

IMPROVING THE INFORMATION ON THE MORTALITY SITUATION IN HONG KONG AND MEXICO

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Magali Barbieri and Dana Glei
with assistance from Mia Zhong and Andreas Barajas-Paz
Human Mortality Database
University of California, Berkeley

Overall goal

To improve the mortality information in Hong Kong and in Mexico building from the Human Mortality Database approach

Specific goals

1. Construct life table series for two countries used as case studies, namely Hong Kong and Mexico
2. Develop a set of standard data quality checks and adjustment methods
3. Assess the reliability of the resulting life table series for monitoring actuarial risks

Identification of In-country Experts

- Hong Kong Collaborators:
 - Jennifer Wong, Census & Statistics Department (CSD), Hong Kong
 - Paul S.F. Yip, University of Hong Kong
 - Karen Cheung, University of Hong Kong
- Mexico Collaborators:
 - Andreas Barajas Paz, Heriot Watt University, UK
 - Piedad Urdinola, Universidad Nacional de Colombia-Bogotá
 - Virgilio Partida, Facultad Latinoamericana de Ciencias Sociales (FLASCO)
 - Victor Manuel Garcia Guerrero, Colegio de México

Collection of Raw Data, Hong Kong

Data Type	Age Format	Years
Births	N/A	1948-2016
Deaths	5-year 1-year to 99+ 1-year to 100+	1986 1987-2000 2001-2016
Official population estimates	1-year to 85+ 1-year to 90+	1986-2000 2001-16
Census counts (used only for comparison)	0,1,2...85-89,90-94,95-99,100+ 1-year to 100+ 1-year to 75+ 1-year to 85+ 1-year to 100+ 1-year to 85+	1986 1991 1996 2001 2006 2011, 2016

* All data are given by sex and calendar year. Birth counts for 1973-2016 are also given by month.

Collection of Raw Data, Mexico

Data Type	Age Format	Years
Births	N/A	1985-2016
Deaths	1-year to 120	1990-2016
Official population estimates	1-year to 89+	1990
	1-year to 90+	1991
	...	...
	1-year to 109+	2010-2017
Census counts (used only for comparison)	5-year to 95+	1950
	1-year to 95+	1960
	1-year to 85+	1970
	1-year to 100+	1980, 1990, 1995, 2000, 2005, 2010

* All data are given by sex and calendar year. Birth counts are also given by month.

Data Entry, Preparation, & Formatting

- All of the raw data for Hong Kong and Mexico have been formatted into standard HMD “Input Data” format.
- The Input Data have been checked for internal consistency.

Construction of Life Tables Using HMD Methods Protocol

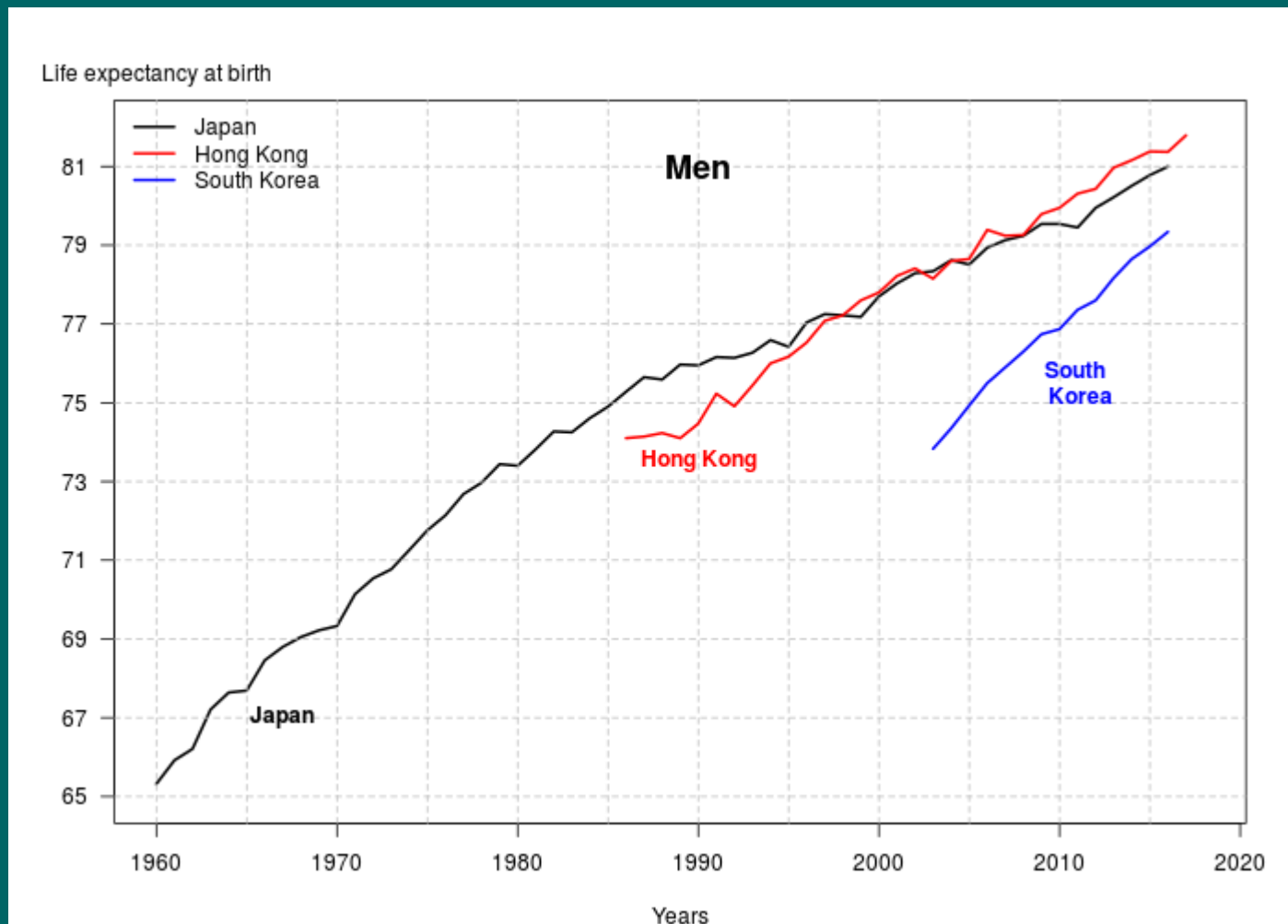
- For both Hong Kong and Mexico, we constructed detailed estimates of deaths and population by Lexis triangle (i.e., by single year of age and birth cohort) from the Input Data.
- Then, we used these estimates to calculate sex- and age-specific death rates.
- Finally, we use the death rates to compute preliminary life tables.

