Consumption:
An International Comparison
in the NTA Framework

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NTA 6

Outline

1. Motivation
2. Selected facts
3. Information extraction
4. Regularities and preponderance
5. Interpretations
6. Concluding remarks

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1. Motivation

NTA
  – Introducing age into national accounts

Measuring consumption in NTA

  – Quite a few public policy issues are reflected in
     the age distribution of consumption
  – Examples include what the government can and
     should do on education and health,
    (the State may remedy what the private economy
     is constrained from doing adequately)

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Effective policy design starts from a grasp on reality

– available information must be organized and presented in
  useful form
– cross-country comparisons can be used to provide
  perspective

The method of NTA has already gone beyond what
  was available, though subject to certain limitations
  (e.g., not all economies meet the heavy data requirement…)

Today we focus on some highlights of cross-country
  comparison for illustration.

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In the current context of comparative consumption profile, the method of NTA made two relevant contributions, among many –

- In extending the range of the age profile:
  for those very young, and for those old

- In providing compositional detail:
  especially on the inclusion of public-funded
  consumption, particularly on education
  and health.

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2. Selected facts

- Life-Cycle Hypothesis (e.g., Modigliani and Brumberg 1954…), perhaps the most influential model on consumption
  - consumption-smoothing should drive for a *level* age distribution of (private) individual consumption.
- Reality may depart from the optimal
  - the humped consumption profile (Courant et al 1984…),
  - the retirement consumption puzzle (Miniaci 2003…)…
- Explanation includes liquidity constraint (Thurow 1969…), family size (Irvine 1978…), bequest (Barro 1974…), social security (Feldstein 1974, Kotlikoff 1984…) and so on

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Questions that may be addressed, to some extent,
   by international comparison
   via the NTA methods:
– *what* pattern does the age profiles present,
      which regularities can be surmised from it,
– *whether* and *how* public policy has helped,
      in *which* countries and *why* so
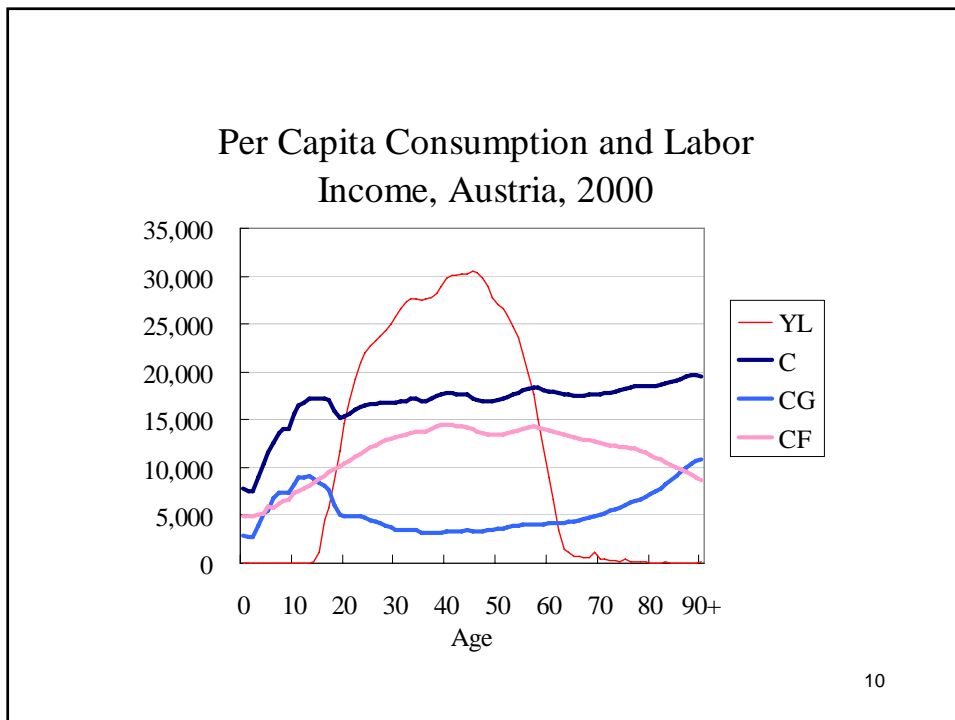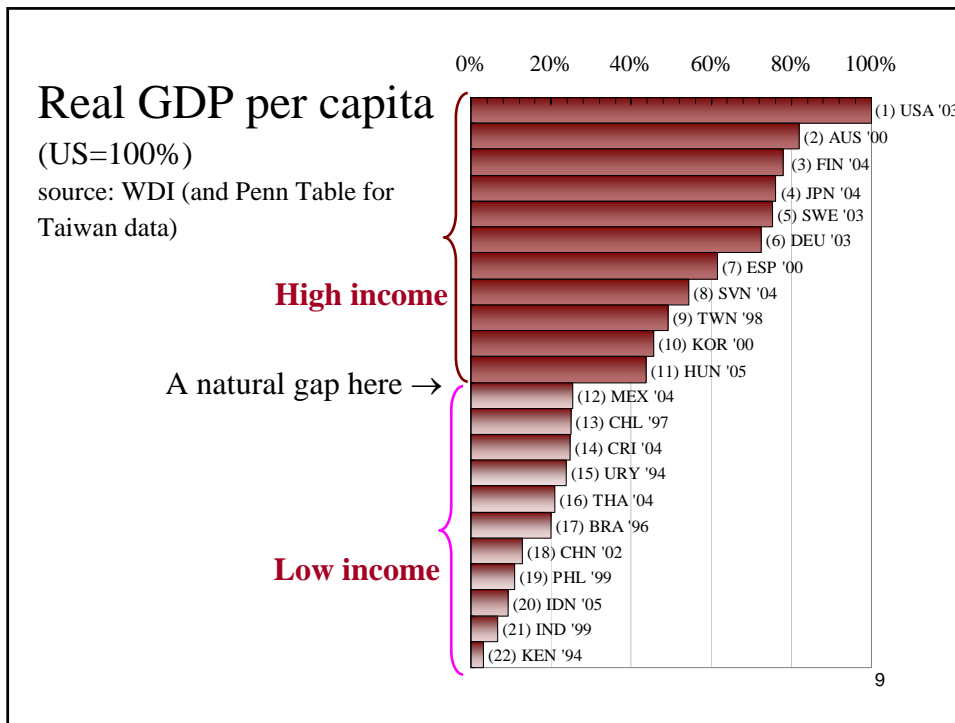
Evidences from 22 NTA countries

