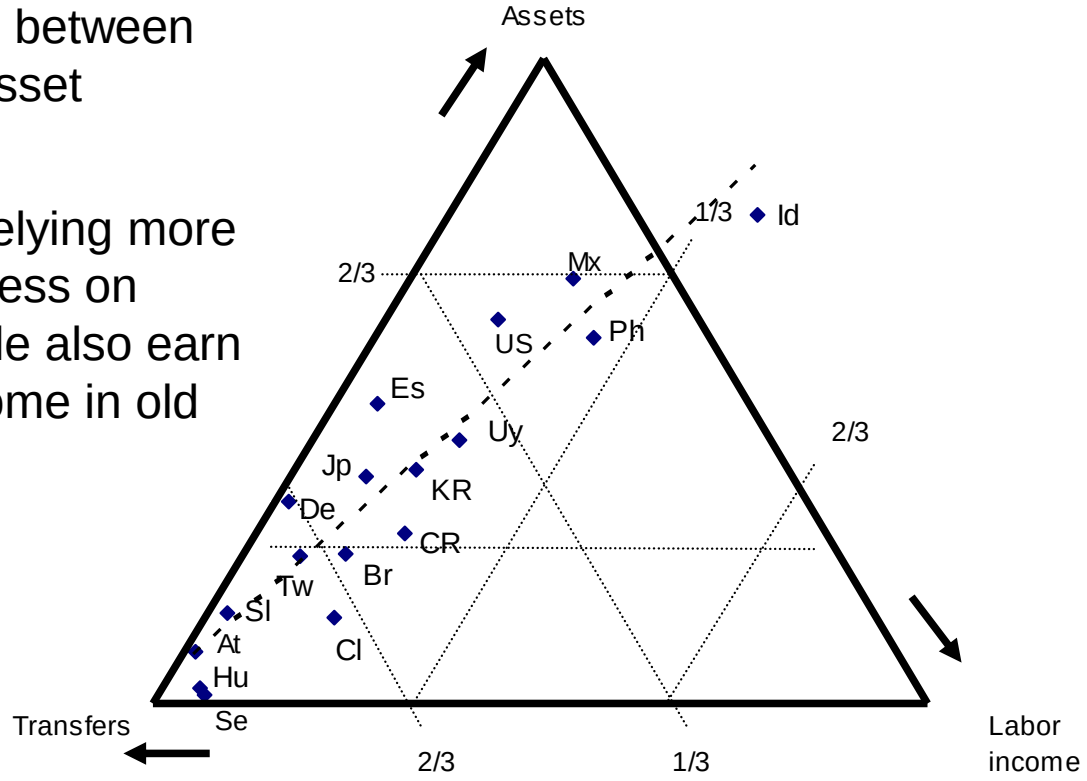
- Great increase in levels of transfers and asset use.
- Increase in saving (ABR<0)
- Decrease in relative importance of family transfers
- Increase in relative importance of public transfers
- Why do the oldest people become net savers? Maybe a data problem.



6. How old age consumption is financed

Funding consumption of the elderly in 17 economies around 2000: **Labor income**, **Transfers** (public and private combined), and **Asset income** (part not saved)

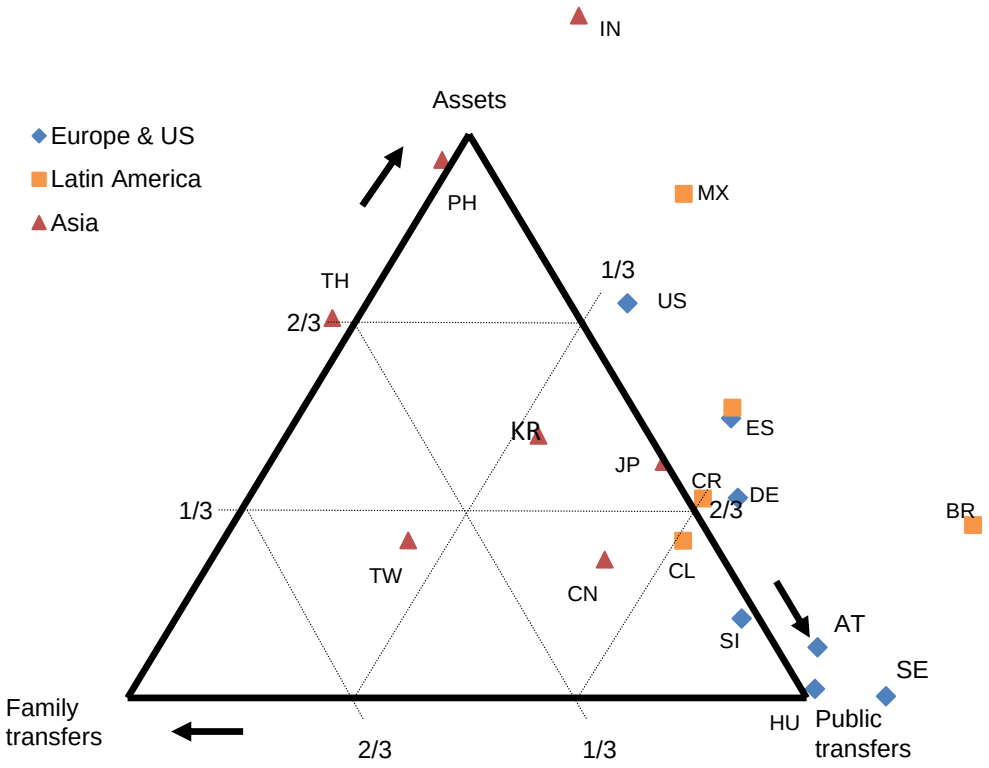
1) Shows proportion of consumption for 65+
2) Main tradeoff is between transfers and asset income.
3) In economies relying more on assets and less on transfers, people also earn more labor income in old age.



