



Population Aging and Economic Growth: From Demographic Dividend to Demographic Drag?

Context & Research Questions

Population aging is the dominant demographic trend of our time. Initially, countries can harness a demographic dividend as they transition from high to low mortality and fertility rates: Living standards rise as large cohorts enter the workforce and channel resources to savings, education, and innovation. Yet once the transition expires, those cohorts progress to older ages and possibly slow economic growth.

Question 1: Will foreseeable contractions in working-age shares (the proportion of population that is of working age) slow economic growth?

The answer to this question depends on how long people can contribute economically. Therefore, we use a new concept of functional aging that considers improvements in functional capacities due to changing age patterns of health in addition to the traditional concept of chronological aging that only focuses on age.

Question 2: To what extent do the effects of population aging on economic growth depend on the conceptualization of population age structure?

Measurement of Age Structure

Retrospective (chronological) measures of population age structure:

- Classify people as old if their age exceeds a threshold, e.g., 60 or 65.
- Are inadequate for cross-country or historical comparisons because they ignore differences in age patterns of health (retrospective old-age threshold is fixed).

Prospective (functional) measures of population age structure:

- Classify people as old if age exceeds a prospective old-age threshold (POAT), e.g., the age at which remaining life expectancy is less than 15 years.
- POATs vary across countries and over time and correlate with functional capacity in terms of mortality, disability, body strength, and cognition.

Retrospective vs. prospective measures of population age structure (Figure 1):

- OECD countries appear “younger” under prospective measures of age structure than under retrospective ones, whereas non-OECD countries appear “older.”
- The differences between both measures can be sizable: Working-age shares are projected to differ by 5 percentage points in OECD countries by 2050.

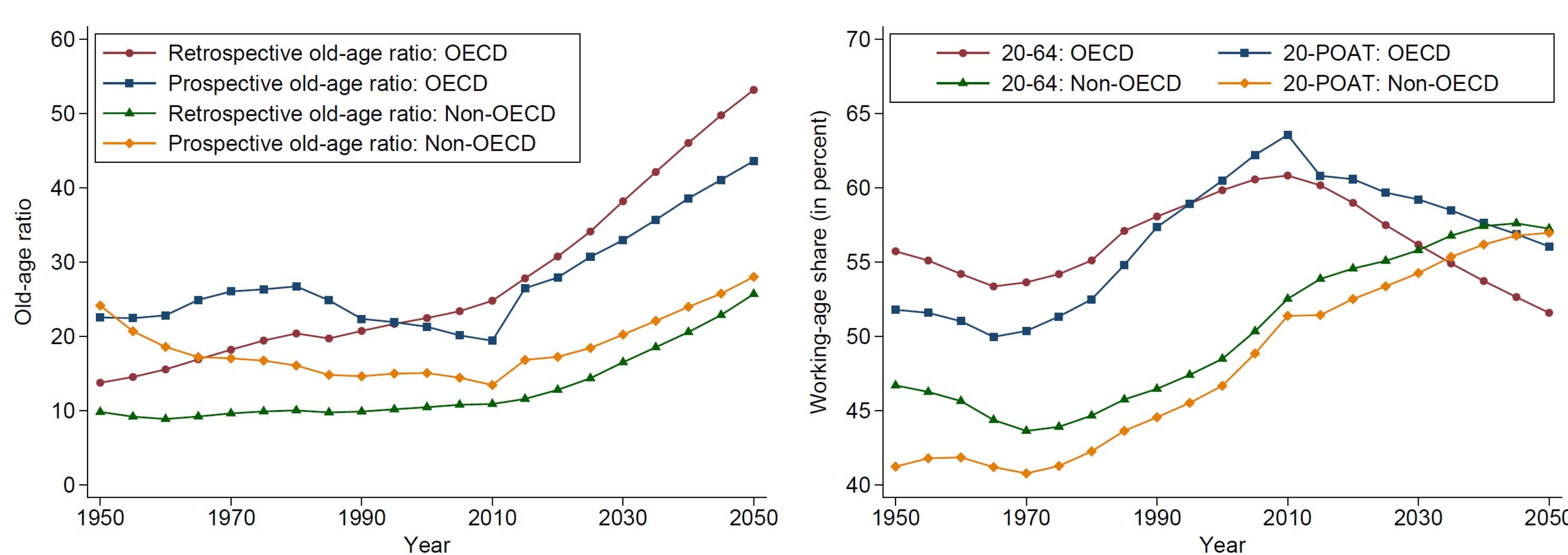


Figure 1: Retrospective and prospective measures of population age structure produce qualitatively and quantitatively different demographic trends.

