

Interactive Data Visualization

João Moura Pires

Notice

- **Author**

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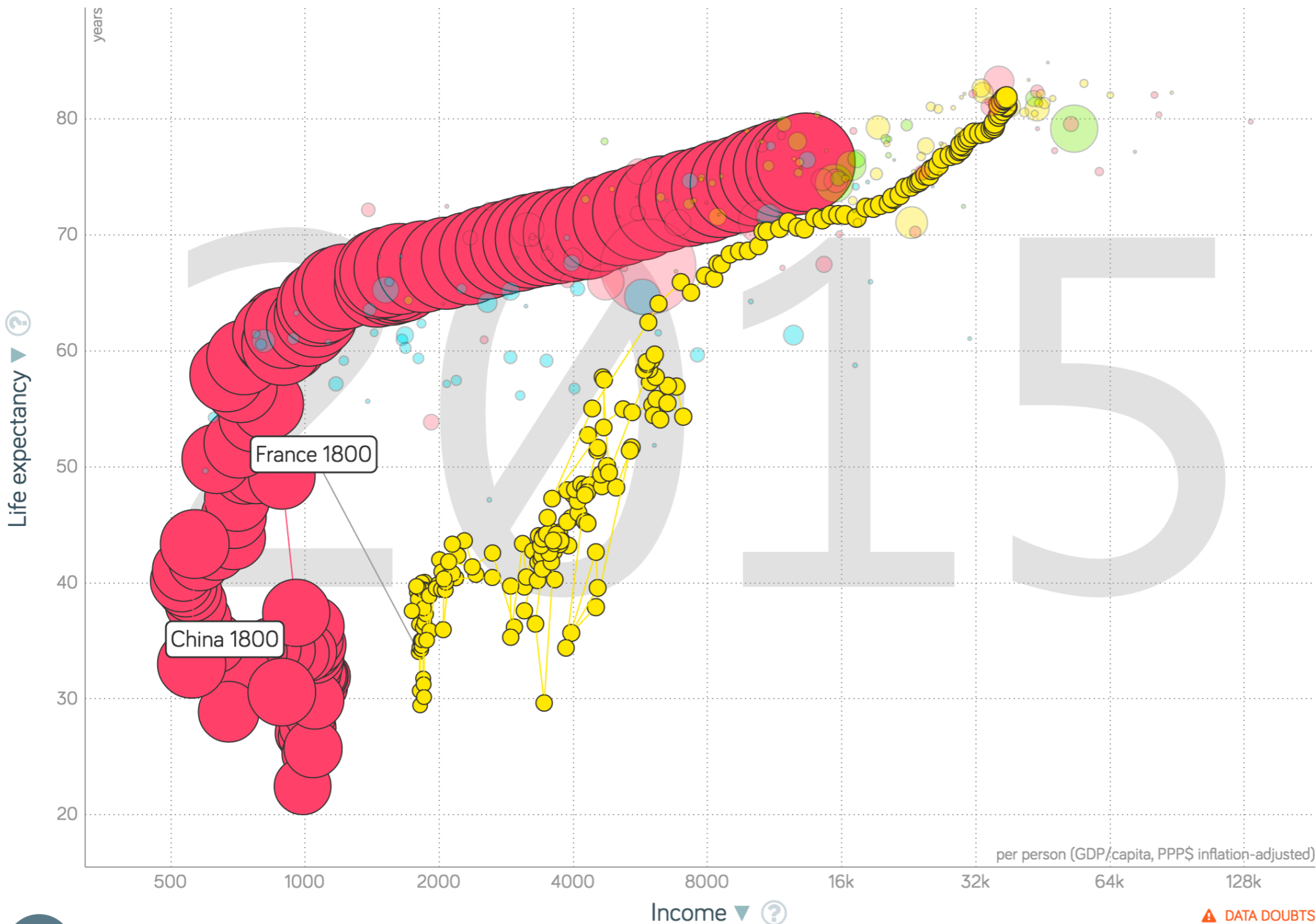
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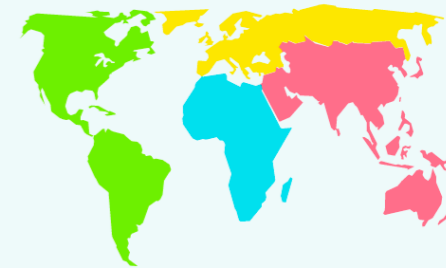
Table of Contents

- **Gapminder**

Gapminder



Color World Regions



Select China

China

DESELECT

Size Population

Zoom 100%

- TRAILS
- LOCK
- OPTIONS
- EXPAND
- PRESENT

DATA DOUBTS



1800 1900 2000

First see Hans Rosling

- See the video

- ◆ <http://www.gapminder.org/videos/ted-talks/hans-rosling-ted-2006-debunking-myths-about-the-third-world/>

- ◆ or

- ◆ <https://www.youtube.com/watch?v=RUwS1uAdUcl>

GAPMINDER

a fact-based worldview

GAPMINDER WORLD

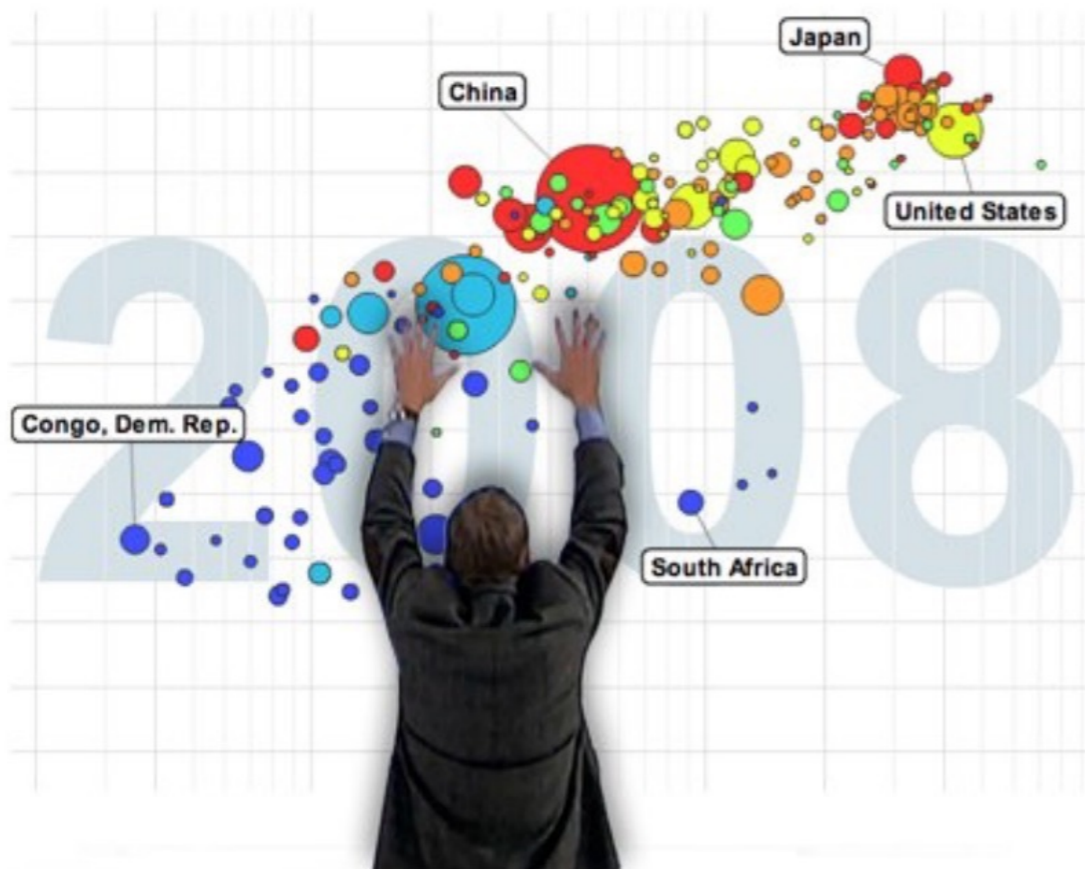
VIDEOS

DOWNLOADS

TEACH

IGNORANCE

DATA



Refresh your world

Pour the sparkling fresh numbers into your eyes and upgrade your worldview.

EXAMPLES:

- Wealth & Health of Nations ▶
- CO₂ emissions since 1820 ▶
- Africa is not a country! ▶
- Is child mortality falling? ▶
- Where is HIV decreasing? ▶

BUBBLE CHART ▶



Videos



Singapore in a Global Perspective

The change from large to small families reflects dramatic changes in peoples lives. In this TEDx video Hans Rosling talks [Read more ...](#)



Don't Panic — End Poverty

Hans Rosling asks: Has the UN gone mad? The United Nations just announced their boldest goal ever: To eradicate extreme [Read more ...](#)



Will saving poor children lead to overpopulation?

Hans Rosling explains a very common misunderstanding about the world: That saving the poor children leads to overpopulation. Not only is it not right, it's the other way around!