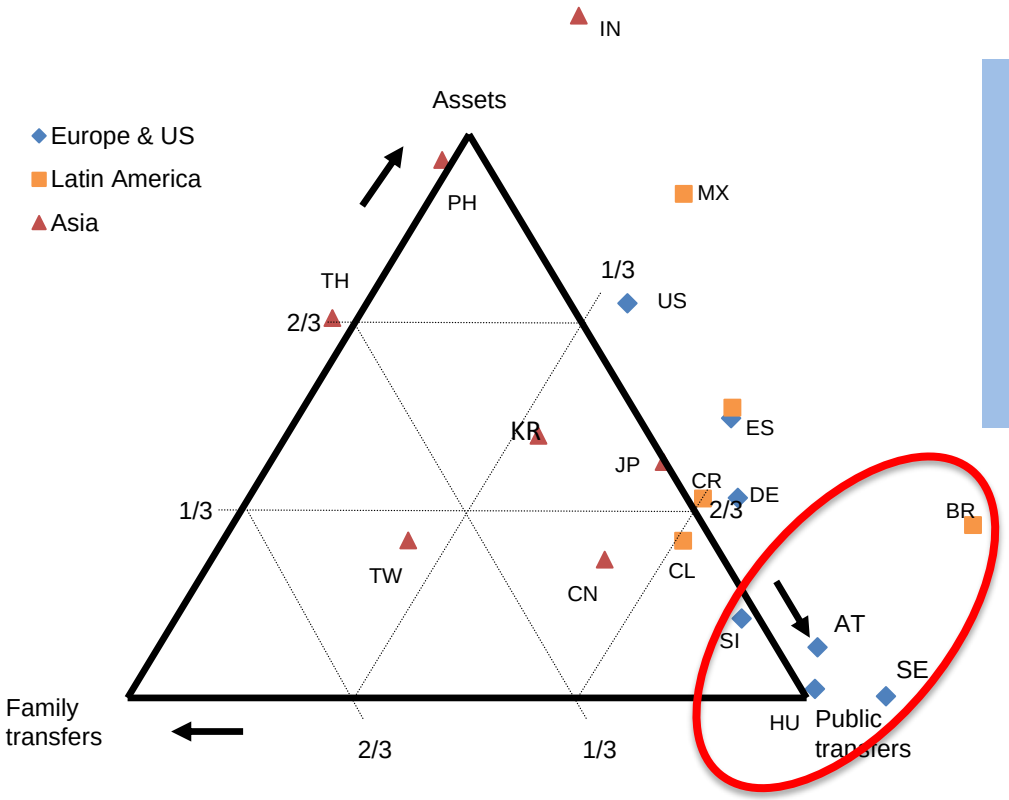
The following diagrams

- Are for consumption net of labor income
- Show public and private transfers on separate vertices

Shares of consumption not covered by labor income: **Family Transfers, Public Transfers** and **Asset income** (part not saved) sum to 1.0



Elders In some countries rely 100% on public sector transfers.

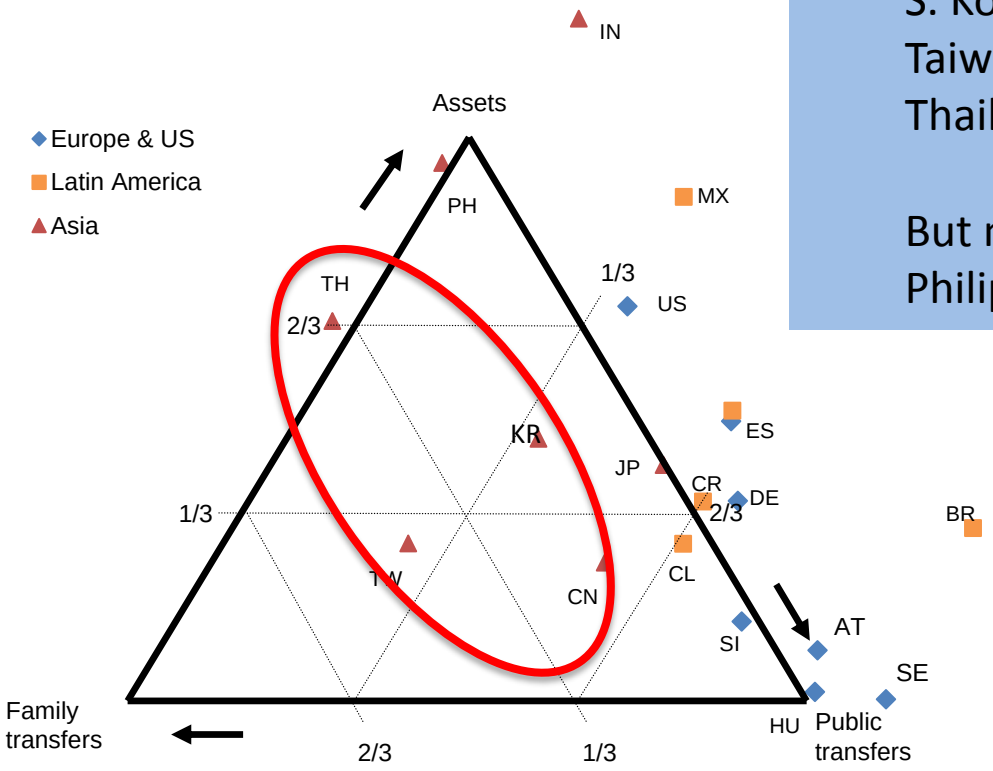


Sweden
Austria
Hungary
Slovenia

Brazil

- When consumption of the elderly is funded mainly out of public or private transfers, then population aging just raises the transfer burden on workers.
- No increased assets or capital per worker.

