Applied Data Analytics

Statistics — Dispersion & concentration

Quantile-based concentration measures

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Concentration measures

- Dispersion
  - Q: How far apart are values, typically?
  - A only depends on distances between values
- Concentration
  - Q: How is the total amount distributed over values?
  - A depends on distances and total amount

Example

	A	B
0	0.17	0.04
1	0.17	0.33
2	0.67	0.62
mean	0.33	0.33
var	0.08	0.08

Example

Nach Angaben des BMF zahlten im Jahr 2022 die – gemessen an der Höhe der Einkünfte – oberen 10 Prozent der Einkommensteuerpflichtigen 55,8 Prozent des gesamten Lohn- und Einkommensteueraufkommens. Bei den untersten 50 Prozent der Einkommensteuerpflichtigen lag der entsprechende Anteil bei lediglich 6,1 Prozent

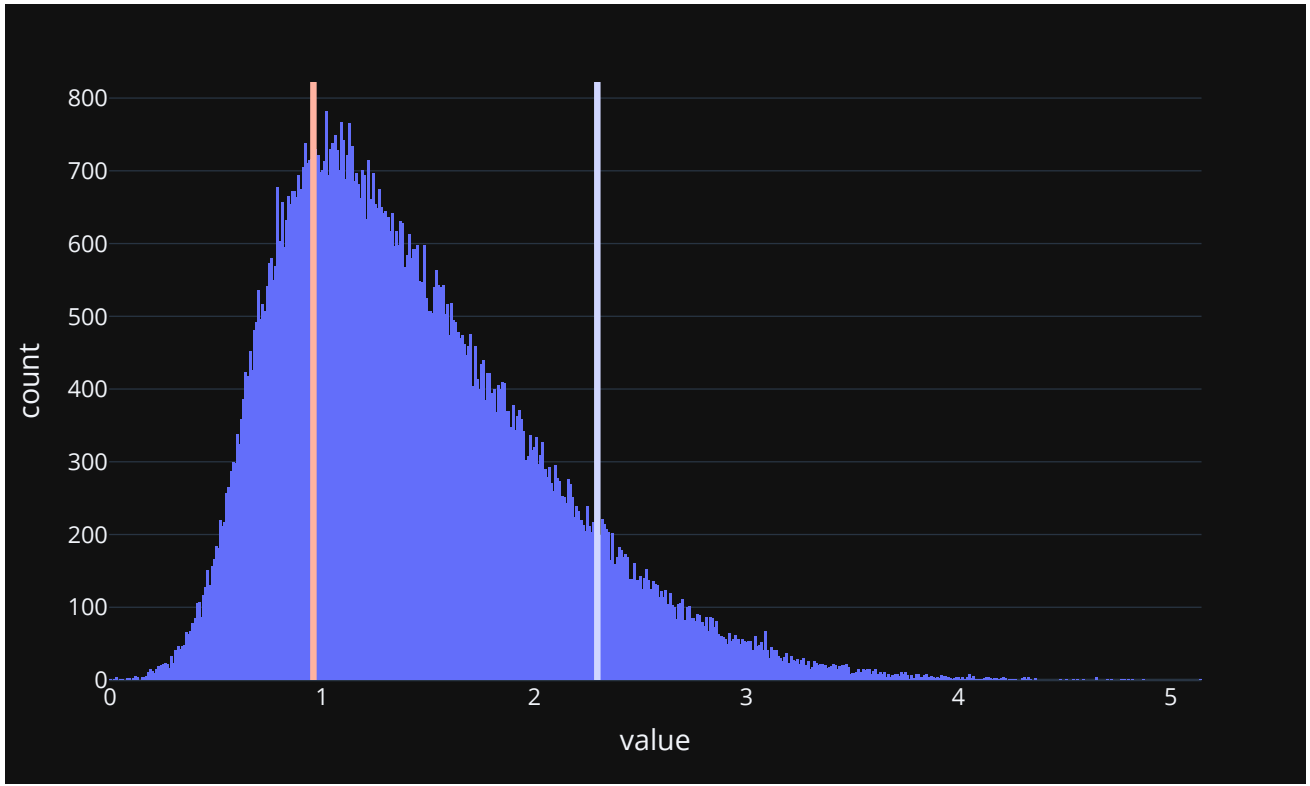
Beim obersten Prozent lag der Anteil am Einkommensteueraufkommen bei 22,8 Prozent, bei den untersten 20 Prozent waren es 0,3 Prozent.