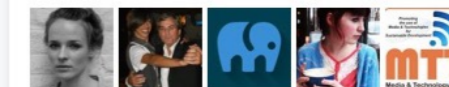


Don't Panic – The Facts About Population

The world might not be as bad as you might believe! “Don't Panic” is a one-hour long documentary produced by Wingspan Productions and [Read more ...](#)



Be the first of your friends to like this




TEDTalks

Hans Rosling's TEDTalks have been seen by millions. Tune in and see the talks from 2006 onwards:



TED 2006
Debunking myths about the "third world"
19.50



TED 2007
The seemingly impossible is possible
18.57



TED 2009
HIV: New facts and stunning data visuals
11.13

Debunking myths about the “third world”



TED Ideas worth spreading

HANS ROSLING
(click to play)

Share

00:00 | 00:00

Quiz 1

- **Which Country has highest child mortality?**
 - ◆ **Turkey or Sri Lanka**
 - ◆ **Poland or South Korea**
 - ◆ **Russia or Malaysia**
 - ◆ **Pakistan or Vietnam**
 - ◆ **South Africa or Thailand**

Quiz 1 - Answer

- Which Country has highest child mortality?
 - ◆ **Turkey** or Sri Lanka
 - ◆ **Poland** or South Korea
 - ◆ **Russia** or Malaysia
 - ◆ **Pakistan** or Vietnam
 - ◆ **South Africa** or Thailand

Quiz 2

- Which axes is showing in the first part to compare the Western World and the Third World?
- How look like the world in 1961?
- How look like the world in 2003?

Quiz 2

- **Which axes is showing in the first part to compare the Western World and the Third World?**
 - ◆ X -> Fertility Rate
 - ◆ Y -> Life Expectancy at Birth
- **How look like the world in 1961?**
 - ◆ Two different worlds:
 - Third world with long family and small life
 - Western world with small family and long life
- **How look like the world in 2003?**
 - ◆ Just “one” world

Quiz 3

- **What are the conclusions from the comparison from EUA and Vietnam?**

Namely how Vietnam in 2003 compares to the EUA in 1974 (end of Vietnam war).

- **What hint about the social change in Asia?**

Quiz 3

- **What are the conclusions from the comparison from EUA and Vietnam?**

Namely how Vietnam in 2003 compares to the EUA in 1974 (end of Vietnam war).

- ◆ The same !

- **What hint about the social change in Asia?**

- ◆ Social change come before economic change

Quiz 4

- **What about the relationship between GPD (gross domestic product) per capita and Child Survival?**
- **That relation is uniform among the countries inside each region?**

Quiz 4

- **What about the relationship between GPD (gross domestic product) per capita and Child Survival?**
 - ◆ Highly positively related

- **That relation is uniform among the countries inside each region?**
 - ◆ No !!! Even if the correlation seems to me the same they are very dispersed

Quiz 5

- **What Visual Variables are used and what is a typical mapping?**
 - ◆ x- and y-position <- numerical quantities (indicators)
 - ◆ size <- numerical quantities (indicators); normally the total population.
 - ◆ color <- categorization; normally a world region.
 - ◆ motion <- time
 - ◆ opacity <- selected versus non selected

- **Other important visual / interactions aspects**
 - ◆ Log versus linear scales on x- and y-position
 - ◆ Tails
 - ◆ Selection

Gapminder - Lets Try

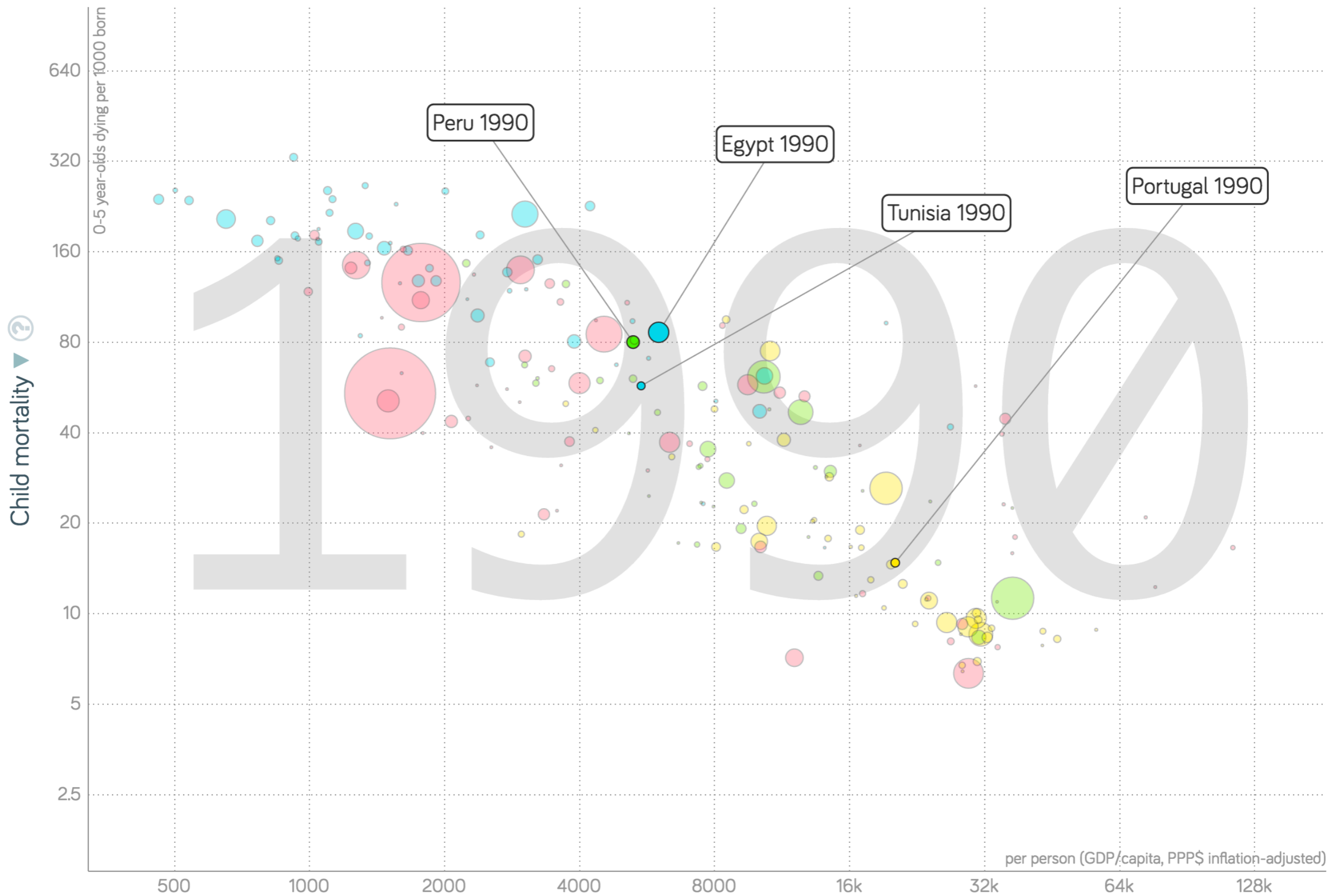
Instal Gapminder or use online

- Go to <http://www.gapminder.org>
- Install
 - ◆ <https://www.gapminder.org/tools-offline/>
- Run online
 - ◆ <https://www.gapminder.org/tools/>

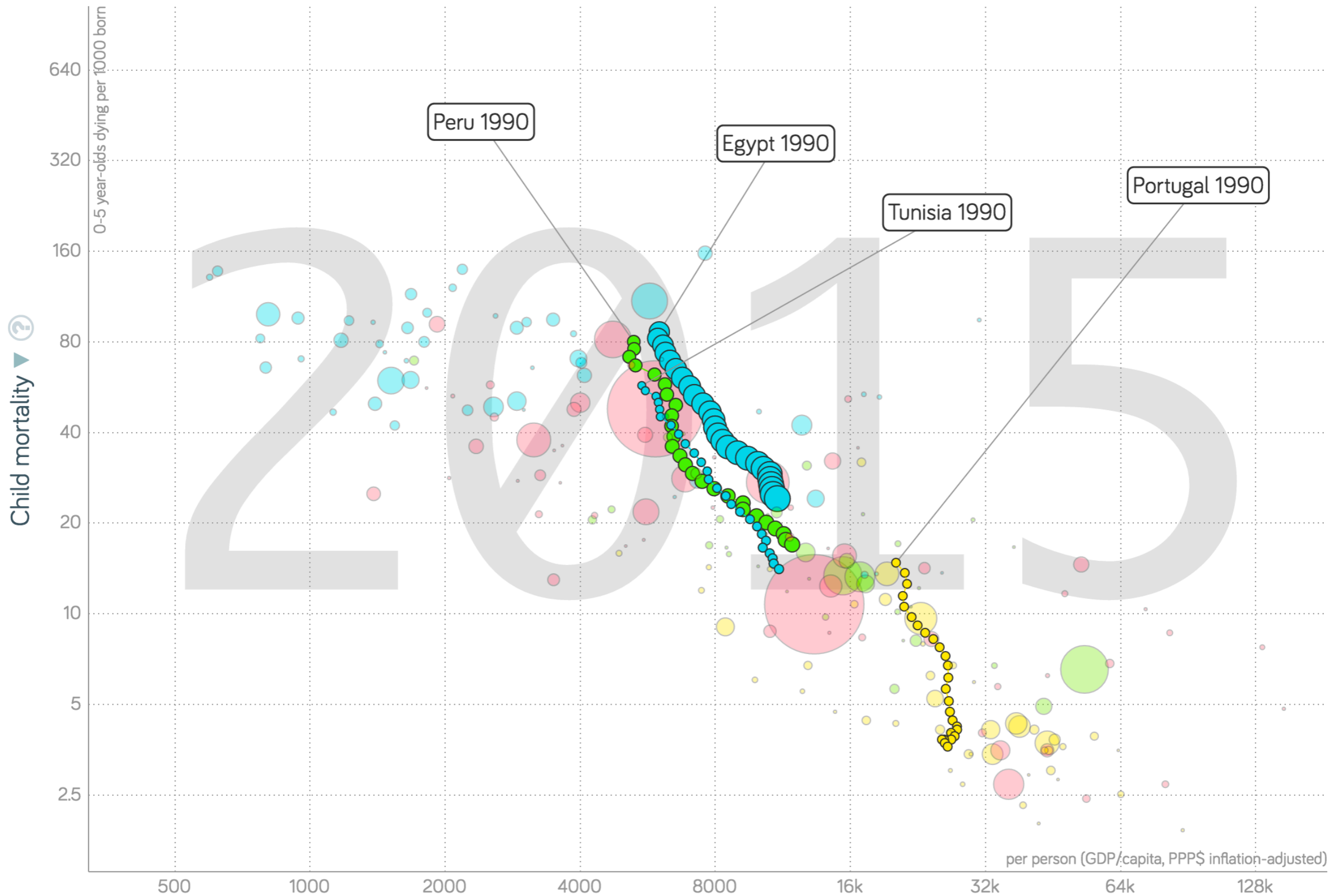
Is child mortality falling?

