A Model Proposed to Estimate the Various Effects from Data on Current Fertility

A model for estimating the effects of adaptation, generation and disruption from data on current or period fertility of rural to urban migrants by duration of stay is given below.

The basic equation is:

\[ f(d) = f_1 + s(d) + h(d) (f_1 - f_2), \]

where,

- \( f(d) \) = Fertility of migrants at duration of stay of 'd' years,
- \( f_1 \) = Expected fertility of rural population (controlled for socio-economic and demographic factors, at the level of migrants),
- \( f_2 \) = Expected fertility of urban population (controlled for socio-economic and demographic factors, at the level of migrants),
- \( d \) = Duration of stay at the urban place,
- \( s(d) \) = Disruption effect at duration 'd',
- \( h(d) \) = Adaptation effect at duration 'd'.

The disruption effect \( s(d) \) would be negative. The adaptation effect \( h(d) \) is also expected to be negative in case of rural (high fertility regime) to urban (low fertility regime) migration.
Thus, \( f(d) - f_1 = (f_1 - f_2) h(d) + s(d) \), which is the total of adaptation and disruption effects.

The generation effect is complementary. Hence,

\[ f(d) - f_2 = (f_1 - f_2) [1 + h(d)] + s(d), \]

gives the sum of generation and disruption effects.

One could model the functions \( h(d) \) and \( s(d) \). For example, if the adaptation effect is multiplicative so that \( h(d) = a \cdot d \), where \( a \) is a coefficient for adaptation, the equations become quite simple. However, as duration rises, the \( h(d) \) function may not remain linear, and perhaps asymptote to a certain value (see Figure 8.a.2). The disruption effect would be felt only at early durations (see Figure 8.a.1). If both \( h(d) \) and \( s(d) \) could be parameterised and the parameters could be estimated from data on current or period fertility, it would be possible to estimate the adaptation, disruption, and generation effects from data on current/period fertility.
Figure 8.a. A schematic diagram showing disruption, adaptation, and generation effects on current fertility by duration of stay.

Disruption (-)  
Duration of stay

Adaptation (-)  
Duration of stay

Generation  
Duration of stay

Note: The disruption and adaptation effects are expected to be negative, but in the graph (Figure 8.a.3) the absolute values are shown.
Figure 8.b. A schematic diagram showing relative contributions of adaptation, generation, and disruption effects on Cumulative fertility.