

# Ageing and Economic Growth: Measures, Effects and Policies

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# AGEING AND PRODUCTIVITY: THE EVIDENCE

- ▶ Age structure and labour supply:
  - ▶ Participation rates and labour productivity differ by age, gender and educational attainment level
  - ▶ The degree of substitutability between workers of different ages shapes the labour supply effects
  - ▶ The effects obtained using matched employer-employee datasets are inconclusive
  - ▶ Population ageing affects the relative returns to human capital accumulation
- ▶ Age structure and physical capital accumulation
  - ▶ Standard life-cycle consumption theory would predict a decrease in savings as populations age
  - ▶ The possibility of a *second demographic dividend* which would affect economic growth through an increase in savings as life expectancy increases has been suggested also in the literature
  - ▶ Unambiguous negative effects on public savings and the sustainability of public finance

# AGEING AND PRODUCTIVITY: THE EVIDENCE

- ▶ Age structure and technological progress
  - ▶ The age structure of educated individuals matters for economic growth: technology adoption and innovation effects
  - ▶ To the extent that public spending in R&D is a determinant of technological progress, the negative effects of ageing on public savings will exert negative effects on innovation
- ▶ The theoretical channels are partly ambiguous and call for a rigorous empirical analysis of the aggregate effects on economic growth
- ▶ Standard approach implies using variation in the old-age dependency ratio (*OADR*) in the framework of regression models to explain variation in economic growth rates across countries or over time

$$OADR = \frac{\text{Number of people aged 65+}}{\text{Number of people aged 20-64}}$$

# REASSESSING AGEING IN ADVANCED SOCIETIES

- ▶ But ... isn't 40 the new 30?

## Panel A

1952	30 Years Lived	Remaining Life Expectancy 44.7 Years
2005	30 Years Lived	Remaining Life Expectancy 54.4 Years

## Panel B

1952	30 Years Lived	Remaining Life Expectancy 44.7 Years
2005	40 Years Lived	Remaining Life Expectancy 44.7 Years

# REASSESSING AGEING IN ADVANCED SOCIETIES

- ▶ From chronological to prospective age measures
  - ▶ From the standard *OADR*,

$$OADR = \frac{\text{Number of people aged 65+}}{\text{Number of people aged 20-64}}$$

- ▶ ... to the prospective *OADR*,

$$POADR = \frac{\text{People with remaining LE} < 15}{\text{People aged 20 - threshold age at which LE} < 15}$$

# AGEING IN EUROPE: CHRONOLOGICAL AND PROSPECTIVE MEASURES

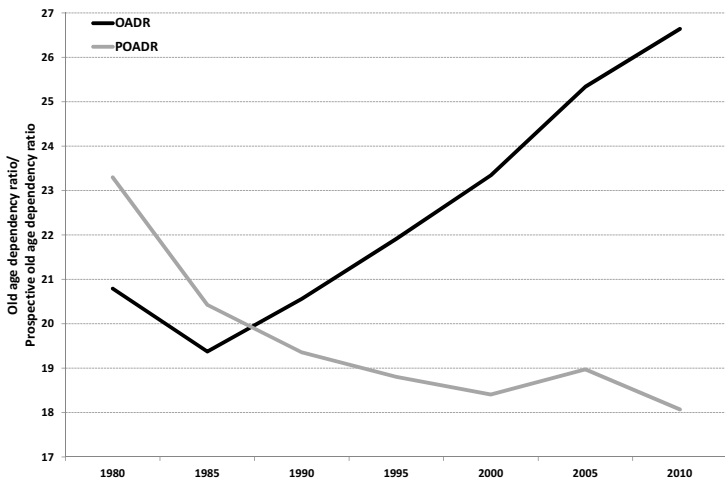


FIGURE: EU-28: Old age dependency ratio (OADR) and prospective old age dependency ratio (POADR), 1980-2010

# AGEING IN EUROPE: CHRONOLOGICAL AND PROSPECTIVE MEASURES

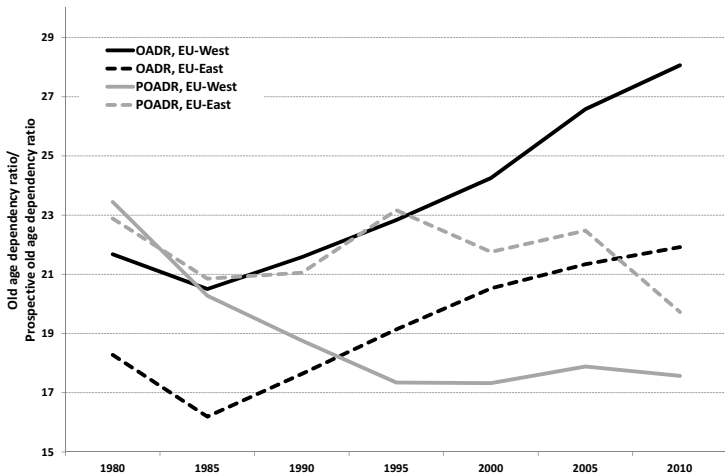


FIGURE: Western and Eastern EU regions: Old age dependency ratio (OADR) and prospective old age dependency ratio (POADR), 1980-2010

