Economic Support Ratios and the First and Second Demographic Dividend in Europe

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Structure of the talk

1. **National transfer accounts**

2. **Data and methodology**
   - population projections
   - NTA methodology
   - NTA age profiles
   - support ratio
   - first and second demographic dividend

3. **Results**

4. **Conclusion**

RONALD LEE AND ANDREW MASON

Population Aging and the Generational Economy

A Global Perspective
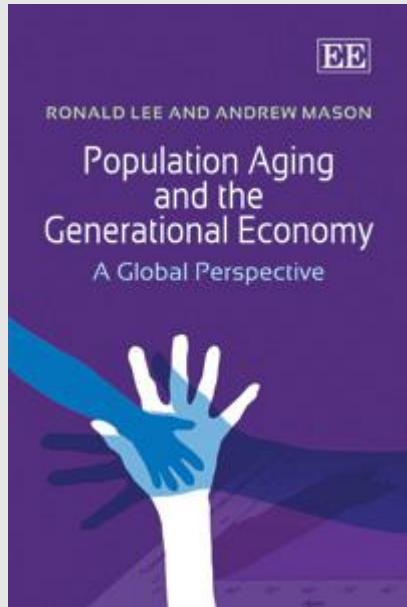
"Over coming decades, changes in population age structure will have profound implications for the macroeconomy, influencing **economic growth**, **generational equity, human capital, saving and investment, and the sustainability of public and private transfer systems**. How the future unfolds will depend on key actors in the generational economy: governments, families, financial institutions, and others. This path-breaking book provides a comprehensive analysis of the macroeconomic effects of changes in population age structure across the globe."

1. National Transfer Accounts

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http://www.ntaccounts.org/web/nta/show   http://europe.ntaccounts.org/web/nta/show/

National Transfer Accounts Project Country Members
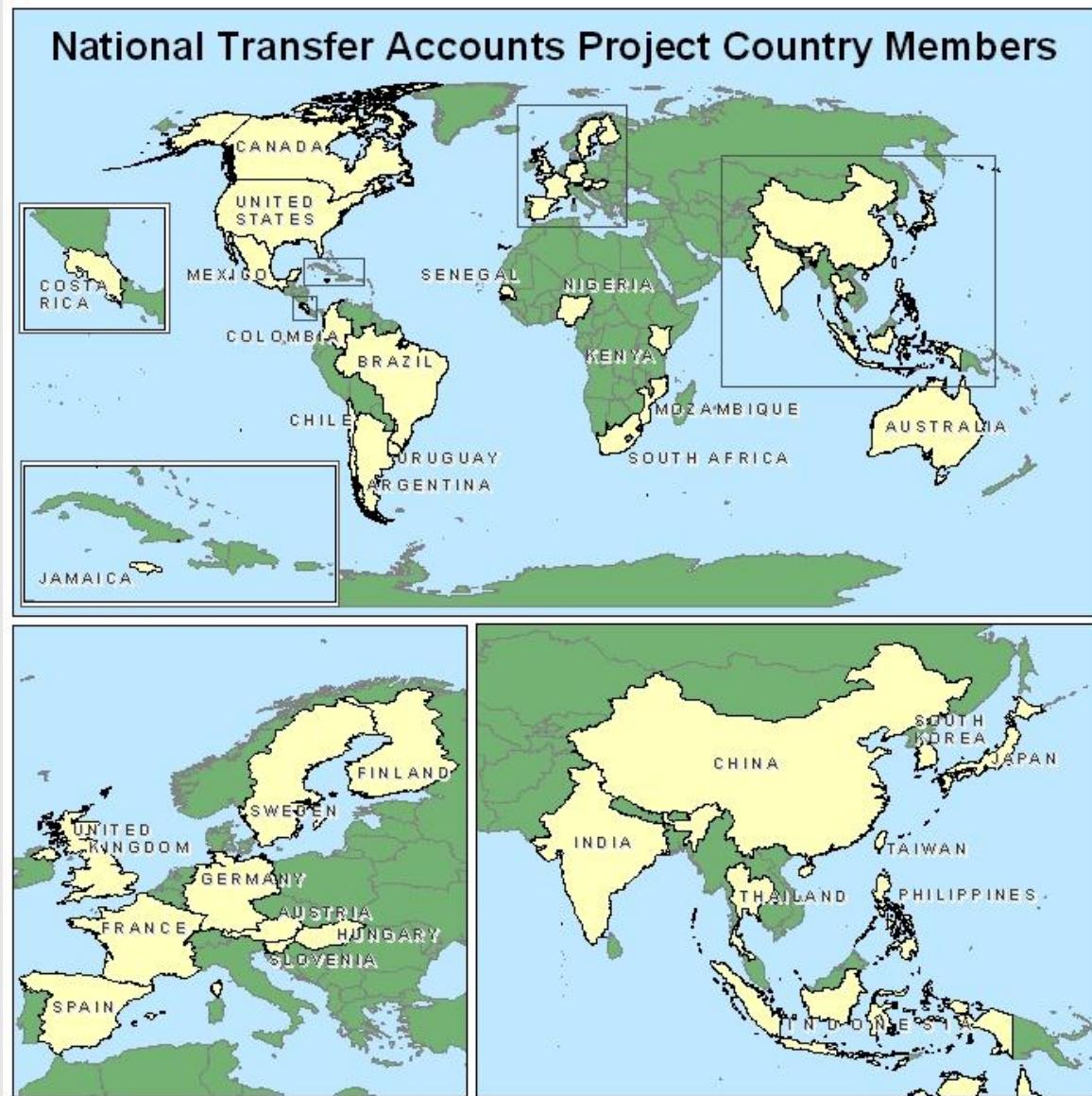
36 countries

Europe:

Austria
Finland
France
Germany
Hungary
Slovenia
Spain
Sweden
UK
Italy
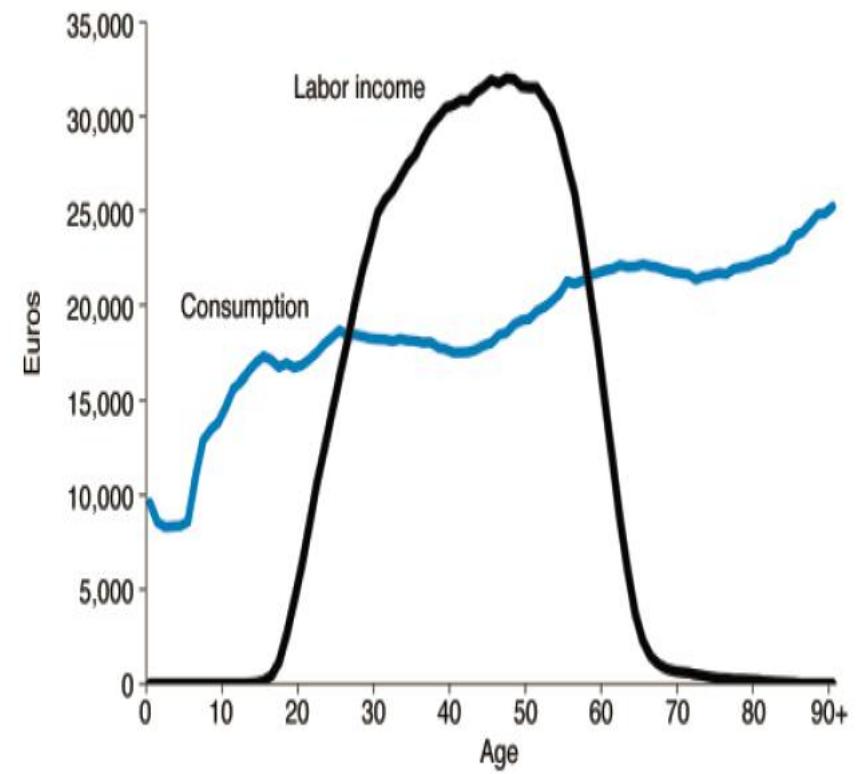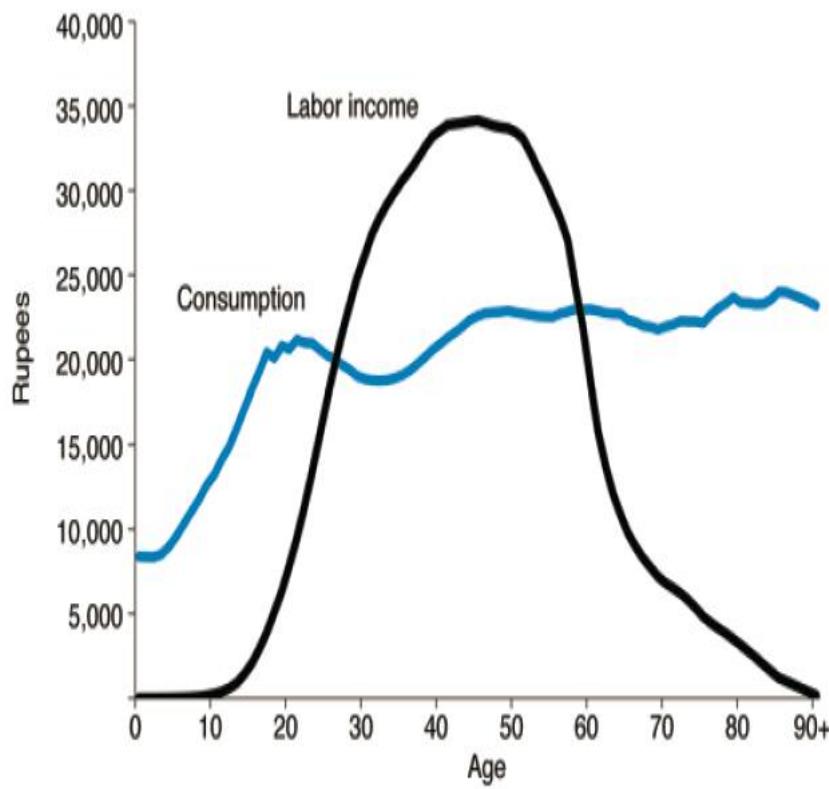
Figure 1. Per-capita labor income and consumption by age in India (left) in 2004 and in Germany (right) in 2003. *Source:* Lee and Mason forthcoming, Figure 1.3.
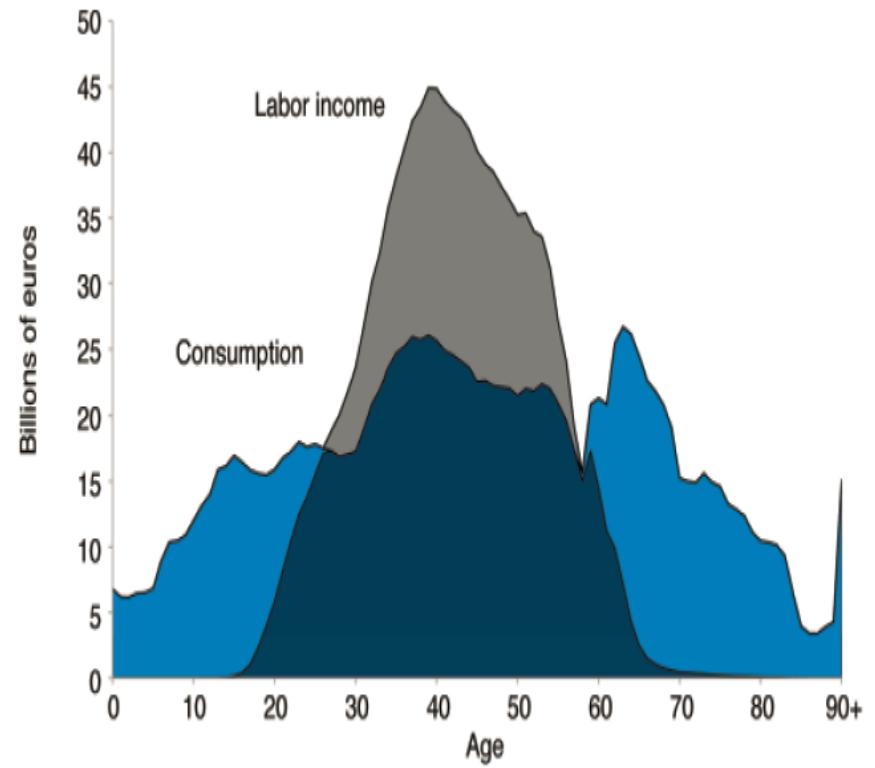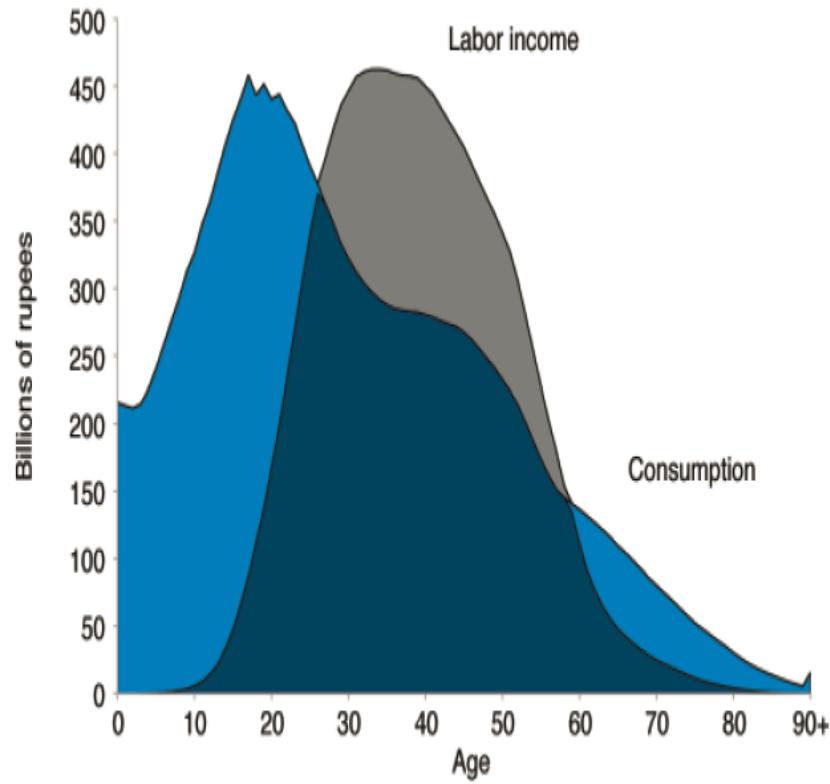
Figure 2. Aggregate labor income and consumption by age in India (left) in 2004 and in Germany (right) in 2003. *Source:* Lee and Mason forthcoming, Figure 1.3.