Evaluation of Data Quality Using Fixed Set of Indicators

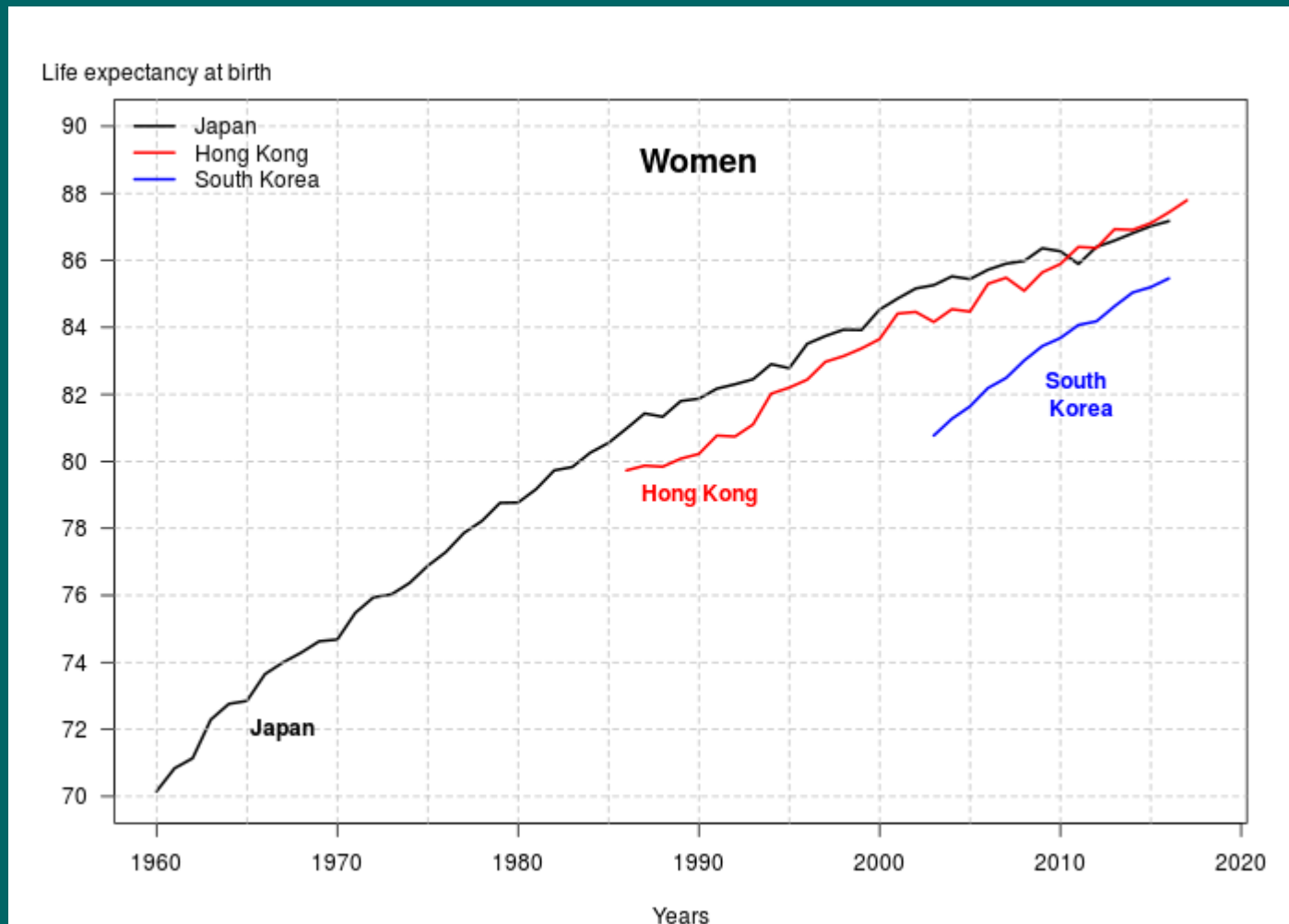
- We have analyzed the resulting preliminary life tables using standard diagnostics used for all HMD countries to evaluate:
 - Internal consistency
 - External consistency
 - Internal plausibility
 - External plausibility