Europe (7): Austria (AUS), Finland (FIN), Germany (DEU),
            Hungary (HUN), Slovenia (SVN), Spain (ESP),
            Sweden (SWE)
America (6): Brazil (BRA), Chile (CHL), Costa Rica (CRI),
            Mexico (MEX), Uruguay (URY), USA (USA)
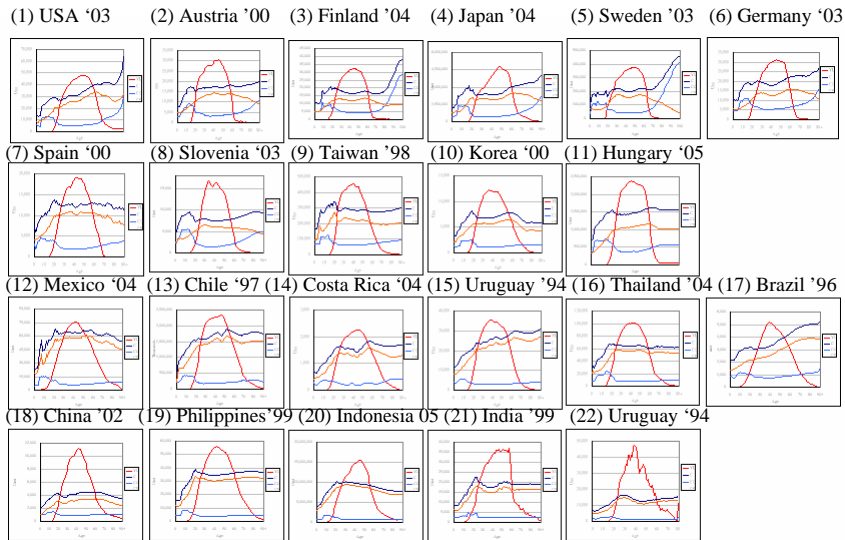**Asia** (8): China (CHN), India (IND), Indonesia (IDN),
            Japan (JPN), Korea (KOR), Philippines (PHL),
            Taiwan (TWN), Thailand (THA)
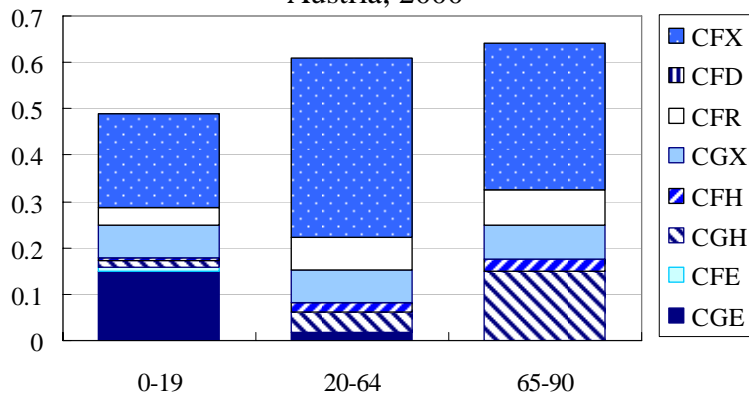**Africa** (1): Kenya (KEN)