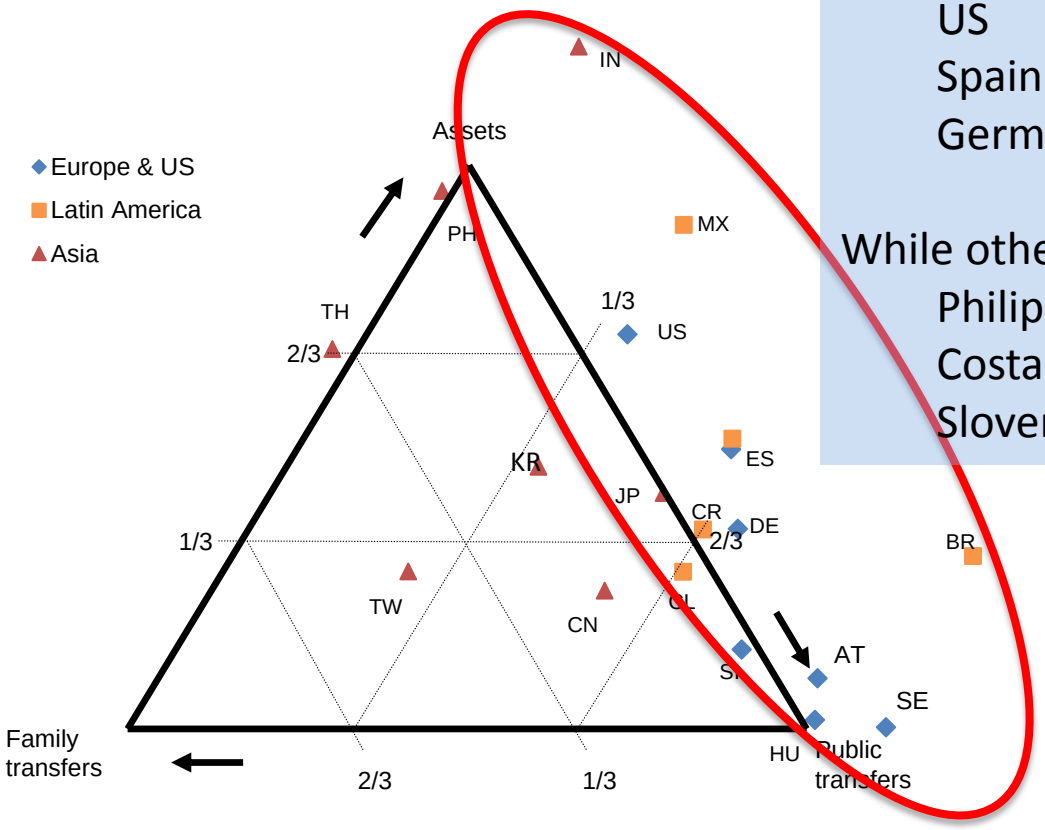
Elders In some Asian countries rely in part on family transfers.