„*NTA documents means by which those age groups with life cycle deficits draw on surplus resources from persons in prime working ages.*"

2. Data and methodology

a)   Population projections

b)   NTA Methodology

c)   NTA age profiles of labour income, consumption and lifecycle deficit

d)   Support ratio

e)   The first and second demographic dividend

a) Population Projections
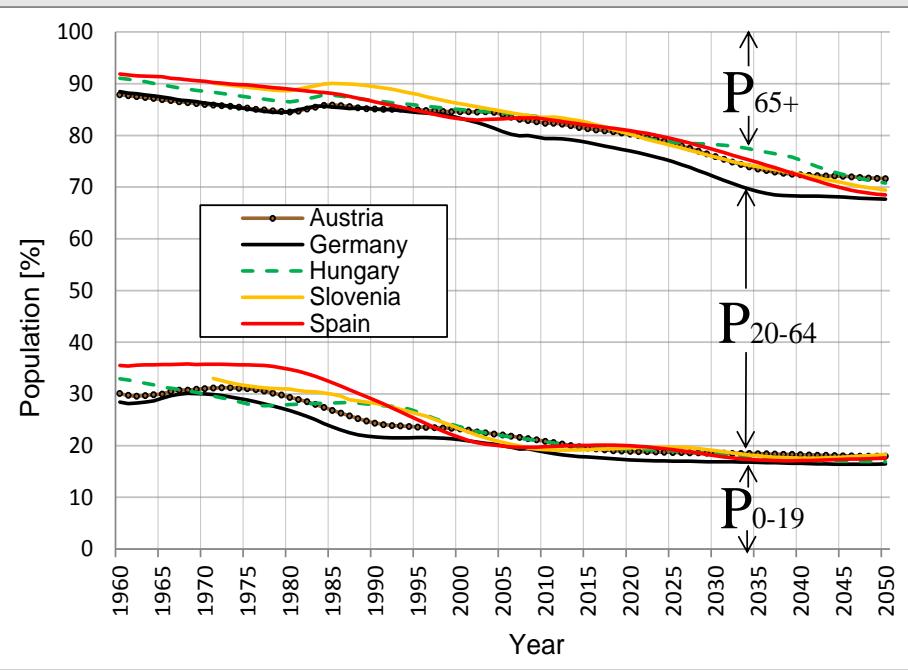
Age structure in European NTA countries 1960-2050 (actual data for 1960-2010 and projections for 2011-2060); in percentages

b) NTA methodology

flow account identity

Inflows		Outflows
▪ $Y^l(a)$ …labor income		▪ $C(a)$ …consumption
▪ $Y^a(a)$ …asset income	**=**	▪ $S(a)$ …savings
▪ $\tau^+(a)$ …transfers received		▪ $\tau^-(a)$ …transfers paid

$$\underbrace{Y^l(a) + Y^a(a) + \tau^+(a)}_{\text{inflows}} = \underbrace{C(a) + S(a) + \tau^-(a)}_{\text{outflows}}$$

$$\underbrace{C(a) - Y^l(a)}_{\text{lifecycle deficit}} = \underbrace{\underbrace{Y^a(a) - S(a)}_{\text{asset-based reallocations}} + \underbrace{\tau^+(a) - \tau^-(a)}_{\text{net transfers}}}_{\text{age reallocation}}$$

(Source: Mason 2007)

Components of...

...**consumption**:   education, health, others
$\Rightarrow$ private vs. public

...**income**:   asset income, labor income

...**transfers**:   education, healthcare, pensions, illness, unemployment, family and children
$\Rightarrow$ public vs. private

...**assets**:   businesses, homes, etc.
$\Rightarrow$ primarily through private institutions

"The mechanisms by which assets are shifted across age groups is important because it determines whether population ageing leads to accumulation of assets or to the expansion of public and private transfer programs."

(Mason and Lee 2006)

life cycle deficit can be financed through:

        a) public transfers (health, pensions, unemployment, …)

        b) private transfers (parents financing consumption of children)

        c) asset reallocation (savings, interests on bonds, selling house)

These flows are mediated by

        public and private institutions

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.

c) NTA age profiles
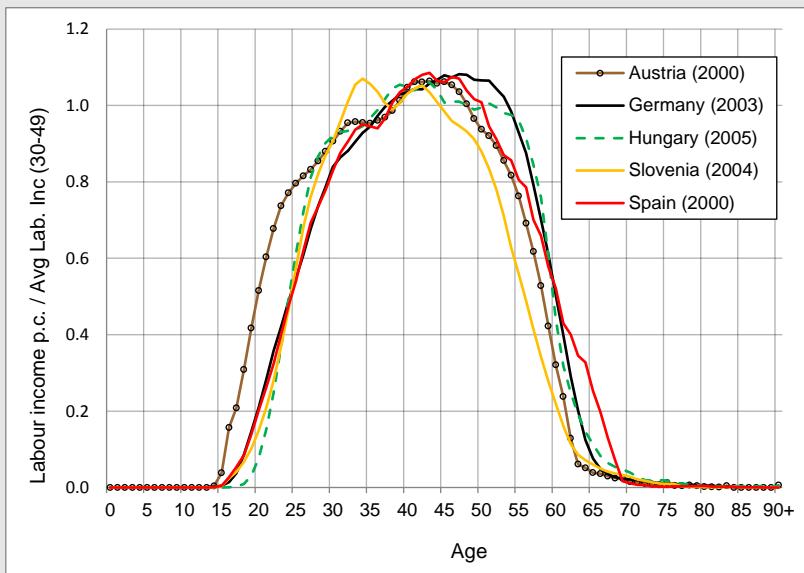
Labour income age profile for European NTA countries; presented as labour income per capita relative to the average labour income in 30-49 age group

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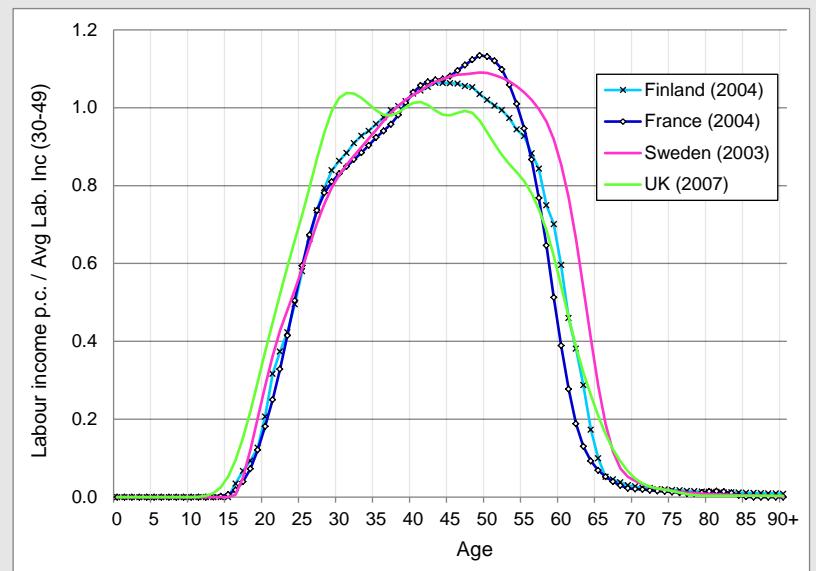
c) **NTA age profiles** - continued

Consumption age profile for European NTA countries; as consumption per capita relative to the average labour income in the 30-49 age group
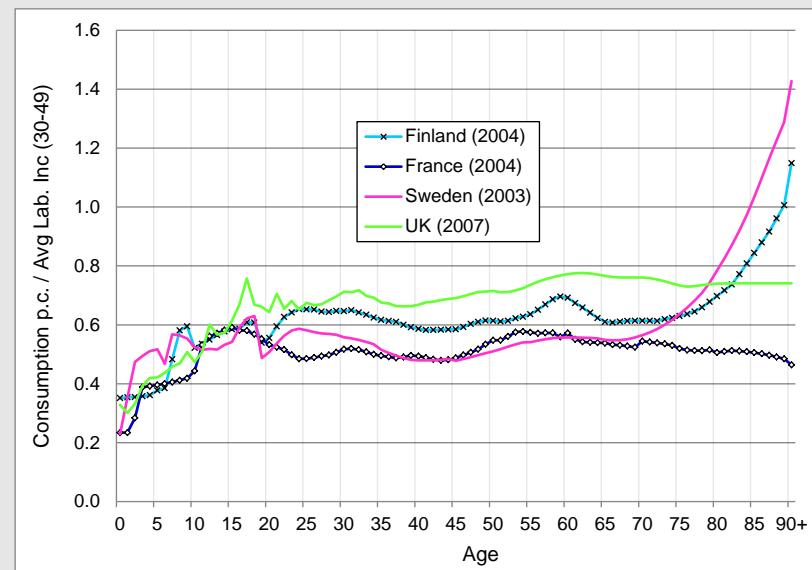
c) NTA age profiles - continued
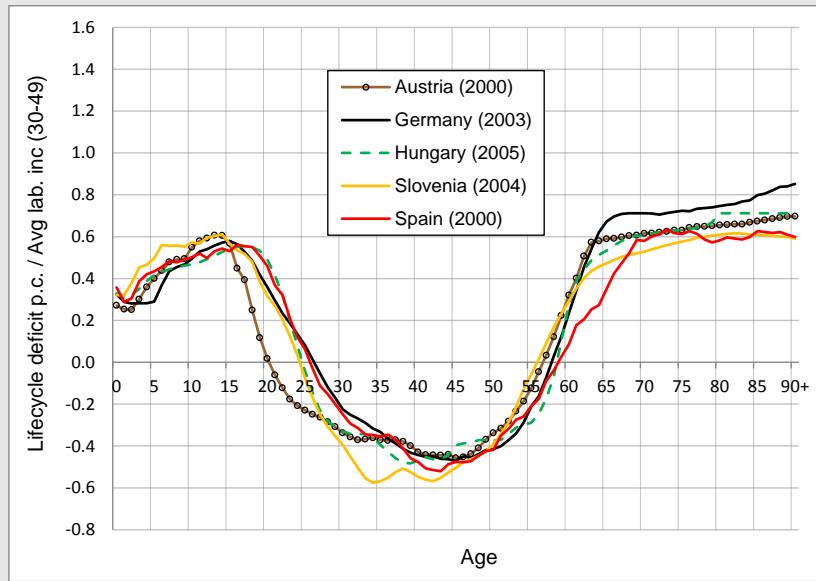
Lifecycle deficit age profile for European NTA countries; as lifecycle deficit per capita relative to the average labour income in 30-49 age group
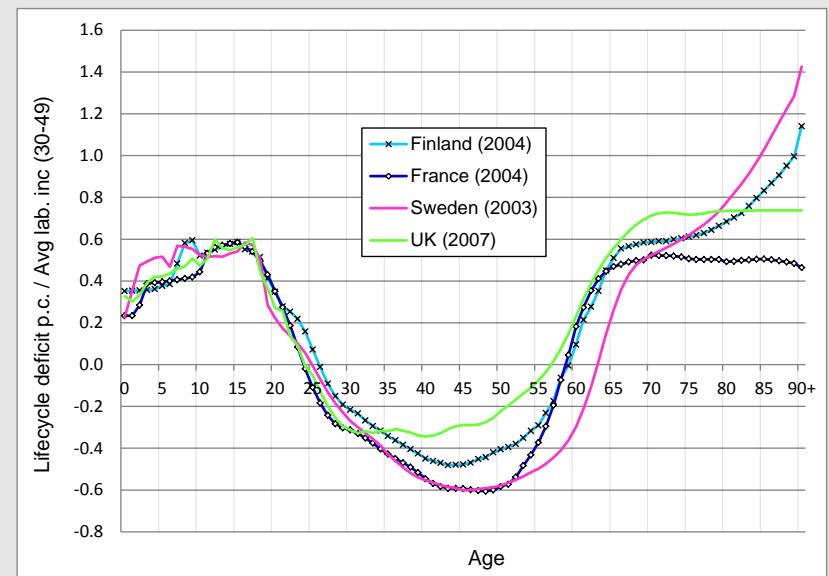

