

Accounting for Intergenerational Transfers: An Overview

Ronald Lee
University of California, Berkeley

Asia's Dependency Transition: Intergenerational Transfers, Economic
Growth, and Public Policy
Nihon University Population Research Institute
Tokyo, Japan
November 1-3, 2007

I. Transfers and Human nature

- Humans are a social and altruistic species as we know from primatologists and anthropologists.
 - Hunter/gatherers lived in groups
 - Invested heavily in their children
 - Shared food, spreading risk and helping the needy
- Humans are also competitive and individualistic
- Human nature is a continuing struggle between these tendencies.

In today's economies

- Competitive behavior is expressed in market exchanges.
 - Buying and selling
 - Borrowing and lending
 - Saving, investing
- Altruistic and socially oriented behaviors are expressed in transfers, gifts with no quid pro quo.
 - Intergenerational transfers (vertical)
 - Horizontal transfers (risk sharing, need based)

In today's economies

- Public sector transfers can be a very large share of the economy.
 - Not just a quaint carry-over from pre-capitalist days.
 - Deeply rooted in our human natures.
 - Should not be viewed as unnatural.
- However, extent of transfers to the elderly is new and population aging will drive their increase.
- Resulting pressures on public budgets and families will lead to a major 21st century drama.

- National accounts cover market transactions but also public transfer programs.
- National accounts do not attempt to cover private or familial transfers.
- National accounts do not attempt to include the age dimension of flows or exchanges.

National Transfer Accounts (NTA)

- Extend standard National Accounts in both ways
 - Add the age dimension
 - Add private transfers occurring within and between households
 - parents rear children.
 - Adults care for co-resident elderly parents
 - Bequests at death

II. Organization of the NTA project

- Lead Institutions: East-West Center and CEDA, UC-Berkeley
- Asia Regional Office: Nihon University Population Research Institute
- Funding
 - National Institute on Aging
 - United Nations Population Fund
 - **Academic Frontier Project (Japan)**
 - International Development Research Centre (Canada)
 - MacArthur Foundation
 - Others
- www.ntaccounts.org

Research Teams for 23 Economies



**The National Transfer Accounts project is a collaborative effort of
East-West Center, Honolulu
and
Center for the Economics and
Demography of Aging,
University of California - Berkeley**

Lee, Ronald, Co-Director	Takayesu, Ann
Mason, Andrew , Co-Director	Boe, Carl
Auerbach, Alan	Comelatto, Pablo
Miller, Tim	Sumida, Comfort
Lee, Sang-Hyop	Schiff, Eric
Donehower, Gretchen	Stojanovic, Diana
Ebenstein, Avi	Langer, Ellen
Wongkaren, Turro	Chawla, Amonthep
	Pajaron, Marjorie Cinco

Japan

Key Institutions: Nihon University Population Research
Institute and the Statistics Bureau of Japan, Tokyo, Japan.
Ogawa, Naohiro, Country Leader
Matsukura, Rikiya
Maliki
Obayashi, Senichi
Kondo, Makoto
Fukui, Takehiro
Ihara, Hajime
Suzuki, Kosuke
Akasaka, Katsuya
Moriki, Yoshie
Makabe, Naomi
Ogawa, Maki

Australia

Key Institution: Australia National University
Jeromey Temple, Country Leader

Brazil

Turra, Cassio, Country Leader
Lanza Queiroz, Bernardo
Renteria, Elisenda Perez

Chile

Key Institution: United Nations Economic Commission for
Latin America and the Caribbean, Santiago, Chile
Bravo, Jorge
Mauricio Holz

China

Key Institution: China Center for Economic
Research,
Beijing, China.
Ling, Li, Country Leader
Chen, Quilin
Jiang, Yu

Taiwan

Key Institution: The Institute of Economics,
Academia Sinica, Taipei, Taiwan.
Tung, An-Chi, Country Leader
Lai, Mun Sim (Nicole)
Liu, Paul K.C.
Andrew Mason

France

Wolff, Francois-Charles, Country Leader
Bommier, Antoine

Thailand

Key Institution: Economics Department, Thammasat University.
Phananiramai, Mathana, Country Leader
Chawla, Amonthep (Beet)
Inthornon, Suntichai

India

Key Institution: Institute for Social and Economic Change, Bangalore
Narayana, M.R., Country Leader
Ladusingh, L.

