

# Population and Sustainable Development

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July 21, 2021

# Acknowledgements

- UN Population Division
  - Most authoritative source of information on population estimates and projections
  - Collaboration in the development of National Transfer Accounts.
- UN Population Fund
  - Support for construction and use of National Transfer Accounts by regional offices.
  - Support in the application of NTA
- Research teams from over 70 countries who are members of the NTA Network
- National Institute on Aging, Hewlett Foundation, International Development Research Centre, European Commission, World Bank, Asian Development Bank, Rockefeller Foundation, and governments and institutions that have supported regional and country-specific work.

# Population and sustainable development Highlights

## Four ways population influences sustainable development

- Gains in life expectancy
- Population-driven GDP growth
- Transformation of reproduction and human capital investment
- Demographic dividends

## Policy in an aging world

## Gains in life expectancy

### Life expectancy at birth

	India	Japan	US
1900	24.0	44.0	47.0
1950	37.9	62.2	68.6
2000	62.5	81.8	77.2
2020	69.9	84.8	78.9

Source: Maddison (2000) and United Nations (2011, 2019)

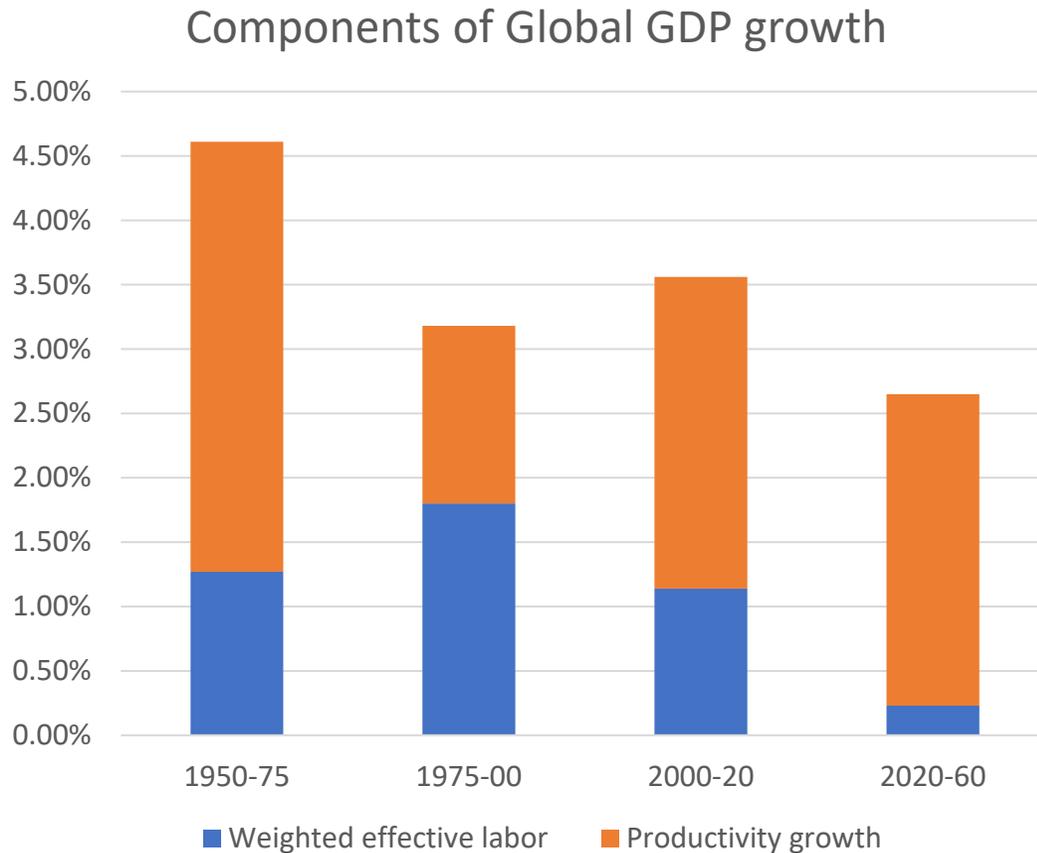
Notes: 2020 values projected.

# Population as a driver of GDP growth

- Given labor productivity (GDP per effective worker), GDP growth is driven by growth in the number of effective workers.
- Effective workers uses National Transfer Accounts data for 185 countries to incorporate age-specific variation in labor force participation, unemployment, hours worked, and wages.
- Until recently, effective labor grew in countries with both high and low labor productivity contributing to record growth in GDP.
- Now, effective labor is growing in countries with relatively low labor productivity, but declining in countries with high labor productivity.
- Hence, the contribution of population to GDP growth will be very small in coming decades.