Negative LCD:
Germany: 31 years (age 27-57)
Slovenia: 31 years (age 25-55)
Sweden: 38 years (age 25 – 62)

Age-Distribution of Income, Consumption and Transfers in Austria 2005

Legend:
- Labor Income (yellow)
- Public Transfers (black)
- Asset-based Reallocation (dark red)
- Private Transfers (blue)
- Consumption (red line)
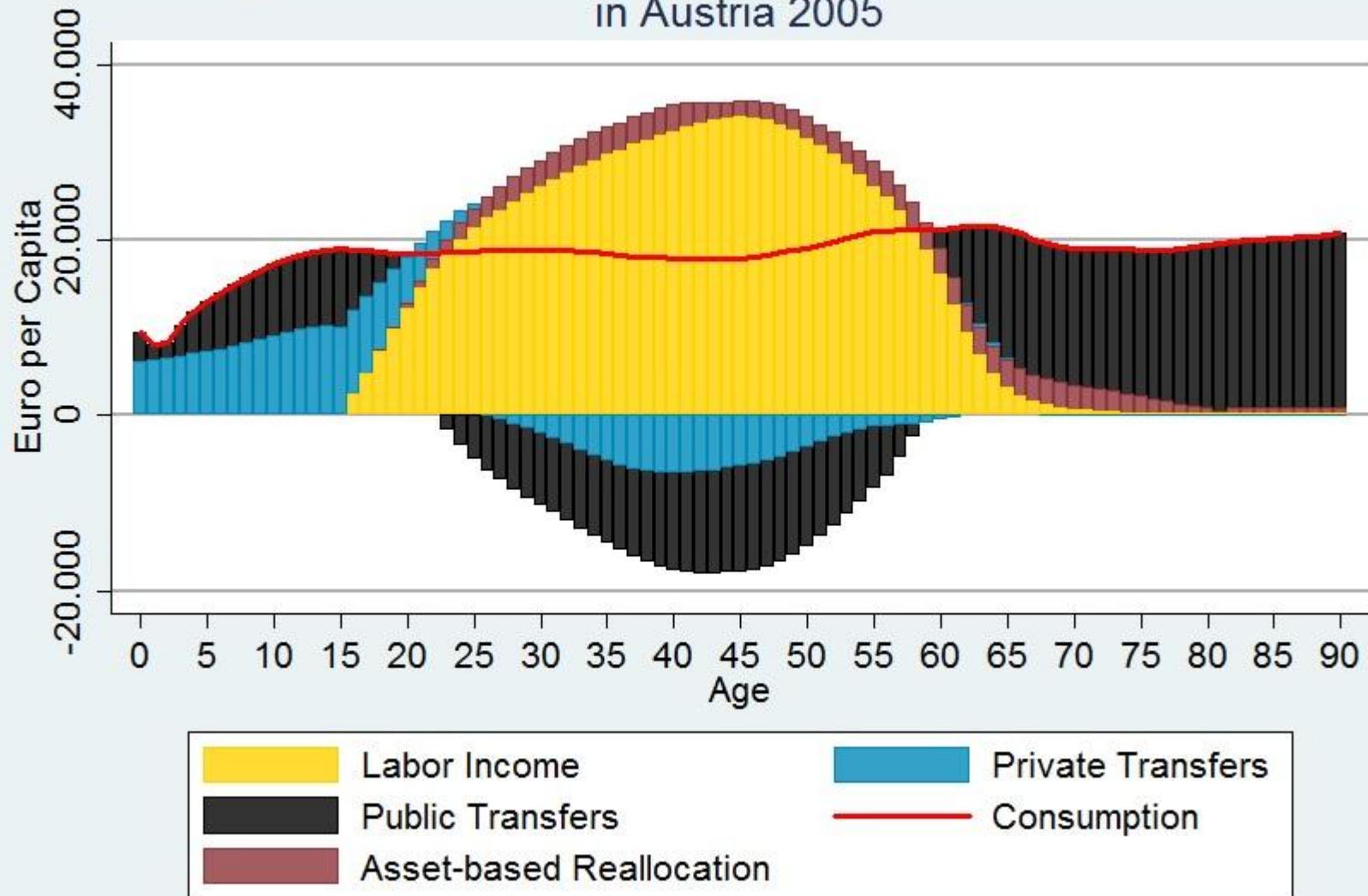
d) Support ratio

$$LF1 = \sum_{a=20}^{64} N_a$$

$$LF2 = \sum_{a=0}^{\omega} \gamma(a)P(a,t)$$

$$CON1 = \sum_{a=0}^{\omega} N_a$$

$$CON2 = \sum_{a=0}^{\omega} \alpha(a)P(a,t)$$

SR1 = LF1/CON1

SR2 = LF1/CON2

SR3 = LF2/CON1

SR4 = LF2/CON2

NTA support ratio

e) The First and Second Demographic Dividend

$$\frac{C(t)}{N(t)} = \frac{C(t)}{Y(t)} \cdot \frac{Y(t)}{L(t)} \cdot \frac{L(t)}{N(t)}$$

$$\hat{C}_N = \hat{C}_Y + \hat{Y}_L + \boxed{\hat{L}_N} \quad \longleftarrow \quad \text{first demographic dividend}$$

$$\boxed{\hat{C}_Y} = (\hat{C}_N - \hat{Y}_L) - \hat{L}_N$$

second demographic dividend

3. Results

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# Four alternative measures of the support ratio (relative to 2000); European NTA countries
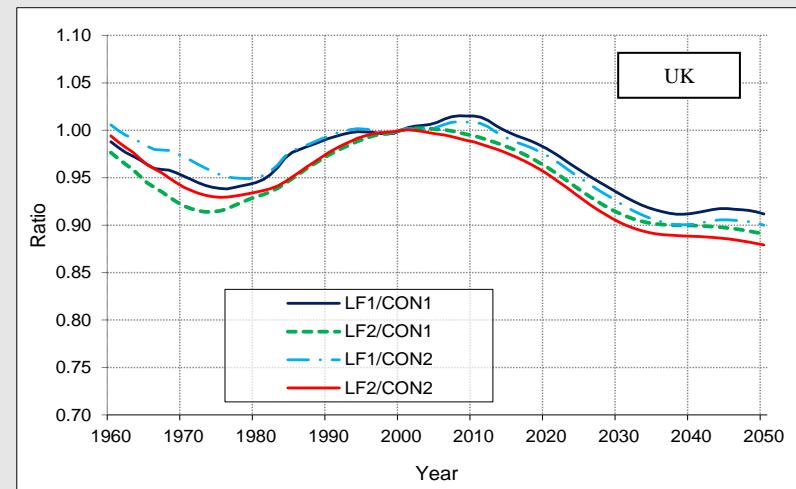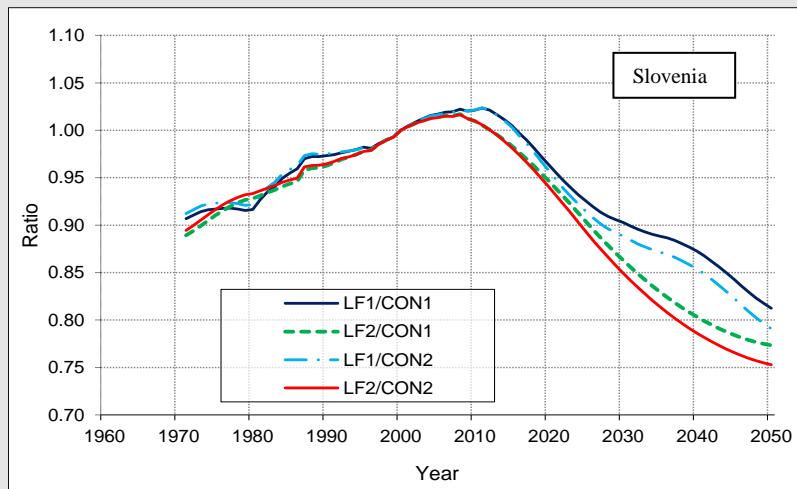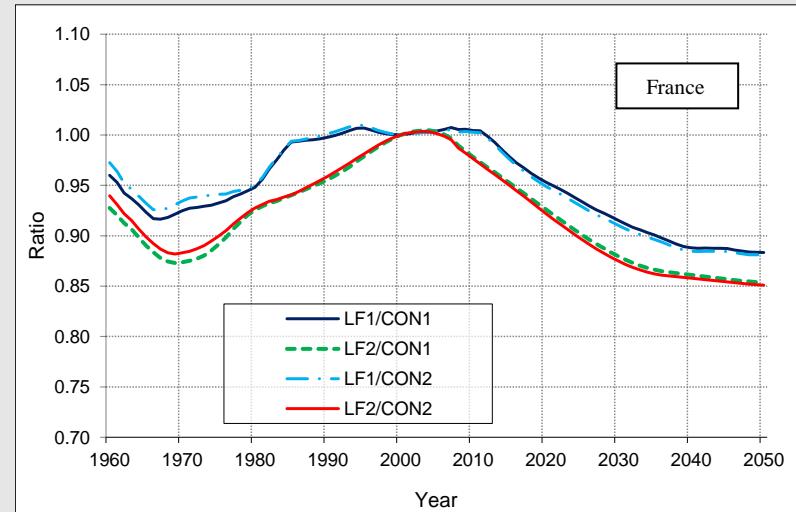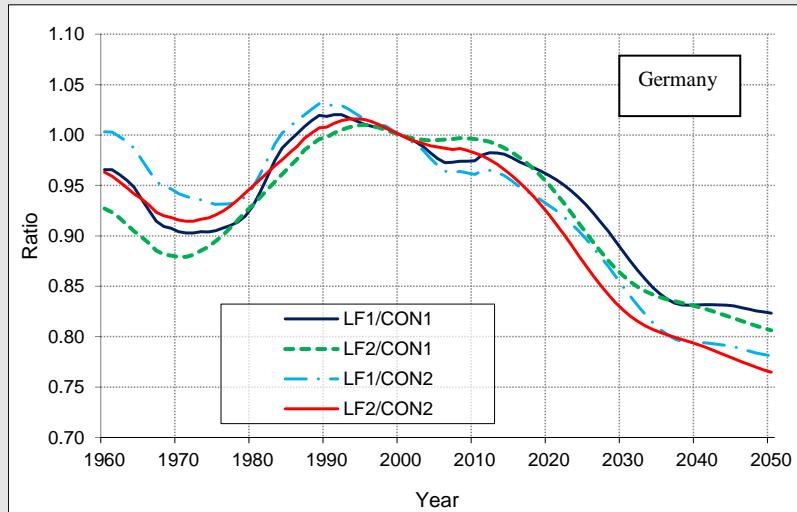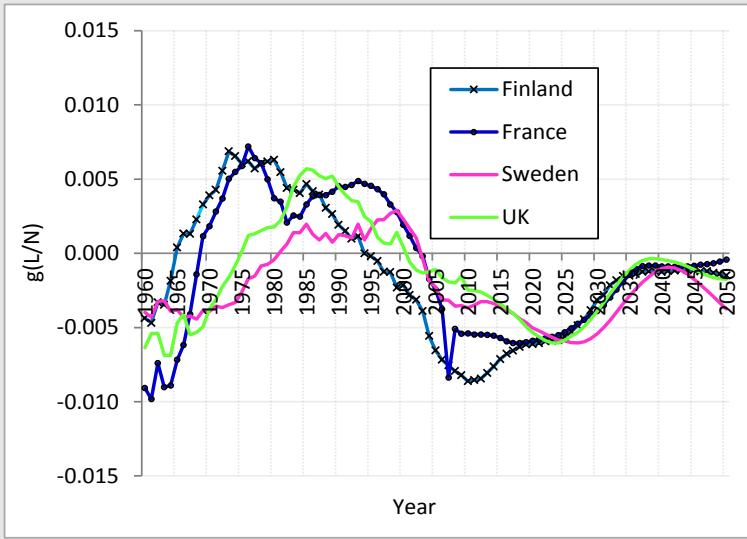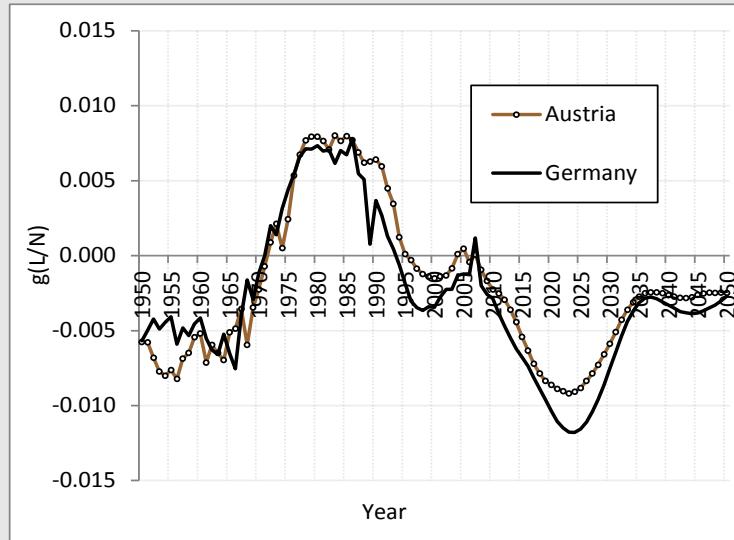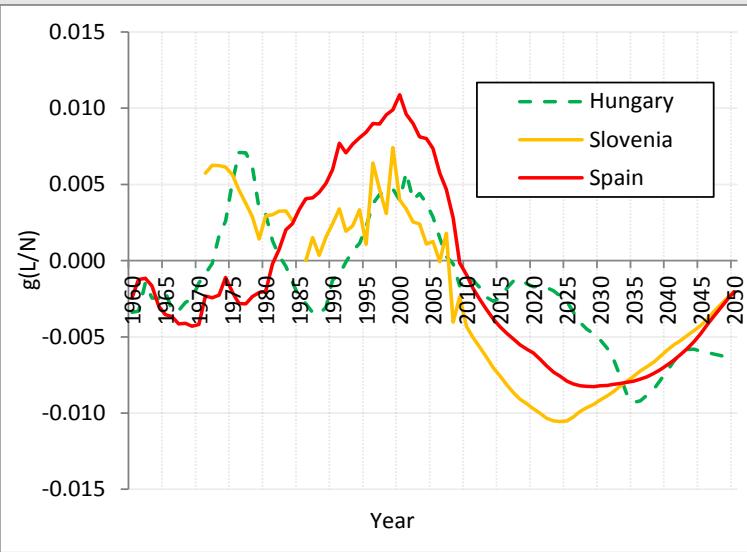
First demographic dividend