- Is it possible to reach Millennium Development Goal 4: a **reduction of child mortality with two thirds** between 1990 and 2015.
- **Axis**
 - ◆ Y - Child Mortality (0-5 years old dying per 1000 born)
 - ◆ X - Income per person (GDP/capita, PPP\$ inflation adjusted)
- **Notes**
 - ◆ Egypt and Turkey did it in only 15 years and Peru has also already met the goal.
 - ◆ In fact, 16 countries managed to reduce child mortality with 2/3 between 1990 and 2008 and another 43 is well on their way to do it by 2015.
 - ◆ The sad story is that 10 countries have the same or higher child mortality today than in 1990.

Is child mortality falling?



Is child mortality falling?



USA or China, who emits most CO2?

■ Axis

- ◆ Y - CO2 Emission (tones per person)
- ◆ X - Income per person (GDP/capita, PPP\$ inflation adjusted)

■ Notes

- ◆ An average American cause 3 times more CO2-emissions than a person in China.
- ◆ However, due to its large population, China emits a lot of CO2 in total.

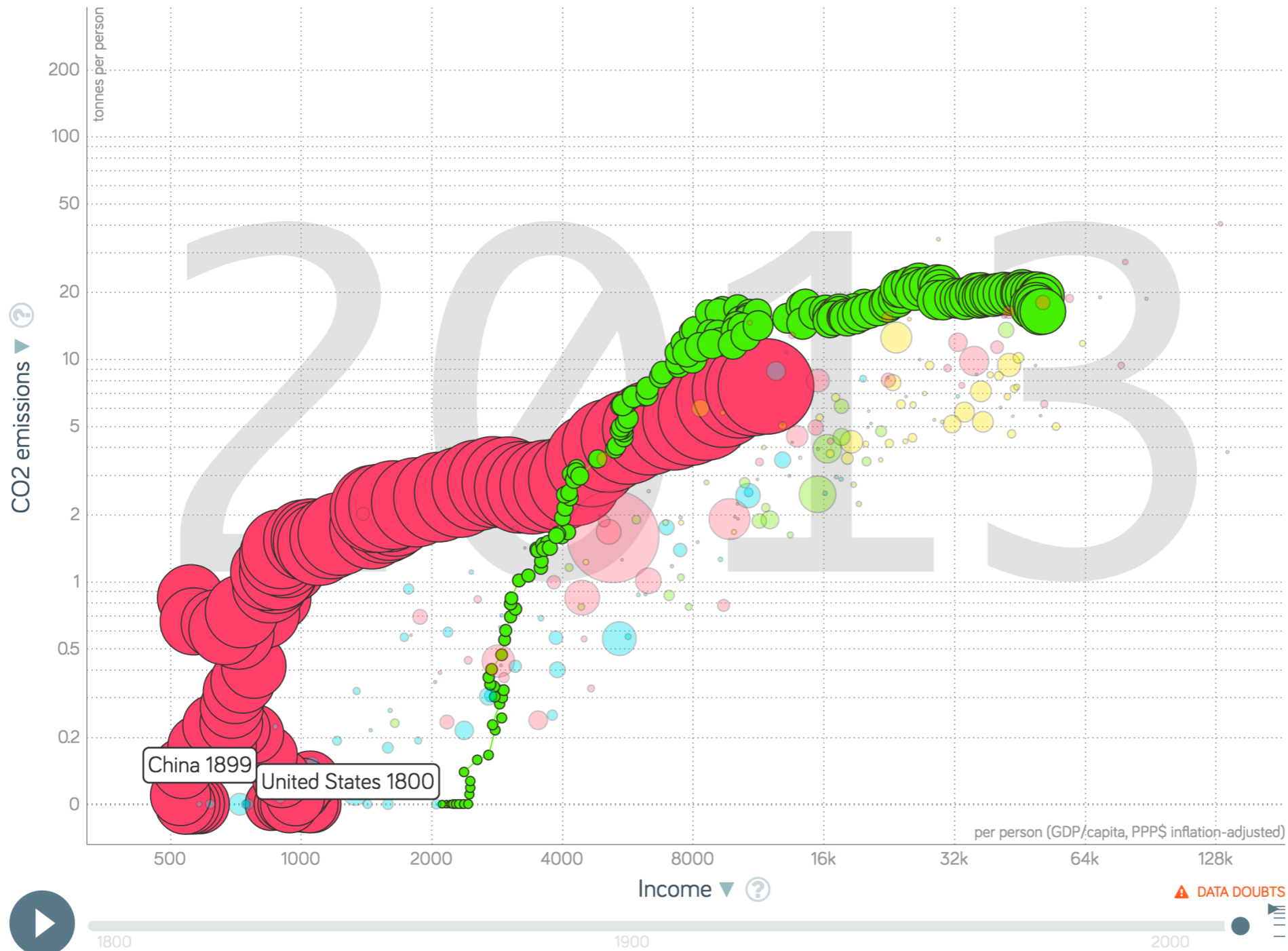
■ Does income matter?

- ◆ Few countries in history have managed to combine high income with low CO2-emissions per person.

USA or China, who emits most CO2?

GAPMINDER

Bubbles 1 x +



Color World Regions



Select search...

- United States
- China

- Afghanistan
- Albania
- Algeria
- Andorra
- Angola
- Anguilla
- Antigua and Barbuda
- Argentina
- Armenia
- Aruba
- Australia
- Austria
- Azerbaijan

DESELECT

Size Population, total

Zoom 100%

TRAILS LOCK OPTIONS EXPAND PRESENT

Smaller families and longer lives

■ Axis

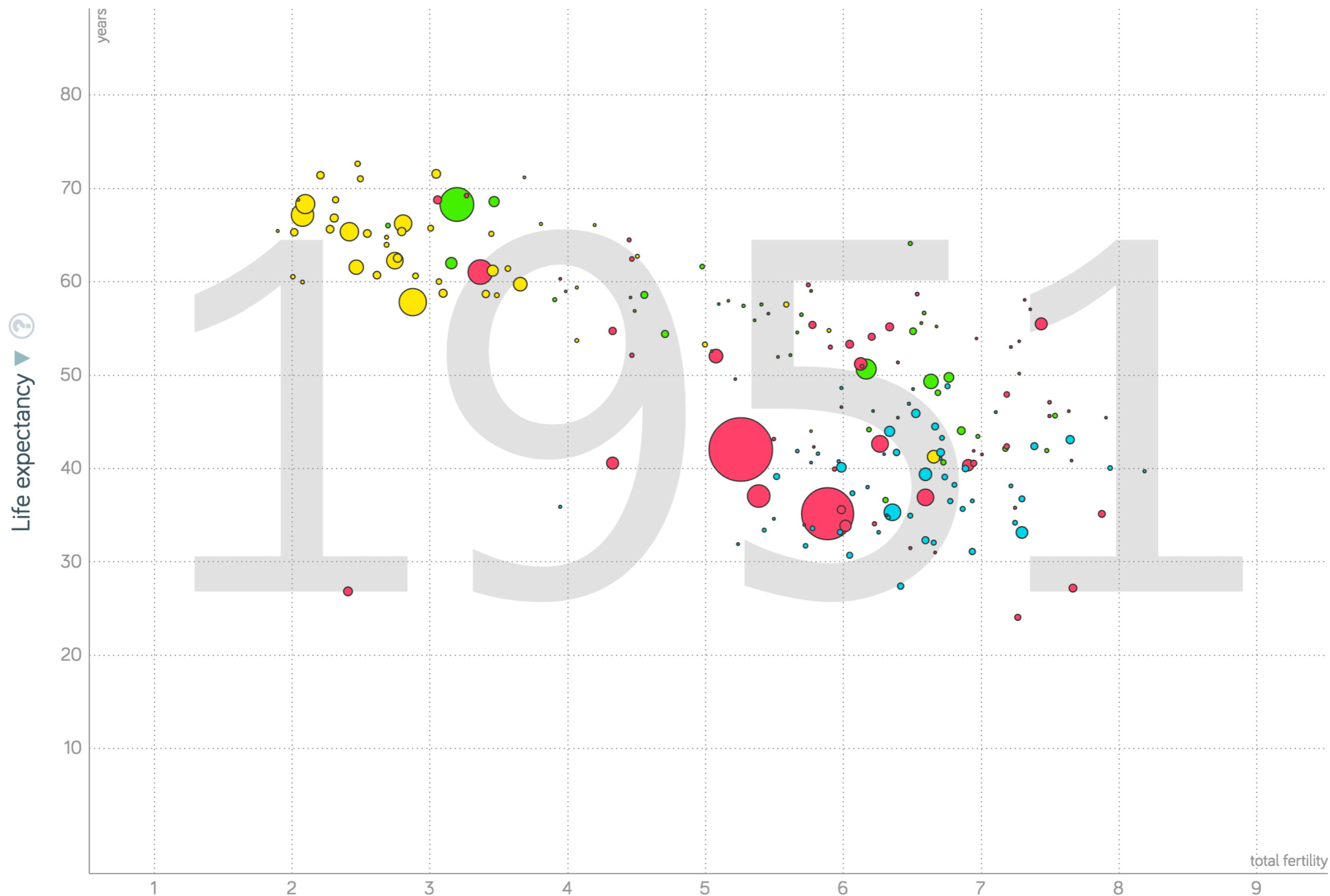
- ◆ Y - Life expectancy (years)
- ◆ X - Children per Woman (total fertility)