HONG KONG

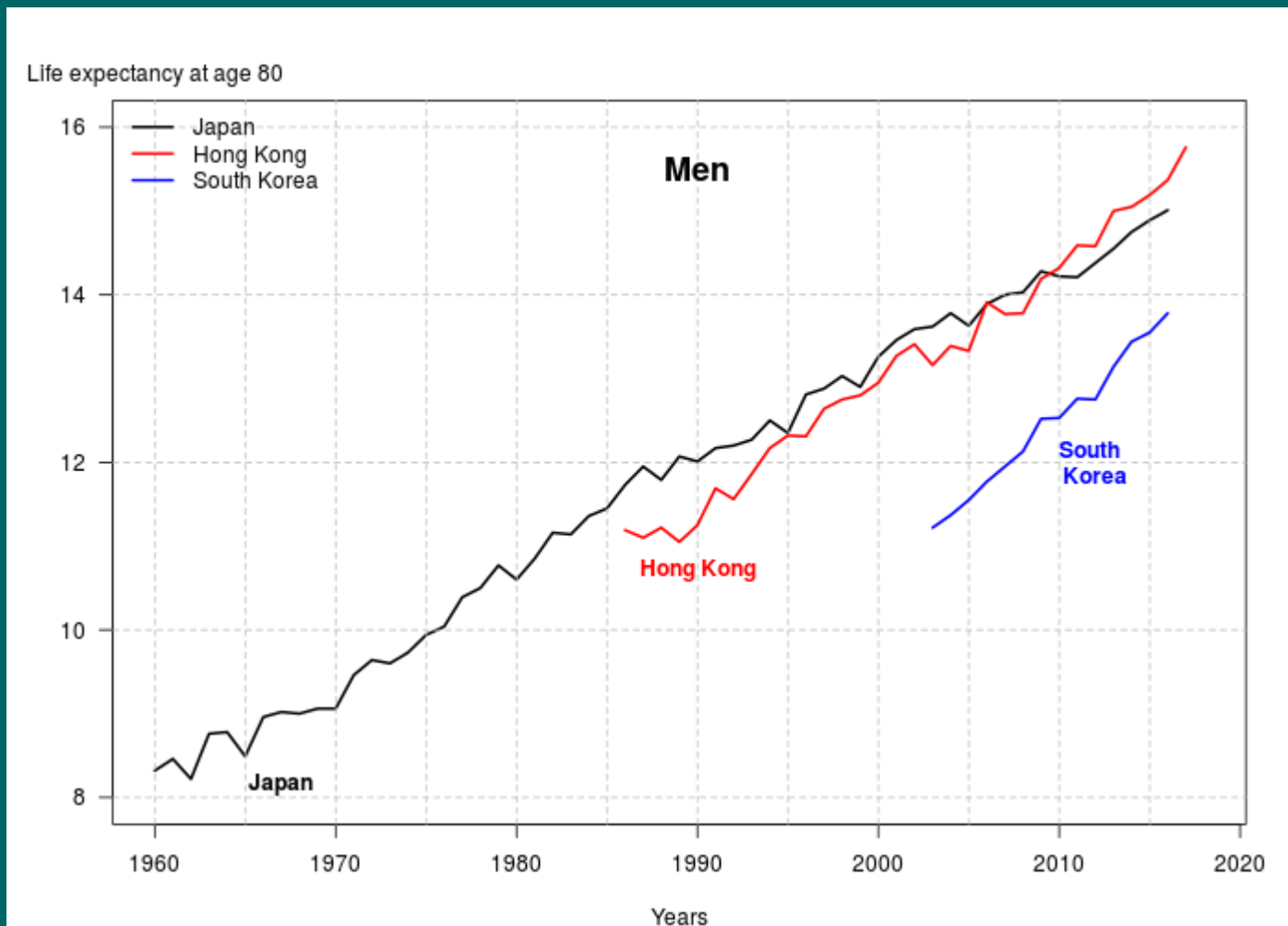
Comparison with other Asian life expectancy leaders