China
S. Korea
Taiwan
Thailand

But not Japan, Philippines or India

But in more countries, elders actually make net transfers to their children

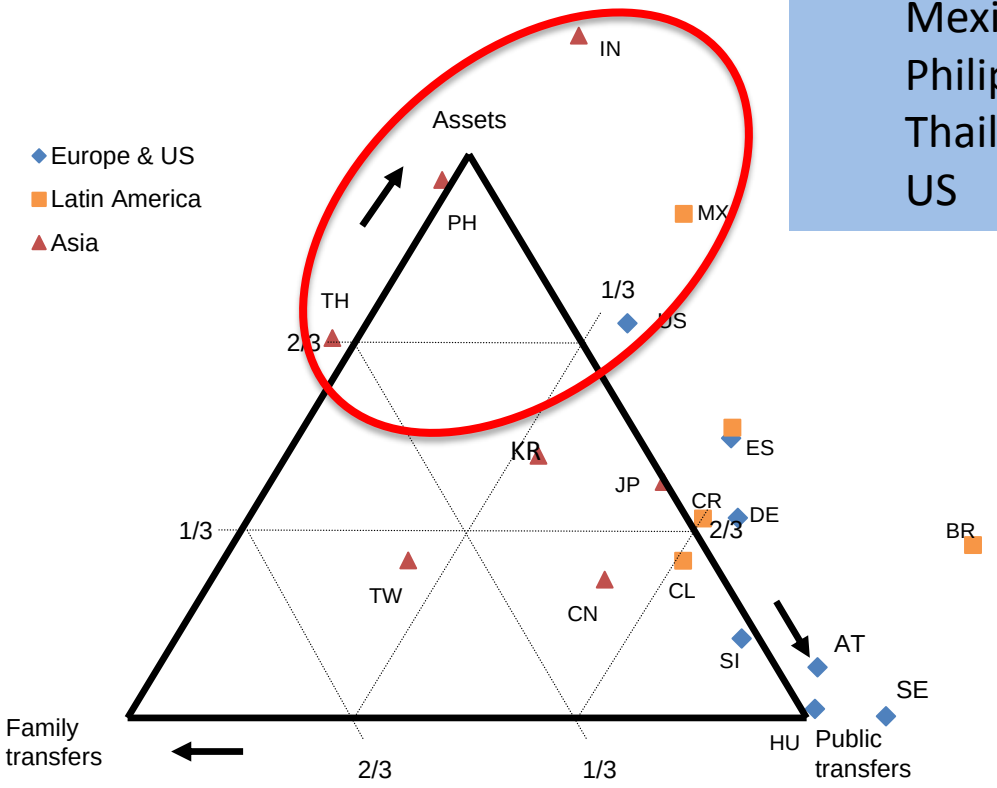


India	Austria
Mexico	Sweden
US	Uruguay
Spain	Brazil
Germany	Indonesia

While others are near zero

Philippines	Japan
Costa Rica	Chile
Slovenia	Hungary

In some countries, elders rely mainly on asset income.