Real GDP per capita

(US=100%)

source: WDI (and Penn Table for Taiwan data)

High income

A natural gap here →

Low income

0% 20% 40% 60% 80% 100%	

(1) USA '03
(2) AUS '00
(3) FIN '04
(4) JPN '04
(5) SWE '03
(6) DEU '03
(7) ESP '00
(8) SVN '04
(9) TWN '98
(10) KOR '00
(11) HUN '05
(12) MEX '04
(13) CHL '97
(14) CRI '04
(15) URY '94
(16) THA '04
(17) BRA '96
(18) CHN '02
(19) PHL '99
(20) IDN '05
(21) IND '99
(22) KEN '94

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Per Capita Consumption and Labor Income, Austria, 2000

Legend: YL, C, CG, CF

Age: 0 10 20 30 40 50 60 70 80 90+

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Consumption at a glance

(1) USA '03 (2) Austria '00 (3) Finland '04 (4) Japan '04 (5) Sweden '03 (6) Germany '03

(7) Spain '00 (8) Slovenia '03 (9) Taiwan '98 (10) Korea '00 (11) Hungary '05

(12) Mexico '04 (13) Chile '97 (14) Costa Rica '04 (15) Uruguay '94 (16) Thailand '04 (17) Brazil '96

(18) China '02 (19) Philippines '99 (20) Indonesia 05 (21) India '99 (22) Uruguay '94

Structure of Consumption, per capita, normalized by labor income of age 30-44, Austria, 2000

Legend:
- CFX
- CFD
- CFR
- CGX
- CFH
- CGH
- CFE
- CGE

(x-axis: 0-19, 20-64, 65-90)

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Consumption composition

(1) USA, 2004 (2) Austria, 2000 (3) Finland, 2004 (4) Japan, 2004 (5) Sweden, 2003 (6) Germany, 2003

(7) Spain, 2000 (8) Slovenia, 2004 (9) Taiwan, 1998 (10) Korea, 2000 (11) Hungary, 2005

(12) Mexico, 2004 (13) Chile, 1997 (14) Costa Rica, 20 (15) Uruguay, 1994 (16) Thailand, 2004 (17) Brazil, 1996

(18) China, 2002 (19) Philippines, 1999 (20) Indonesia, 2005 (21) India, 1999 (22) Kenya, 1994

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3. Information extraction

We organize complex data to reveal inherent patterns:

Country-specific profiles
by age group

characterization

classification

Country profile
by broad age group, x, y, z

Grouping countries
by pattern (hump, rising,…)

