

## Population Change

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## 1 Introduction

## 2 Fertility

## 3 Mortality

## 4 Migration

## 5 Wrap Up

# Introduction

# Why am I interested in population Change?

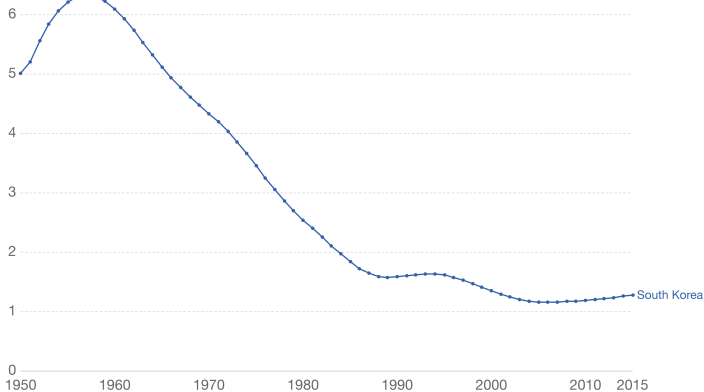
## South Korea

- rapid population change
  - aging
  - decline

# What it looks like

## Children per woman

Shown is the 'total fertility rate' (TFR). The TFR is the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with age-specific fertility rates of the specified year.



Source: UN Population Division (2017 Revision)

OurWorldInData.org/fertility-rate • CC BY-SA

# Whats happening?

- **Low fertility** - having less babies
- **Increased life expectancy** - living longer, longevity
- **Aging population** - smaller proportions of younger age groups, larger proportions of older age groups

# Problems

- working population
- pensions
- industry and market
- schools, teachers
- so many more. . .

## My interests

- Fertility
- Aging society
- Computational methods



# What is Demography?

- scientific study of population
- population growth and decline
- measurement, projections, explanation

# What determines population change?

- 1 Fertility
- 2 Mortality
- 3 Migration

$$\textit{Population} = \textit{Fertility} - \textit{Mortality} \pm \textit{Migration}$$

## Fertility

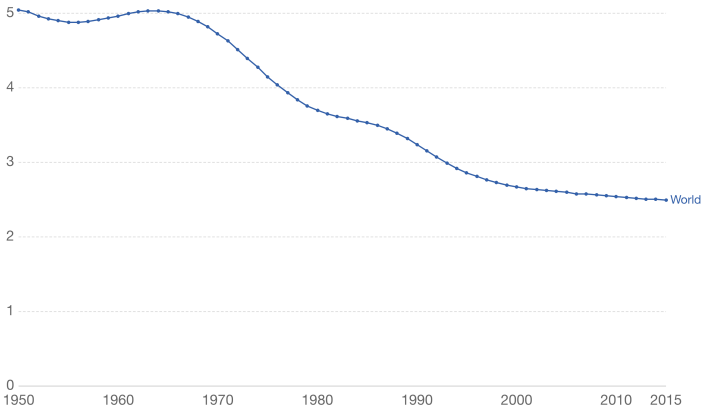
# Fertility

- people's reproductive behavior
- number of births within a population
- factors impacting fertility:
  - fecundity: biologically being able to give birth (15-45, 15-50)
  - contraception
  - abortion
  - family