Example

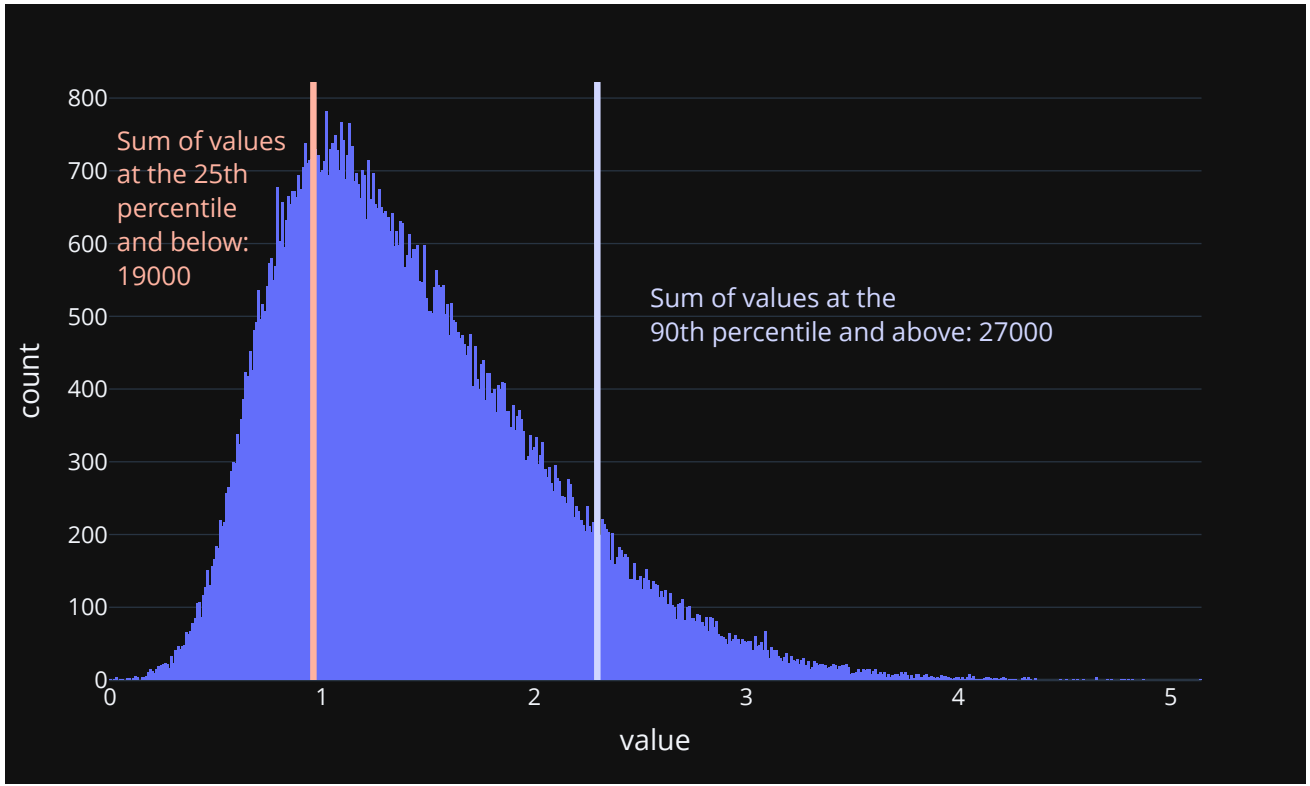
According to the Federal Ministry of Finance (BMF), in 2022, the top 10 percent of income taxpayers contributed 55.8 percent of the total wage and income tax revenue, measured by the amount of income. In contrast, the bottom 50 percent of income taxpayers accounted for only 6.1 percent of this revenue.