Methodological Approach

Approach: We assess the likely effects of population aging on economic growth with an empirical growth model. We first fit this model to country panel data throughout 1950–2015 and then combine the fitted parameters with demographic forecasts to project growth of income per capita in 2020–2050.

Model: The model expresses income per capita as a function of growth of input factors (capital, education, working-age shares) and productivity growth (modeled as a conditional convergence process that depends on lagged income per capita, working-age shares, and education; fixed effects; controls for population health and institutional quality; and random productivity shocks).

Estimation: We use an IV approach that leverages variation in cohort sizes in preceding periods cohort to address endogeneity. In addition, we test whether the parameters match constraints of our model and are stable across specifications.

Data: Prospective age structure is defined as in Sanderson and Scherbov (2010). Data are sourced from established international sources (see paper).

Accuracy: The model reproduces observed growth in within-sample projections.

From Dividend to Drag?

Projections of income per capita in 2020–2050:

- Feed demographic forecasts into the fitted model to project income per capita.
- Extrapolate exogenous growth processes according to trends in the data.

We compare differences in economic growth across three scenarios:

- **No aging** (working-age share 20–64 fixed).
- **Retrospective aging** (working-age share 20–64).
- **Prospective aging** (working-age share 20–POAT).

The effects of population aging on economic growth (Figure 2):

- Differences in income per capita between the aging scenarios and the no-aging counterfactual reflect the economic effects of population aging.
- OECD countries are predicted to grow faster without aging (demographic drag), while non-OECD countries are predicted to grow slower (demographic dividend).
- Income per capita levels are not informative as they hinge on extrapolations.

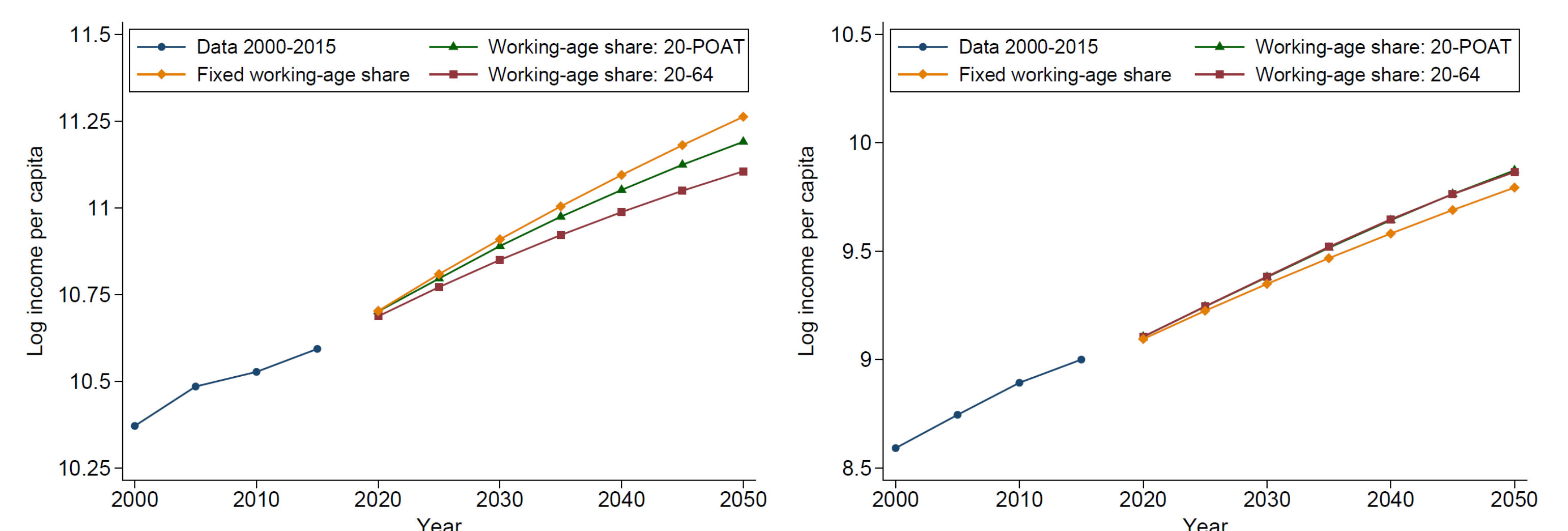


Figure 2. Projected income per capita in 2020–2050: OECD vs. non-OECD countries.