Mexico

Key Institution: Consejo Nacional de Población
Partida, Virgilio, Country Leader
Mejía-Guevara, Iván

Indonesia

Key Institution: Lembaga Demografi, University of Indonesia, Jakarta, Indonesia.
Maliki, Country Leader
Wiyono, Nur Hadi
Nazara, Suahasil
Chotib

Philippines

Key Institution: Philippine Institute for Development Studies.
Racelis, Rachel H., Country Leader
Salas, John Michael Ian S.
Pajaron, Marjorie Cinco

Sweden

Key Institution: Institute for Future Studies, Stockholm, Sweden.
Lindh, Thomas, Country Leader
Johansson, Mats
Forsell, Charlotte

Uruguay

Bucheli, Marisa, Country Leader
Furtado, Magdalena
Rodrigo Ceni
Cecilia Rodriguez

South Korea

An, Chong-Bum , Country Leader
Chun, Young-Jun
Lim, Byung-In
Kim, Cheol-Hee
Jeon, Seung-Hoon
Gim, Eul-Sik
Seok, Sang-Hun
Kim, Jae-Ho

Austria

Key Institution: Vienna Institute of Demography
Fuernkranz-Prskawetz, Alexia, Country Leader
Sambt, Joze

Costa Rica

Key Institution: CCP, Universidad de Costa Rica
Rosero-Bixby, Luis, Country Leader
Maria Paola Zuniga

Slovenia

Sambt, Joze, Country Leader

Hungary

Key Institution: TARKI Social Research Institute
Gal, Robert
Medgyesi, Marton

Finland

Key institutions: The Finnish Center for Pensions
And the Finnish Pension Alliance
Vanne, Reijo
Gröhn, Jukka
Vahtinen, Risto

United States

Key Institution: Center for the Economics and Demography of Aging

Lee, Ronald, Country Leader

Miller, Tim

Ebenstein, Avi

Boe, Carl

Comelatto, Pablo

Donehower, Gretchen

Schiff, Eric

Langer, Ellen

Kenya

Mwabu, Germano

Nigeria

Soyibo, Adedoyin

III. Flow identity

- Basic accounting identity for flows for individuals at each age: $\text{Inflows} = \text{Outflows}$
- Here is somewhat simplified version

Inflows:

labor income
+ asset income
+ private transfers received
+ public transfers received
+ borrowing
+ sale of assets

Outflows

- consumption
- + public transfers made (tax payments)
- + private transfers made
- + purchase of assets
- + lending
- + payment of interest

Stocks can be derived from these flows

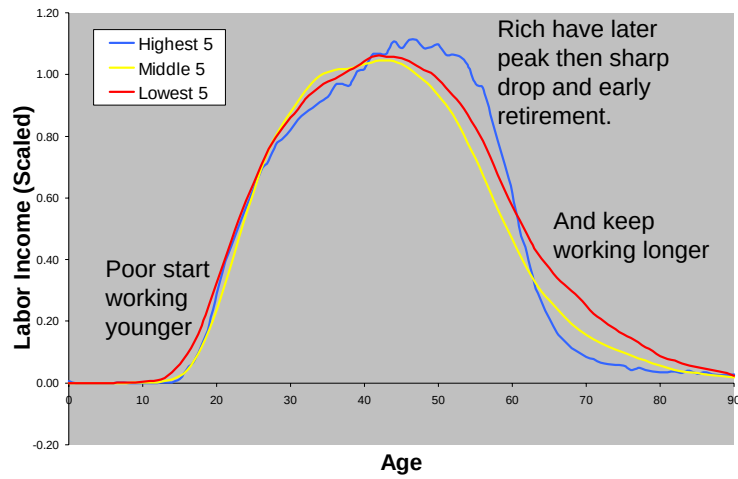
- Capital stock
- Credit
- Transfer wealth (at each age, present value of expected future net transfers)
- Each has a public and private dimension.

- convenient to focus on labor income and consumption
 - Strong biological component to productivity by age, e.g. children and elderly are less productive
 - Strong biological component to consumption by children
- Age schedules of labor income and consumption are centrally important for many theories
 - Samuelson's consumption loan model
 - Diamond's overlapping generations model
 - Life cycle savings theory

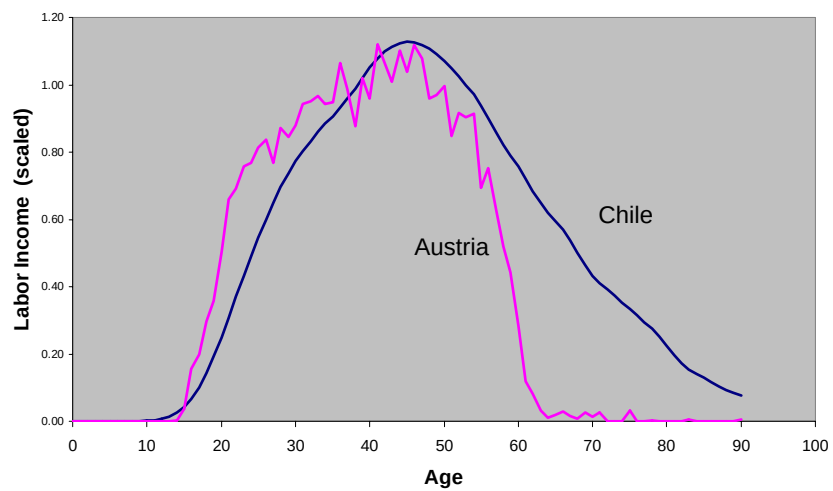
III. NTA estimates of age profiles of labor income