# AGEING IN EUROPE

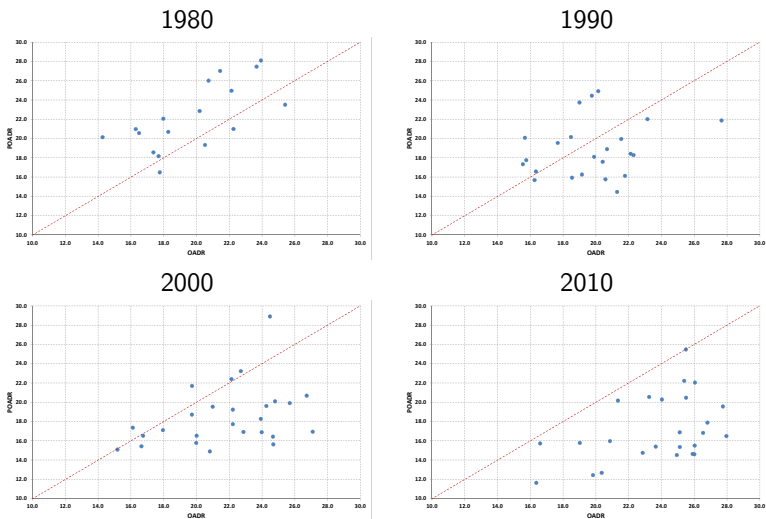


FIGURE: EU-28 countries: Old age dependency ratio (OADR) against prospective old age dependency ratio (POADR); 1980, 1990, 2000 and 2010



# ECONOMIC GROWTH AND AGEING IN EUROPE

- ▶ Do ageing measures help explain income growth differences in Europe?
- ▶ Simple income growth specification, based on an aggregate production function

$$\begin{aligned} \Delta \log y_{it+\tau} = & \alpha_i + \theta_t + \beta_1 \Delta \log POP_{it+\tau} + \beta_2 \Delta \log K_{it+\tau} + \\ & + \beta_3 \log y_{0,it} + \gamma \Delta AGE_{it+\tau} + \\ & + \theta \Delta AGE_{it+\tau} \times \log y_{0,it} + \varepsilon_{it+\tau}, \end{aligned}$$

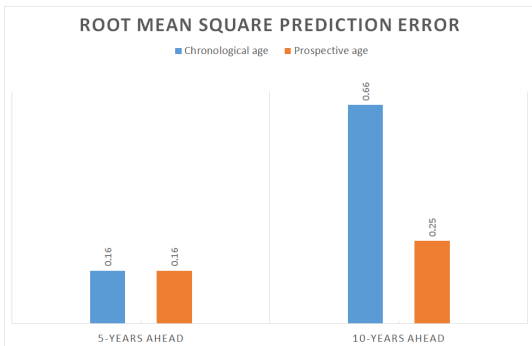
- ▶ Panel dataset spanning the period 1970-2010, alternatively at 5, 10 and 20-year intervals
- ▶ Can new ageing indicators be used to explain in-sample variation of income per capita growth robustly? Do they help predict income growth out of sample?

# ECONOMIC GROWTH AND AGEING IN EUROPE

- ▶ Comparable results for chronological and prospective ageing measures at relatively short horizons, the effects are only significant for prospective ageing measures once we move to longer horizons
- ▶ The results indicate that the negative effects of ageing on economic growth appear to be more important in economies with a relatively lower income per capita level
- ▶ The model estimates give thus evidence that ageing is a particularly serious challenge to sustainable income growth in Eastern European economies, whose income per capita level is below EU average and which are precisely expected to experience further increases in old age dependency ratios
- ▶ The results are robust to changes in the model specification: adding other determinants of income growth, changing fixed effects specification

# ECONOMIC GROWTH AND AGEING IN EUROPE: OUT-OF-SAMPLE RESULTS

- ▶ Do prospective ageing measures improve out-of-sample predictions?  
An experiment
  - ▶ Estimate two alternative models using the 5-year dataset with OADR and POADR for 1970-1995 and use 1995-2010 as an out-of-sample period
  - ▶ Repeat exercise for 10-year models



# CONCLUSIONS

- ▶ We evaluate empirically for the first time whether prospective ageing measures are better able to explain the effect of such demographic changes on economic growth than chronological age indicators
- ▶ The results of our panel regressions provide clear empirical evidence concerning the superiority of measures based on prospective ageing as predictors of future economic growth at long horizons
- ▶ Our results indicate that the effect of ageing on income dynamics is heterogeneous across countries and that the negative consequences of ageing societies are stronger in relatively poorer economies
- ▶ Monitoring prospective ageing measures should be a priority in the framework of designing policies aimed at combating the negative economic consequences of ageing