TED Talk

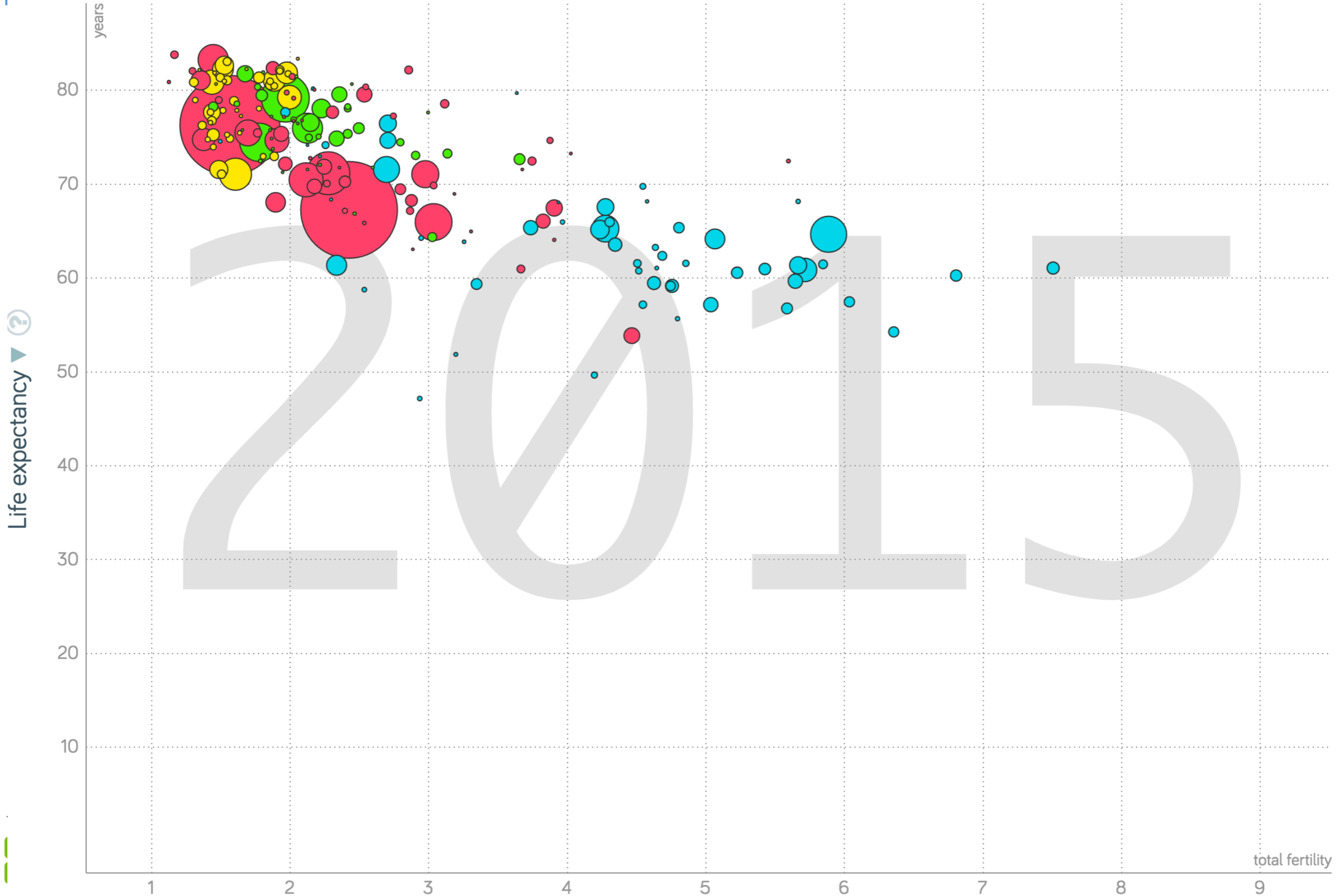
■ Notes

- ◆ In the 1950s, most countries in Latin America, Asia and Africa had low life expectancy and high birth rates; in most cases, more than 5 children per women.
- ◆ Only five decades later, most of those countries have less than three children per woman, and much longer lives.
- ◆ Demographic transition is the transformation of countries from high birth rates and high death rates to low birth rates and low death rates as part of the economic development of a country.