- Fifteen countries (others are now available but not yet included).
- Profiles are standardized relative to average labor income at ages 30-49 for each country.
- In every case, our estimates are per member of the population, whether working or not, and averaged across sex at each age.
- Arranged into three groups of five each by gdp per capita, adjusted for purchasing power parity (PPP).

Average Labor Income Profiles Grouped By GDP Per Capita



Two Contrasting Labor Income Age Profiles Reflect Policy Differences: Austria (2000) and Chile (1997)

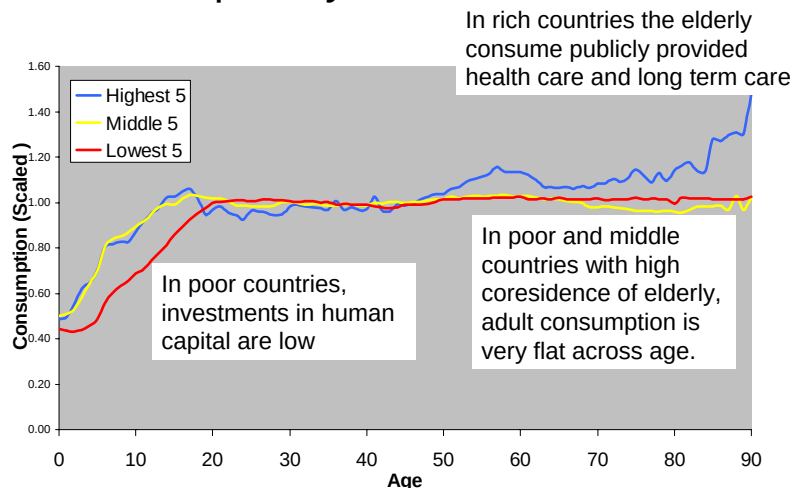


What is going on here?

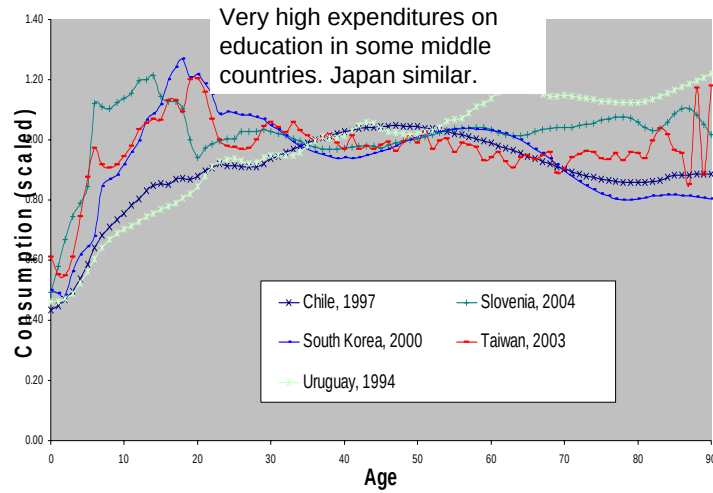
Interpretations from Chile and Austria teams

- Chile: Old age labor income may have been driven up by the new funded pension system with private accounts.
- Austria:
 - The structure of the educational system and apprenticeship program encourages early work by teenagers.
 - The structure of the retirement system encourages very early retirement.
- So transfer systems help shape labor income