The top 1 percent contributed 22.8 percent of the income tax revenue, while the bottom 20 percent contributed just 0.3 percent.

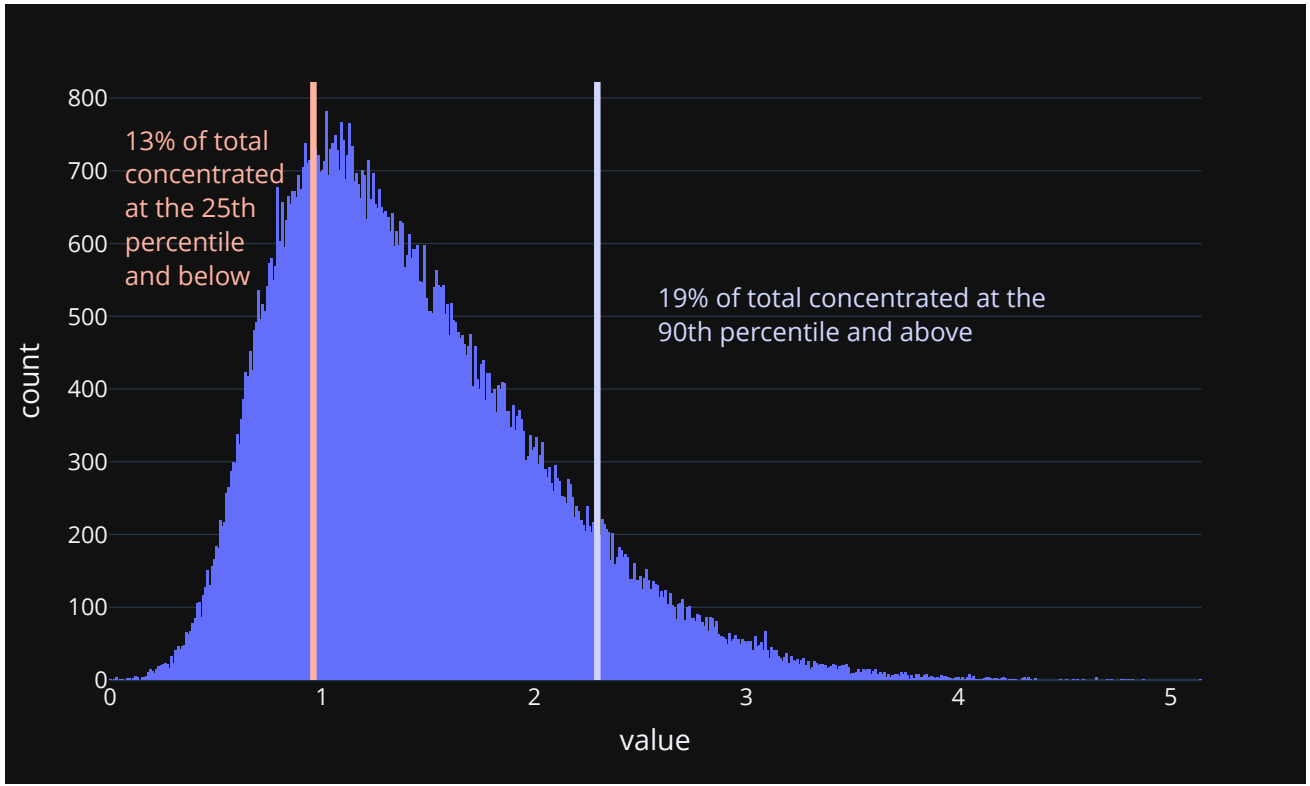
Histogram



Histogram with sums of values



Histogram with fractions of values



Palma ratio

$$\text{Palma ratio} = \frac{\text{top } 10\% \text{ of income}}{\text{bottom } 40\% \text{ of income}}$$

All concentration measures are relative

	Country A	Country B
0	1	2
1	2	5
2	3	10