Applied Data Analytics

Statistics — Basics & location

Absolute and relative differences

Hans-Martin von Gaudecker and Aapo Stenhammar

Interval scales

- Continuous

- Well-defined differences (cardinal)

- No true zero point

- Example: Degrees Celsius, cardinal utility

Ratio scales

- Continuous

- Well-defined differences (cardinal)

- True zero point

- Examples: Weight, income, wealth, inflation, ...

Absolute diff's

$$\Delta_{\text{abs}} x = x_{\text{new}} - x_{\text{old}}$$

- Works for interval scales and ratio scales

Relative diff's

$$\Delta_{\text{rel}} x = \frac{x_{\text{new}} - x_{\text{old}}}{x_{\text{old}}}$$

- Works for ratio scales only

- Hard to interpret if x takes on non-positive values

Which to pick depends on what is useful in a particular context!

Taking logarithms

$$\Delta_{\mathrm{abs}} \log(x) = \log(x_{\mathrm{new}}) - \log(x_{\mathrm{old}}) \approx \Delta_{\mathrm{rel}} x$$

- Possible for ratio scales with strictly positive values

- Strategy: Transform the data, then work with absolute differences

- Useful for plotting when you are interested in relative differences

- Not very intuitive for many people (including me)!

  So if possible, use original labels.
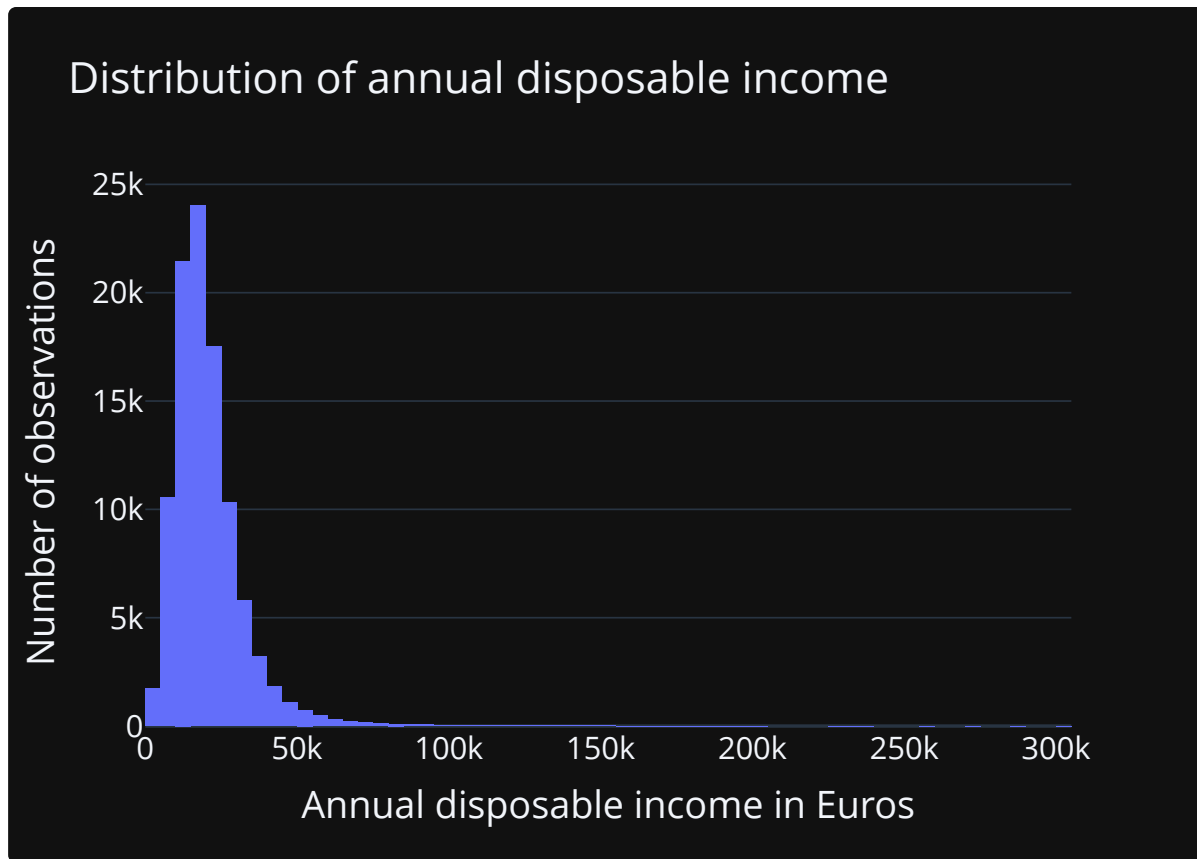
Distribution of log annual disposable income