

Quality of survey weights

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Short reminder

- Weight is a multiplier assigned to each case
- General aim is to correct sample to be a good representation of the population
- Two main types of weights:
 - Design
 - Poststratification

What is a „good weight”?

- Essentially „good weight” corrects discrepancies between sample and the population according to some selected and believed as important factors
- Technically „good weight” meets some simple requirements

Technically „good weight”

- $\text{Mean}(\text{weight})=1$
- $\text{Minimum}(\text{weight})>0$
- $\text{Maximum}(\text{weight}) ?$
- $\text{SD}(\text{weight}) \rightarrow$ as small as possible

Technically „bad weight”

- Mean(weight)≠1

$$SE = \frac{s}{\sqrt{n}}$$

where:

s – standard deviation

n – sample size

The problem of „n”!

Technically „bad weight”

- $\text{Mean}(\text{weight}) \neq 1$
- $\text{Weight} = 0$
- $\text{Weight} < 0$
- $\text{Weight} = 1$
- $\text{Weight} > X$ (?)
- big SD

Some examples from real data

The project on data harmonization:

- 22 international projects
- 130 countries
- years: 1966-2013
- 1721 studies

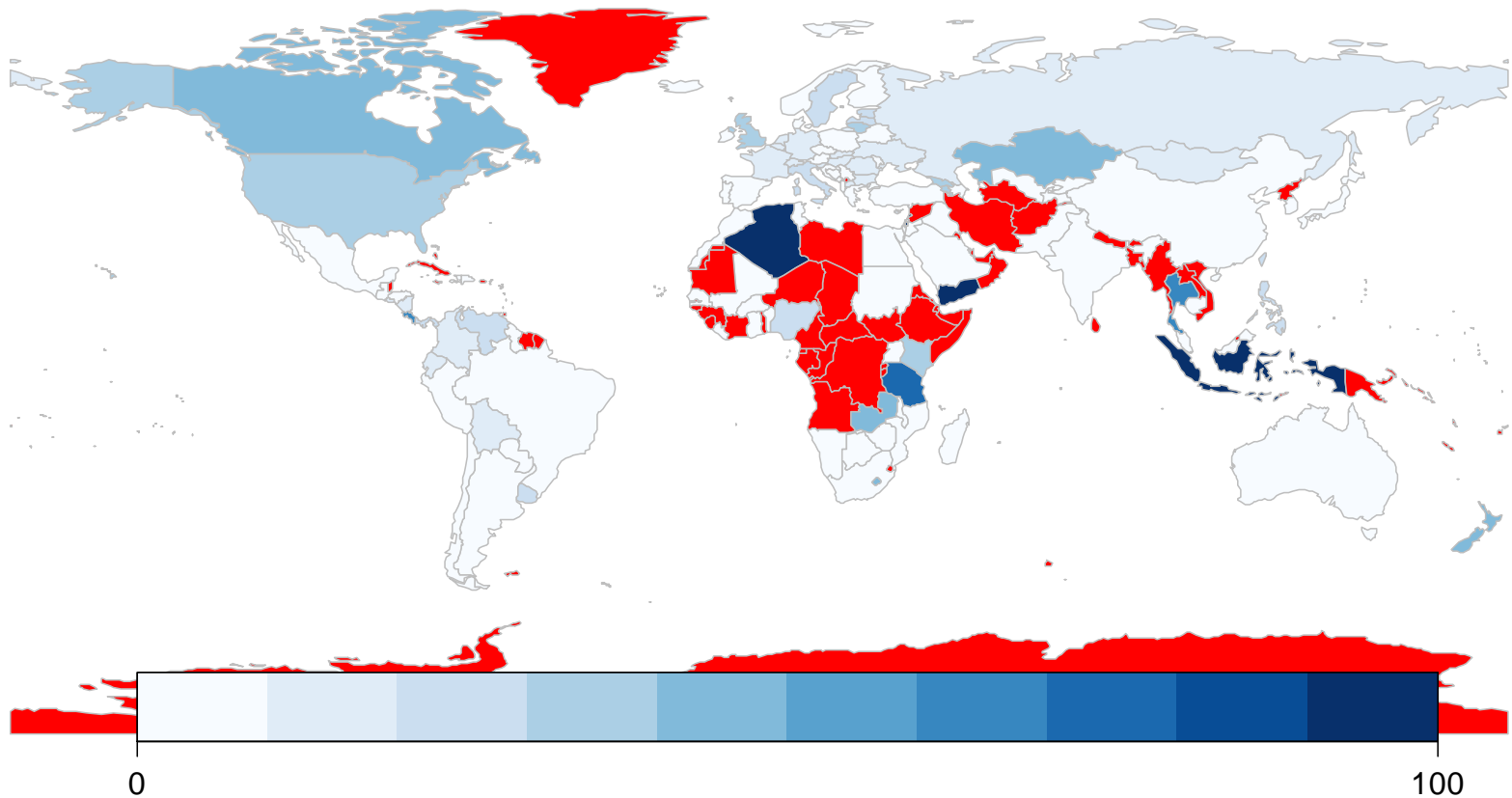
Properties of weights

- mean
- standard deviation
- minimum
- maximum

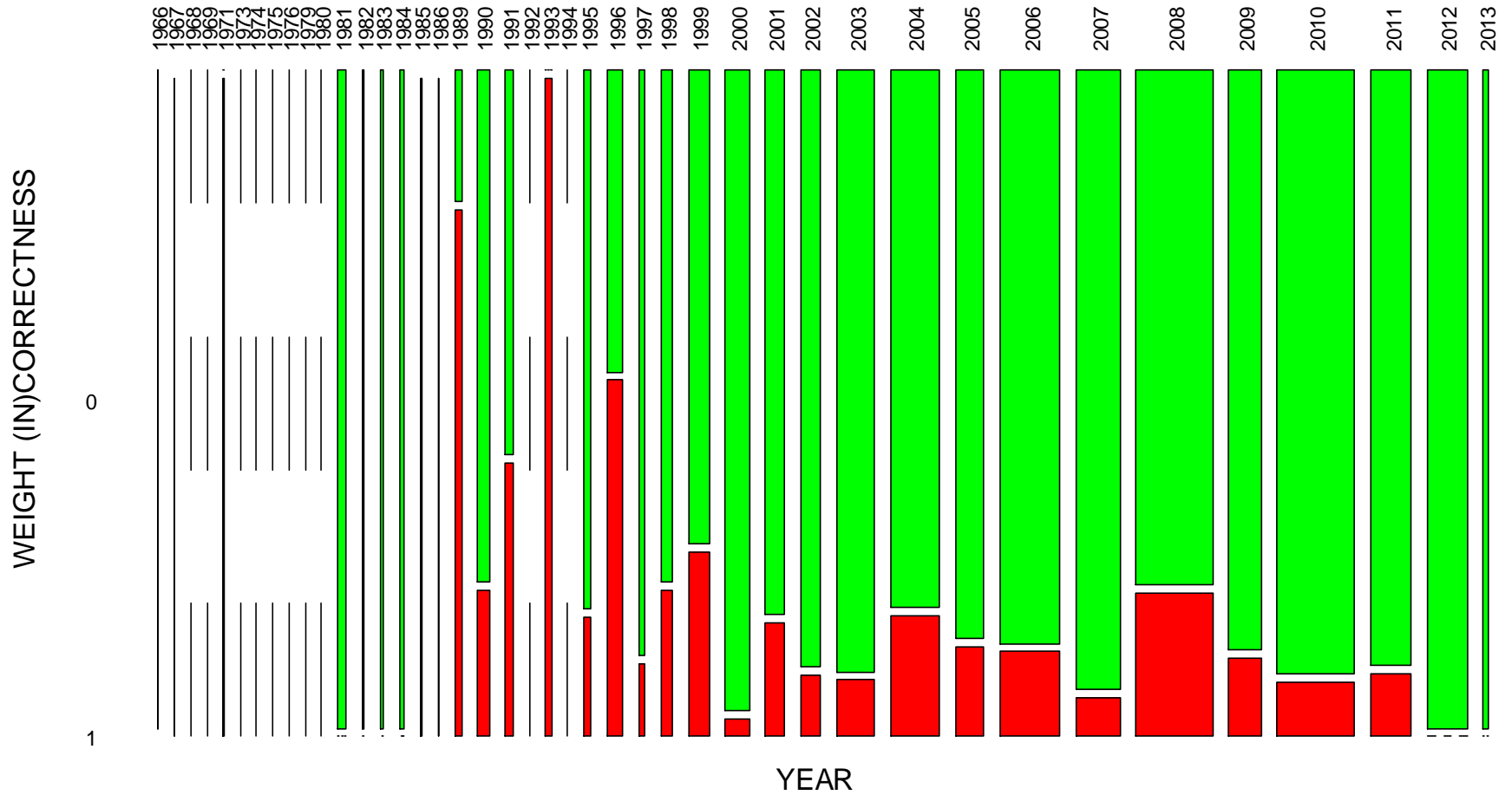
Mean of the weights

- Incorrect weights $\text{mean}(wght) \neq 1$: 70% of studies
- Assuming tolerance of error $< 0,001$: 15% incorrect
- Range $\text{mean}(wght)$:
 - 3,29 (Philippines, ISSP 1996)
 - 0,83 (Philippines, ASB 2010)

