

PROJE032

Version 5.20

Description

This workbook calculates consistent projected life expectancies at birth ($e(0)$) for each sex for up to 32 subnational areas given initial levels of subnational $e(0)$ and national $e(0)$ trends. The projection calculation uses the relative complements of $e(0)$ s in relation to user-provided limit $e(0)$ s.¹

Data Required

- (1) Base year of the projection
- (2) Limit (upper asymptote) $e(0)$ s for each sex
- (3) National-level base year estimate and estimates or projections of $e(0)$ by sex for 25 years following base year, from $e(0)$ extrapolations
- (4) Subnational area base year estimates of $e(0)$ for each sex

Assumptions

For each sex, the $e(0)$ trajectory in relation to the $e(0)$ target level for all subnational areas follows that of the national level. For each projected year, the relative change in the sex-specific complements of the $e(0)$ s for each subarea are the same as for the country.

Procedures

The projection calculation is in two steps:

- (1) A ratio is formed of the complements of the national $e(0)$ for base year t and future year $t+n$, representing the extent to which the national $e(0)$ approaches the limit over the t to $t+n$ period:

$$(K - \text{National } e(0)_{t+n}) / (K - \text{National } e(0)_t)$$

where:

t = base year

$t+n$ = future year

K = limit $e(0)$

$K - e(0)$ = complement of $e(0)$

¹ The relative complement of an estimated $e(0)$ relative to a limit $e(0)$ is the difference between the two $e(0)$ s, or $K - e(0)$ at some time t , where K is that limit $e(0)$. For a discussion of mortality projection as part of the larger process of population projection, see Arriaga (1994).

- (2) This ratio is multiplied by the complement of the subnational $e(0)$ for year t . The product is an estimate of the reduction in the complement of the subnational $e(0)$ from t to $t+n$ and represents the extent to which the subnational area $e(0)$ approaches the limit over the t to $t+n$ period.
- (3) This complement is then subtracted from K to give an estimated $e(0)$ for the subnational area for year $t+n$:

$$K - \left\{ (K - \text{Subnational area } e(0)_t) * \left[\frac{(K - \text{National } e(0)_{t+n})}{(K - \text{National } e(0)_t)} \right] \right\}$$

Advantages

The workbook provides a means of establishing consistency between national and subnational area projected $e(0)$ trends and consistency across subnational area projected $e(0)$ trends.

Limitations

The PROJE032 procedure implicitly assumes that the national-level $e(0)$ estimates and projections are more reliable than those that could be generated using subnational-area estimates alone. This may not be the case, especially for later projection years, if some subnational areas have aberrant growth patterns that will likely influence demographic change at the national level.

References

Arriaga, Eduardo E. 1994. *Population Analysis with Microcomputers*. With Peter D. Johnson and Ellen Jamison. Washington, D.C.: U.S. Bureau of the Census, U.S. Agency for International Development, and United Nations Population Fund. Volume 1, Chapter VIII.

Note

For access to all Subnational Projections Toolkit workbooks and documentation, go to:
<http://www.census.gov/population/international/software/sptoolkit/>