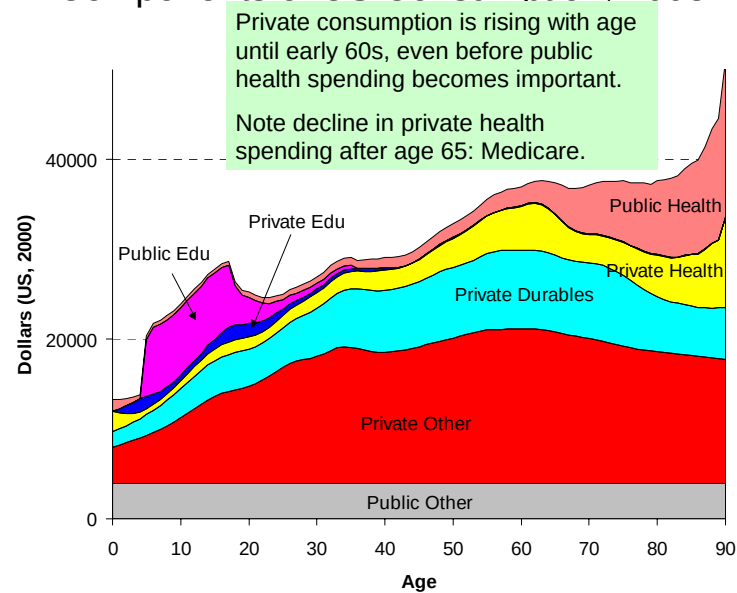
Average Consumption Profiles (scaled) Grouped By GDP Per Capita



Consumption Profiles (scaled) for 5 Middle Per Capita GDP



Components of US Consumption. 2003



IV. Some theory—why these age profiles matter

The average ages at which income is earned and consumed

- Calculate the average ages
 - Use the actual population age distributions
 - Multiply the age the age profiles
 - Find A_{yl} and A_c
- These average ages summarize a lot of information about the economic demography.

Consider the average age difference between consuming and earning, $A_c - A_{yl}$

- Is income is spent before or after it is earned, on average?
 - If $A_c - A_{yl} > 0$ income is consumed after it is earned, and it must be held in some form of wealth between earning and consuming, so there is a **demand for positive wealth**.
 - If $A_c - A_{yl} < 0$ income is consumed before it is earned, so there is a **demand for negative wealth**, or credit.
 - If $A_c - A_{yl} = 0$ there is no net demand for wealth.

Life cycle wealth W

- This amount of wealth is required to achieve the observed age profiles of consumption and labor income.
- Life cycle wealth is proportional to the gap in average ages (Willis, 1988):
- $W = (A_c - A_{yl})c$
Where c is per capita consumption

Life cycle wealth can be capital, K, or transfer wealth, T.

- At age x, $T(x)$ is the Present Value of expected future (transfers received – transfers given) after age x.
- T is the population weighted average of $T(x)$.
- Transfer wealth is the sum of public and familial:
 $T = T^G + T^F$
- Children receive transfers first, and then make them later in life to their own children.
 - Their transfer wealth is negative.
- Transfers to elderly are made first, received later.
 - Their transfer wealth is positive.

- Overall, T is positive or negative depending on whether transfers to old or young dominate.
- In a closed economy: $W = T + K$
- **This is a fundamental accounting identity.**
- **Alternatively, $K = W - T$.**
 - The bigger are transfers to the elderly, the less capital there will be.
 - The bigger are transfers to children, the more capital there will be.

Fertility, population growth and aging

- When fertility is higher,
 - population growth is more rapid
 - Population is younger.
- When fertility is lower
 - Population growth is slower or negative
 - Population is older
 - Japan is champion!

Effects of population growth depend on transfer wealth T

- Consider the present value of consumption over the whole lifetime, C.
- The effect of a change in fertility, or population growth rate, on C is proportional to transfer wealth T (Willis, 1988)
- **$d \ln(C)/dn = T/c$**

- Higher fertility, faster pop gr, and younger pop
 - Raise life time consumption C if net transfers are upward to the elderly ($T > 0$)
 - Reduce life time consumption C if net transfers are downward to children ($T < 0$).
 - Have no effect if net transfers are 0 ($T = 0$).
- This is a striking, non-obvious result
- **It depends not just on govt programs, but on whole age pattern of earning and consuming, and how periods of dependency are funded.**

Conclude that patterns of transfers are very important

- Insights carry over to more general cases, beyond golden rule.
- Much depends on whether net transfers are upward to elderly or downward to children.
- The NTA project has carried out a number of simulations and dynamic optimization exercises that confirm the importance of transfers in a more realistic circumstances.

Summarizing the direction of reallocation of income (in golden rule steady states)

- The population-weighted average age of labor income tells us the average age at which a dollar of income is earned, A_{yl} .
- Similarly for consumption, A_c .
- The difference, $A_c - A_{yl}$, tells us whether on average income is spent before or after it is earned.
 - If $A_c - A_{yl} > 0$ income is consumed after it is earned, and it must be held in some form of wealth between earning and consuming, so there is a **demand for positive wealth**.
 - If $A_c - A_{yl} < 0$ income is consumed before it is earned, so there is a **demand for negative wealth**, or credit.
 - If $A_c - A_{yl} = 0$ there is no net demand for wealth.

