Comments and Errata for

Statistical Size Distributions in Economics and Actuarial Sciences

by Christian Kleiber and Samuel Kotz

October 23, 2014

General. The numbering of the figures is *chapter.figure* throughout the text, but the legends of the figures themselves only contain chapter numbers in Chapters 2 and 7, not in Chapters 3–6.

p. ix.   should state "October 2002".

p. 14, eq. (1.15). φ should be θ.

p. 112. (4.6) should be $E(X) = \exp(\mu + \sigma^2/2)$.

p. 115. (4.16) should be $L(u) = \Phi[\Phi^{-1}(u) - \sigma]$ (not σ^2!). (thanks to Tobias Schoch)

p. 118, eqns (4.25) and (4.26).   replace $\sum_{i=1}^{n}$ by $\sum_{j=1}^{n}$

p. 121, 2nd equation (no number). should be

$$L = \frac{I_X(\sigma) - I_N(\sigma)}{I_X(\sigma)} = 1 - \frac{\sigma^2}{2n} I_N(\sigma)$$

p. 124, line -7. $(2\pi)^{n/2}$ should be $(2\pi)^{k/2}$

p. 124, line -1. $r^\top \Sigma \mu$ should be $r^\top \Sigma r$

p. 125, line 2. σ_{ii}^2 should be σ_{ii}

p. 149. Limiting cases of the generalized gamma distribution. (thanks to Davide Provenzano)

This is plagued by several typos (it would also have deserved more detail . . .).

First, the lognormal limit arises upon setting $p = (a\mu + 1)/\beta^a$, and $\beta^a = a^2\sigma^2$, and then letting $a \to 0$. This implies $pa^2 \to 1/\sigma^2$ as $a \to 0$ (here p was missing).

Second, the power function limit arises upon setting $p = r/a$ for $a \to \infty$ (this was also spotted by McDonald, Sorensen and Turley, Rev. Income and Wealth 59 (2013), pp. 360–374, see fn. 1 in their online supplements).

p. 152, line 14.   Inequalities should be $a \geq \frac{1}{2}$ and $a < \frac{1}{2}$, respectively.

p. 172, eq. (5.69), and p. 285, eq. (C.12). The kth moment of the inverse gamma is (thanks to Víctor Miranda)

$$E(X^k) \ = \ \beta^k \, \frac{\Gamma(p - k)}{\Gamma(p)}.$$

p. 197, eq. (6.41) should have been (note the first exponent)

$$f(x) \; = \; \frac{a\theta x^{a-1}}{b^a \; B(p,q)} \left[1 + \left(\frac{x}{b}\right)^a\right]^{-\theta p - 1} \left\{1 - \left[1 + \left(\frac{x}{b}\right)^a\right]^{-\theta}\right\}^{q-1}$$

p. 206, line 7. The formula for the Theil index is incorrect. (thanks to Florent Bresson)

There are at least three published versions of this formula, all different:

McDonald, J.B. (1981). Some issues associated with the measurement of income inequality. *Statistical Distributions in Scientific Work*, 6, 161–179.

Schader, M. and Schmid, F. (1988). Zur Messung der Einkommenskonzentration aus gruppierten Daten. *Jahrbücher für Nationalökonomie und Statistik*, 204/5, 437–453.

Schmittlein, D.C. (1983). Some sampling properties of a model for income distribution. *Journal of Business and Economic Statistics*, 1, 147–153.

Only the version of Schader and Schmid (1988) is correct.

Specifically, rearranging gives

$$T(X) = E\left[\frac{X}{E(X)} \log\left(\frac{X}{E(X)}\right)\right] = \frac{E(X \log X)}{E(X)} - \log E(X).$$

Now

$$E(X) = \frac{bB(1 + 1/a, q - 1/a)}{B(1, q)} = \frac{b\Gamma(1 + 1/a)\Gamma(q - 1/a)}{\Gamma(q)}$$

and, specializing from Prudnikov et al. (1986, p. 489, formula 7),

$$E(X \log X) = \frac{q}{a} B\left(1 + \frac{1}{a}, q - \frac{1}{a}\right)\left[\psi\left(1 + \frac{1}{a}\right) - \psi\left(q - \frac{1}{a}\right)\right].$$

This yields, noting that b is irrelevant and that $B(1, q) = 1/q$,

$$T(X) = \frac{1}{a}\left[\psi\left(1 + \frac{1}{a}\right) - \psi\left(q - \frac{1}{a}\right)\right] - \log q - \log B\left(1 + \frac{1}{a}, q - \frac{1}{a}\right).$$

p. 220, line 11. This should have been $x_0 = b\{[(1 - 1/\alpha)^{1/p} - 1]\}^{-1/a}$. (thanks to Pablo Mitnik)

p. 222, lines 3-4. replace "does not do appreciably improve" by "does not appreciably improve".

p. 265, line 9. reference should be
Lorenz, Max Otto. In *National Encyclopedia of American Biography*, Vol. 47 (1965), Clifton, NJ. J.T. White, p. 490.

p. 280, line 6. Chotikapanich (1994) should be Chotikapanich (1993).

p. 310, line -5. hyphenation (German) should be *National-ökonomie*.

p. 311, line 14. replace "le cruve dil" by "le curve di".

p. 312, line 27. "distribution" (singular).

p. 313, line 21. "on" should be "On".