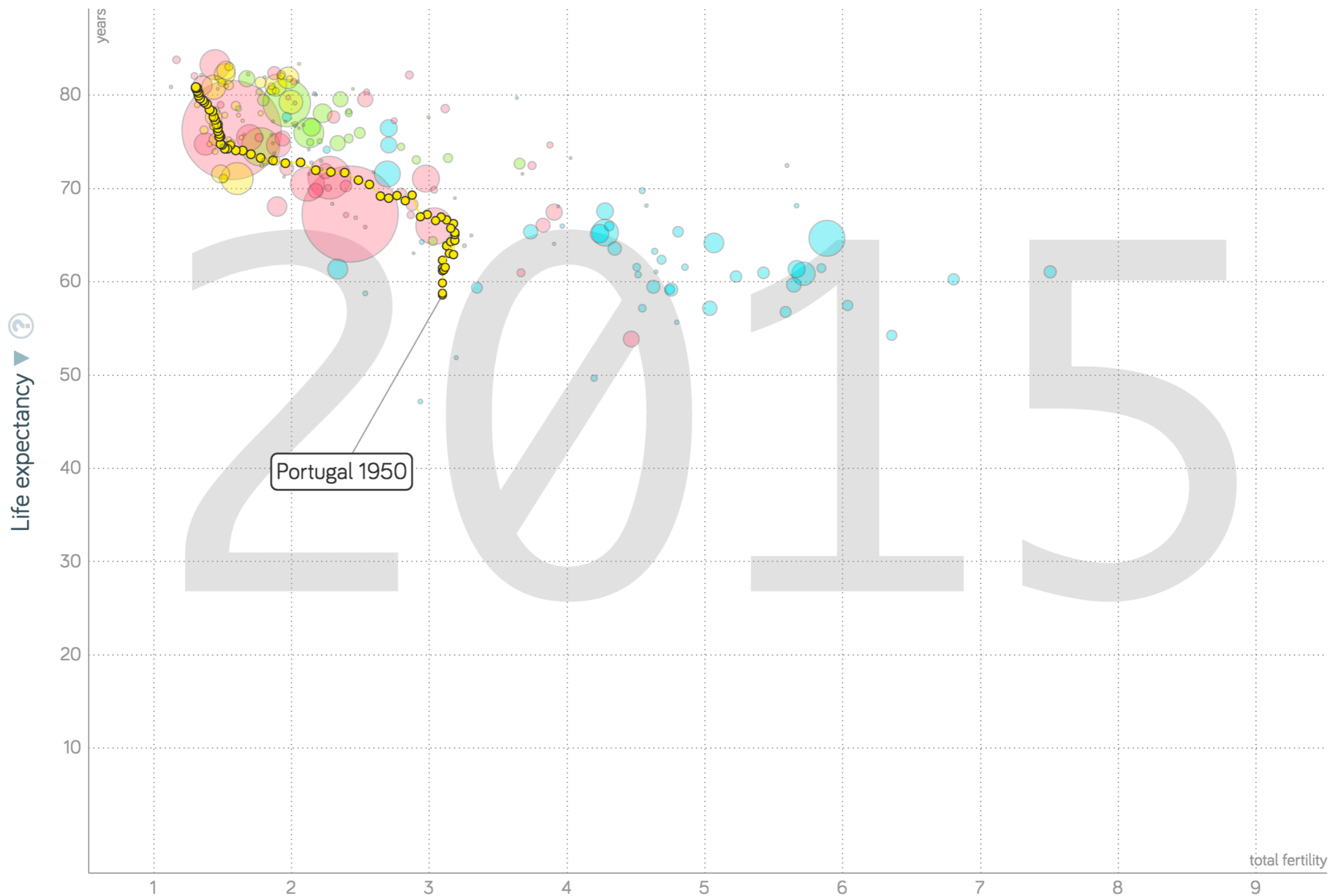
Smaller families and longer lives



Smaller families and longer lives



Smaller families and longer lives



Asia best in math

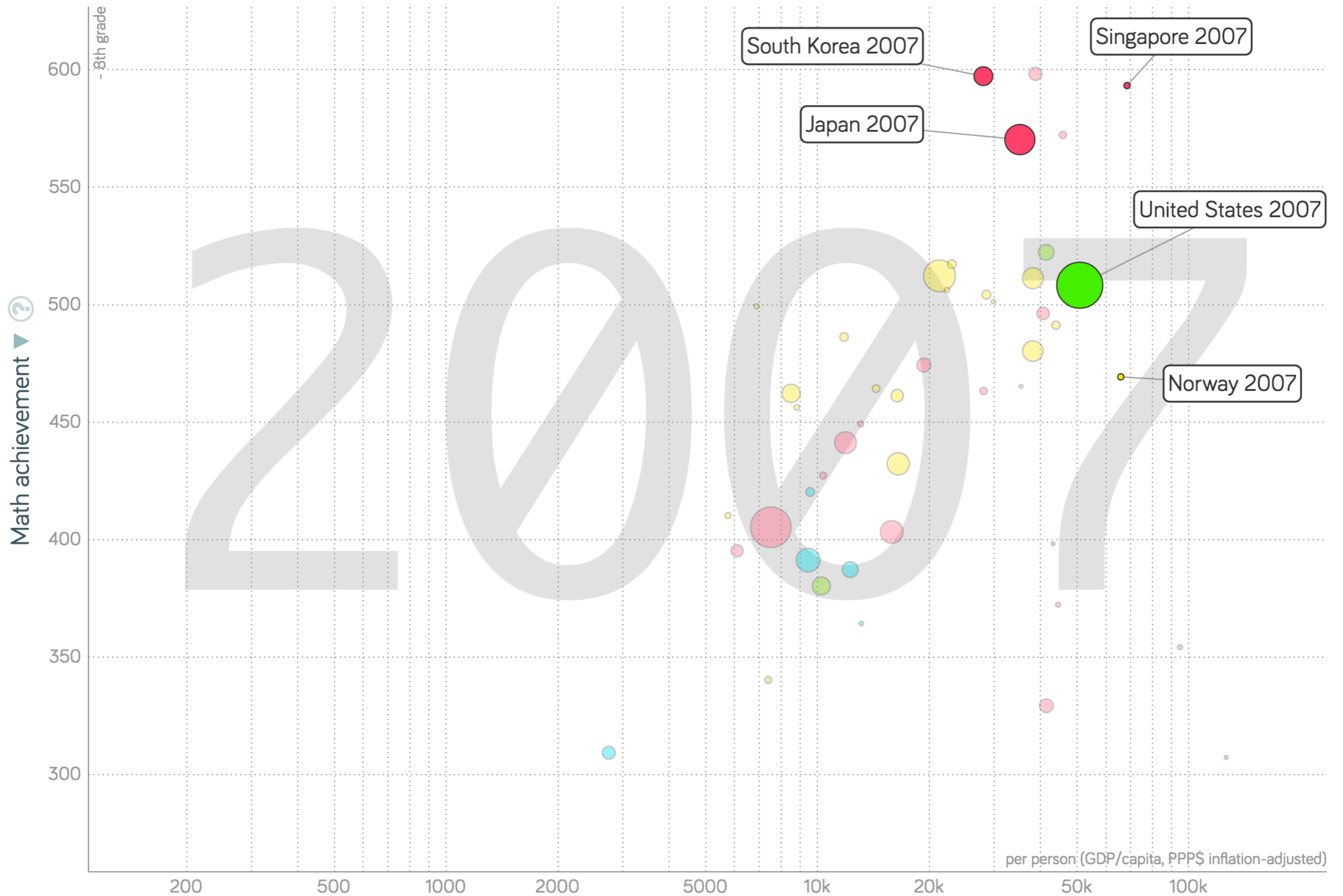
■ Axis

- ◆ Y - Math achievements - 8th grade
- ◆ X - Income per person (GDP/capita, PPP\$ inflation adjusted)

■ Notes

- ◆ The top five in an international math test are all East Asian countries.
- ◆ The graph shows the average achievement for children in 8th grade. A higher score means better achievements in the test.
- ◆ Scores haven't changed much over the last decade.
- ◆ The data is based on an international math test for children in 4th and 8th grade, from the TIMSS (Trends in International Mathematics and Science Study).

Asia best in math



High age at marriage – a long tradition

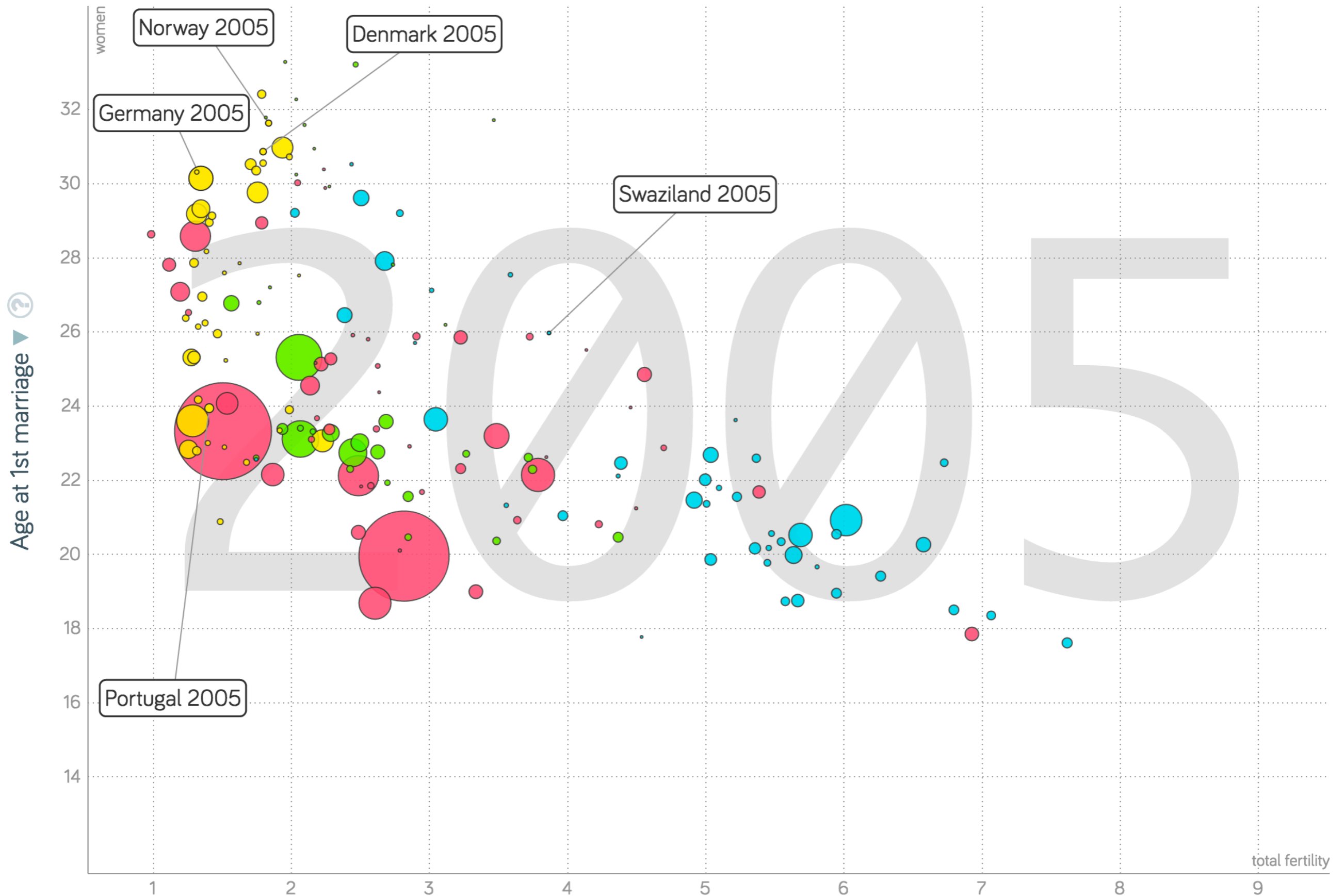
■ Axis

- ◆ Y - Age of 1st marriage (woman)
- ◆ X - Children per Woman (total fertility)