Aging and Growth across Countries

Economic consequences of population aging across OECD countries (Figure 3):

- Almost all OECD countries are projected to experience a demographic drag.
- The drag is larger the faster a country’s population is aging (blue bars).
- The healthier a population the more of the drag it can mitigate by extending economic activity into older ages (difference between red and blue bars).

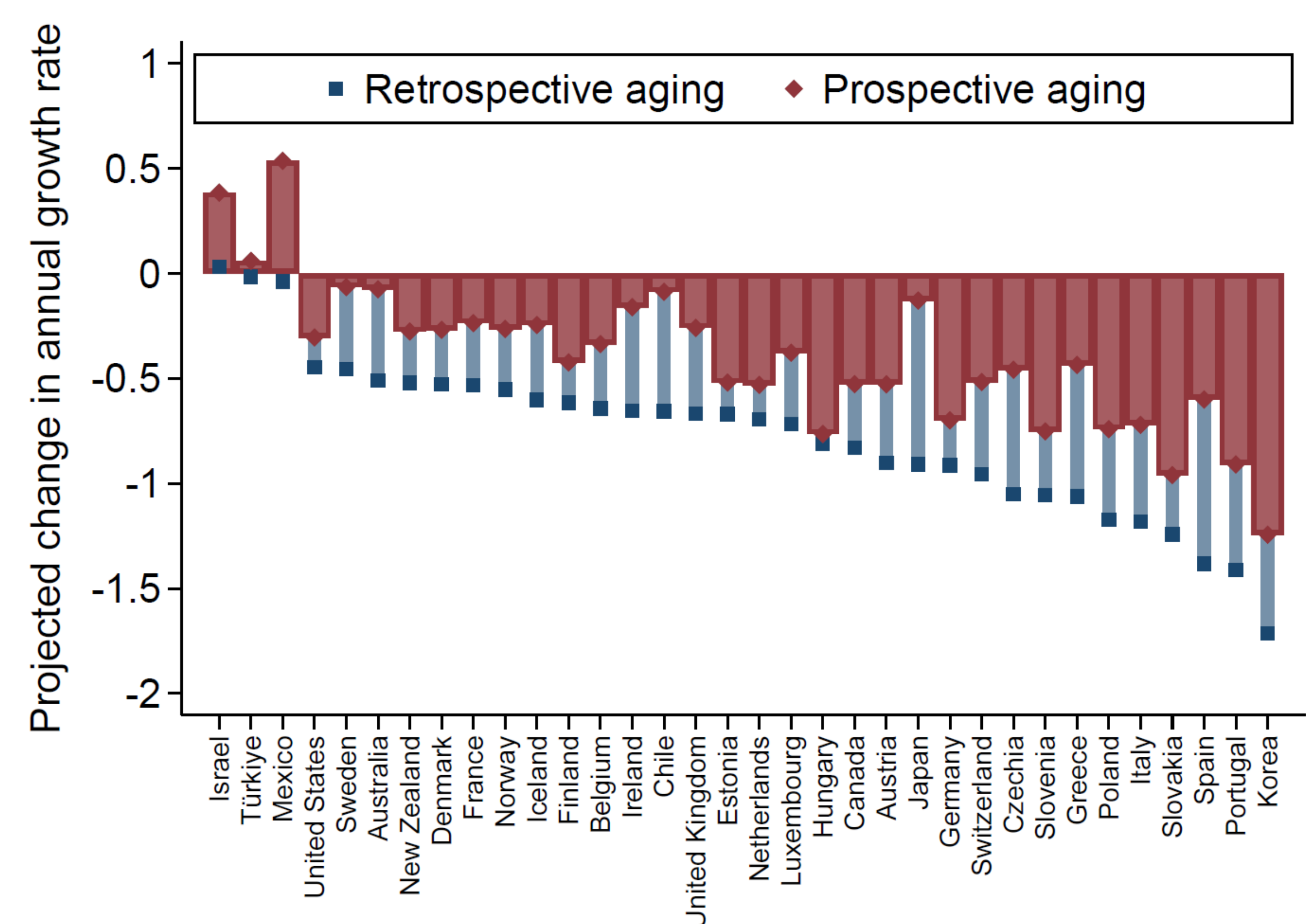


Figure 3. Projected change in annual income per capita growth rates for OECD countries.

Conclusion

Population aging will slow economic growth, but demography is not destiny:

- Contracting working-age shares will turn the demographic dividend into a drag.
- However, healthy aging can offset a significant portion of this drag.
- Policy matters: Not automatic that gains of better functioning are harnessed.

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Paper