Vector representation, x/y, z/y

Group portrait, x/y, z/y
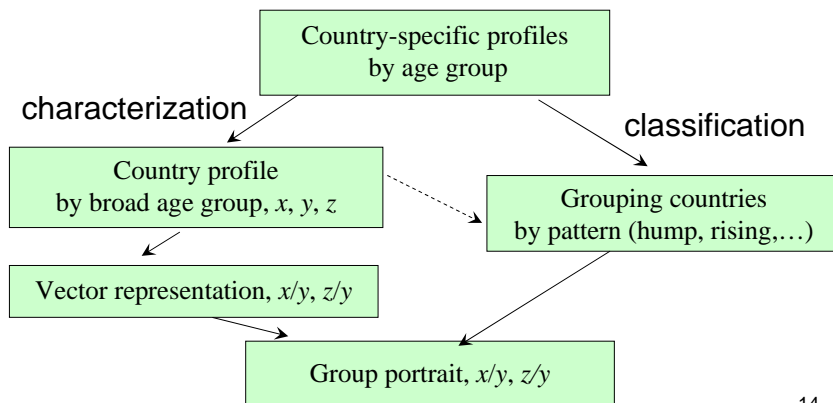
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Age profile into three-group histogram

age profile

three groups
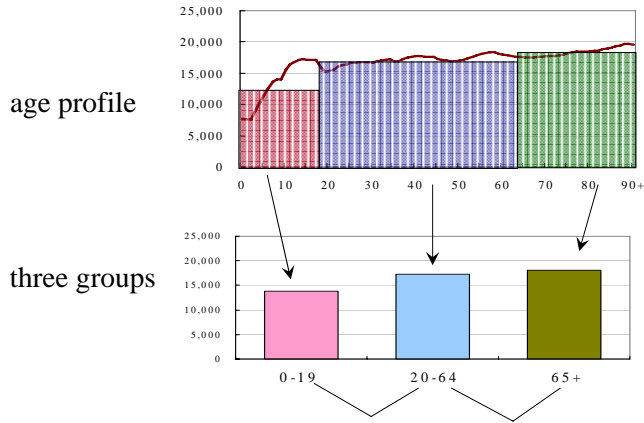
two statistics: child/adult = C_{0-19}/C_{20-64}; elderly/adult = C_{65+}/C_{20-64}
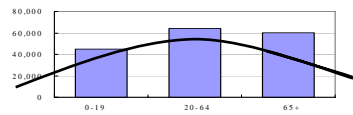
(both are per capita consumption in relative terms)

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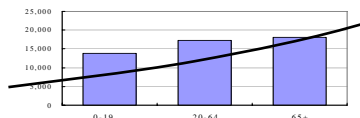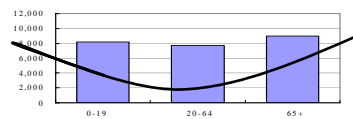# Comparing per capita consumption of kids (0-19), adults (20-64) and elderly (65+)

$C_{20-64} < C_{65+}$

$C_{20-64} > C_{65+}$

C_{65+}/C_{20-64}

$C_{0-19} < C_{65+}$ $C_{0-19} > C_{65+}$

45º

$C_{0-19} < C_{20-64}$ $C_{0-19} > C_{20-64}$

C_{0-19}/C_{20-64}

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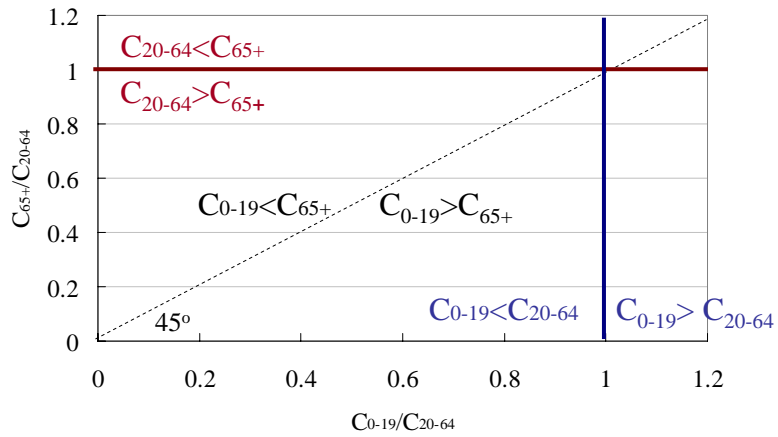
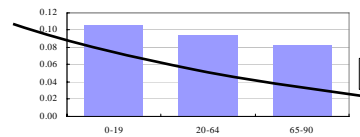# Age profile patterns

