

Analysing Open Birth Interval Distributions*

G. FEENEY† AND J. A. ROSS‡

* Comments from Tim Keller and Robert D. Retherford are gratefully acknowledged.

† East–West Population Institute, The East–West Center, Honolulu, Hawaii 96848, USA.

‡ J. A. Ross, Center for Population and Family Health, Faculty of Medicine, Columbia University, USA, and formerly Advisor to the National Family Planning Coordinating Board (BKKBN), Government of Indonesia.

(excerpt)

CONCLUSION

The relationship between open and closed birth interval distributions is essentially the relation between age distributions and mortality schedules. The key to developing this analogy is to regard women with a given number of children ever born as a population entered by the birth of one child and left either by death or by the birth of the next child. Exploiting this formal analogy, we give an explicit formula for the relationship between open and closed birth interval distributions.

The existence of two decrements to the population of women of a given parity necessitates the introduction of multiple decrement theory, and this leads to the notions of birth interval and parity progression statistics ‘in the presence of’ and ‘in the absence of’ mortality. Though obvious, this idea seems not to have been developed in the literature. A probable explanation is that most authors have used retrospective fertility survey data, in which mortality is eliminated as a decrement by the selection of surviving women. Birth interval and parity progression statistics may be calculated from vital statistics as well, however, and the multiple decrement concepts developed here are essential to comparing fertility survey data, which yield ‘in the absence of mortality’ fertility measures, with vital registration data, which yield ‘in the presence of mortality’ measures. They are evidently necessary also to use fertility survey data for projections based on birth interval and parity progression concepts.

Perhaps the most important consequence of the relationships established between open and closed birth interval distributions is the insight they provide into the value of open birth interval distributions as fertility measures. What our analysis shows is that if a population is stationary or stable, open birth interval distributions may be used to estimate closed birth interval distributions and are thus potentially useful measures of fertility. Under any other circumstances, however, it seems unlikely that they can provide useful measures of fertility.⁵ Estimating fertility from an open birth interval distribution is analogous to estimating mortality from an age distribution, and this is impractical unless the age distribution has a fairly simple structure.

⁵ This conclusion is evidently consistent with the work of K. Srinivasan, whose models appear to assume stationarity: ‘The “open birth interval” as an index of fertility’, *Journal of Family Welfare* (India), **8**, (1966), pp. 40–44; ‘A probability model applicable to the study of inter-live birth intervals and random segments of the same’, *Population Studies*, **21**, (1967), pp. 63–70; ‘A set of analytical models for the study of open birth intervals’, *Demography*, **5**, (1968), pp. 34–44; ‘Birth interval analysis in fertility surveys’, WFS Scientific Report, no. 7 (London: World Fertility Survey). See also K. Venkatacharya, ‘Some problems in the use of open birth intervals as indicators of fertility change’, *Population Studies*, **26**, (1972), pp. 495–505. On the indirectly related issue of ‘current status’ data, see M. Bracher and Gigi Santow, ‘Some methodological considerations in the analysis of current Status data’, *Population Studies* **35**, (1981), pp. 425–437.