- This amount of wealth is required to achieve the observed age profiles of consumption and labor income.
- It is called “life cycle wealth” and denoted W
- An important identity (Willis, 1988):
$$W = (A_c - A_{yl})c$$

Where c is per capita consumption.
- Life cycle wealth is proportional to the gap in average ages.

Wealth does not have to be assets

- Life cycle wealth can be either capital or **transfer wealth** in closed economy.
- Transfer Wealth, T .
 - At age x , $T(x)$ is the Present Value of expected future (transfers received – transfers given) after age x .
 - T is the population weighted average of $T(x)$.
 - Transfer wealth is the sum of public and familial:

$$T = T^G + T^F$$
- Wealth can also be held as credit, but in a closed economy credits and debts must sum to zero.
- In a closed economy: **$W = T + K$**
- **This is a fundamental accounting identity.**

Transfer wealth and effects of pop growth and aging

- Let C be the present value of life time consumption.
- Let dn be a small change in pop growth rate due to a difference in fertility.
- Willis (1988) showed :
 - $d \ln(C)/dn = A_c - A_y - K/c$ or substituting,
 - **$d \ln(C)/dn = T/c$**
- Says higher fertility, faster pop gr, and younger pop
 - Raise life time consumption if net transfers are upward to the elderly
 - Reduce life time consumption if net transfers are downward to children.
 - Have no effect if net transfers are 0.

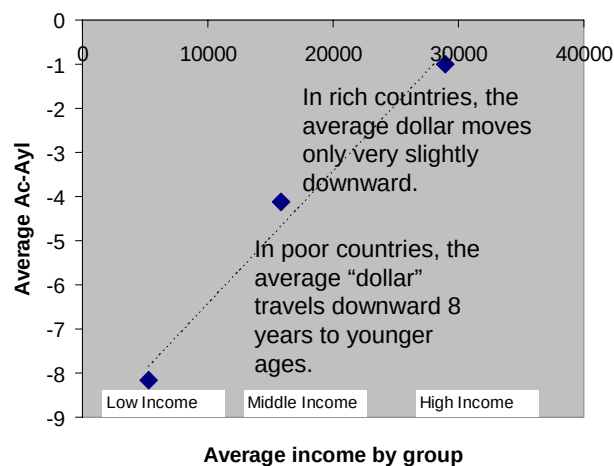
In case of $T=0$, no net transfers

- All wealth is held as capital, like pure life cycle savings.
- Changing population age distribution causes just enough change in savings to offset the change in population growth rates.

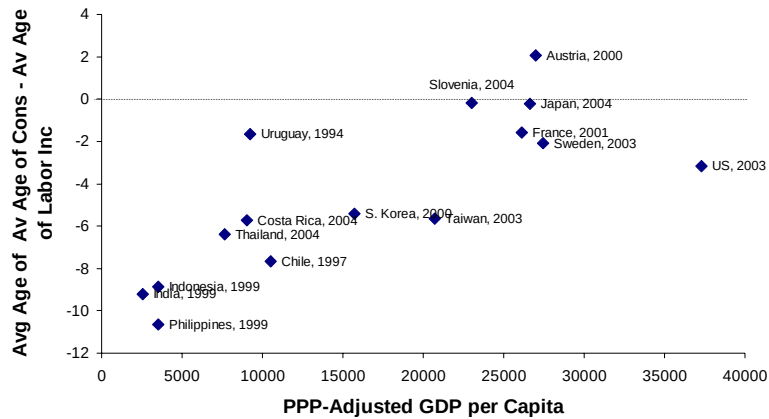
V. NTA data on average ages of consuming and earning, A_c and A_y

- NTA data will let us evaluate $T = T^G + T^F$ but not yet.
- Now look at the direction reallocation flows, $A_c - A_{yl}$, through all means, including transfers.
- First look at averages for the same three income groups as before.

Average Consumption-Earning Gap by average income groups: 15 NTA countries



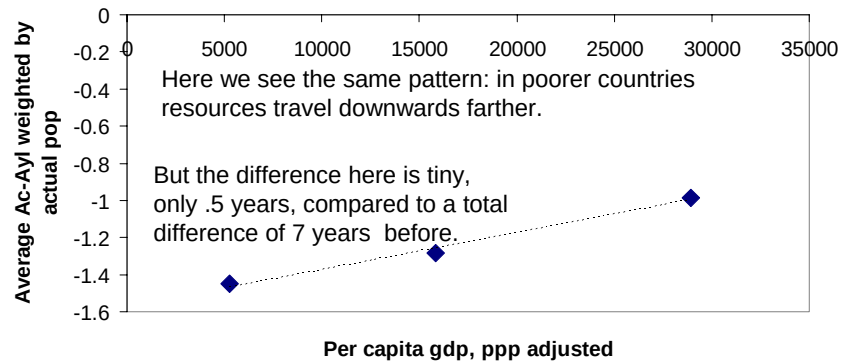
Average Consumption-Earning Gap by GDP



Why does the age gap vary across these income groups?