# Population as a driver of global GDP

Major role in 1975-2000 to minor role in 2020-60

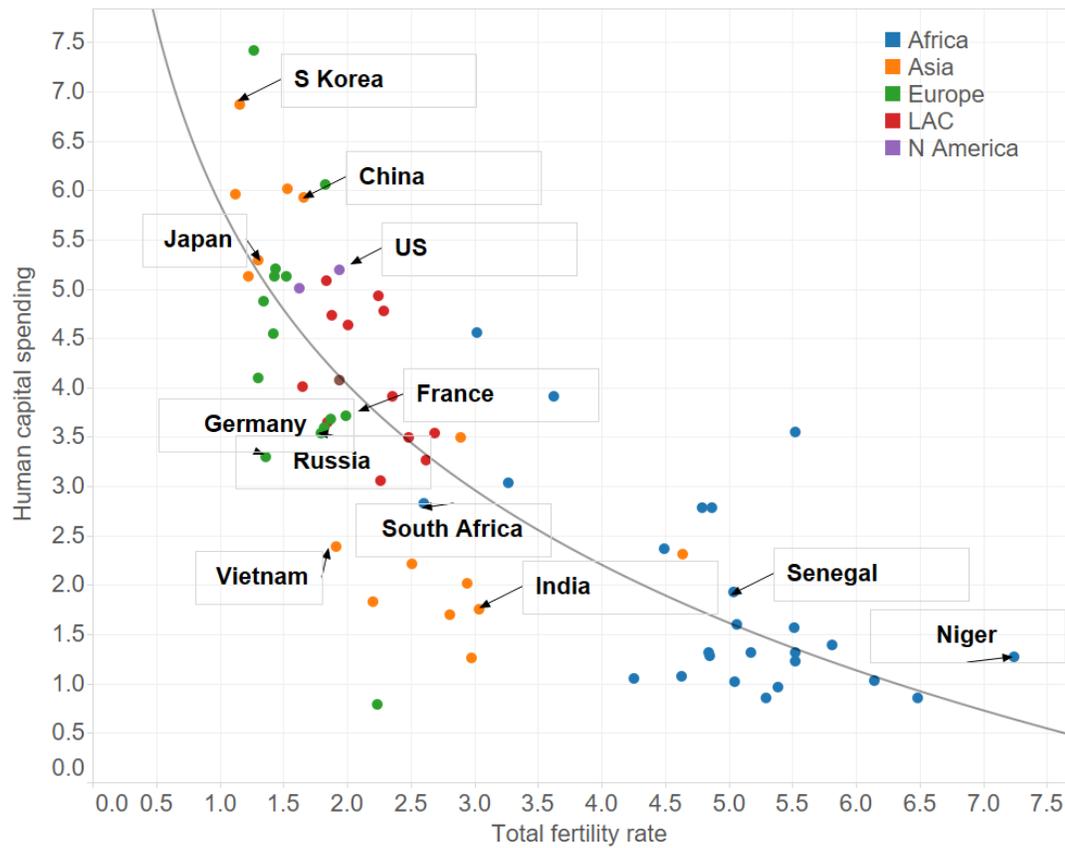


- Weighted effective labor is effective labor weighted for country differences in GDP/L in the base year.
- Productivity growth is growth of GDP per effective worker.
- Based on NTA estimates of labor income and UN estimates and projections of population for 185 countries.
- Source: Mason et al (2021)

# Transformed reproduction and human capital investment

- Increased opportunities for women as they redirect their time to:
  - Education
  - Production of market goods and services
  - Time-intensive childrearing
- Small families are investing more per child in human capital
  - Health
  - Education
  - Both public and private

# Greater investment in human capital per child



- Human capital spending is a synthetic cohort value calculated as the sum of public and private education spending, ages 3 to 26, and public and private health spending 0 to 17 expressed as a percentage of annual pre-tax labor income of persons 30-49.
- Higher productivity and income for children
- Ability to maintain support for older generations as population aging occurs.
- Source: Lee and Mason 2010 updated.

# Demographic dividends: Impact of changing population on growth in standards of living.

## First dividend

Definition: Growth in the effective number of workers relative to effective number of consumers.