Years, in which the first demographic dividend was positive
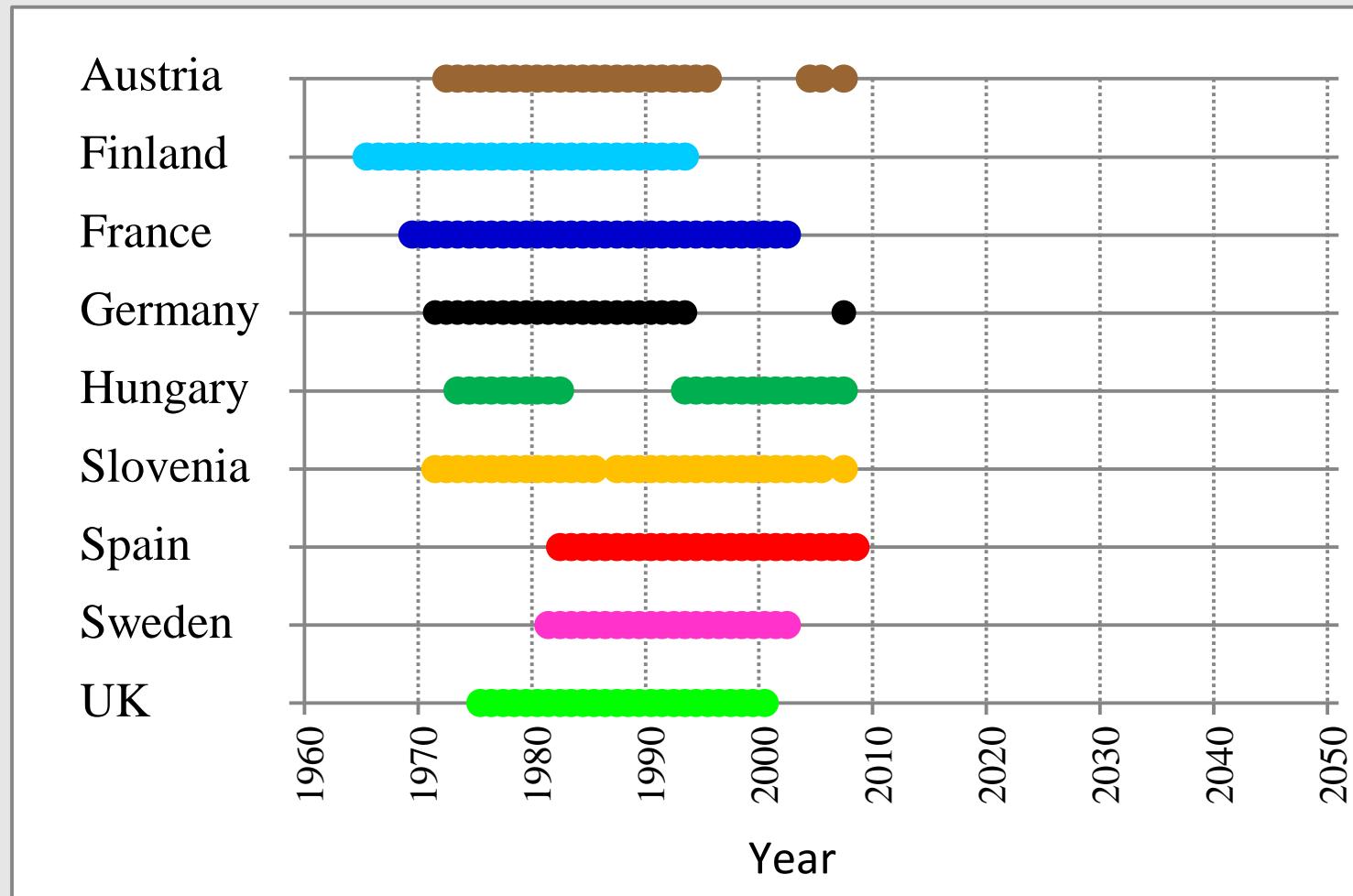
Components of **consumption per capita**

$$\frac{C(t)}{N(t)} = \boxed{\frac{C(t)}{Y(t)}} \cdot \frac{Y(t)}{L(t)} \cdot \boxed{\frac{L(t)}{N(t)}}$$
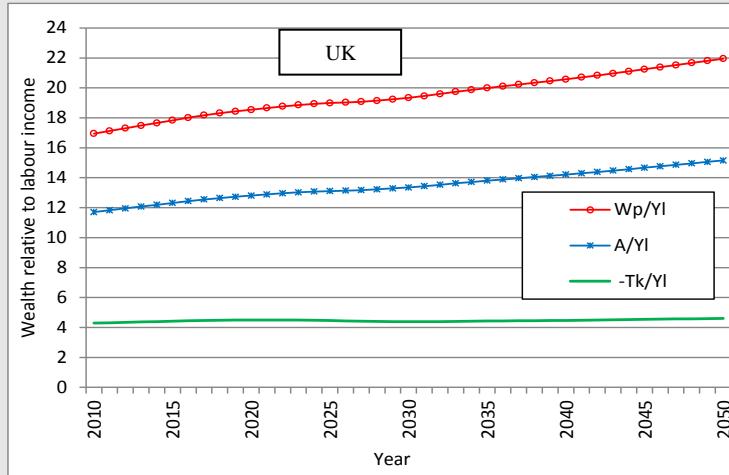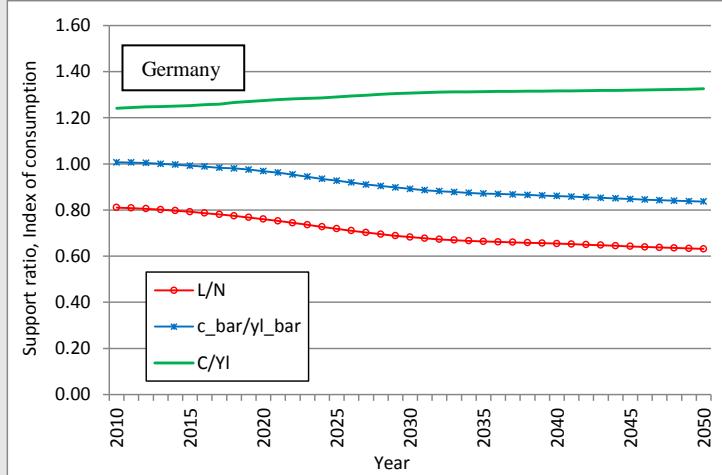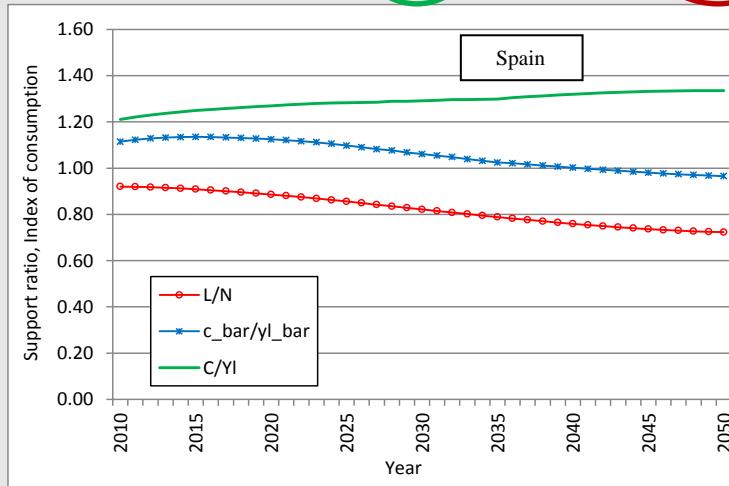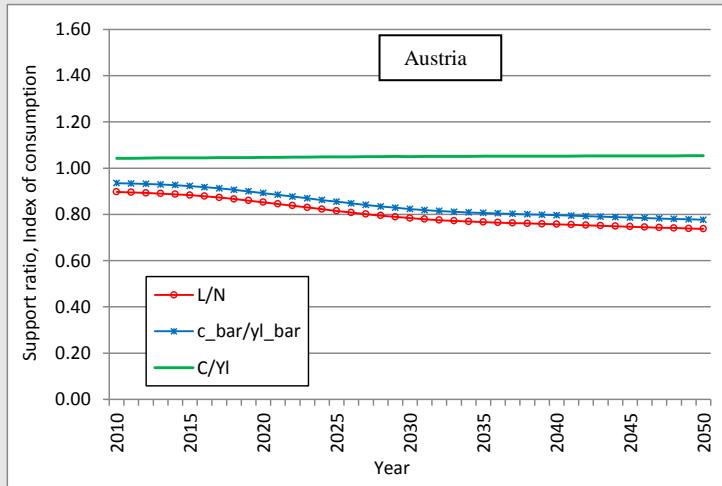
Cumulative effect of the first (negative values) and second (positive values or zero) demographic dividend on economic growth in 2010-2060 period
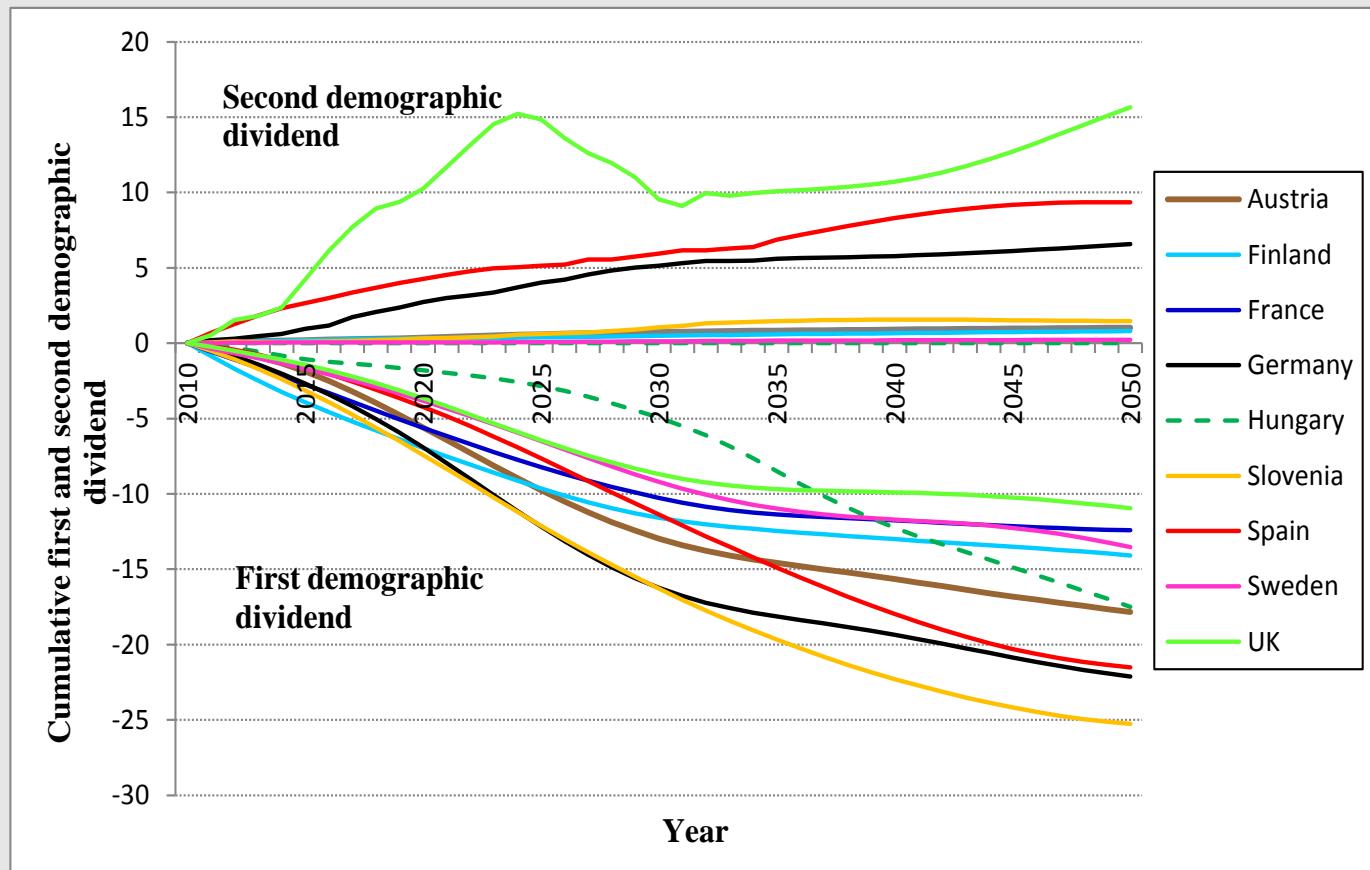
Cumulative effect of both demographic dividends combined on economic growth in 2010-2060 period

