

Pareto's Law

The high-end of income distribution in a society follows a power law,

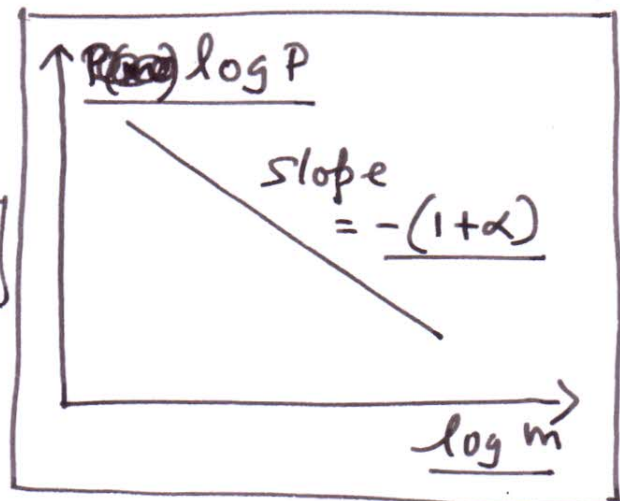
$$P(m) \sim m^{-(1+\alpha)} \text{ for large } m.$$

$P(m) \rightarrow$ (Normalised) Number of people with an income m or higher.

$\alpha \rightarrow$ Pareto exponent
($\alpha > 0$).

$$\log P(m) \sim -(1+\alpha) \log m$$

A straight line in the log-log plot.



Pareto studied income data of England, Prussia, Saxony, Italy and Dem. Also on cities like Paris, Florence, Augsburg.

The value of α was ~~always~~ around 1.5.

Later validated in countries like U.S.A., India, Japan and Germany. (Even in ancient Egypt).

Special Case: $\alpha = 1 \rightarrow$ Zipf's law. Seen in city size distributions and word frequency of words in languages. (George Kingsley Zipf).