Age structure effects on the economy
Why is age structure one of the determinants of the macroeconomy?

1. Biological and economic reasons imply that human behavior and resources vary over the life cycle.
2. Age structure change therefore correlate with macroeconomic change.
3. Useful because such changes can be independently predicted for many years.
Age structure effects on the economy

Age distribution of population

- Public expend.
  - Tax base
- Savings
- Stocks
- Housing
- Consumption of goods
- Demand for services
- Children
- Labor
- Enterprise

- Interest rates
- Wages
- Inflation
- Exchange rates
- Relative prices

- Imports
- Exports
- Investment
- Wealth
- Industries
- Regional development

- GDP growth
- Current account
- Budget balance
Age profiles I
Source: Malmberg & Lindh, Swedish estimates

- National savings
  - 50-64 pos
  - 0-14, 75+ neg
- Government budget
  - 15-29, 50-64 pos
  - 0-14, 65+ neg
- GDP growth
  - 15-64 pos
  - 0-14, 65+ neg
Age profiles II
Source: Malmberg & Lindh, Swedish estimates

- **Investment**
  - 30-74 pos
  - 0-14, 75+ neg

- **Current account**
  - 50-64, 75+ pos
  - 65-74 neg

- **Inflation**
  - 65-74 pos
  - 50-64, 75+ neg
OECD evidence

GDP growth forecasts Sweden

- **Actual GDP growth**
- **Global panel model forecast using data up to 1998**
- **Swedish time series forecast from 2003**

**NIER forecasts**
- NIER forecast 2006-2009 (Oct -07)
- NIER forecast 2007-2009 (Jan -08)
- NIER forecasts 2007-2010 (June 08)
Backcast of global GDP per capita model
Sweden 1820-1950

Forthcoming, De la Croix et al. Journal of Macroeconomics

What about Germany?

- Report forthcoming financed by Bertelsmann Stiftung
- **Age structure effects on the German economy, with an international comparison.** Lindh & Malmberg, Institute for Futures Studies
- Results still preliminary…
- …but basically similar
German age structure

East

West

1950

2000

male females
Unification and age shares

![Graph showing the shares of different age groups over time.](image-url)
GDP/cap growth forecasts out-of-sample for Germany

1987:01

1999:01

1980-2004 estimated age pattern
Long term forecast of German GDP/capita up to 2050
Age share variation

Middle aged increasing


-0.16 -0.18 -0.20 -0.22 -0.24 -0.26 -0.28 -0.30 -0.32

S3049  S5064  S65W
Demographic part of growth in East and West according to demographic projections

Disregard the level of the forecasts, the intercept cannot be separately estimated.
Inflation, Consumer Price Index

-0.5 0 0.5 1 1.5 2
age 0_14 age 15_29 age 30_49 age 50_64 age 65_74 age 75+

Estimate Pooled

EU15, China, USA, Japan and India

Age profile estimates from panel data
WDI and WPP
EU15, China, USA, Japan and India

Age profile estimates from panel data

WDI and WPP
Favourite quote

"Understanding how to adjust economic policy with respect to future demographic change will be a crucial question for policy makers in the aging industrial countries”

(Alvin Hansen AER 1939 presidential address at AEA).
Is Doomsday here?

• Forecasts are contingent on assumptions
  – Correlations remaining the same
    • Change over time although slowly in this case
  – Demographic projections
    • Although fairly accurate 10-20 years uncertainty then increases fast
  – Nobody reacting to the forecast
    • But surely people are reacting and starting to adapt
    • Only remember the Hansen quote: to react adequately we have to understand the mechanisms better
    • There are many margins to adapt on that work at widely different horizons
How to adapt and when?

- Work longer
- Start to work earlier
- Work harder
- Educate and work better
- Immigration
- Save capital
- Population growth

- Maybe 5-15 years
- Immediate (short edu)
- Immediate (but hard)
- 10-40 years (cost)
- 2-30 years (integration)
- Global long term horizon?
- 25-60 years (massive investment costs)

Adaptations interact, investment and benefits at different times
Global context

• Timing differs considerably within EU
• Global competition may thwart some adaptations and favour others
• Aging tends to make us internationally more dependent both on migration and capital markets