4. Conclusion

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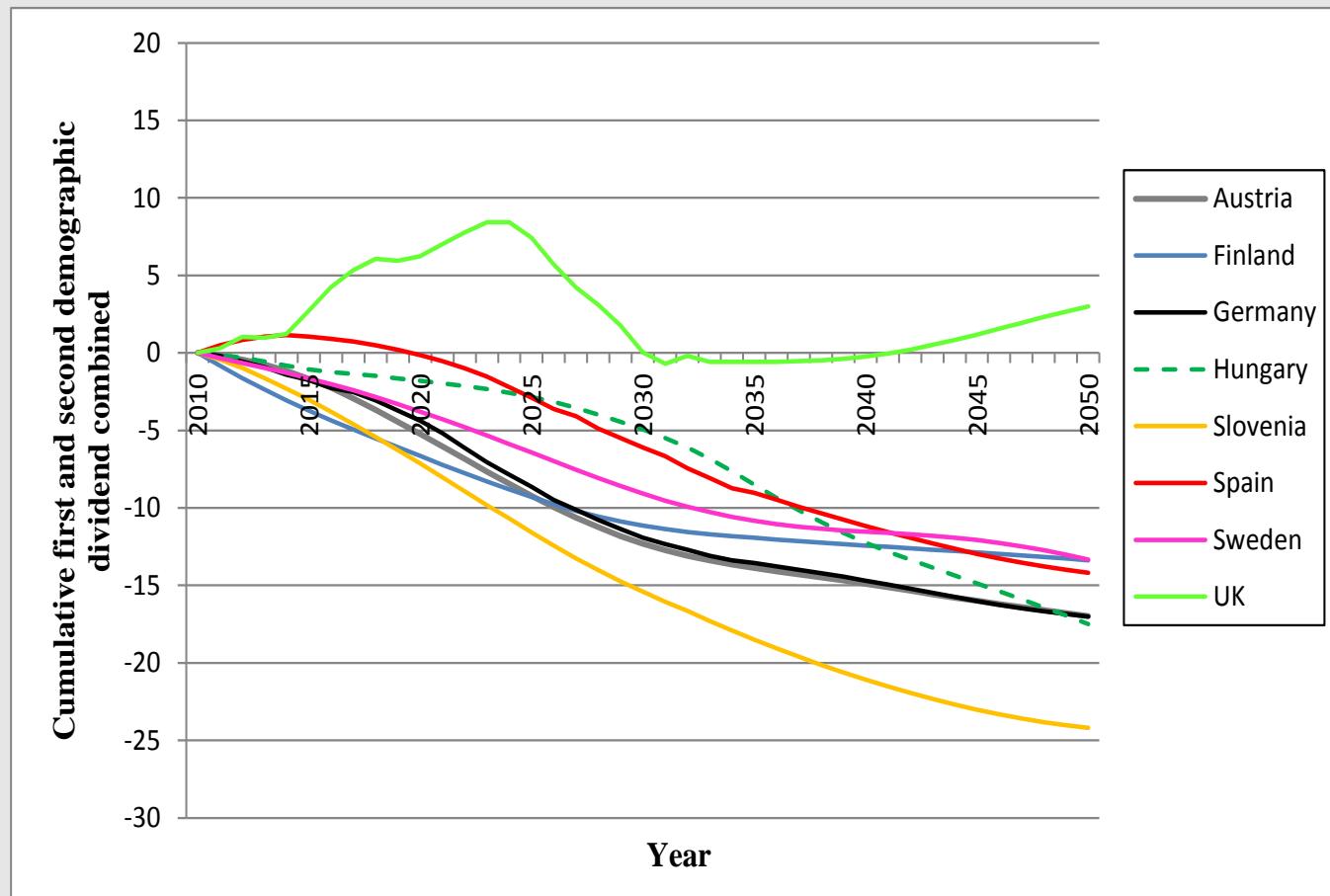
- Age specific economic activities instead of age limits

- NTA support ratio predicts a greater decline as conventional support ratio (SR)

- Germany and Slovenia are the countries with the strongest drop in the SR

- The first demographic dividend is negative for the next five decades

- The cumulative effect of the FDD is in the range of -11% (UK) and -28% (Slovenia)

- A second demographic dividend is projected only for UK, Germany and Spain.

BUT

So far only cross-section age profiles !

E N D

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Ergebnisse für Österreich (2005)

Das Lebenszyklusdefizit

Alterprofile Arbeitseinkommen und Konsum 2005

Quelle: Hammer und Prskawetz 2011
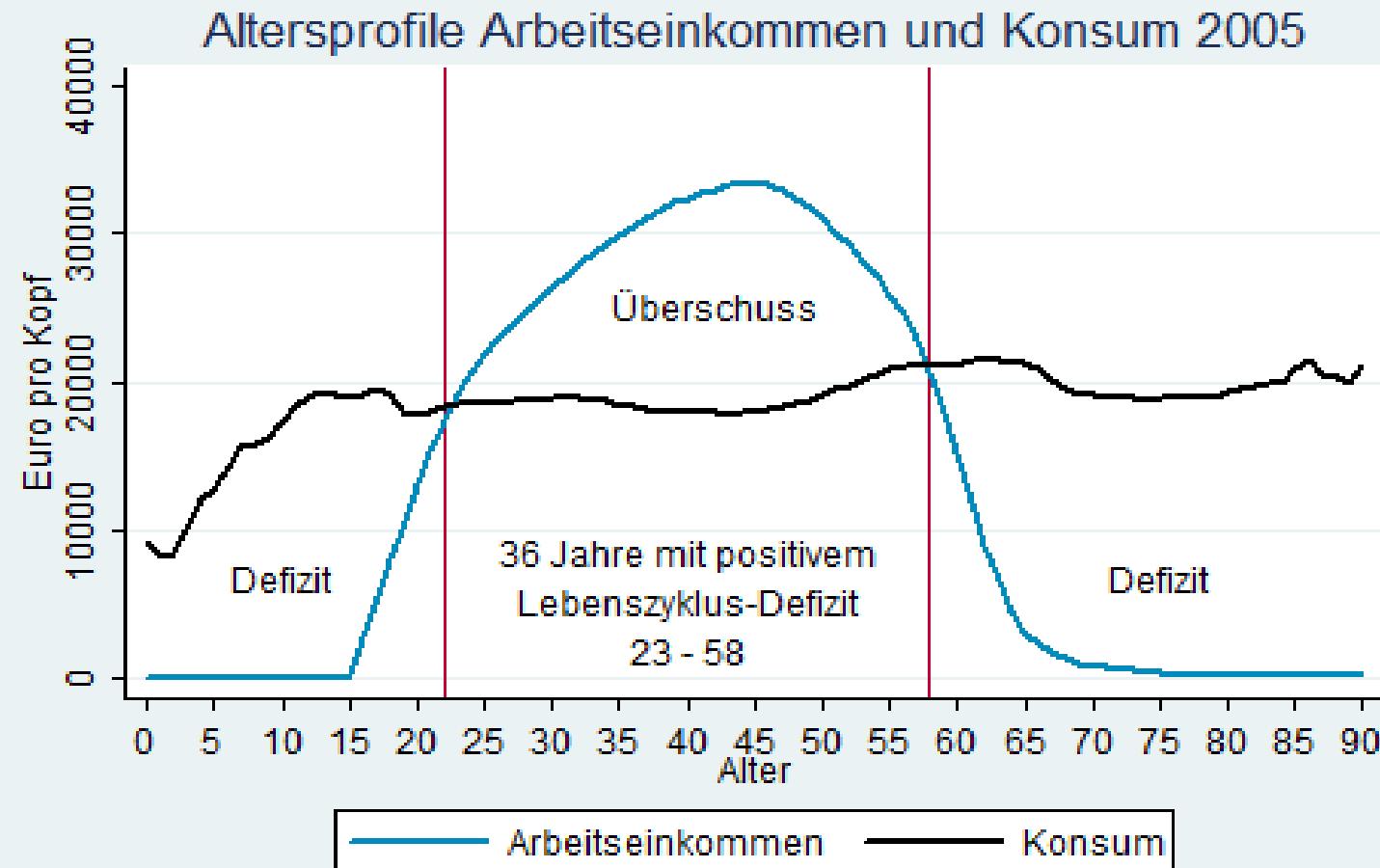
Öffentliche und Private Konsumausgaben 2005

Öffentliche Konsumausgaben 2005

Gesundheit: 28.2% der Gesamtausgaben
Bildung: 27.5%
Rest: 44.3%

Euro pro Kopf

Alter

Gesundheit   Bildung
Restlicher Konsum
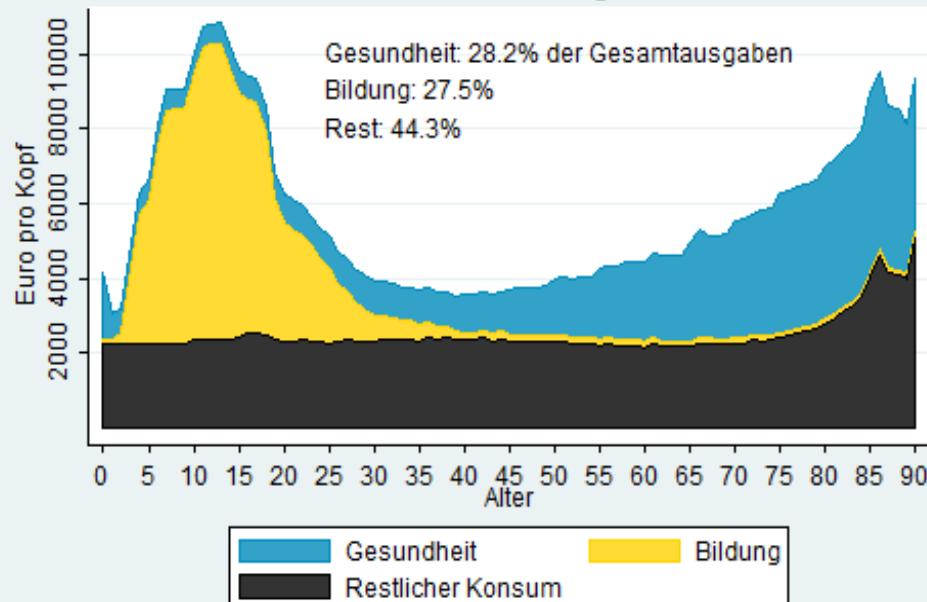
Quelle: Hammer und Prskawetz 2011

Private Konsumausgaben 2005

Gesundheit: 3.4% der Gesamtausgaben
Bildung: 0.8%
Wohnen: 9.6%
Rest: 86.2%

Euro pro Kopf

Alter

Restlicher Konsum   Wohnen im Eigentum
Gesundheit   Bildung
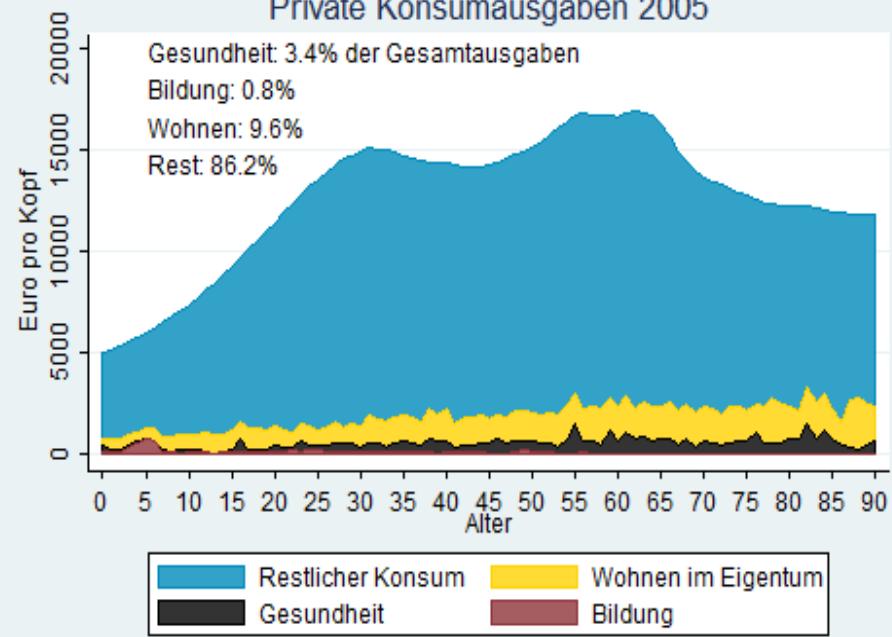
Quelle: Hammer und Prskawetz 2011