Hump: C_{20-64} highest

Rising (No hump): C_{65+} highest

Inverse hump: C_{20-64} lowest

Falling: C_{65+} lowest

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- Comment on the hump (or inverse hump)
  - more patterns possible concerning C_{0-19}/C_{65+}, but by using the equivalence scale in measuring CF, it is likely that $CF_{0-19}/CF_{65+} < 1$.
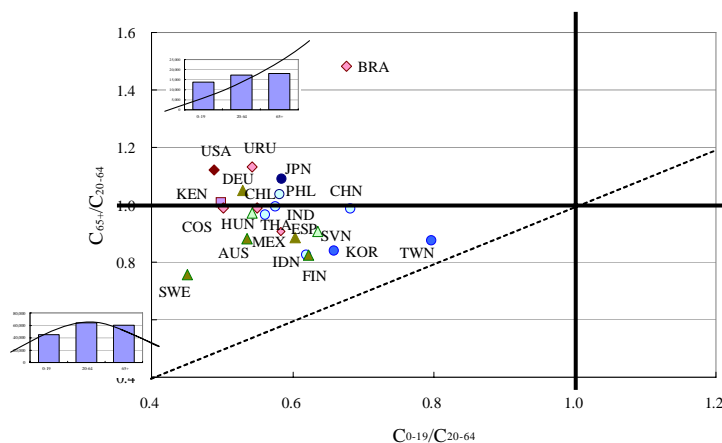
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4. Regularities and preponderance

- Regularities based on cross-country comparison
- Preponderance caused by income and a few other characteristics: socialist connection, Western ethos...
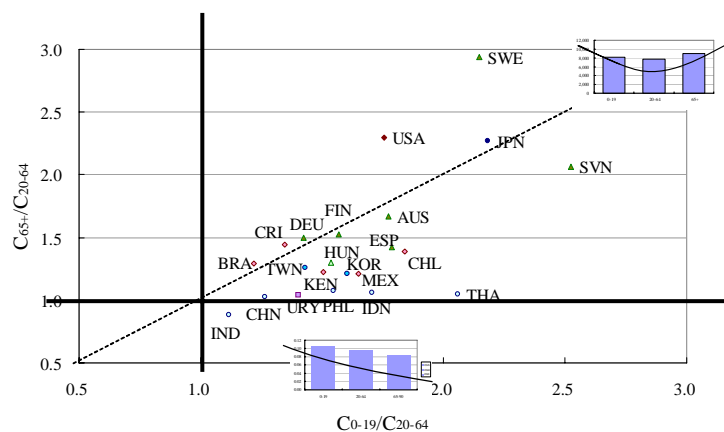
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Private Consumption (CF) per capita

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Some findings

- $CF_{65+} > CF_{0-19}$: All countries have larger elderly consumption than child consumption on per capita basis

- $CF_{20-64} > CF_{0-19}$: All countries have larger adult consumption than child consumption

- 8 countries exhibit a rising pattern

- 14 countries have the hump pattern
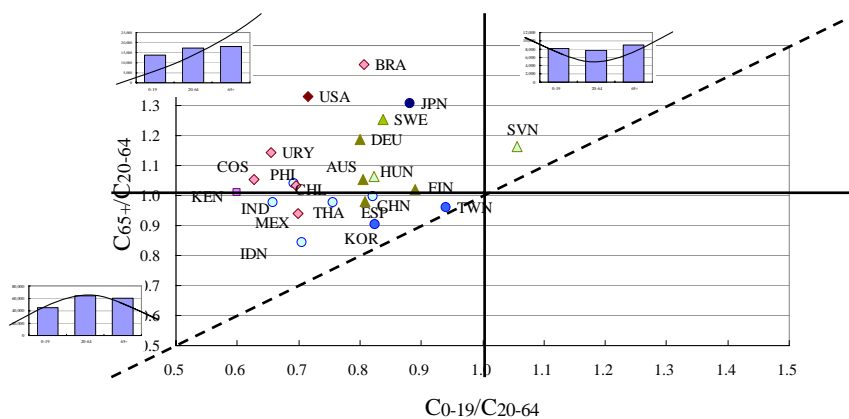
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Public Consumption (CG) per capita