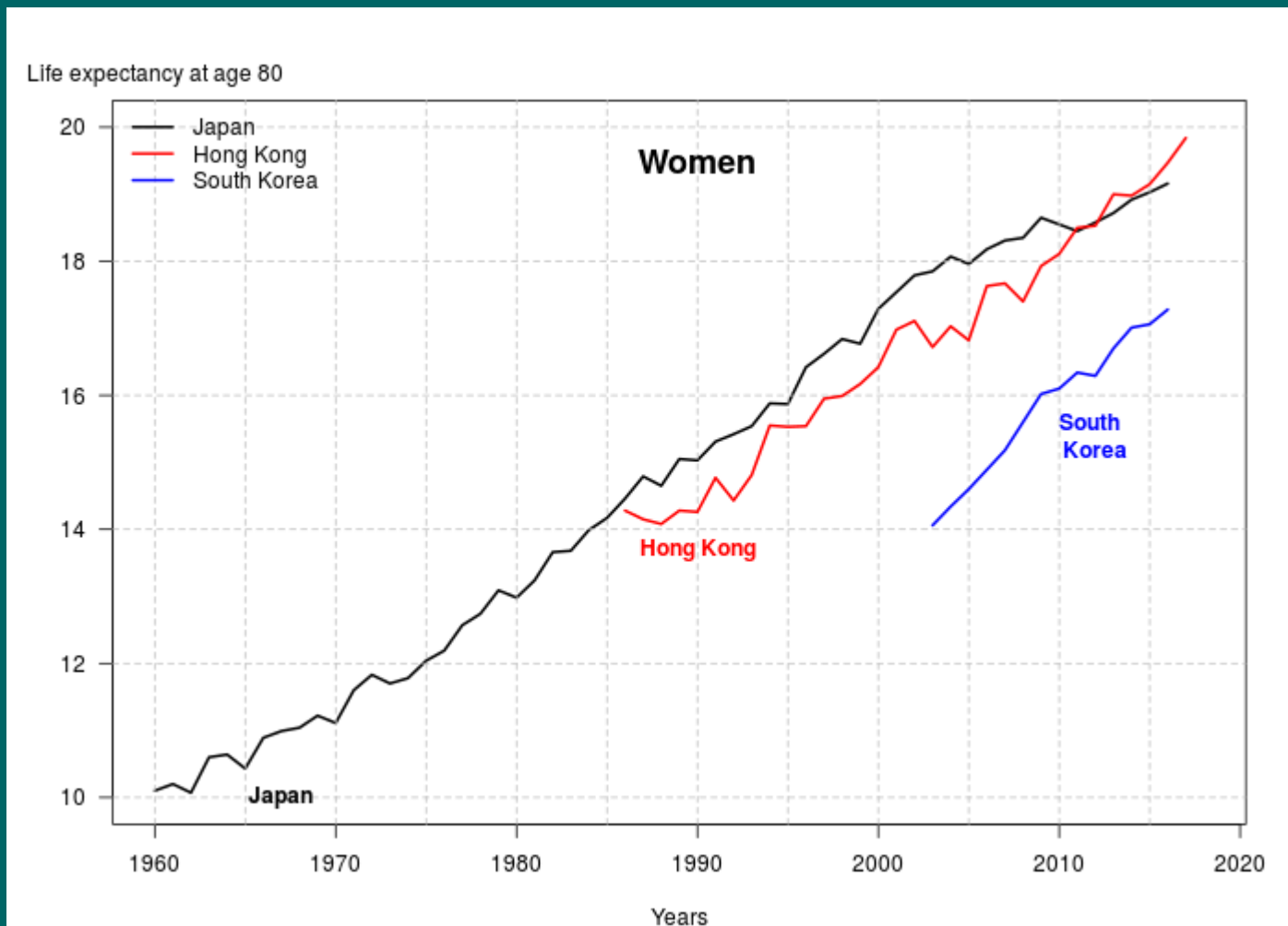
Comparison with other Asian life expectancy leaders