Measurement: Age profiles of consumption and labor income combined with population data to incorporate the effects of policies and practice that vary from country to country.

## Second dividend

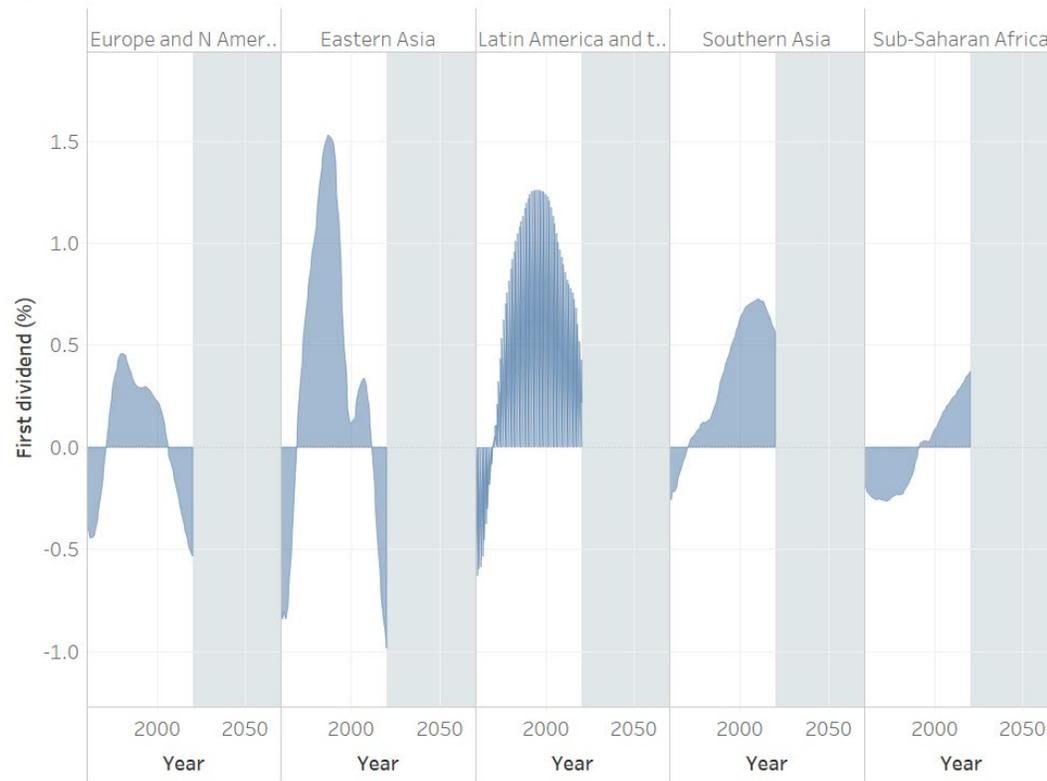
Definition: Growth in consumption per effective worker due to population change.

Capital deepening, human capital investment, etc.

Not explored here.