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Some findings

- $CG_{0-19} > CG_{20-64}$: All countries have larger child consumption than adult

- $CG_{65+} > CG_{20-64}$: All countries (except India) have larger elder consumption than adult consumption

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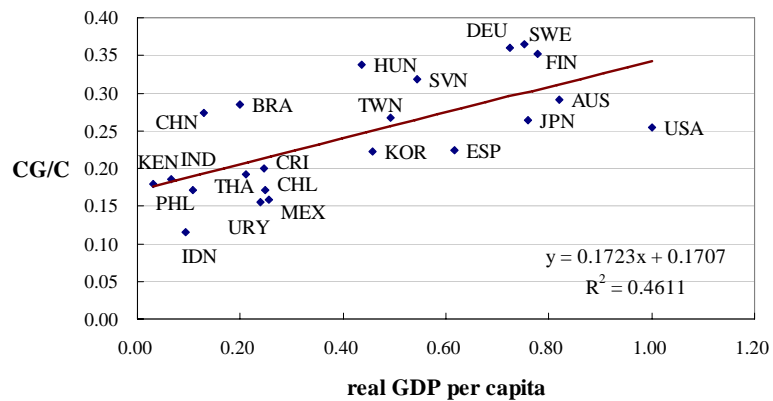---

Total consumption per capita:
$C = CG + CF$

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Some findings

- $C_{65+} > C_{0-19}$: all economies
- $C_{20-64} > C_{0-19}$: all economies, except Slovenia
- $C_{20-64} < C_{65+}$: USA, Japan, most European and LA economies, Kenya, Philippines,…

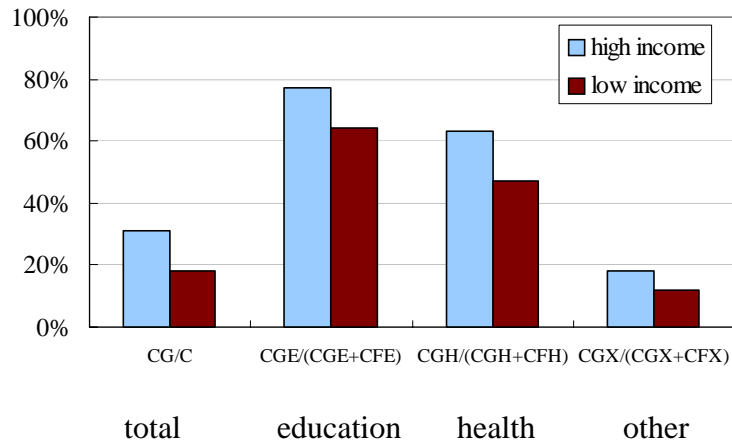 $C_{20-64} > C_{65+}$: most Asian economies, also Mexico and Spain

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Public component in consumption rises with income

$y = 0.1723x + 0.1707$

$R^2 = 0.4611$

CG/C

real GDP per capita

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simple average of public component in consumption across economies

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Z1 = CG/C   administrative capacity (To tax & spend)
Z2 = CGX/CG   ability to afford needs other than HC investment
Z3 = CGH/(CGE + CGH) relative ability to care for the elderly

Explanatory variables: GDP per capita, Dummy for Socialism & West
----
CG/C = 0.1556 + 0.1794 GDPpc + 0.0876 SOC R^2=0.64
          (0.019)*** (0.353)***   (0.293)***

CGX/CG = 0.7130 – 0.1160 GDPpc – 0.16 WEST R^2=0.47
             (0.458)   (0.107)   (0.065)**

CGH/(CGE+CGH) = -0.3091 + 0.2640 GDPpc + 0.0088 WEST R^2=0.66
                       (0.319)   (0.107)**   (0.005)*

***: significant at 1% level; **: significant at 5% level; *: significant at 1% level

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Regularities

R1. In private consumption per capita, for all countries,
Elderly consumption exceeds Child consumption
$$(CF_{65+} > CF_{0-19})$$

R2. In private consumption per capita, for all countries,
Adult consumption exceeds Child consumption
$$(CF_{20-64} > CF_{0-19})$$

R3. In public consumption per capita, for all countries,
Child consumption exceeds Adult consumption
$$(CG_{0-19} > CG_{20-64})$$