Comparison with other Asian life expectancy leaders



Comparison with other Asian life expectancy leaders



Conclusions

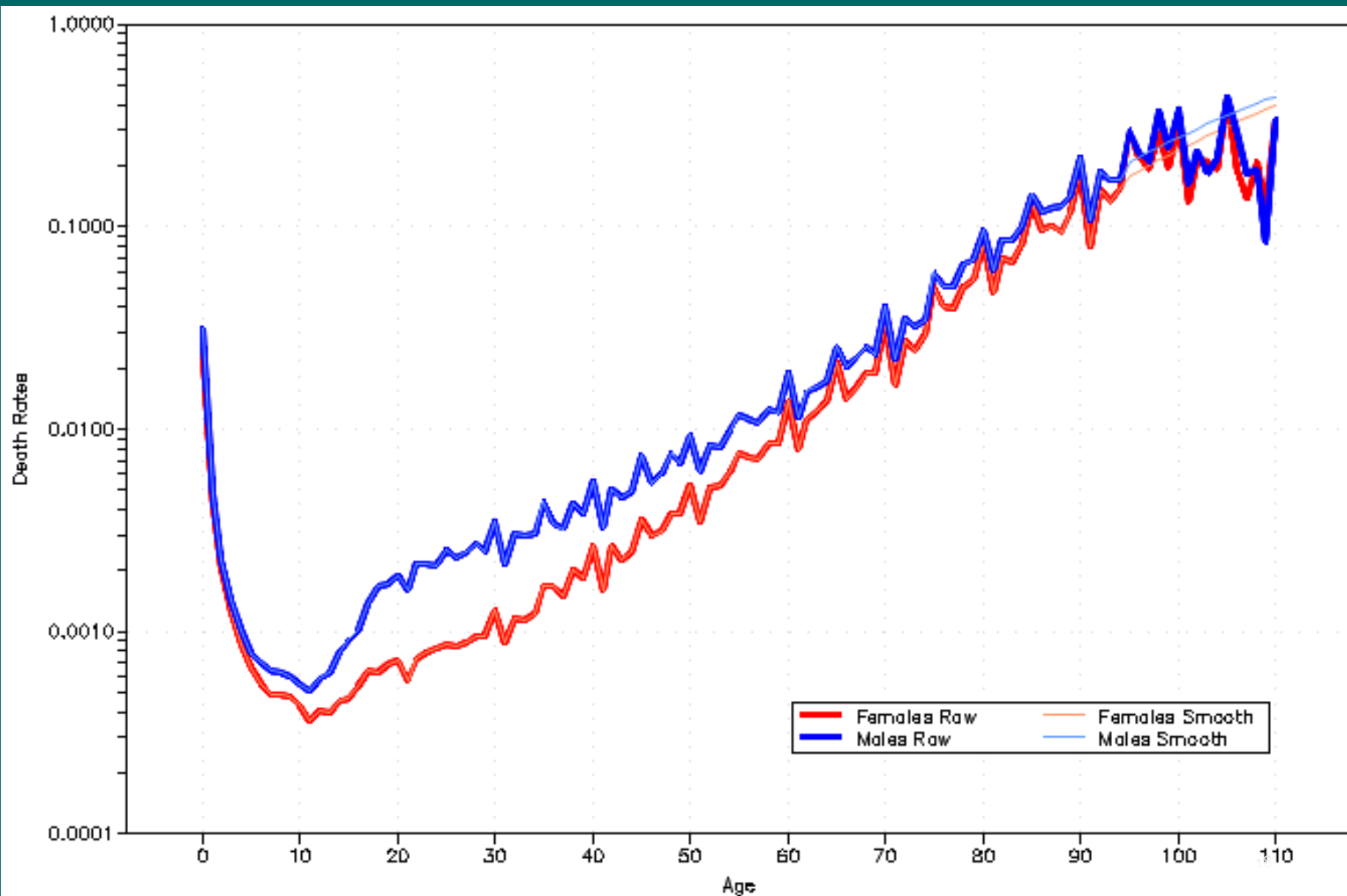
- In general, data quality looks good for this recent period (1986-).
- We suspect that it may be possible to add Hong Kong to the HMD.
- If so, Hong Kong will probably set the record for life expectancy among HMD countries.
 - Not a fair comparison?
 - Hong Kong is not a country, but a city.
 - It might be more appropriate to compare Hong Kong with Tokyo, London, or New York City.