- First look at average ages using the same population age distribution for all countries, so result depends only on the shapes of the age profiles.

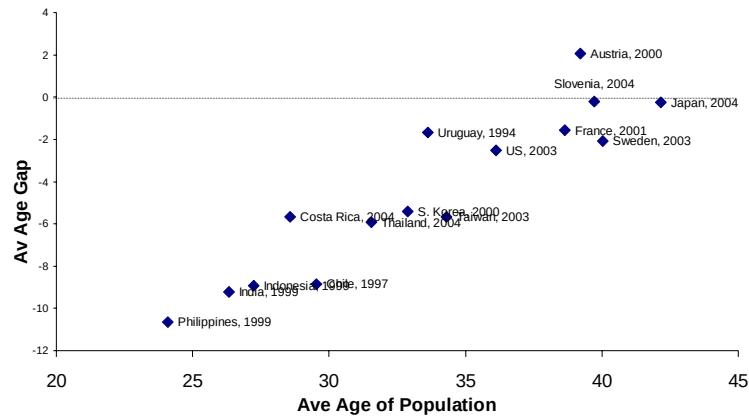
Average Consumption-Earning Gap by average income, using fixed pop weights



V. Population Aging, Consumption Patterns and the Age Gap

- Next look at the age gap in relation to the average age of the population

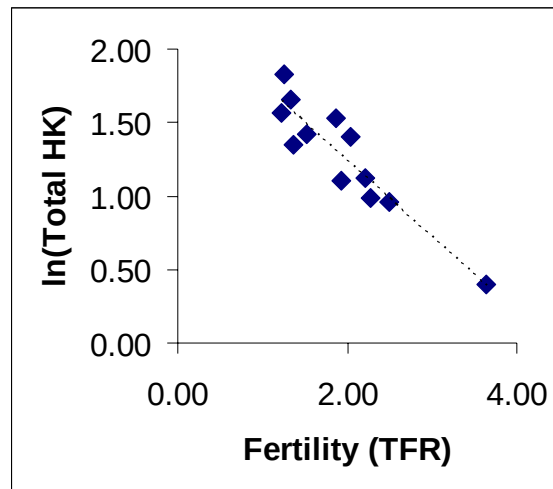
Average Consumption-Earning Gap by Average Age of Population



Demographic change

- Income, population aging, and rising consumption age are all connected.
- Population aging causes big changes in these average ages and in life cycle wealth, W .
- But aging is also caused by changes in transfers, perhaps.

Ln Total Human Capital Spending per Child
vs. Fertility (Health and Education only, up
to 18 and 26, respectively)



The quantity-quality tradeoff in fertility

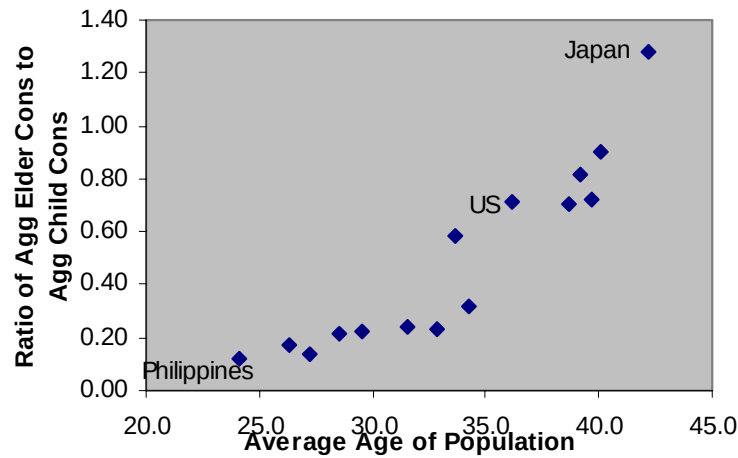
- Causal story behind chart is not clear.
- Desire to invest more per child may cause fertility decline.
- Desire to have fewer children may enable increased investments in each.
- Virtually the entire relationship is due the relation between the TFR and public education costs per child – but this still does not tell us the causal direction.

Public pension systems may also help cause fertility decline

- When old age support comes from family, there is a strong motive to have enough children.
- When old age support comes from public pensions, then this motive is gone.
- Same applies to other public transfers that may substitute for children's contributions: health care, long term care, e.g.