# Fertility Trends

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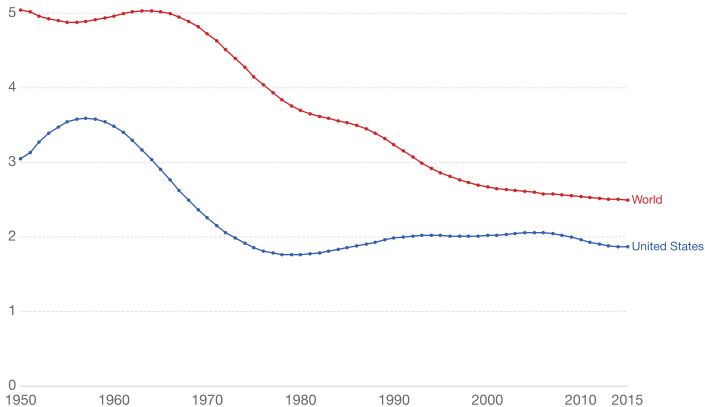
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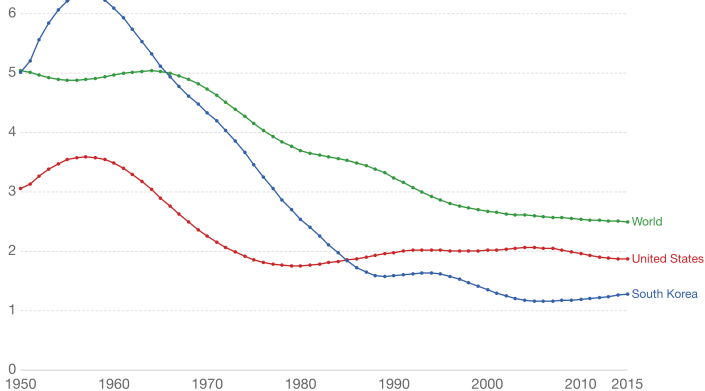
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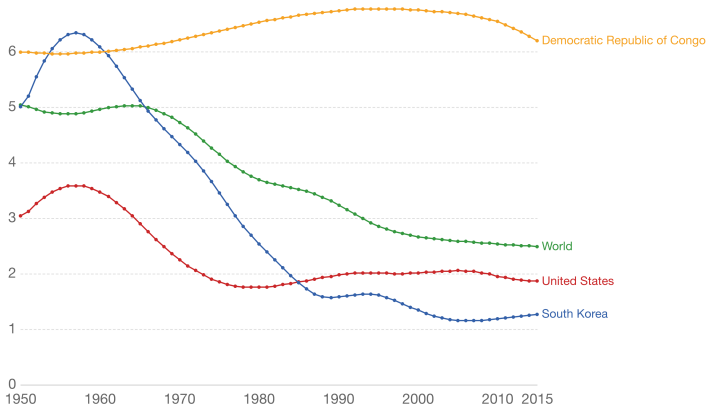
Source: UN Population Division (2017 Revision)

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# Fertility Trends

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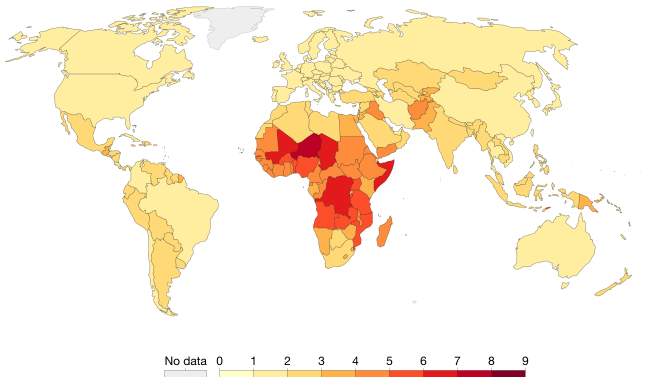
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# World Fertility

## Children per woman, 2015

Shown is the 'total fertility rate' (TFR). The TFR is the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with age-specific fertility rates of the specified year.



Source: UN Population Division (2017 Revision)

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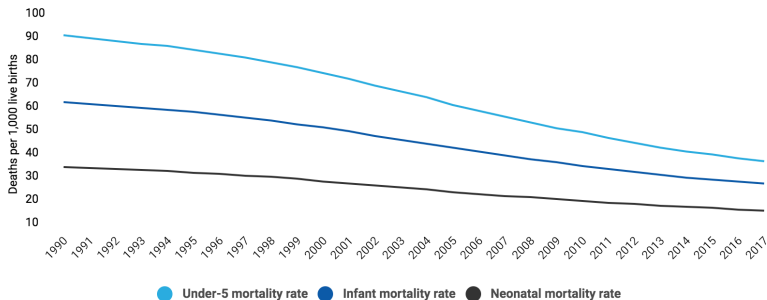
# Mortality