MEXICO

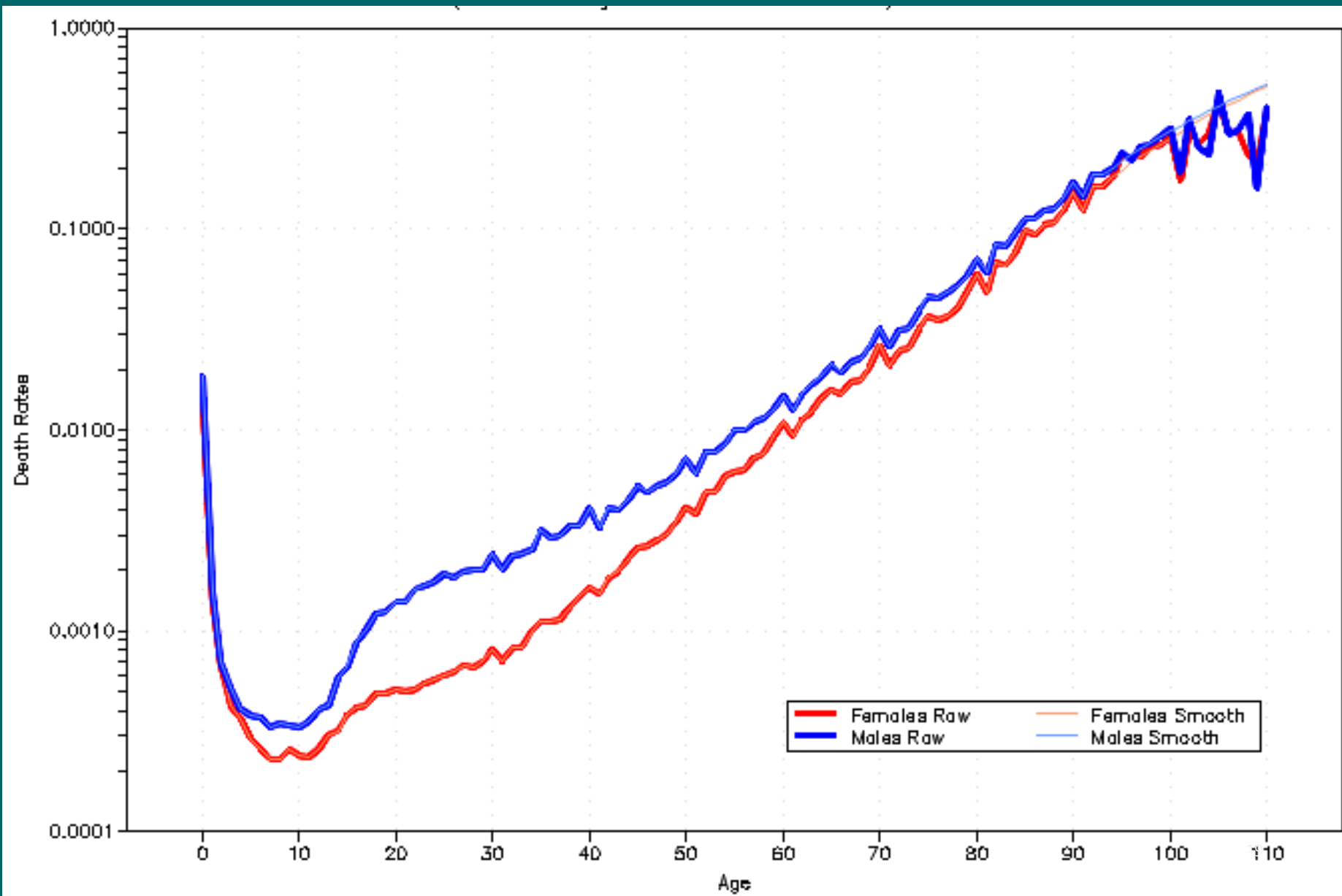
Age Heaping

- Obvious patterns of age heaping in mortality rates prior to 2000.
- Some age heaping persists post-2000 among men aged 30-49.
- If there is age heaping, there may also be more serious forms of age misreporting (i.e., age exaggeration), which is more difficult to diagnose.