Öffentliche Transfers: Ein- und Abgang
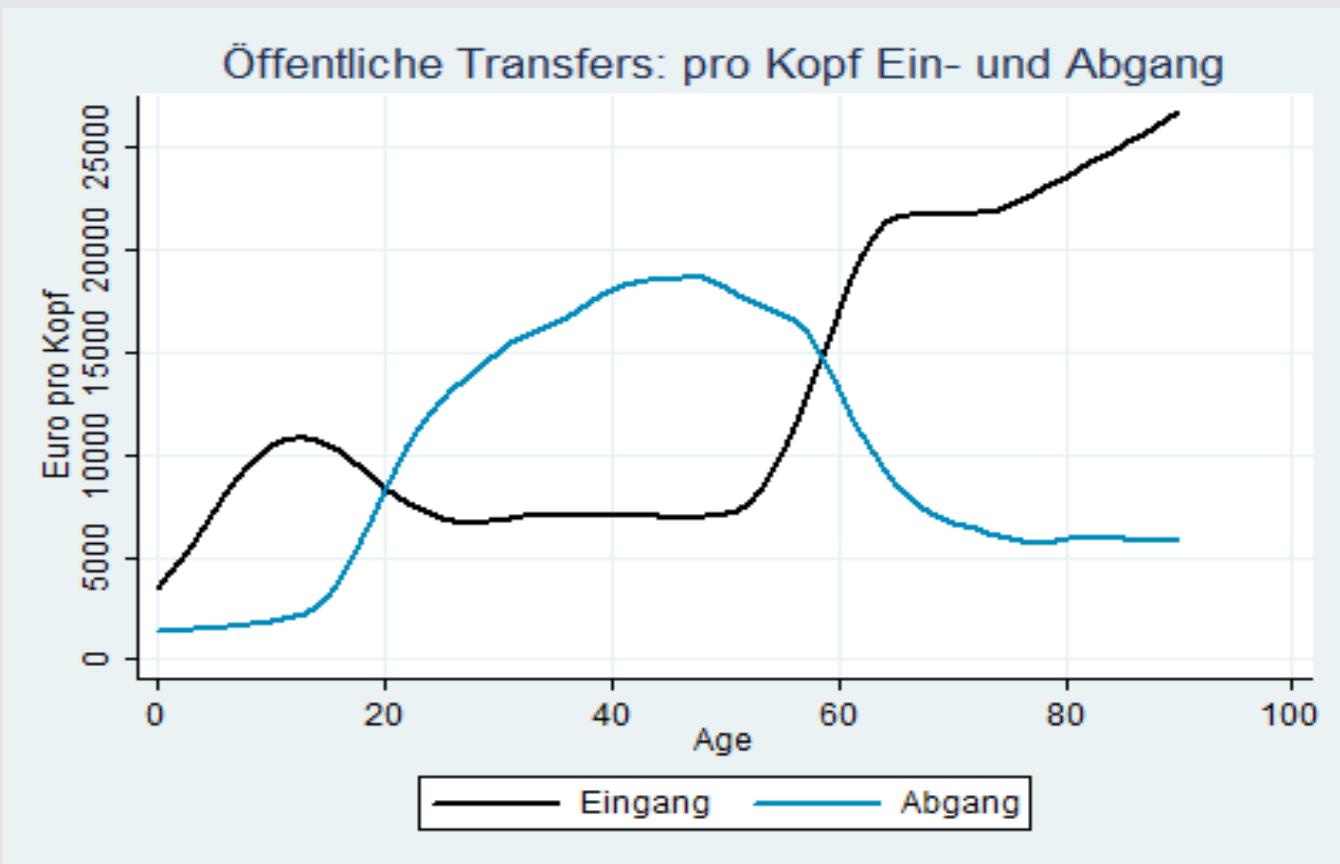
Reallokation von Einkommen, Konsum und Transfers über das Alter

Altersverteilung von Konsum, Einkommen und Transferströmen in Österreich 2005

Legende:
- Arbeitseinkommen
- Öffentliche Transfers
- Vermögensbasierte Umverteilung
- Private Transfers
- Konsum

Source: Hammer und Prskawetz (2011)
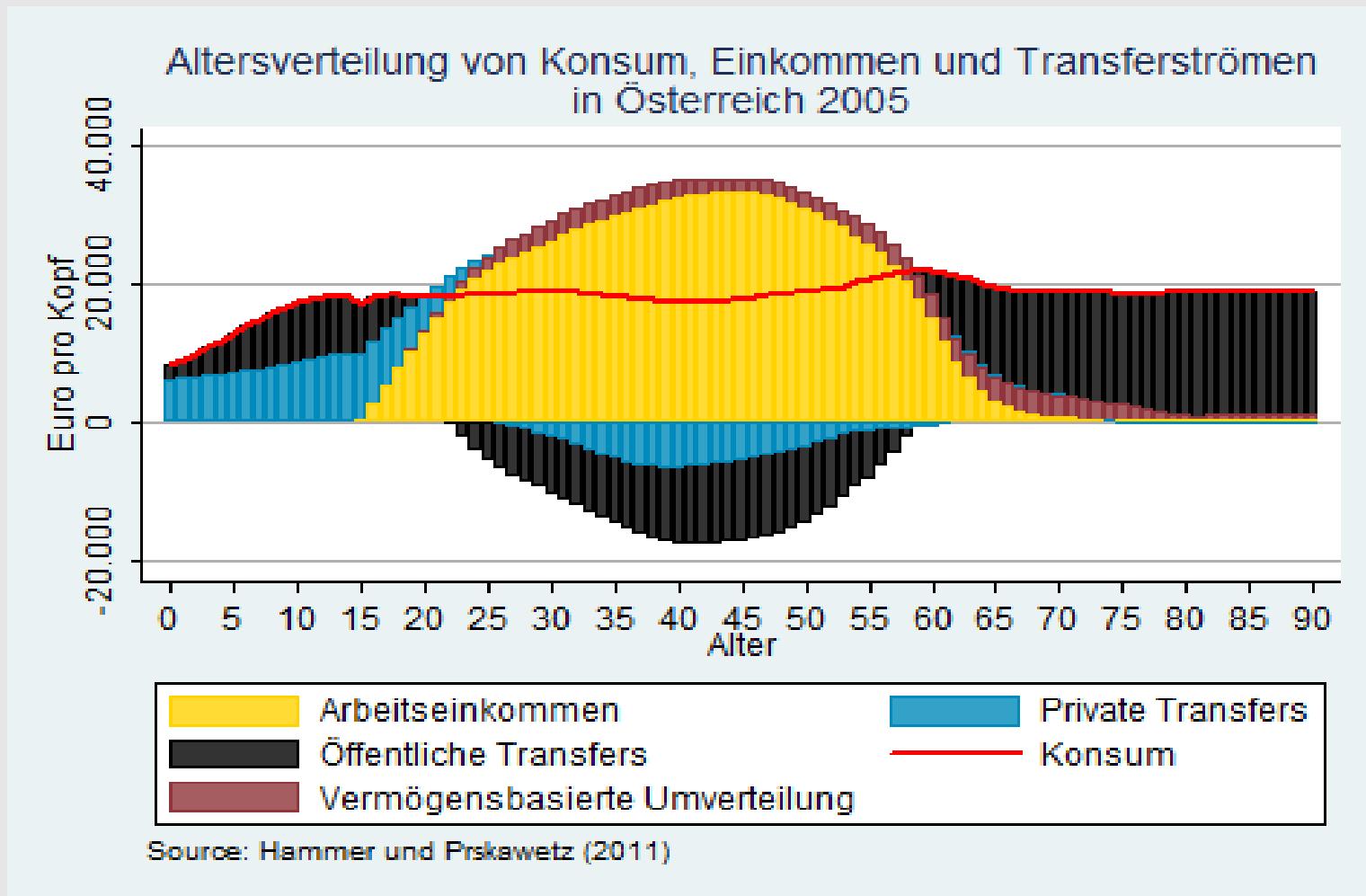
Aggregierte Altersprofile des Einkommens und Konsums
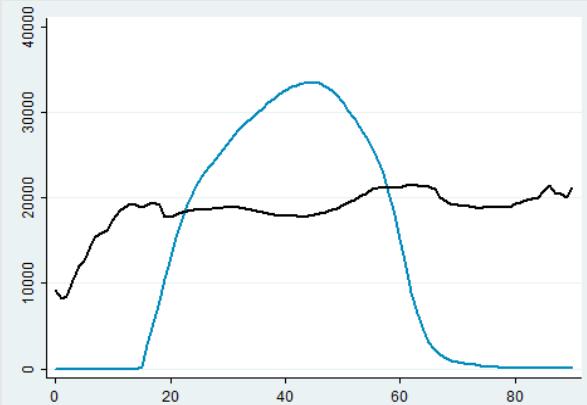
Aggregierte Altersprofile des Arbeitseinkommens und Konsums 2005

Lebenszyklus-Defizit der Jugend: 18.3%

Lebenszyklus-Defizit der Älteren: 24.1% des gesamten Arbeitseinkommens

Quelle: Hammer und Prskawetz 2011

Arbeitseinkommen — Konsum
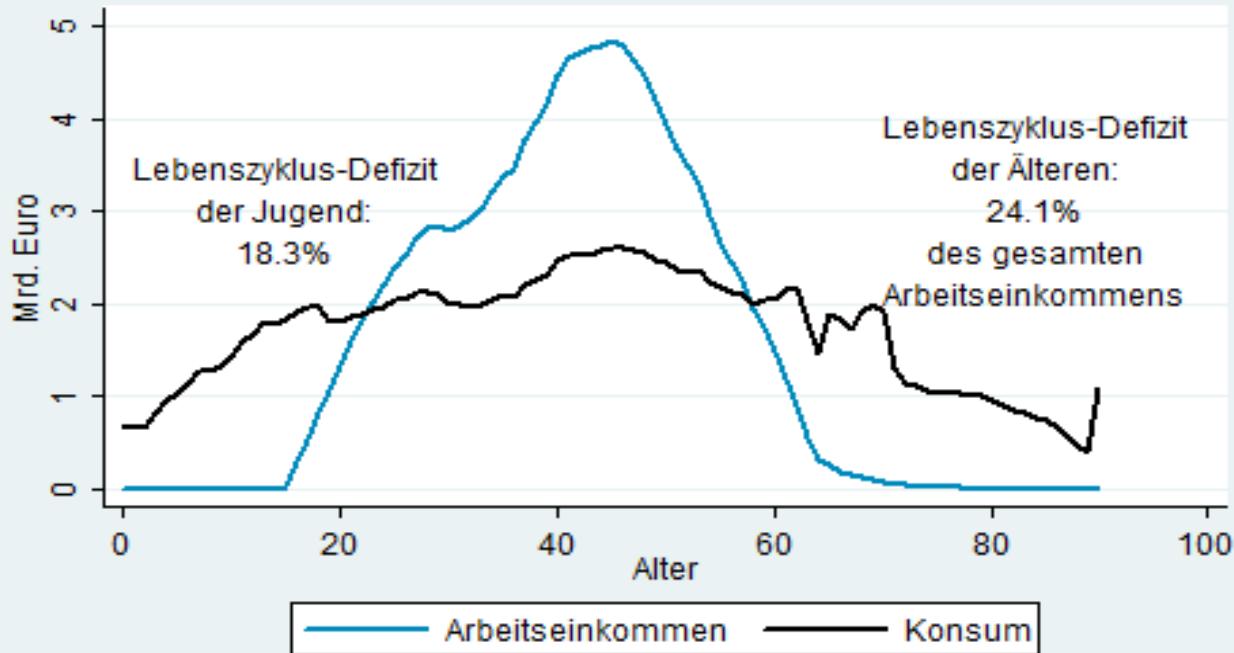
SUPPORT RATIO

$$\boxed{\alpha = LF \, / \, CON}$$ LF   …. Arbeitsbevölkerung
CON …. Konsum

Demographischer support ratio:

$$LF \quad = \sum_{i=20\ldots64} N_i$$

$$CON = \sum_{i=1\ldots99} N_i$$

Ökonomischer support ratio:

$$LF \quad = \sum_i w_i \, PR_i \, N_i$$

$$CON \; = \sum_{i=1\ldots99} S_i \, N_i$$

Entwicklung der ökonomischen und demographischen Support Ratio im Vergleich

Ökonomische Support Ratio
Demographische Support Ratio

Entwicklung der Support Ratio; 2005=1

Jahr
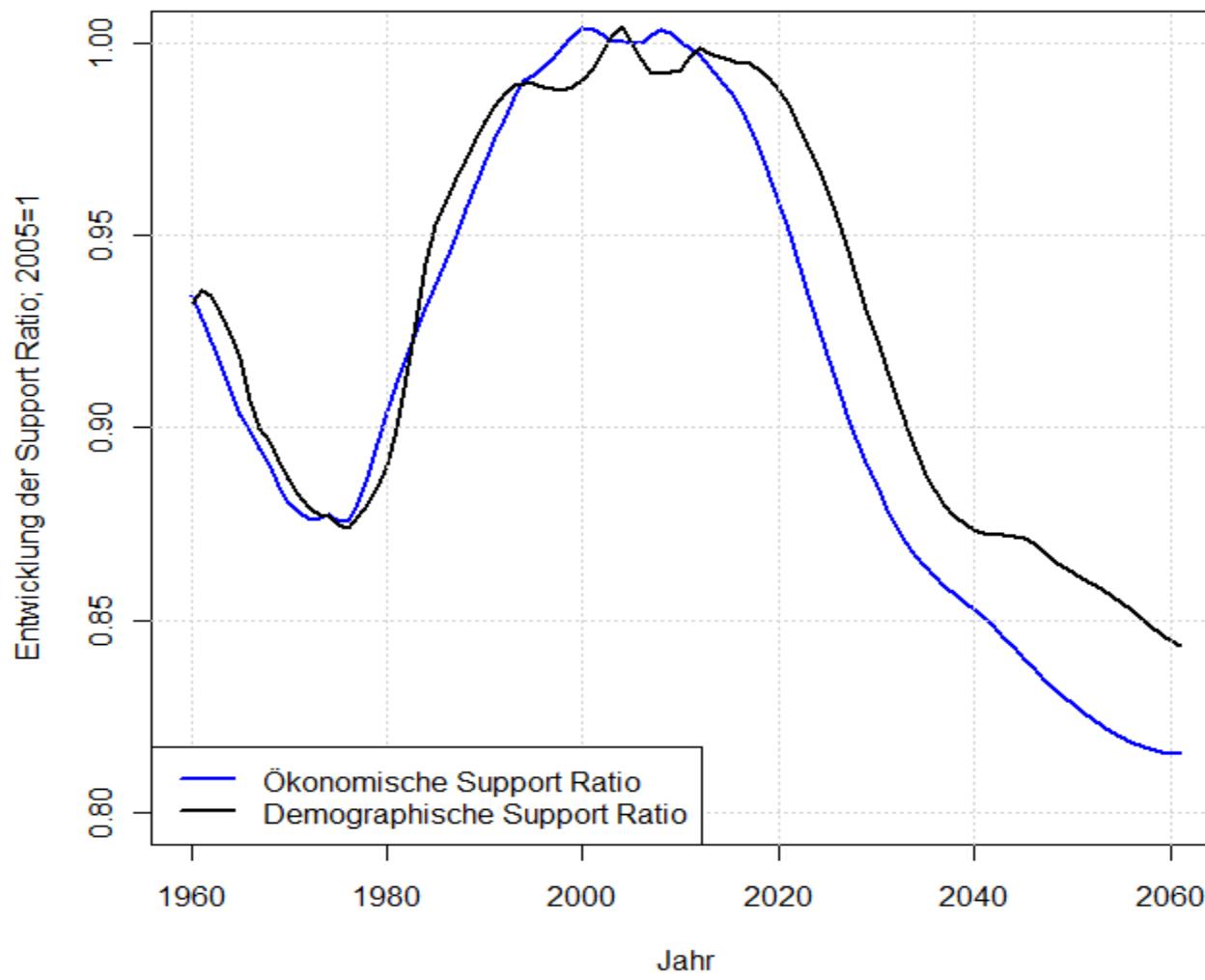
Erste demographische Dividende

$$\frac{Y(t)}{N(t)} = \frac{L(t)}{N(t)} \frac{Y(t)}{L(t)}$$

$$\hat{y} = \boxed{\hat{L} - \hat{N}} + \hat{y}^l$$

Erste demographische Dividende
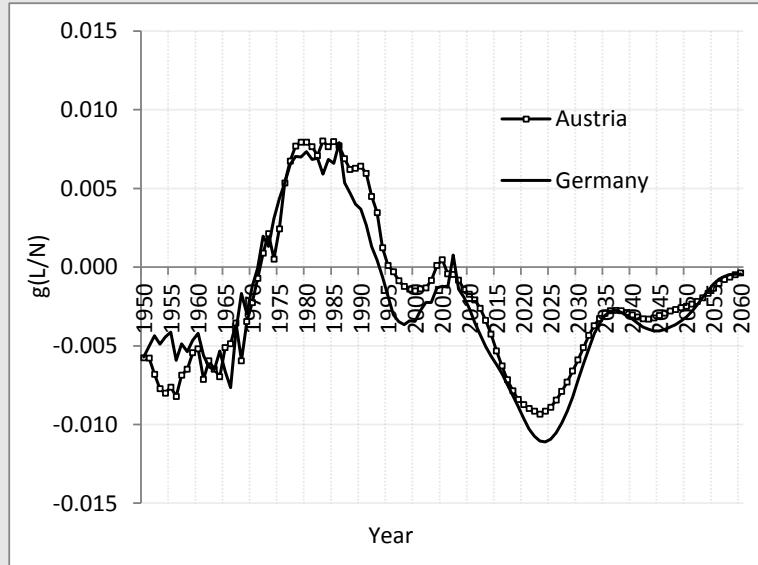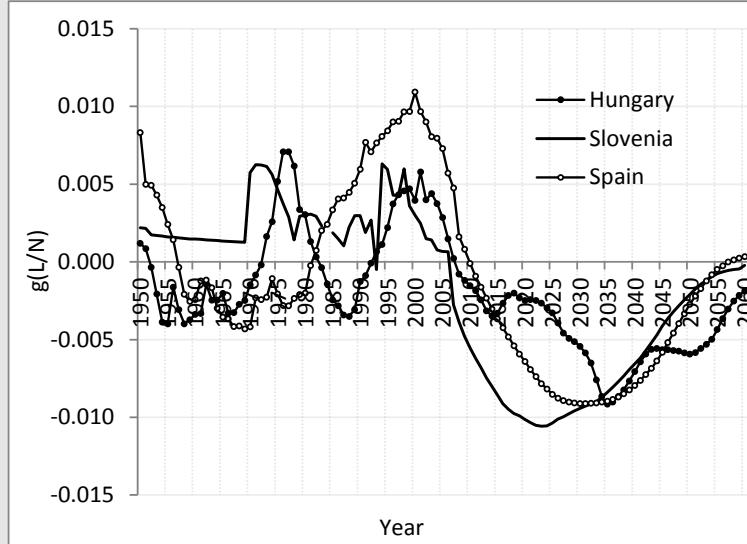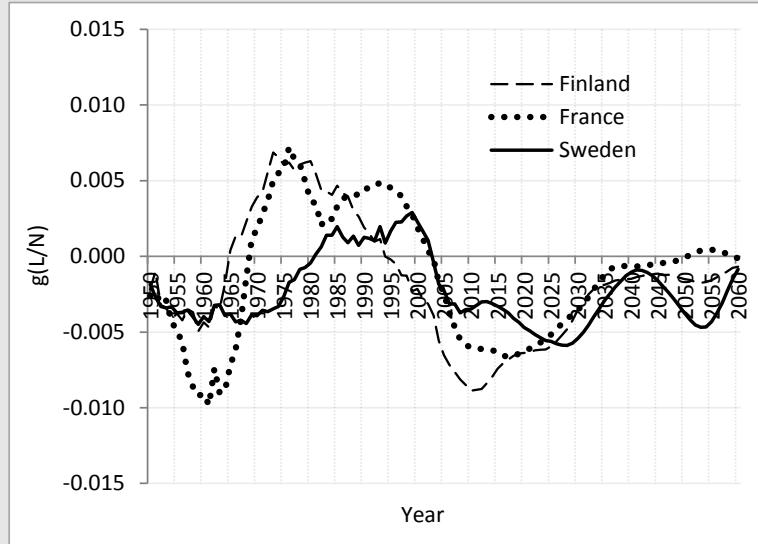
Periods of positive 1st dem. dividend
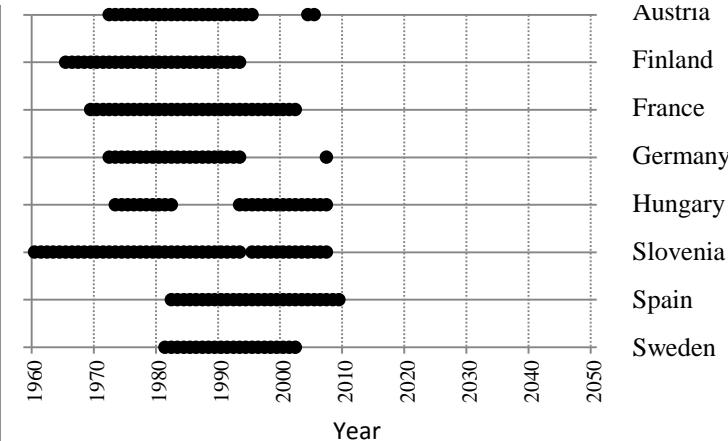
3. National Transfer Accounts

The Flow Account Identity

Inflows
- $Y^l(a)$ …labor income
- $Y^a(a)$ …asset income
- $\tau^+(a)$ …transfers received

=

Outflows
- $C(a)$ …consumption
- $S(a)$ …savings
- $\tau^-(a)$ …transfers paid

$$Y^l(a) + Y^a(a) + \tau^+(a) = C(a) + S(a) + \tau^-(a)$$

$$\underbrace{\qquad\qquad\qquad}_{\text{inflows}} \qquad \underbrace{\qquad\qquad\qquad}_{\text{outflows}}$$

inflows   outflows

$$\underbrace{C(a) - Y^l(a)}_{\text{lifecycle deficit}} = \underbrace{Y^a(a) - S(a)}_{\text{asset-based reallocations}} + \underbrace{\tau^+(a) - \tau^-(a)}_{\text{net transfers}}$$

lifecycle deficit   asset-based reallocations   net transfers

$$\underbrace{\qquad\qquad\qquad\qquad\qquad}_{\text{age reallocation}}$$

age reallocation

(Source: Mason 2007)

Components of...

...**consumption**:   education, health, others
                  $\Rightarrow$ private vs. public

...**income**:   asset income, labor income

...**transfers**:   education, healthcare, pensions, illness, unemployment, family and children
                  $\Rightarrow$ public vs. private

...**assets**:   businesses, homes, etc.
                  $\Rightarrow$ primarily through private institutions

"The mechanisms by which assets are shifted across age groups is important because it determines whether population ageing leads to accumulation of assets or to the expansion of public and private transfer programs."

(Mason and Lee 2006)

Life cycle deficit

Consumption and labor income, Austria 2005.
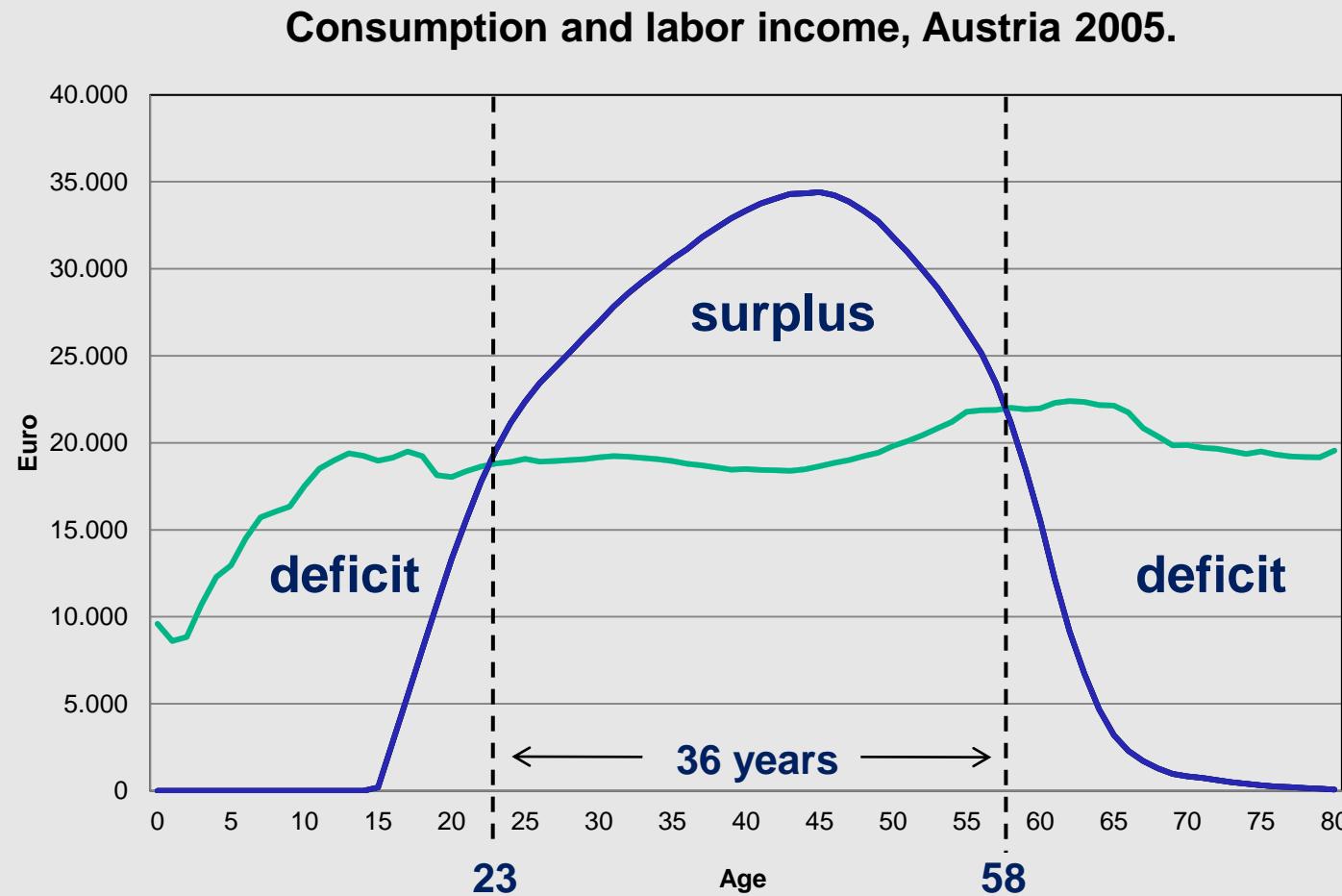
Source: Hammer and Prskawetz (2011)