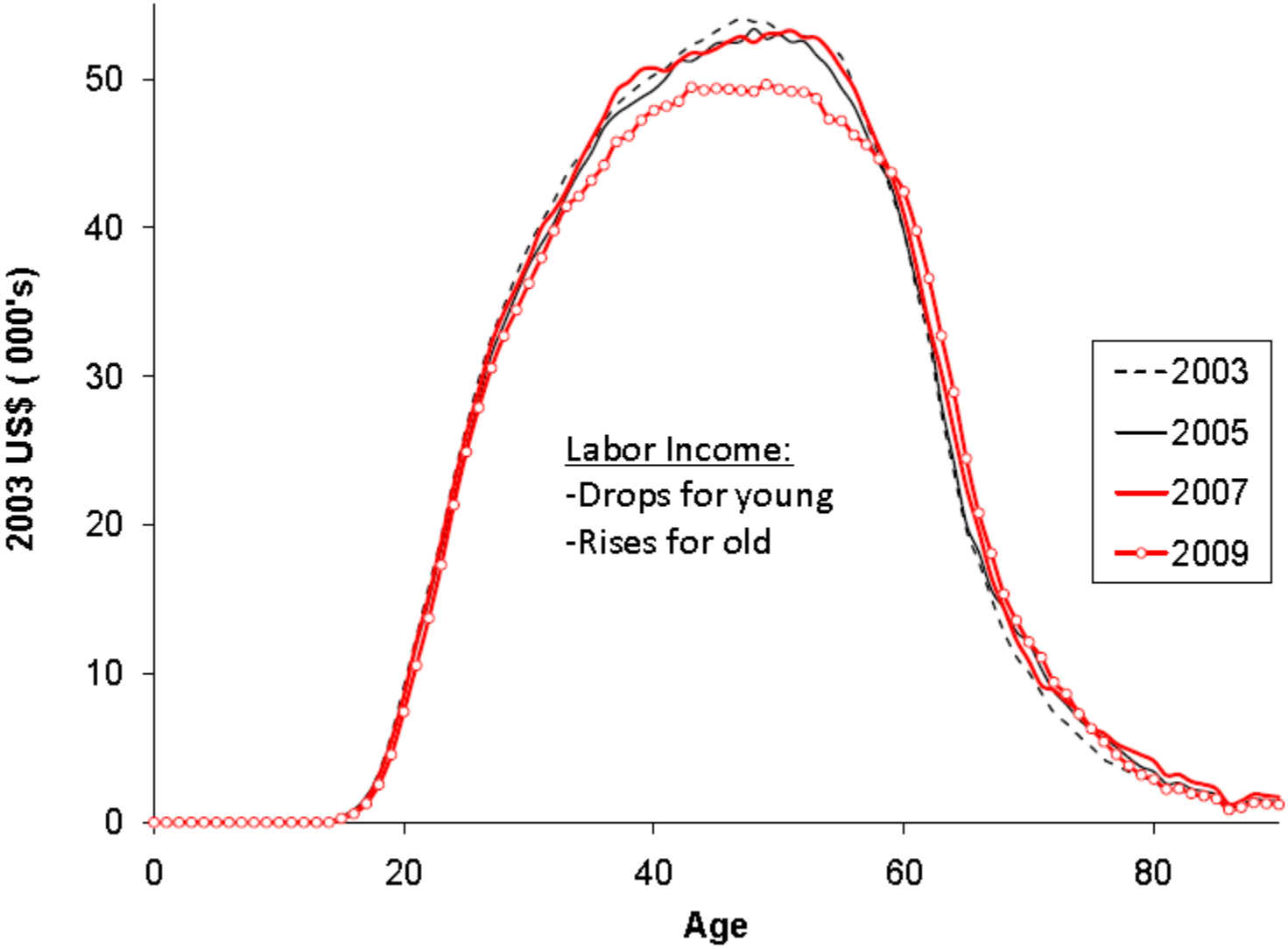


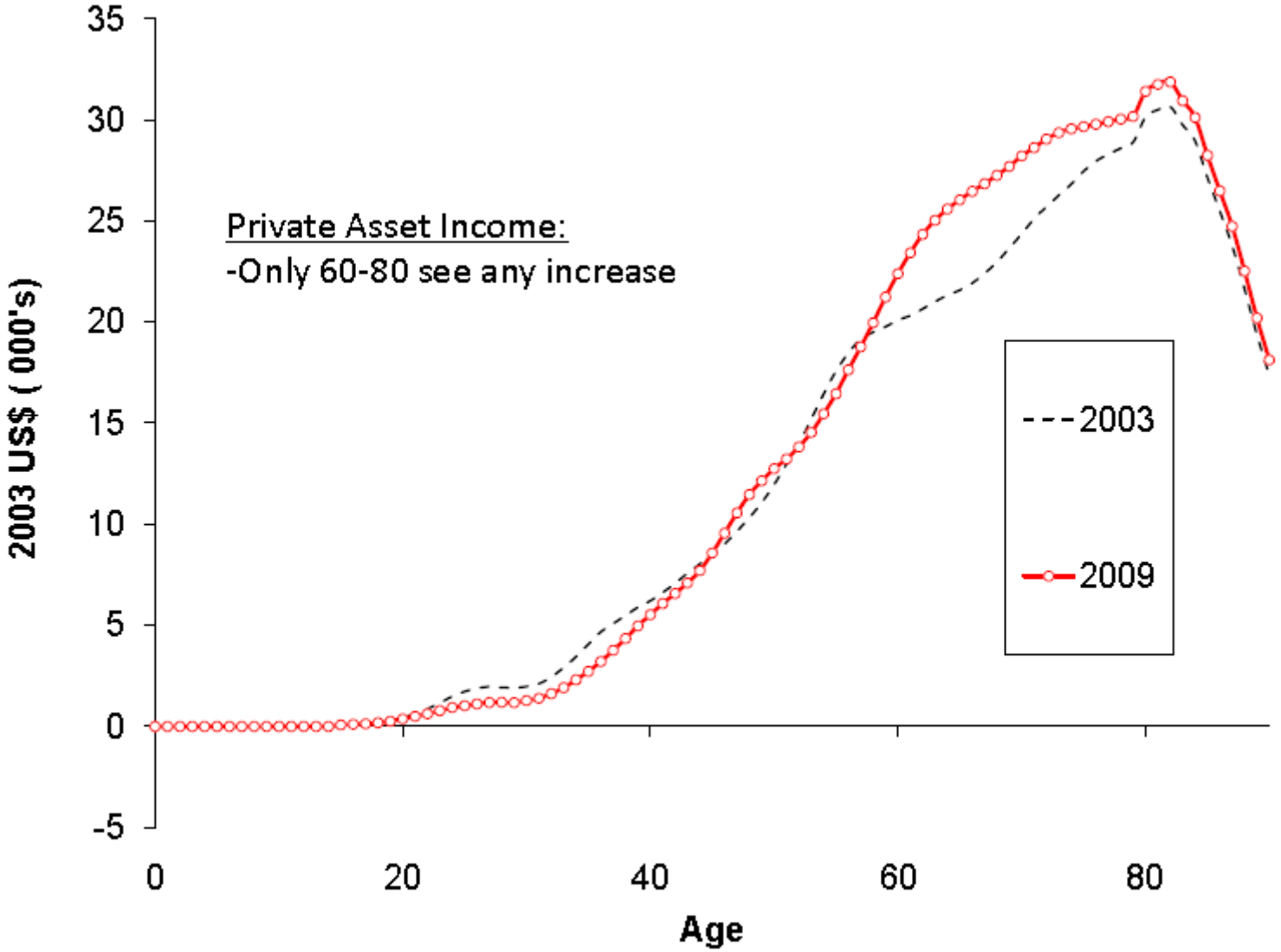
India
Mexico
Philippines
Thailand
US

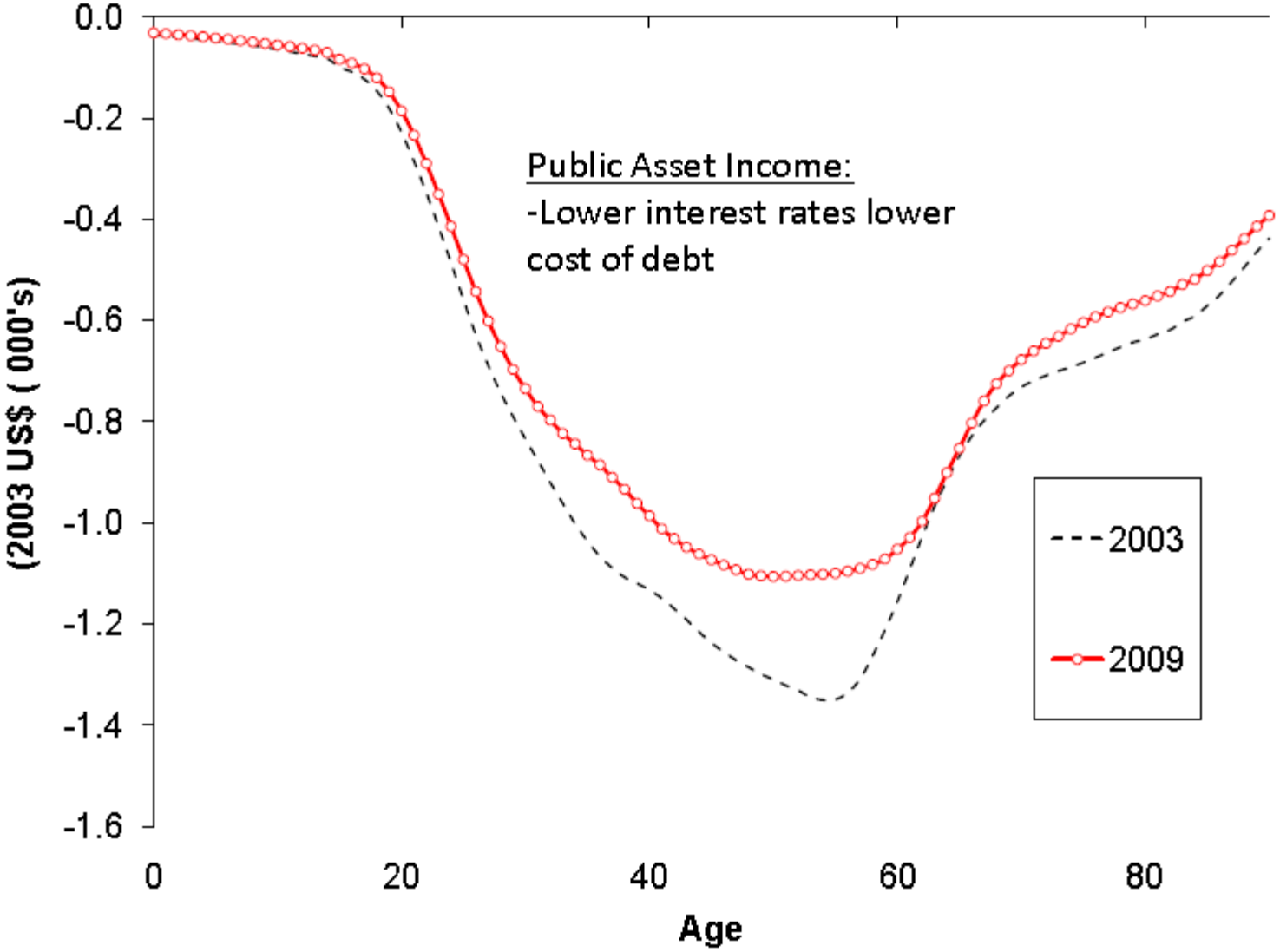
