Teaching projections and challenges regarding the theory and practice

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The idea that permeates this presentation is that while several methods for projecting population and its components are available, in practice the projections require analysis of the results under the light of knowledge of the determinants of demographic phenomena and demand subjective decisions / adjustments. In my opinion, this is the hardest part in teaching projection.

“Although the theoretical models available to the forecaster improve over time this does not lead to substantially more accurate forecast. (…) However, to effectively utilize the improved theoretical model, one must be able to accurately identify and forecast the determinants of change, and that has proved challenging. (Alho, Statistical Demography and Forecasting ).”
Goals:

- In this context I wish to discuss
  - Estimates and projections of mortality and fertility
- Uncertainties in projections
- Errors in the population base
- Effect of errors in the estimates and projections of the components in the projection of population in time
- Courses offered by CEDEPLAR
Estimates fertility and mortality

- Problem: lack of reliable data and discrepancy between the correction methods
BR e Ufs (2001/2009): TFT estimadas com dados das PNADs (sem correção)
What the previous data indicate is that the TFT (calculated here directly) unexpectedly fluctuate from year to year, this can be by error from data, reference period, sample size, etc..

What is the procedure for setting them?

The recipe would be to apply the method of Brass? The traditional P2/F2?
BR e Ufs (2001/2009):
P2/F2 - dados das PNADs
Estimates fertility

Obviously, due to the same reasons stated above, the oscillations in the ratios P2/F2 are evidence that the "recipe" can not apply.

Apply the "recipe" leads to even less plausible results than the results "not correct".
BR e Ufs (2001/2009): TFT estimadas com dados das PNADs (com correção)
TFT* = s/correção
TFT_ = Corrigidas com P2/F2 do ano indicado

2001 2002 2003 2004 2005 2006 2007 2008 2009

TFT* = s/correção
TFT_ = Corrigidas com P2/F2 do ano indicado
Estimates of mortality
### Estimates of mortality

<table>
<thead>
<tr>
<th>Sexo</th>
<th>UF</th>
<th>EEB</th>
<th>Preston</th>
<th>Média(1)</th>
<th>EGB</th>
<th>EGBM</th>
<th>GE</th>
<th>GEC</th>
<th>Média(2)</th>
<th>Média(3)</th>
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<tbody>
<tr>
<td>Mulher</td>
<td>Rondônia</td>
<td>1,466</td>
<td>1,477</td>
<td>1,471</td>
<td>0,853</td>
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<td>1,035</td>
<td>0,943</td>
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<tr>
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<td>1,335</td>
<td>0,736</td>
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<td>0,812</td>
<td>0,910</td>
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<tr>
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<td>0,838</td>
<td>0,917</td>
<td>0,969</td>
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<td>0,978</td>
</tr>
</tbody>
</table>
Projections of fertility

- Literature suggests several ways:

  1. In countries where the transition is under way we analyze:
     • When did the Beginning,
     • What is the rate of decline - it is reasonable in a pace equivalent to the past (using mathematical models?)
     • How will be the structure (time quantum, cohort analysis)

  2. In countries where fertility is already below the replacement level
     • The fertility rate will continue to fall?
     • It will follow the pace of the past?
     • Will return to replacement level?
     • Will Stabilize above or below replacement level?
TFT: Suécia, Inglaterra e vários países sub - desenvolvidos
Projections of fertility

- Looking at the graph we can indicate the beginning of fall and the pace past. Models of extrapolation would be indicated, especially for countries with the transition in progress?
- How will be the structure?
- All these questions can not be answered accurately – uncertainty
- That is, the challenge is to teach how to incorporate formal models and substantive knowledge
Mortality, although greatly vary in level and pattern, as your age pattern varies in a predictable way according to the level of life expectancy, the projection is usually based on extrapolation of the historical trend or model interpolation between boards.
Uncertainty in population projection

- We do not know at what level fertility will reach
- We do not know that new diseases and/or new treatments will emerge
- We do not know the ways that migration will follow

Must be taught how to take into account the uncertainties - scenarios, probabilistic projections?
Brasil (2010) População por sexo e idade (Valores absolutos) segundo:
- Censo de 2010
- Projeções do IBGE revisadas em 2008.
Errors in the projections
Errors in the projections

- Most projection errors occur in the population younger and older.

- The error in the population base contributes greatly to the error in the first year of the projection.

- Error in the estimation of components grows with time.

- Main cause of error in the components is the initial estimate, this can be improved with better data and methodologies for components estimation and projection.
The courses offered by CEDEPLAR

- Required - Application of demographic analysis
  
  Discussion of sources of error in projection
  - Adjust data to Projections
  - Adjust the available estimates of fertility, and methodologies for projection.
  - Ditto for mortality.
  - Ditto for Migration.
  - Method Demographic Components
The courses offered by CEDEPLAR

2 - Options
a) projection multirreginal
b) Projection of small areas
c) Projections Advanced