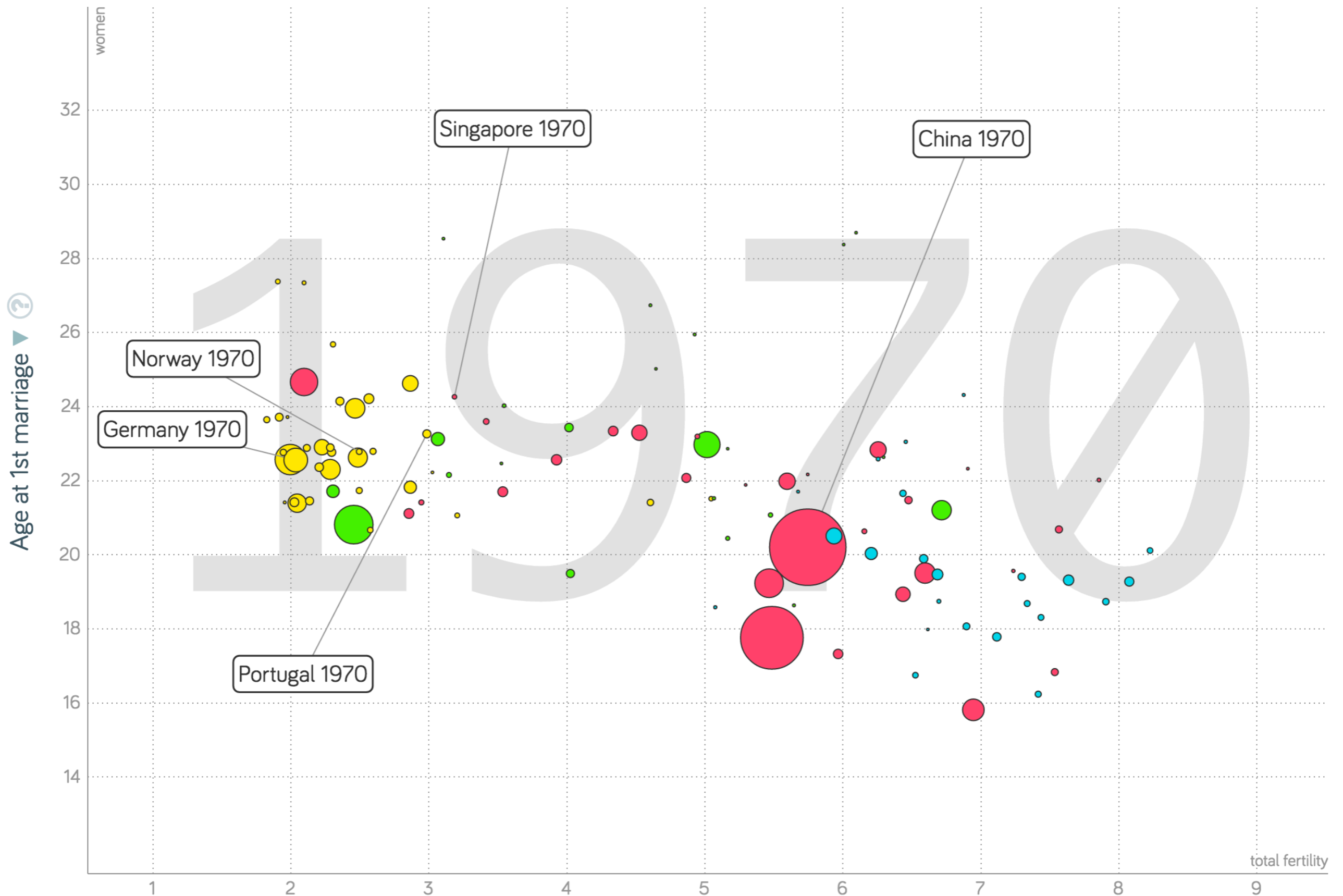
■ Notes

- ◆ Today many wait with marriage, until their late 20s or even 30s. This is not a new phenomenon. In Western Europe, late marriages is a long tradition.
- ◆ Why did people in the past wait so long to get married? Part of the explanation is that new couples weren't expected to get married until they could support themselves and their new family on their own.
- ◆ In the 1950s the age of marriage went down in many countries, only to go back up in the following decades.