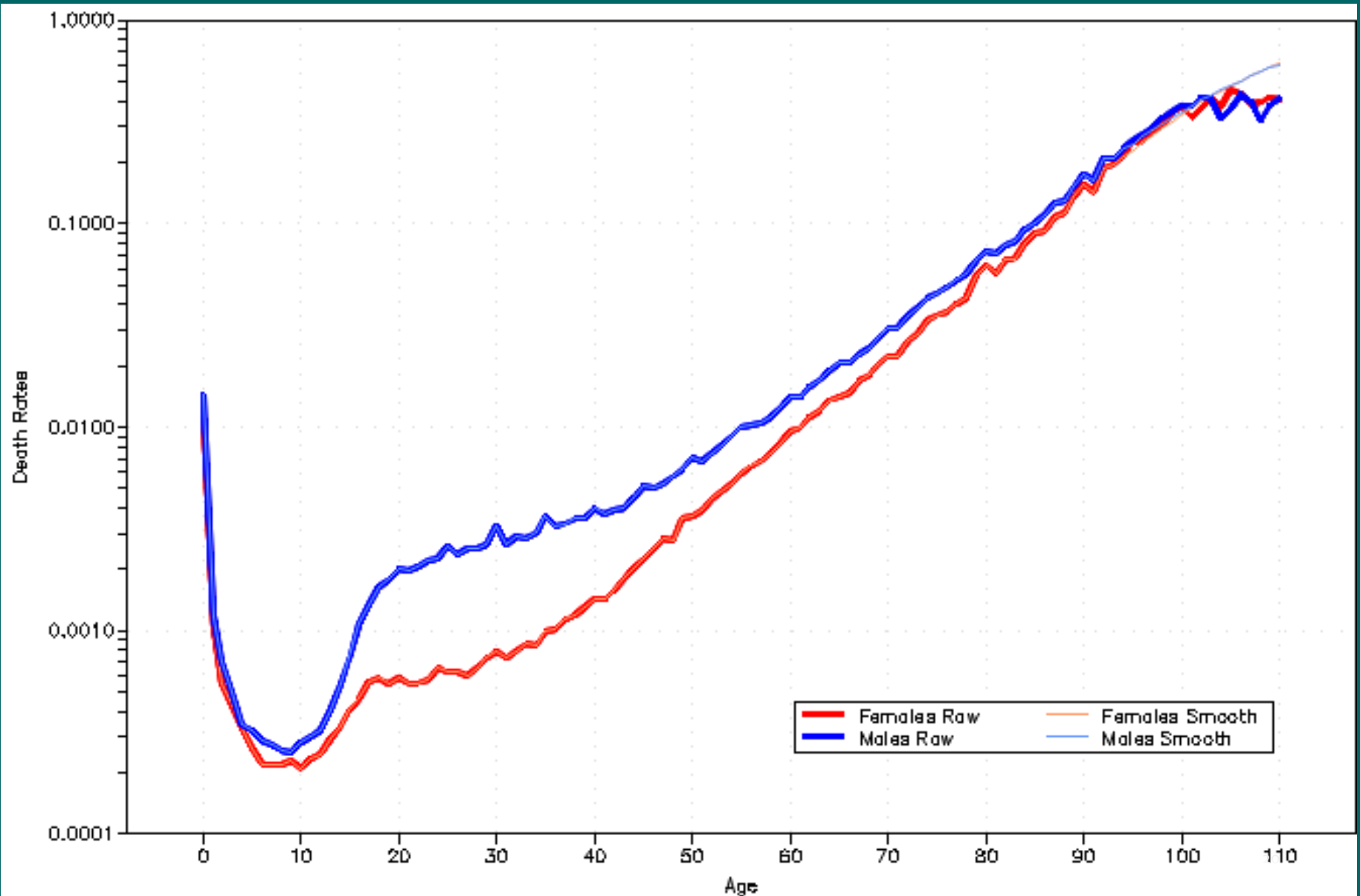
Death Rates by Age, 1990



Death Rates by Age, 2000

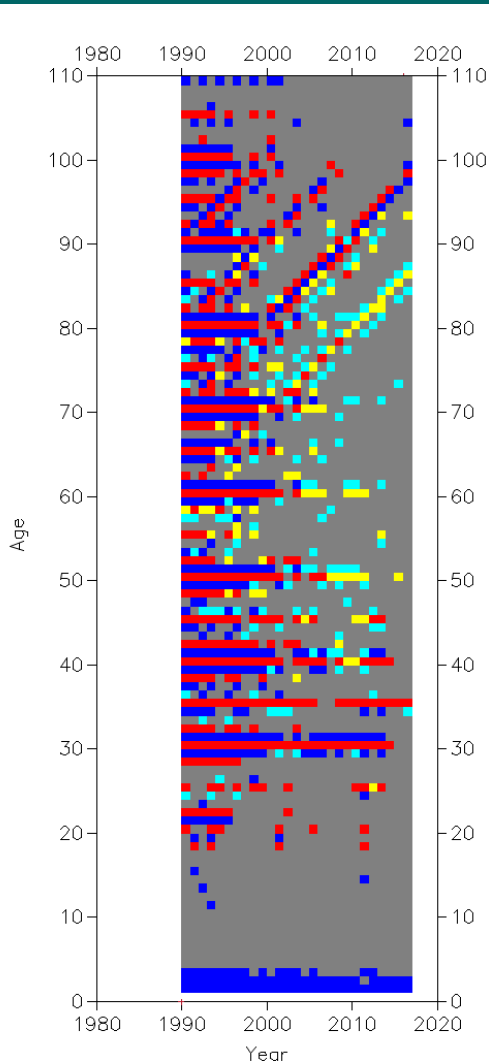


Death Rates by Age, 2010

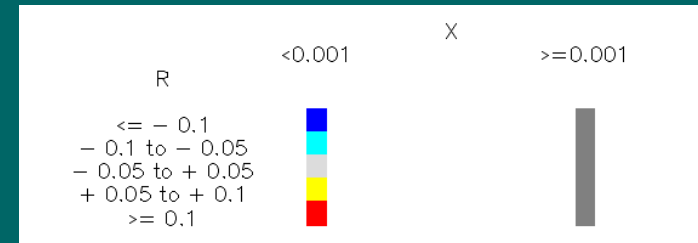
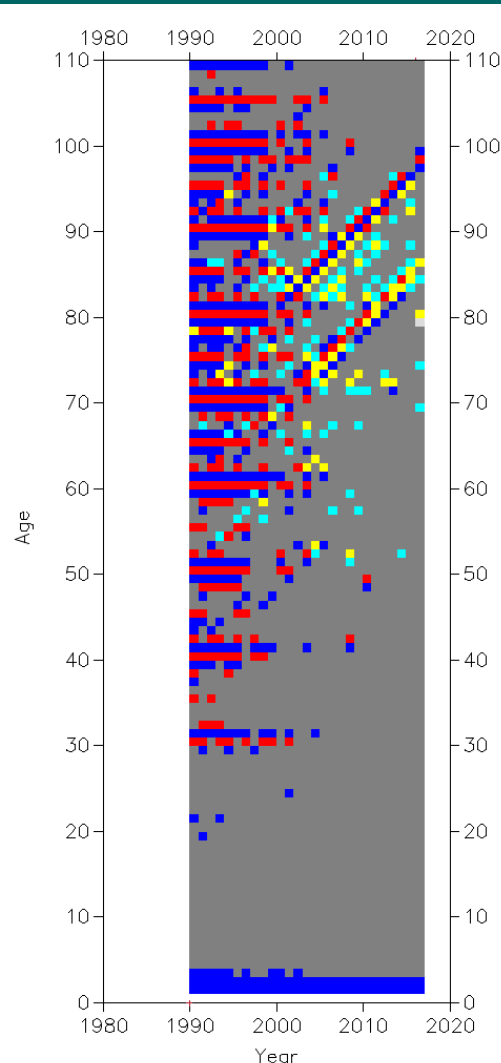