- In countries like these, population aging raises asset holdings per worker, and perhaps raises labor productivity.
- Taxes and transfers are less necessary to fund population aging.

7. The economic crisis: Comparison of 2003 to 2009

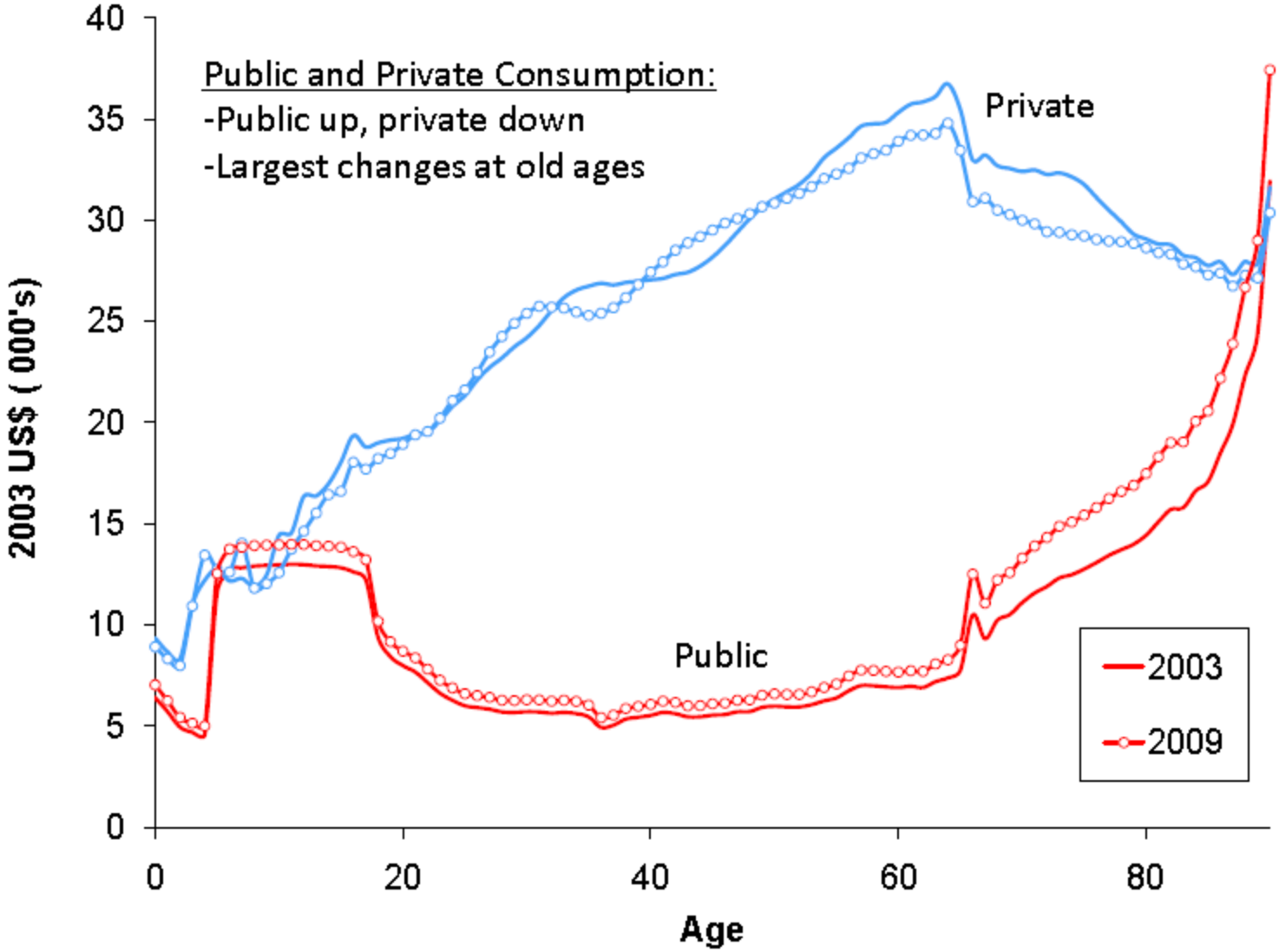
- Slides by Gretchen Donehower (Berkeley-NTA)