public consumption, Austria 2005

Legend: education, health, other consumption, total public consumption
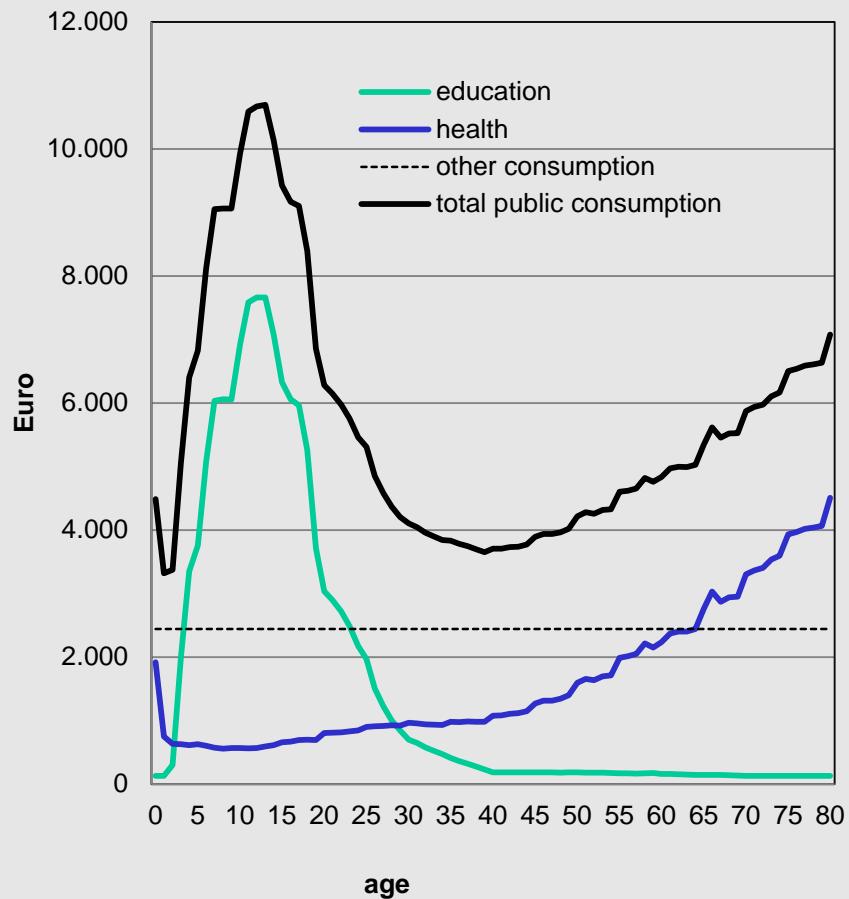
private consumption, Austria 2005

Legend: education, health, other consumption

Source: Hammer and Prskawetz (2011)

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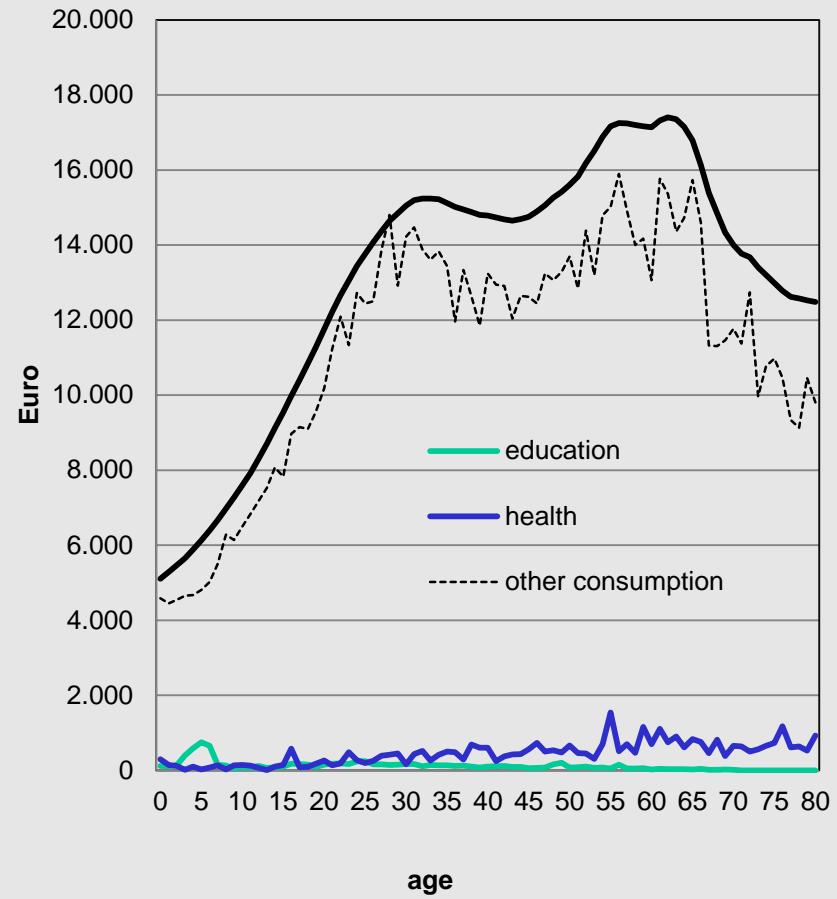
age-reallocation in Austria, 2005
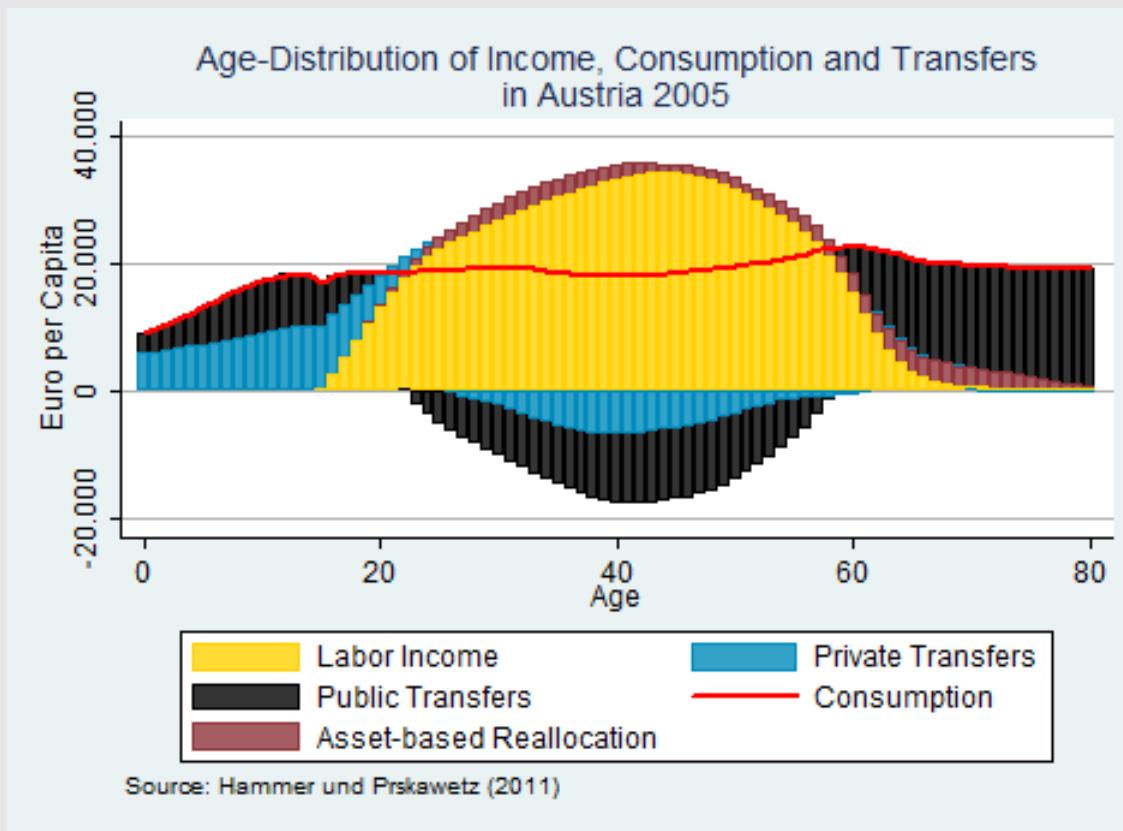
Source: Hammer and Prskawetz (2011)

We

cannot

continue

with

the

status

quo!
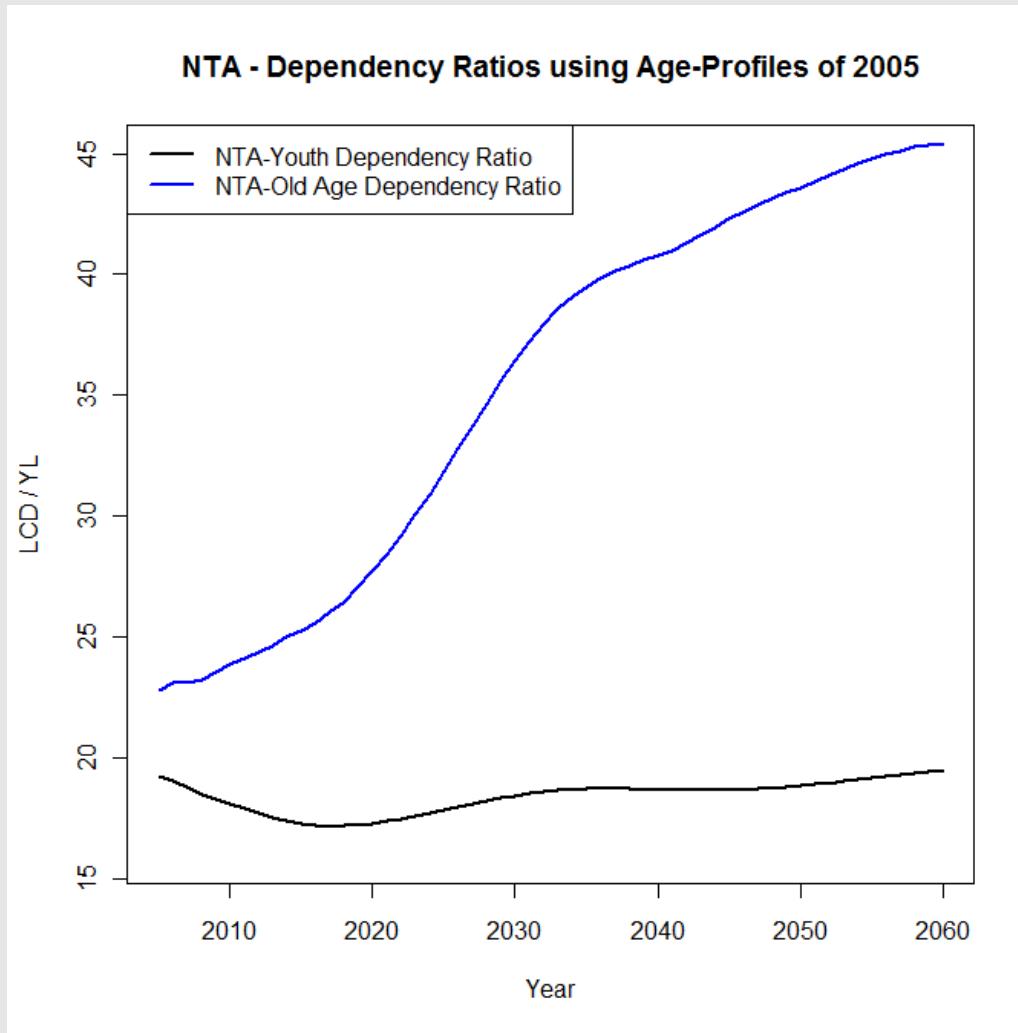
NTA - Dependency Ratios using Age-Profiles of 2005

Source: Hammer and Prskawetz (2011)

Age span in which LCD is negative; the share of private transfers
in total transfers to children and the share of asset based reallocation
in financing the consumption of elderly

Country	Age span in which LCD is negative	Children t_k	Elderly t
Finland (2004)	26-59	44	11
Germany (2003)	27-57	63	46
Hungary (2005)	25-58	49	0
Spain (2000)	26-58	69	51
Sweden (2003)	25-62	61	3
Austria (2000)	21-56	57	14
Slovenia (2004)	25-55	65	15
UK (2007)	24-56	72	69

$$W(t) = A(t) + T_k(t) + T_P(t)$$