# First demographic dividend has contributed to higher standards of living around the world

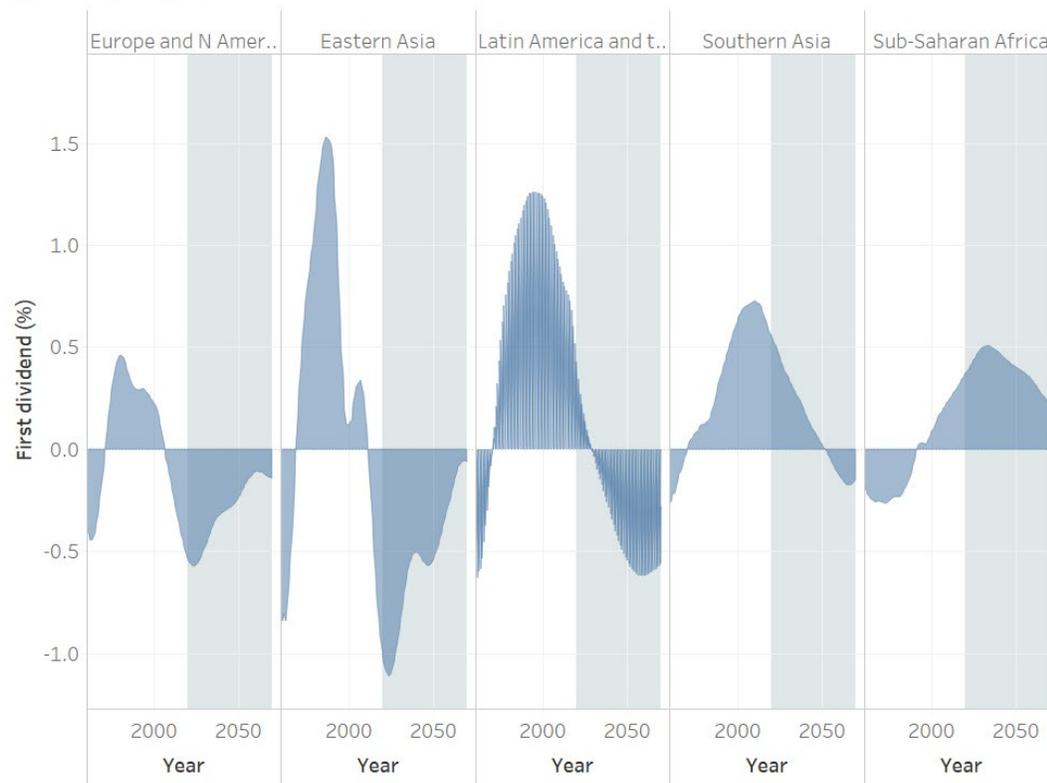
1960-2020



- Largest gain realized in Eastern Asia and Latin America and the Caribbean.
- Gains have been delayed and relatively small in sub-Saharan Africa.

# For the next 50 years, the contribution of the first dividend will be very mixed

1960-2070

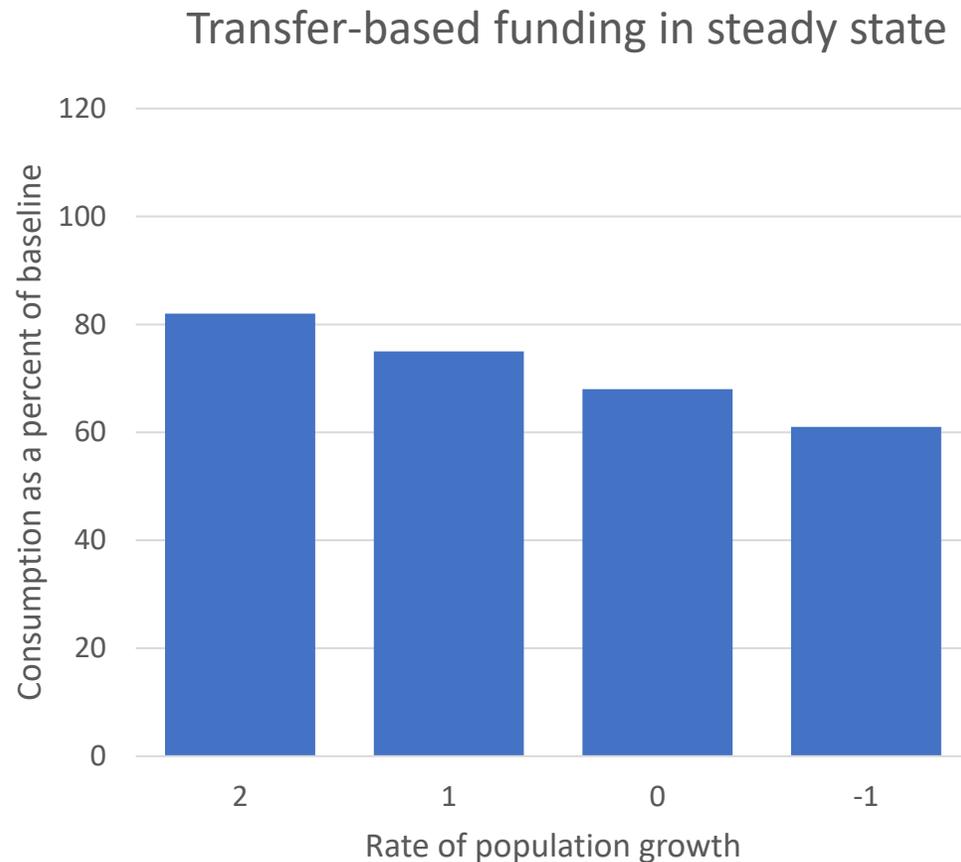


- First dividend has turned negative in the West and in Eastern Asia.
- It will turn negative in Latin America and the Caribbean beginning in 2030.
- First dividend will be positive in Southern Asia until 2050 and for the foreseeable future in sub-Saharan Africa.
- First dividend is playing a convergent role as the support ratio declines in rich countries and increases in poor countries.