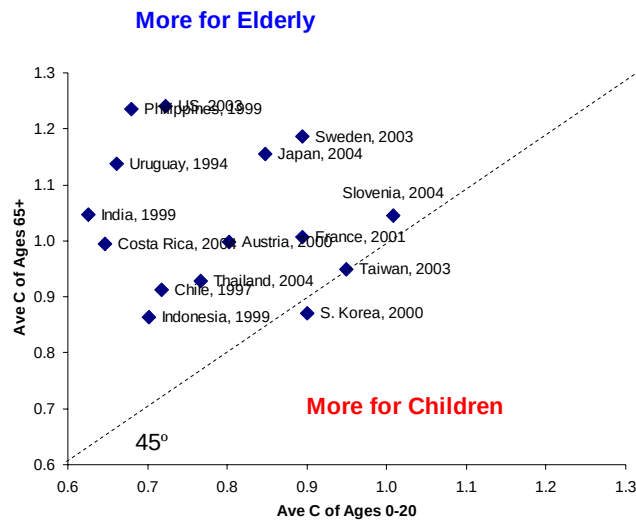
VII. Will the rising costs of supporting the elderly crowd out investment in children?

Ratio of Total Consumption by Old to Children versus Average Age of Population

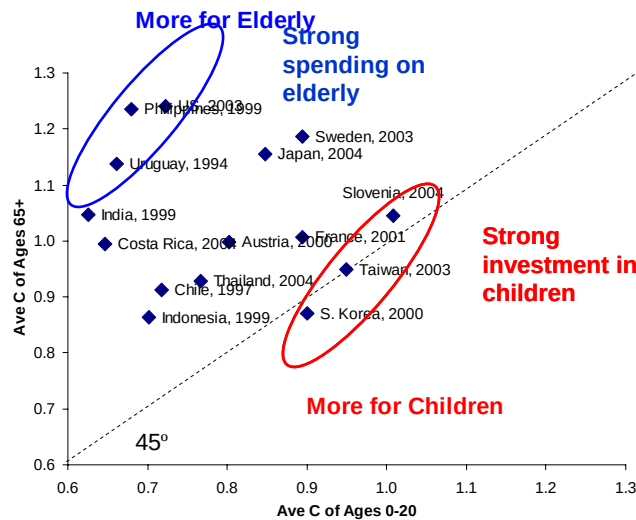


- The ratio of aggregate spending on the elderly to spending on children is bigger by a factor of ten in Japan than in Philippines or Indonesia.
- Now look at spending per child vs per elderly.

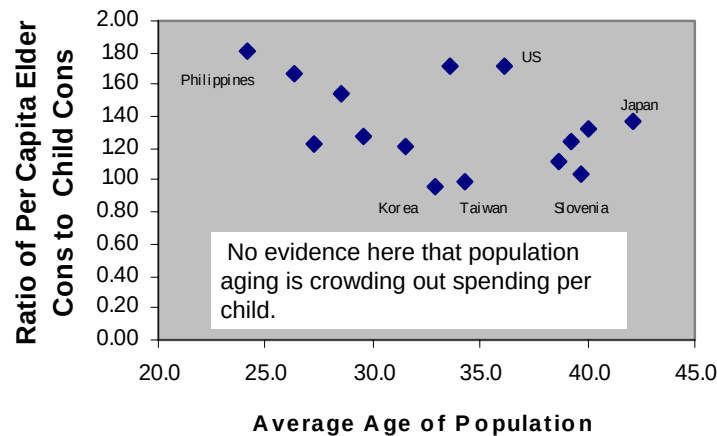
Per Capita Consumption of Young and Old Relative to Working Ages



Per Capita Consumption of Young and Old Relative to Working Ages



Ratio of Per Capita Consumption of Elderly to Children by Average Age of Population

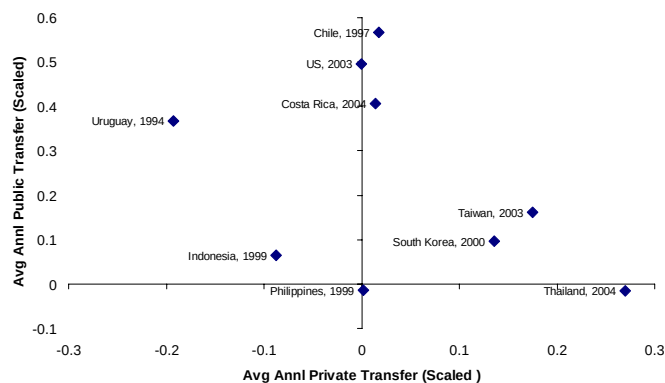


- Now Japan is in the middle
- Philippines has relatively high consumption per elderly
- Taiwan, Korea, and Slovenia again stand out for high investment in children.
- Crowding out is unclear because:
 - Population aging is due mainly to low fertility
 - Low fertility is associated with greatly increased human capital investment per child