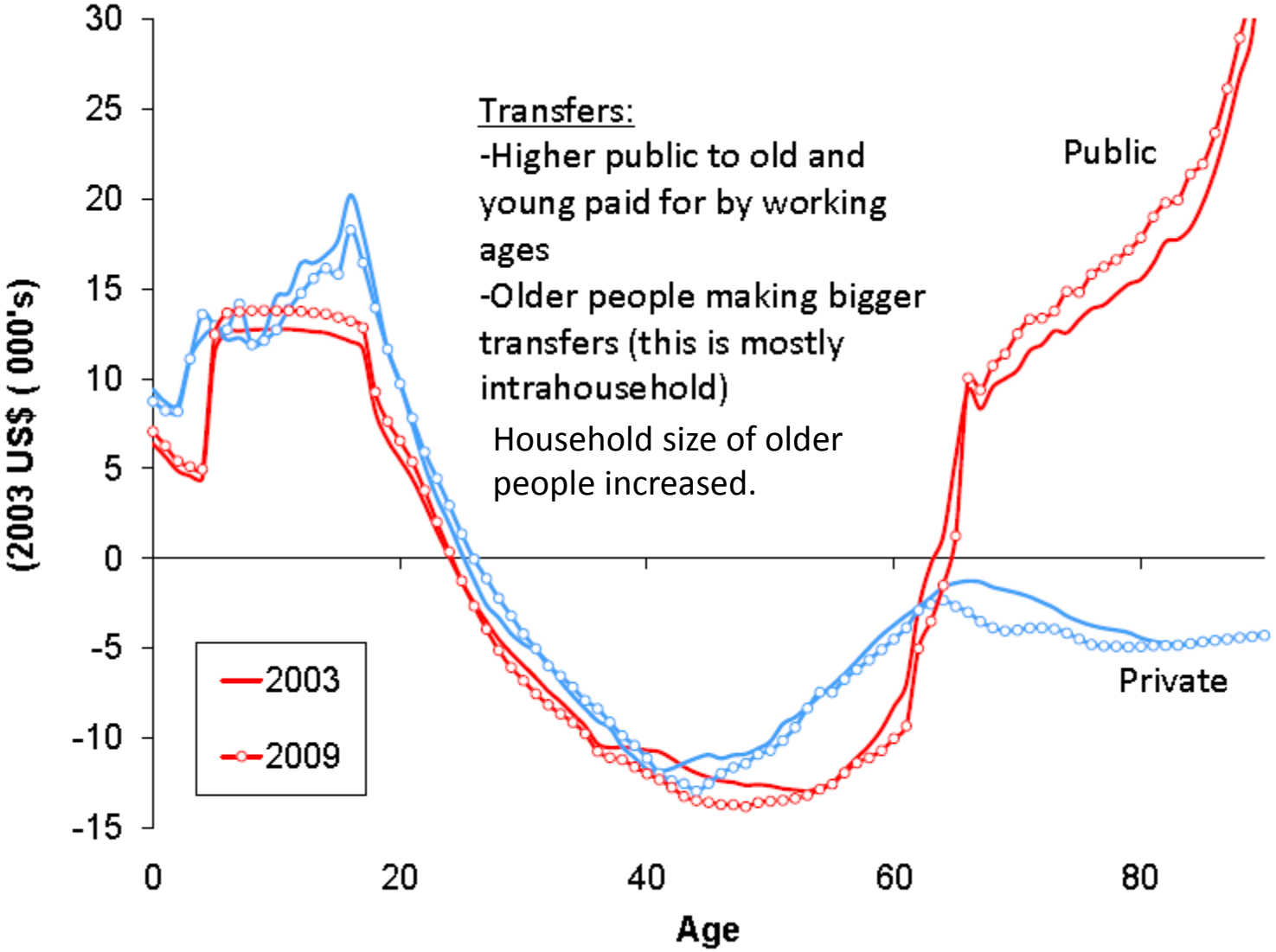

2003 US$ (000's)
50
40
30
20
10
0
0
20
40
60
80
Age
Labor Income:
-Drops for young
-Rises for old
2003
2005
2007
2009

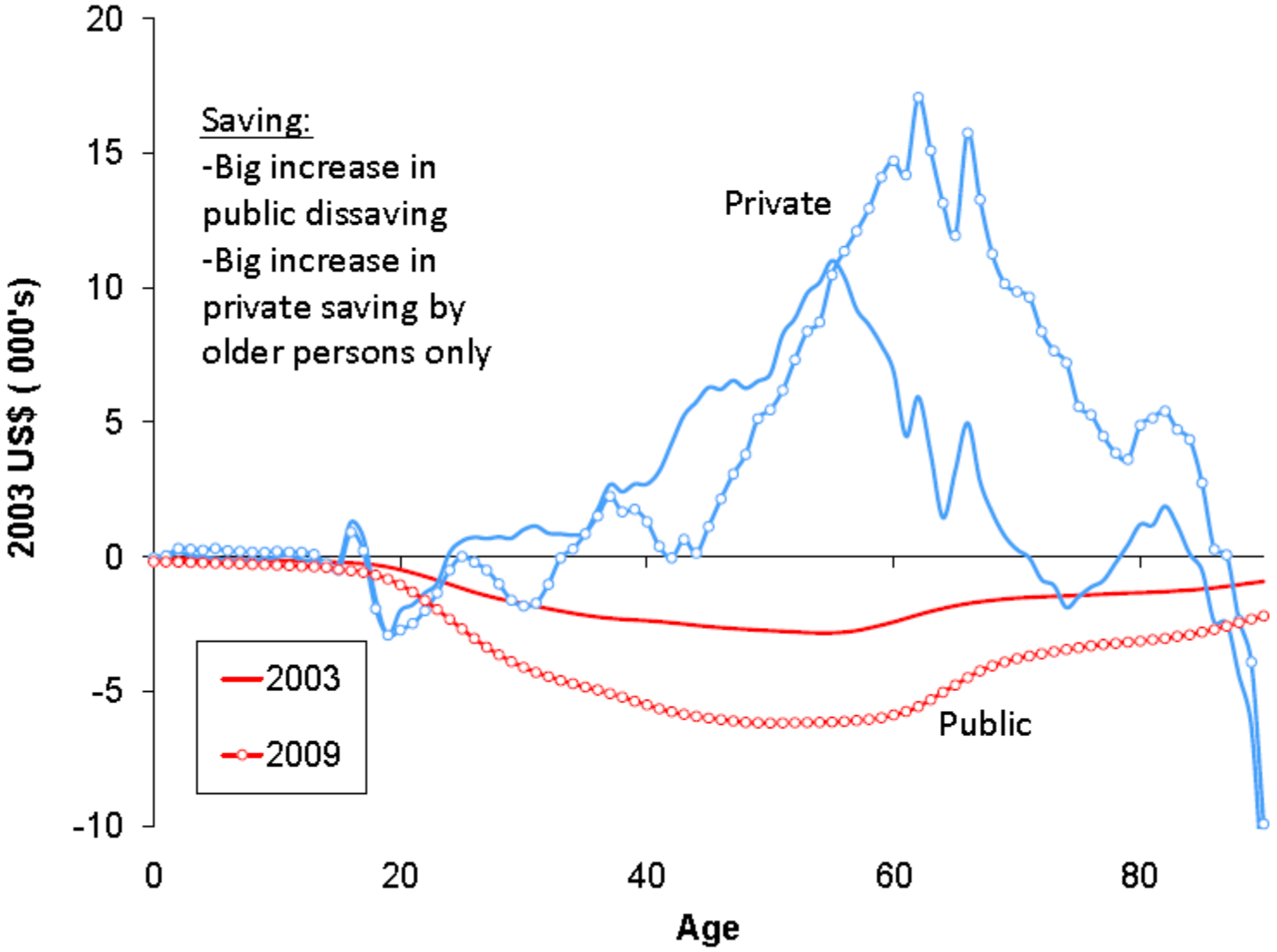

Private Asset Income:
-Only 60-80 see any increase
2003
2009
2003 US$ (000's)
Age
35
30
25
20
15
10
5
0
-5
0
20
40
60
80


0.0
-0.2
-0.4
-0.6
-0.8
-1.0
-1.2
-1.4
-1.6
(2003 US$ (000's)
0
20
40
60
80
Age
Public Asset Income:
-Lower interest rates lower cost of debt
2003
2009

Consumption:
-Maintained at same level even while income goes down.
- It rose fore elderly
2003 US$ (000's)
Age
2003
2009
0
10
20
30
40
50
60
70
80
0
20
40
60
80


Public and Private Consumption:
-Public up, private down
-Largest changes at old ages
Private
Public
2003
2009
2003 US$ (000's)
Age
0
5
10
15
20
25
30
35
40
0
20
40
60
80


Transfers:
-Higher public to old and young paid for by working ages
-Older people making bigger transfers (this is mostly intrahousehold)
Household size of older people increased.
Public
Private
2003
2009
(2003 US$ (000's)
Age
30
25
20
15
10
5
0
-5
-10
-15
0
20
40
60
80


Saving:
-Big increase in public dissaving
-Big increase in private saving by older persons only
Private
Public
2003
2009
2003 US$ (000's)
Age
20
15
10
5
0
-5
-10
0
20
40
60
80

New directions in NTA

- NTA Wealth accounts
  - Bequests
  - Capital transfers
  - Asset holdings
  - Transfer wealth
- NTA by socioeconomic status (by education of household head)
- Incorporate gender and time use in NTA
  - Time use is needed to capture women's home production and contributions of retired elders
- Repeated cross-sections and longitudinal NTA

Many uses

- Data for standard generational accounts (book in progress).
- Full generational accounts including private expenditures.
- Fiscal sustainability with population aging.
- Growth models that include private transfers .
- Fertility and human capital investment cross-nationally
- Consequences of changing population age distributions in context of particular public and private transfer systems.
- Measures of what is bequeathed to a generation including both public and private expenditures and national debt.
- Perspective on public transfer policies to young and old.
- Monitoring the generational implications of actual and proposed public policies.
- A view of the age dimension of national economies.

END