# Policy in an Aging World

- Strategies for increasing resources
  - Quantity of labor (delayed retirement; gender equity)
  - Greater investment in human capital
  - Improvements in capital and labor markets
  - Cost-reducing innovation (health care)
- Reform of reallocation systems
  - Transfer systems
  - Asset-based systems

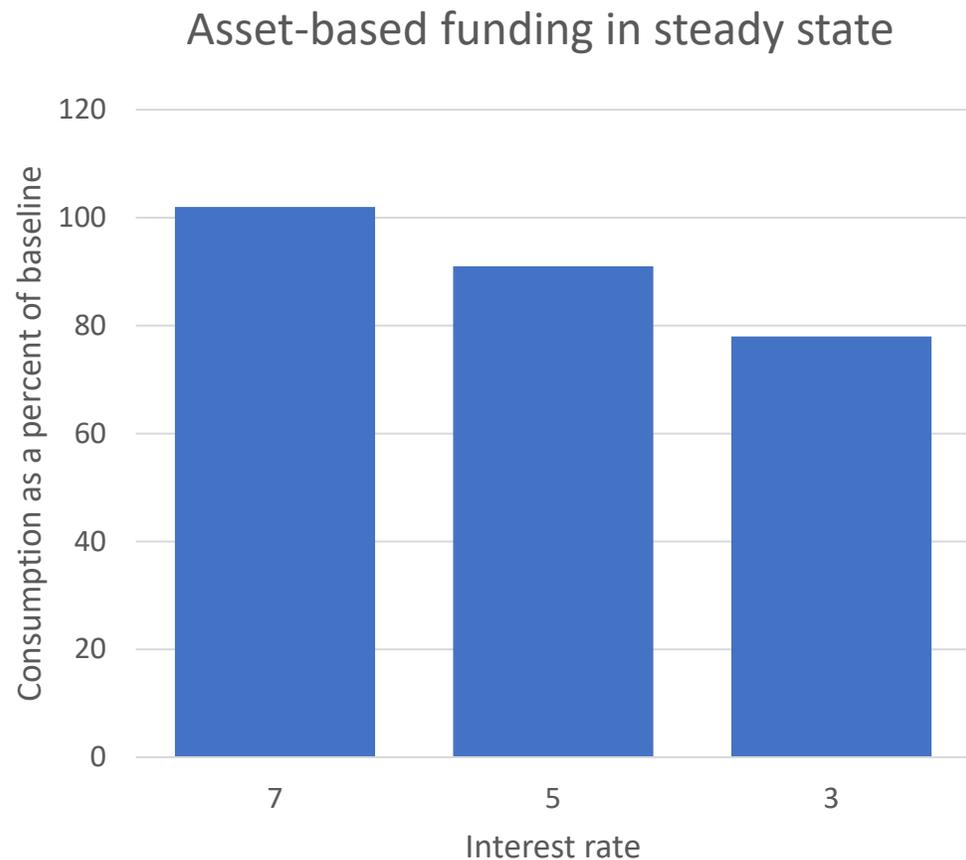
# Steady-state transfer system



- Old-age needs are often met through intergenerational transfers – public programs in particular.
- With aging, per capita transfer outflows (taxes) much rise and/or public transfer inflows (pension and health care benefits) must fall.
- Existing transfer systems are not sustainable. In the US, people would have to reduce their consumption by about 30 percent at all ages to achieve sustainable transfer systems.
- Lower fertility and slower population growth would have even larger effects.

Note: Current US mortality and age profiles of consumption and labor income, Mason 2021 forthcoming.

# Steady-state asset-based system



- If people are living longer and relying on an asset-based reallocation system, they must work more and/or consume less to fund greater old-age needs.
- Changes in age structure that arise due to fertility decline do not affect lifecycle budgeting at the individual level, except for the possible effects of reduced childrearing costs.
- Population aging could affect rates of return to capital leading to lower interest rates.
- If so, aging will require higher saving and lower consumption.

Note: Current US mortality and age profiles of consumption and labor income, Mason 2021 forthcoming.

# Concluding observations

- Population changes have complex implications for sustainable development.
- Longer life and modern reproduction contribute in a very positive way.
- Population aging will require restructuring of economic systems to achieve sustainable development.

# Sources:

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