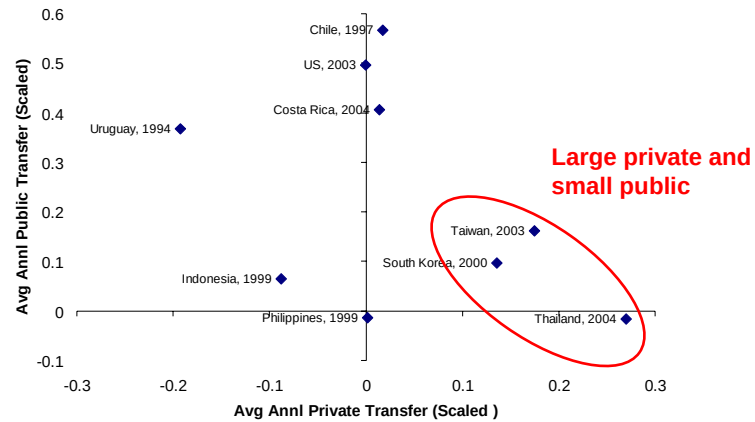
VIII. Substitution of public and private transfers to elderly

- Note that elderly also get income from
 - Continuing labor
 - Assets
- Cross nationally, do countries that have larger public transfers to elderly also have smaller private ones?
- Preliminary data for only 9 countries

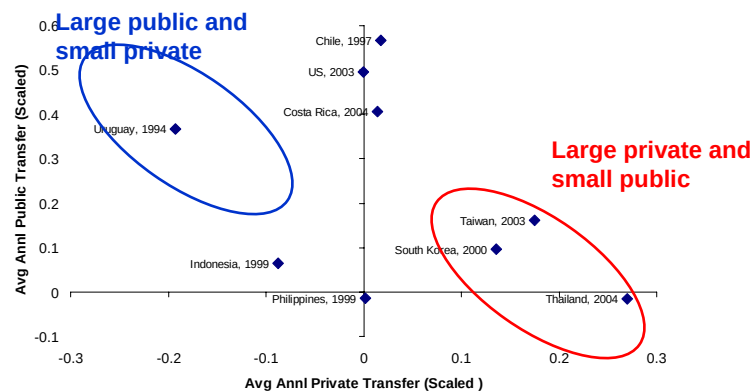
Average Private versus Public Transfers to the Elderly per capita (65+)



Average Private versus Public Transfers to the Elderly per capita (65+)



Average Private versus Public Transfers to the Elderly per capita (65+)



- These topics are just a sampling of some preliminary comparisons
- Now consider broader uses of NTA.

VIII. What is the relevance of age patterns of transfers, labor, consumption, and population aging?

- Development and growth
 - Dependency and the First Dividend
 - Demand for wealth and the Second Dividend
- Efficiency
 - Do transfers displace capital?
 - Do transfer systems distort labor supply decisions?
- Investment in children
 - Competition between children and the elderly for transfer resources?
 - Are we making net life time transfers (total bequest) to our children taking everything into account such as national debt and future transfer obligations to the elderly? Or are we in effect borrowing from them?
- Public Sector
 - Sustainability of Public Program Structures
 - Intergenerational equity when demography or systems change
 - Horizontal equity: public transfers by social class
 - Design of public programs.

What is the role of NTA in addressing these questions?

- These topics are difficult to study within a country
 - not much variation
 - interpretation of changes over time is difficult
- With 23 very different countries we have the variation to do cross-country analyses.
- NTA will provide comprehensible and comparable measures of the relevant quantities for the first time.
- NTA age profiles for the public sector are inputs for analyses like
 - generational accounting
 - Long term budget projections
 - Simulation studies of intergenerational equity under different policies
 - Historical trends in generational accounts
- NTA age profiles are inputs for simulations of saving, capital accumulation, economic growth and development.
- NTA can also describe transfer patterns by education, ethnicity, or sex.

Exciting times for the NTA project.

- We are beginning to get comparable high quality data for many countries.
- There has been strong interest in NTA results by different international agencies.
- We are finding some surprisingly strong differences in patterns of labor supply, consumption, transfers, and capital accumulation across countries.
- Researchers are making new discoveries about their own countries.
- We will be hearing about some of this work over the next few days, and I greatly look forward to it.

END