

Underreported/Overreported Income

In the economic literature, the under reported income is commonly expressed by the multiplicative relationship $Z = XY$, where Y is a multiplicative error and X denotes the true income. It is known that if Y has the power function distribution then X is Pareto distributed if and only if Z is also, see Krishnaji (1970).

The over reported income is commonly expressed by the multiplicative relationship $Z = X/Y$, where X and Y are independent random variables with X denoting the true income and Y a multiplicative error taking values in the interval $(0, 1)$. It is known that if Y has the power function distribution then X is Pareto distributed if and only if Z is also, see Krishnaji (1970).

A Pareto random variable has cdf specified by $F(x) = 1 - (K/x)^a$ for $x > K$. A power function random variable has cdf specified by $F(x) = x^c$ for $0 < x < 1$.

References

- [1] Krishnaji, N. (1970). Characterization of the Pareto distribution through a model of under-reported incomes. *Econometrica*, **38**, 251-255.