R4. In public consumption per capita, for almost all countries,
(Exception: India)
Elderly consumption exceeds Adult consumption
$$(CG_{65+} > CG_{20-64})$$

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R5. In total consumption per capita, for all countries,
Elderly consumption exceeds Child consumption
$$(C_{65+} > C_{0-19})$$

R6. In total consumption per capita, for almost all countries,
(Exception: Slovenia)
Adult consumption exceeds Child consumption
$$(C_{20-64} > C_{0-19})$$

from Vector Representation,

R7. If there is hump in total consumption $(C_{20-64} = C_{max})$
then there is hump in private consumption
$$(CF_{20-64} = CF_{max})$$

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Preponderance

P1. Richer countries tend to have higher share of public consumption in education, health and other consumption than poorer economies

P2. Economies with socialist tradition tend to have higher public component in consumption

P3. The State in richer countries tends to spend relatively more on health than on education than in poorer economies

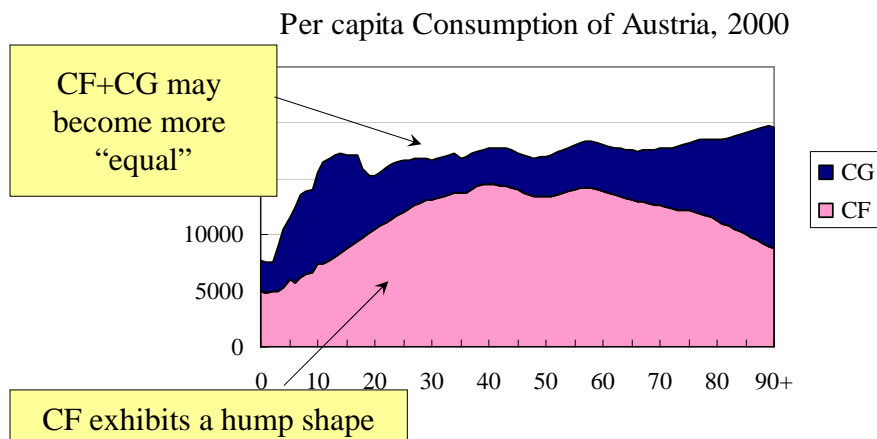P4. The State in Western economies tends to spend more on health

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5. Interpretations

- "Complementary" principle?
  - A role for public consumption to make consumption more "equal" among age groups?

  channels: merit goods such as education, health, (what about other public goods?)

  - determinants: income level, institutions (political system), social values,…

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Austria as an example

Per capita Consumption of Austria, 2000

CF+CG may become more "equal"

CF exhibits a hump shape

Legend: CG, CF

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- CG ameliorates humps,

    but needs further study

- In this (exploratory) study, the 'roll-call' of all nations in the next table is presented to allow for various possible explanations,

    beside income (rich or poor),

  but income apparently does matter,

    in the comparison between the two subsamples.

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Hump among the rich		In CF	In C	Hump among the poor		In CF	In C
USA	'03			MEX	'04	*	*
AUS	'00	*		CHL	'97	*	
FIN	'04	*		CRI	'04	*	
JPN	'04			URY	'94		
SWE	'03	*		THA	'04	*	*
DUE	'03			BRA	'96		
ESP	'00	*	*	CHN	'02	*	*
SVN	'04	*		PHL	'99		
TWN	'98	*	*	IDN	'05	*	*
KOR	'00	*	*	IND	'99	*	*
HUN	'05	*		KEN	'94		
11		8	3	11		7	5

Out of 22 observations, 15 have humps in CF, but only 8 in C.

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6. Concluding Remarks

- More explanations needed besides income,
  - culture, social value
  - historical/political heritage
  - …

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- More refinements to make
  - Other important features: location of peak, shape of the entire age profile (e.g., double hump, as "Chayanov cycle" (Mason and Miller, 2000))
  - classification scheme: same across nations while life expectancy (positively correlated with income) and other factors varies?
  - measuring scheme: not just by broad age group
  - …

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- Inter-temporal comparisons
  - response to policy initiatives: social security programs, population policies
  - economic development, industrialization,…
  - time series evidence: evolution
- And more…

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Thank you for listening.

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