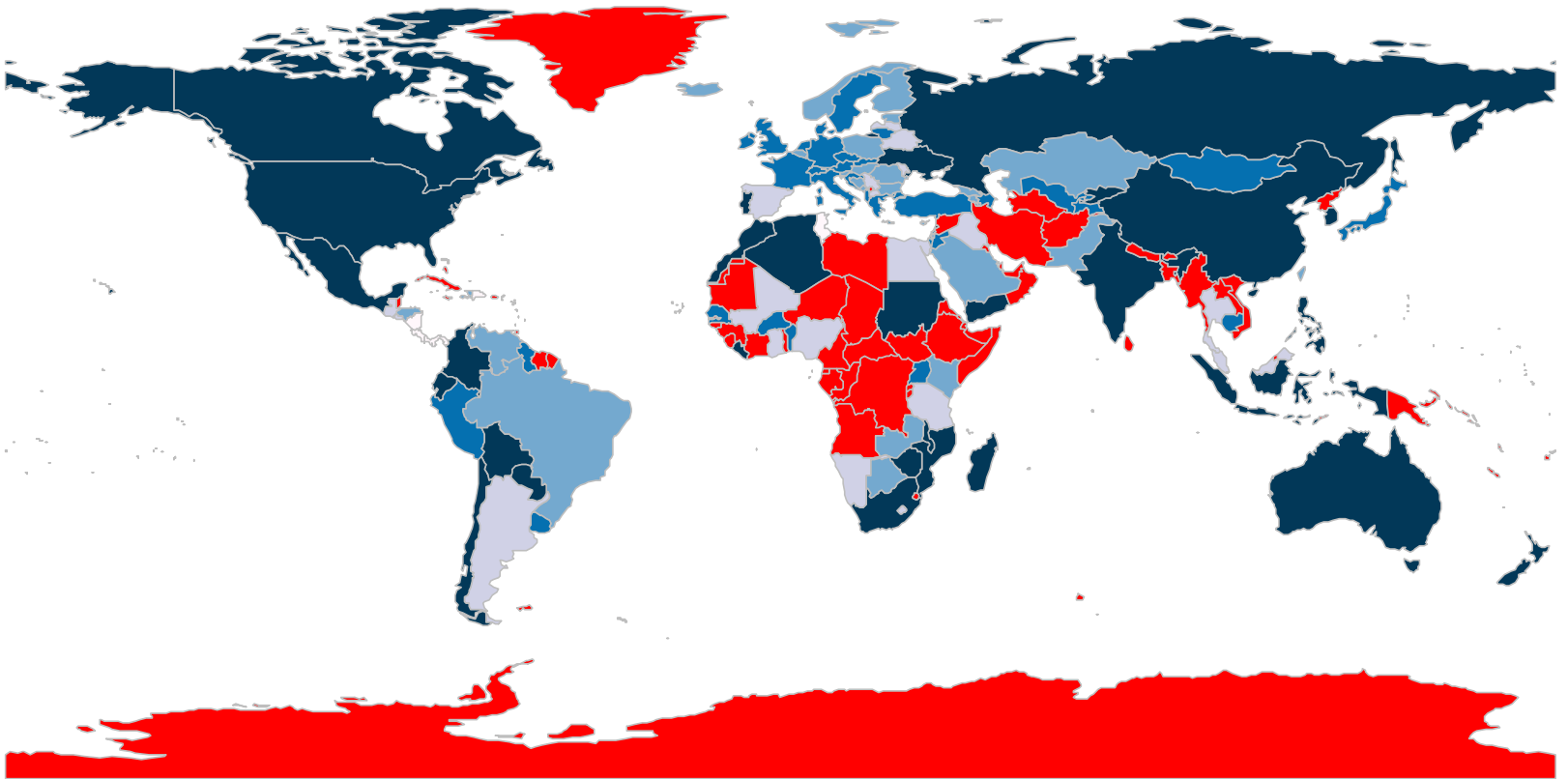
wghts $\neq 1$ (with tolerance) per country (%)



wghts \neq 1 (with tolerance) per year (cor=-0,20)



mean(std) per country



MIN; MAX

MINIMUM (range):

- 0.000 (42 studies)
- 1.900 (Philippines, ISSP 1991)

MAXIMUM (range):

- 0.921 (Lithuania, NBB 2001)
- 90.320 (New Zealand, ISSP 2007)

Weight components

- Poststratification factors:
 - Gender (70%)
 - Age (57%)
 - Country region (42%)
 - Education (36%)
 - Other (42%)
- Design factors:
 - Household+other factors (25%)

What to do?

- $\text{Mean}(\text{weight}) \neq 1 \rightarrow \text{rescale}$
- $\text{Weight} = 0 \rightarrow ?$ (consider reweighting)
- $\text{Weight} < 0 \rightarrow ?$ (consider reweighting)
- $\text{Weight} = 1 \rightarrow \text{really needs weighting?}$
- $\text{Weight} > X (?) \rightarrow \text{trimming (may lead to bias)}$
- $\text{big SD} \rightarrow ?$ (consider reweighting)