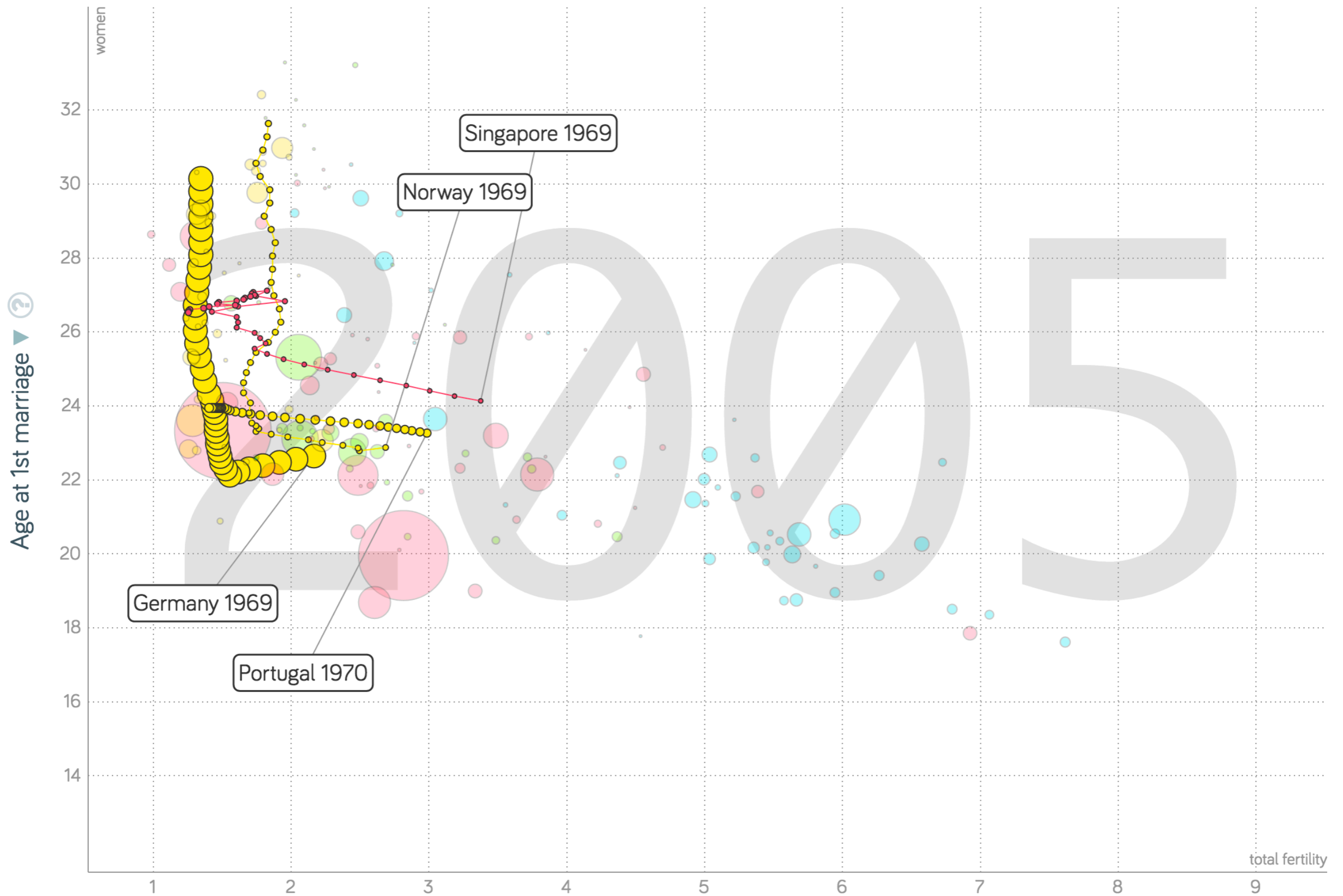
High age at marriage – a long tradition



High age at marriage – a long tradition



High age at marriage – a long tradition



People killed in earthquakes - World Map

■ Data

- ◆ earthquakes deaths - Annual number

■ Notes

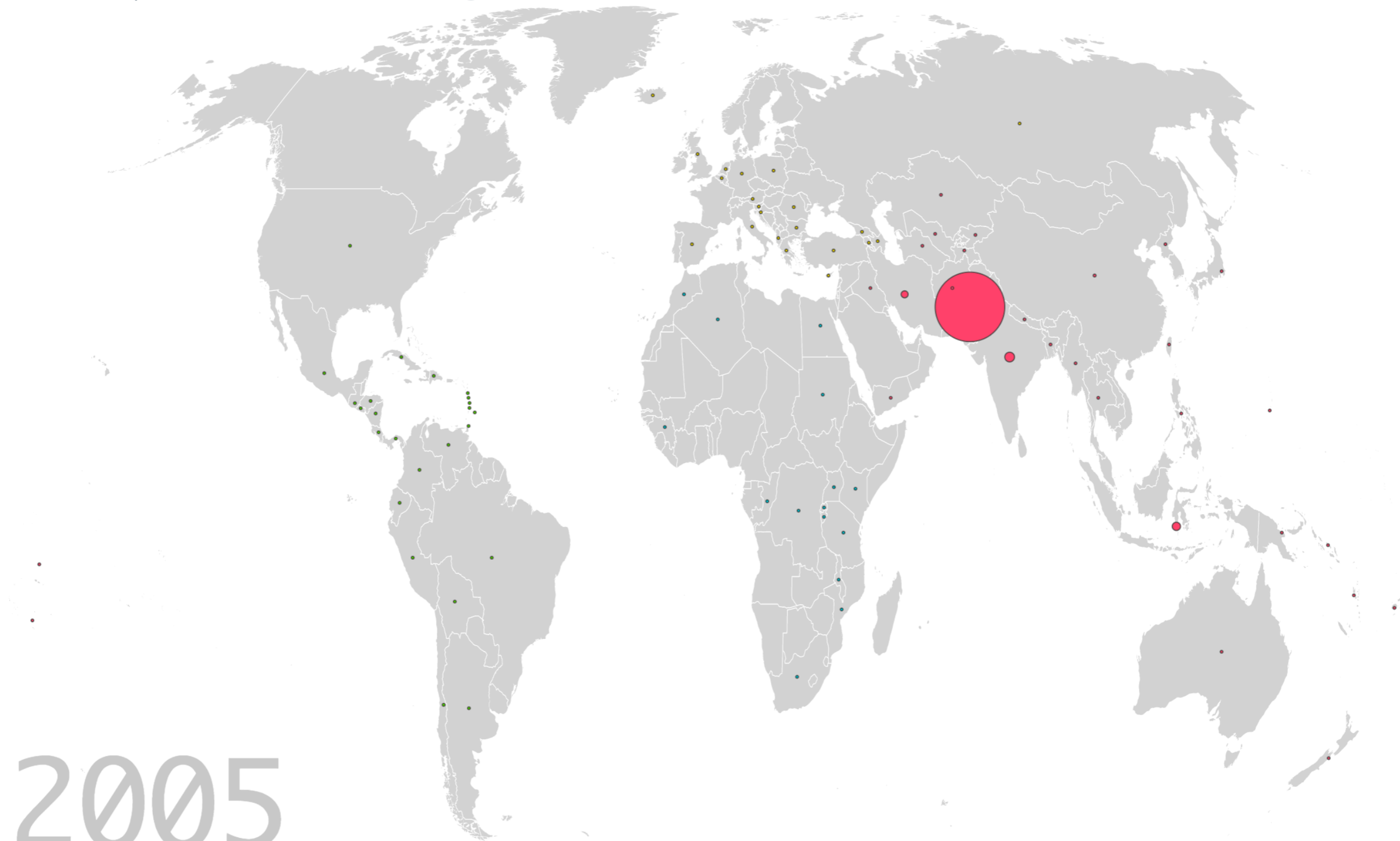
- ◆ The size of the bubbles shows the number of people killed in earthquakes during a given year.
- ◆ The data is from the Emergency Events Database.

■ Your Opinion?

- ◆

People killed in earthquakes - World Map

Size: Earthquake deaths annual number 



2005

Mountains Graphs

■ Data

- ◆ Number of people by income - <<Stacked frequency distribution>>

■ Notes

- ◆ The size of the bubbles shows the number of people killed in earthquakes during a given year.
- ◆ The data is from the Emergency Events Database.

■ Your Opinion?

- ◆

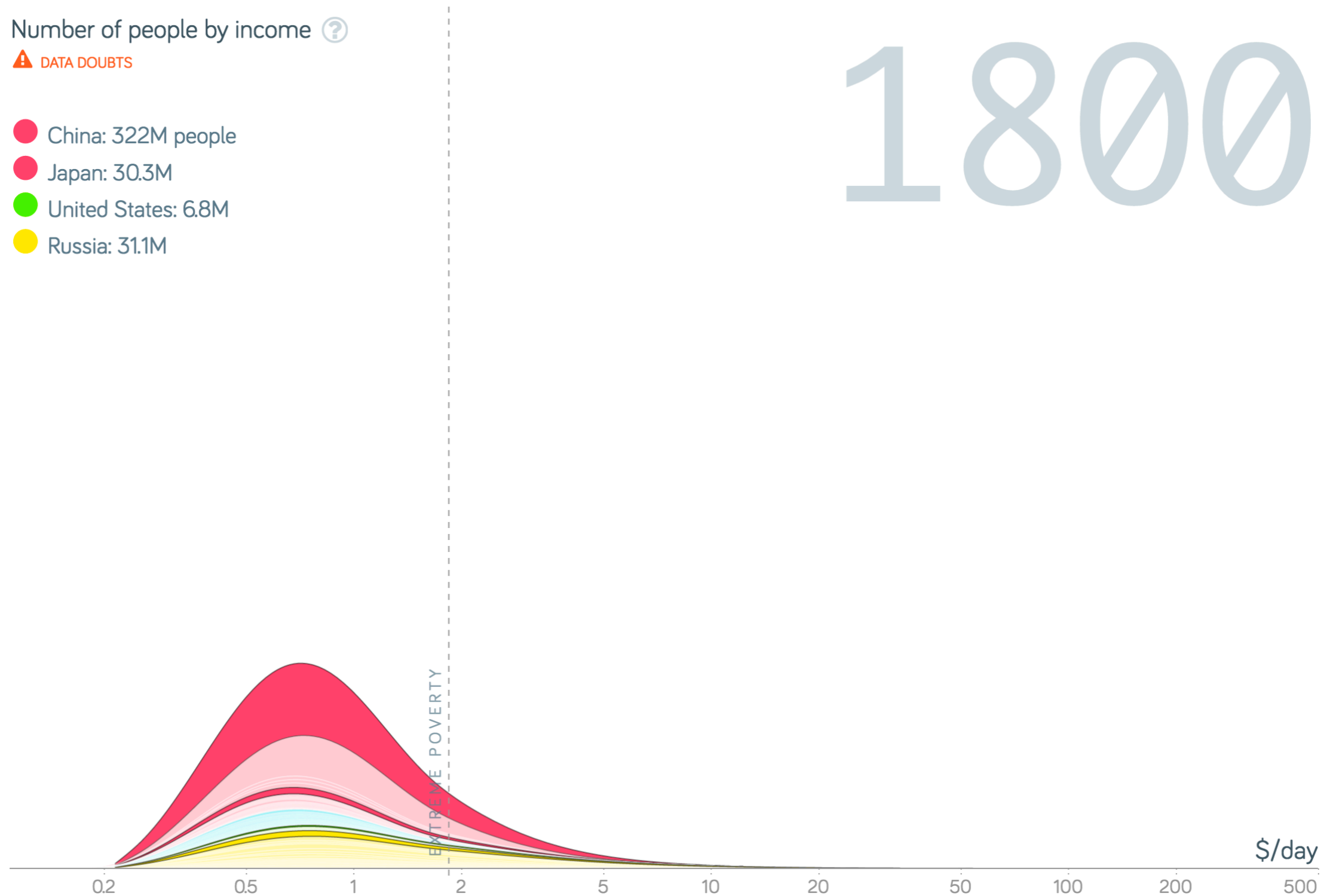
Montains Graphs

Number of people by income ?

⚠ DATA DOUBTS

- China: 322M people
- Japan: 30.3M
- United States: 6.8M
- Russia: 31.1M

1800



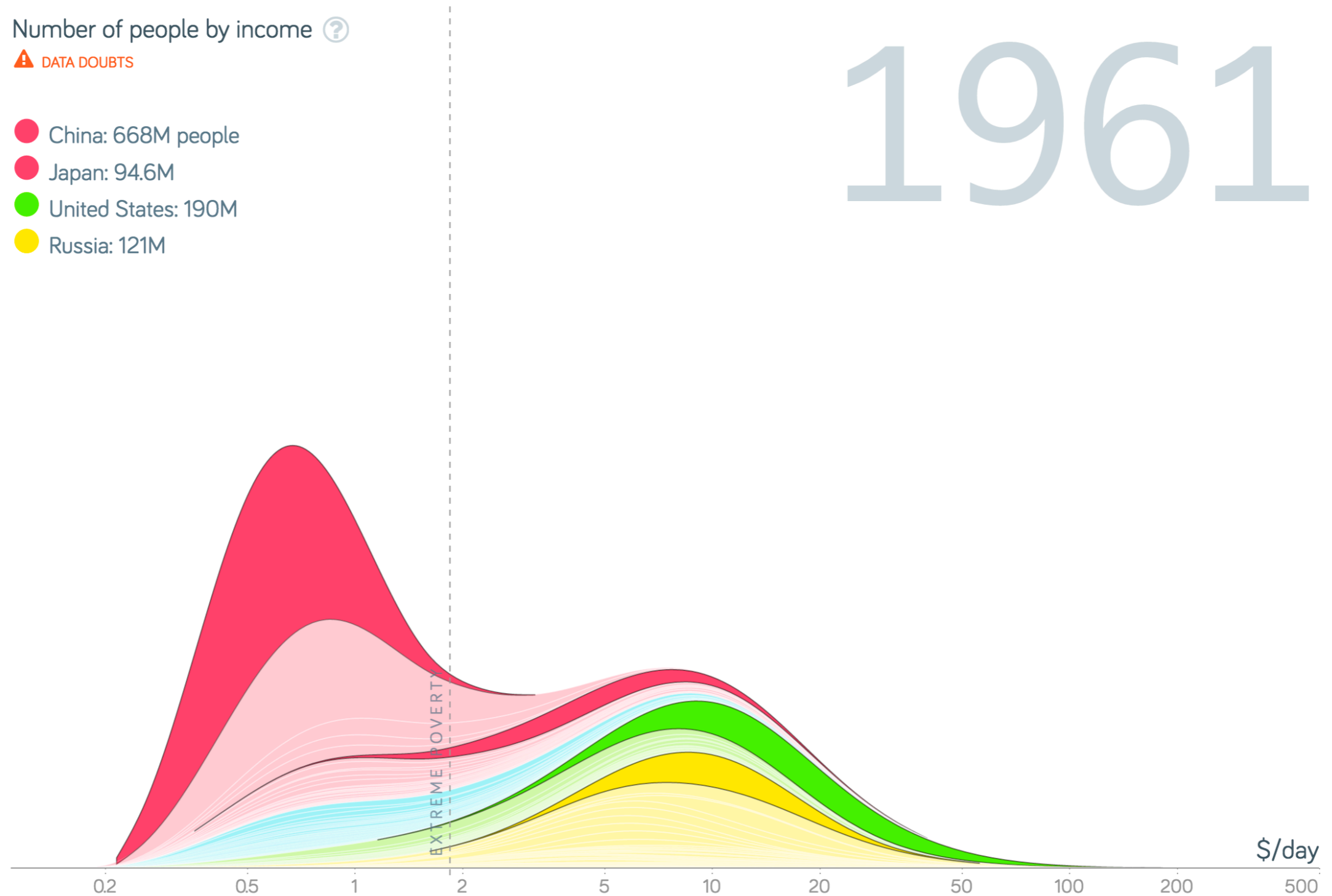
Mountains Graphs

Number of people by income ?