# Mortality

- deaths within a population
- life expectancy: “number of years an individual can be expected to live”
- child mortality (Under 5 Mortality)
  - UN SDG (Sustainable Development Goal) #3
  - reduce **neonatal** mortality to at least 12 per 1,000 live births and
  - under-5 mortality to at least as low as 25 per 1,000 live births

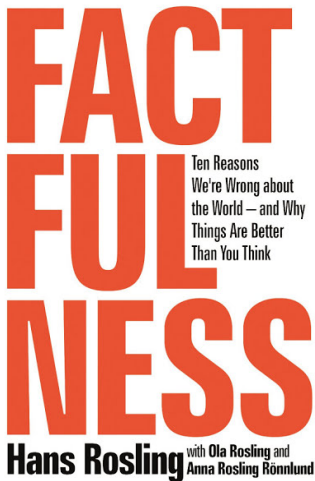
# U5MR

Global under-five, infant and neonatal mortality rates, 1990-2017



Source: United Nations Inter-agency Group for Child Mortality Estimation (UN IGME) 2018

## Trends in life expectancy and income



- Hans Rosling
- Short Clip

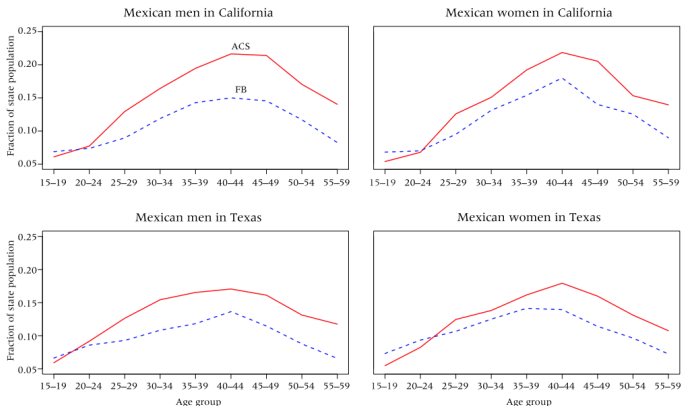
## Migration

# Migration

- Migration is not related to a biological event
- Two types of migration:
  - Immigration (In-migration)
  - Emigration (Out-migration)
- Measurement problems
  - continuing process (when do we measure?)
  - involves two or more countries

# Facebook data to measure migrants (Zagheni, Weber and Gummadi 2017)

**FIGURE 3 Facebook and ACS profiles of stocks of migrants by age and sex for Mexicans in California and in Texas**



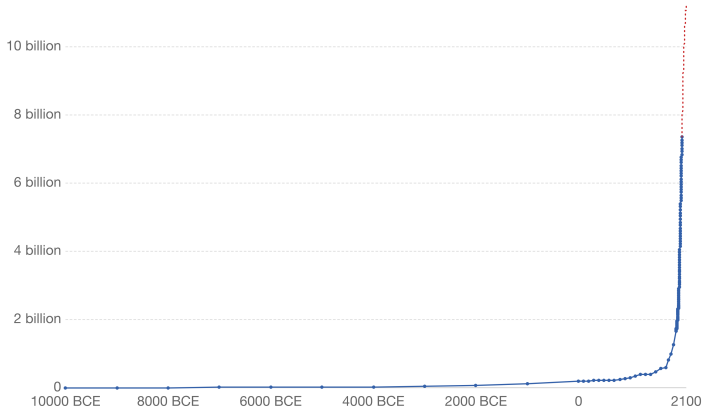


## Wrap Up

# Why is population change important?

World Population over the last 12,000 years and UN projection until 2100

Our World  
in Data



Source: World Population over 12000 years - various sources (2016), Medium Projection - UN Population Division (2015 revision)  
OurWorldInData.org/world-population-growth/ • CC BY-SA

- How is what you are studying impacting the population?
- How will that change the future?

Thank You