DATA DOUBTS

- China: 668M people
- Japan: 94.6M
- United States: 190M
- Russia: 121M

1961



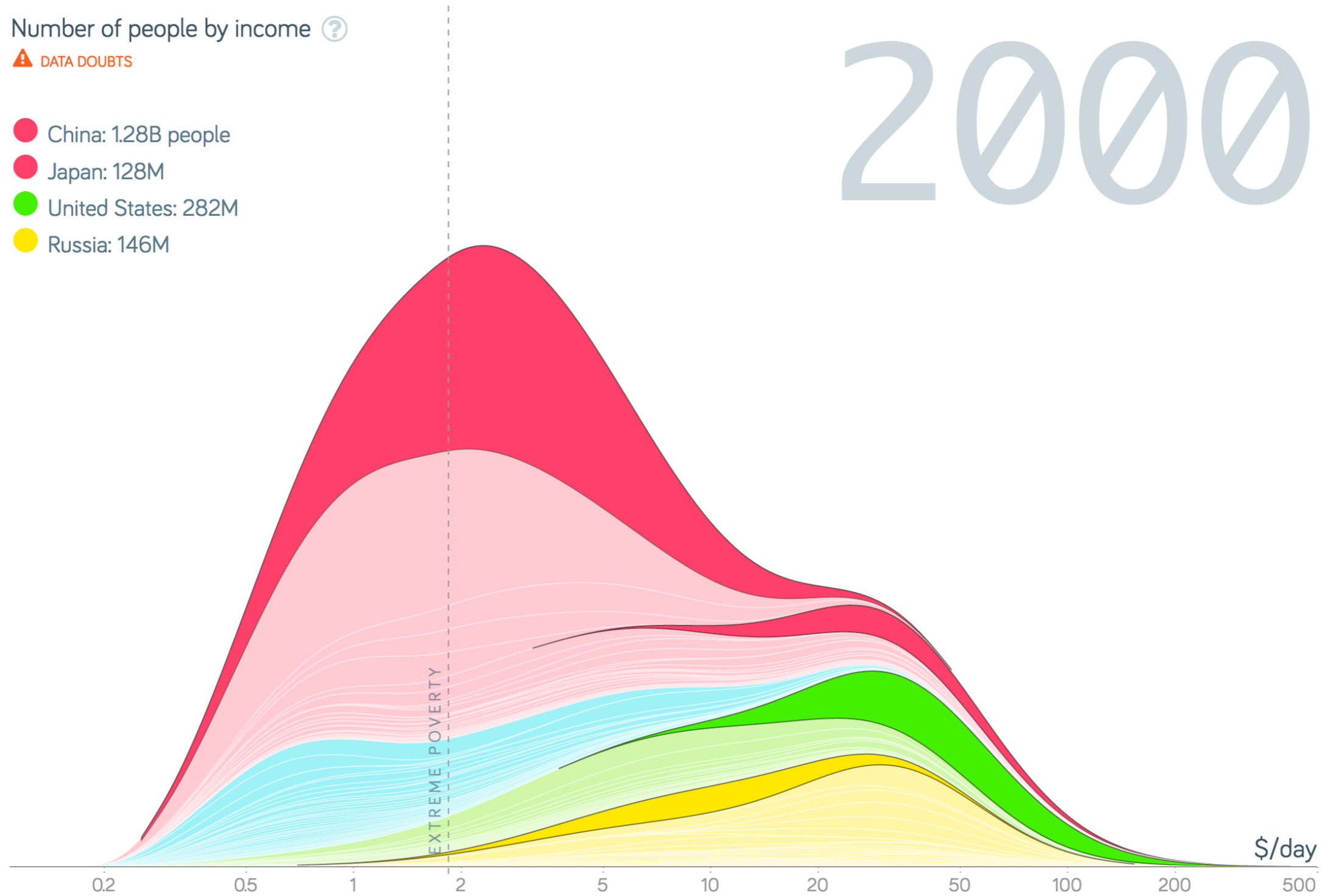
Mountains Graphs

Number of people by income ?

⚠ DATA DOUBTS

- China: 1.28B people
- Japan: 128M
- United States: 282M
- Russia: 146M

20000



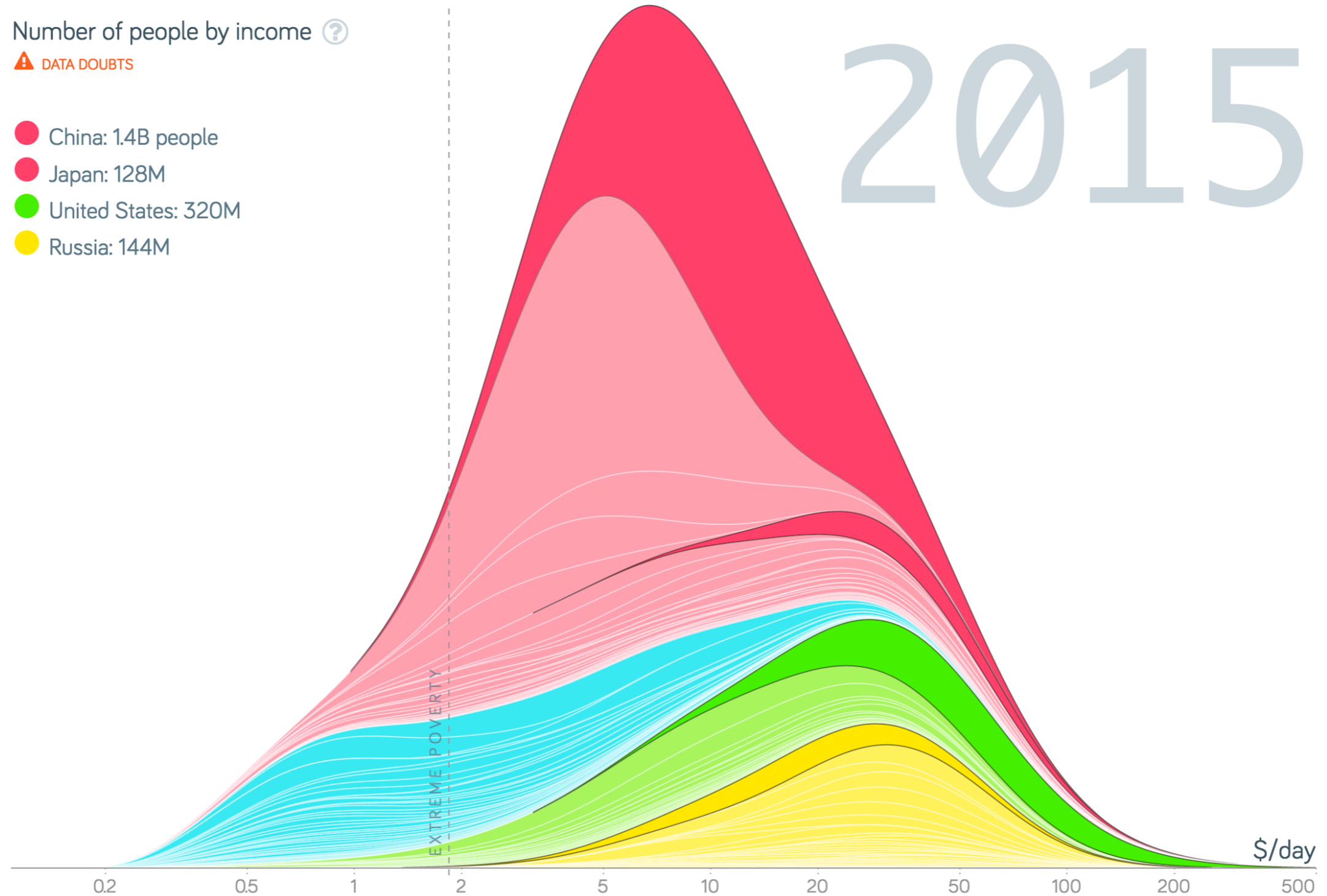
Mountains Graphs

Number of people by income ?

⚠ DATA DOUBTS

- China: 1.4B people
- Japan: 128M
- United States: 320M
- Russia: 144M

2015



First see Hans Rosling

- Later see the last (and long) Hans Rosling's video
 - ◆ <http://www.gapminder.org/videos/dont-panic-end-poverty/>
 - ◆ Really! Do not miss!
 - ◆ Not only for Data Visualization purpose