Map of Mortality Deviations

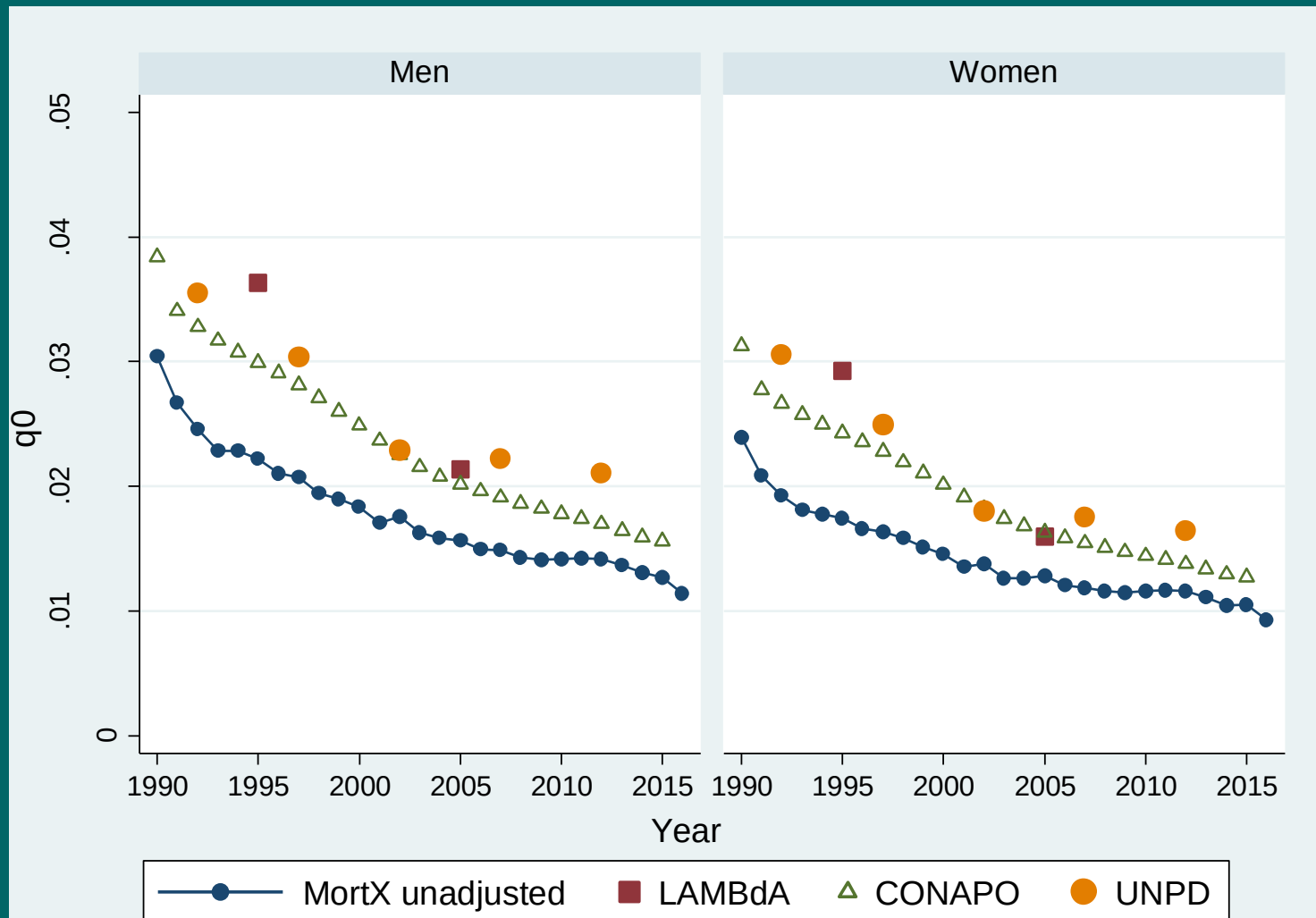
Men



Women



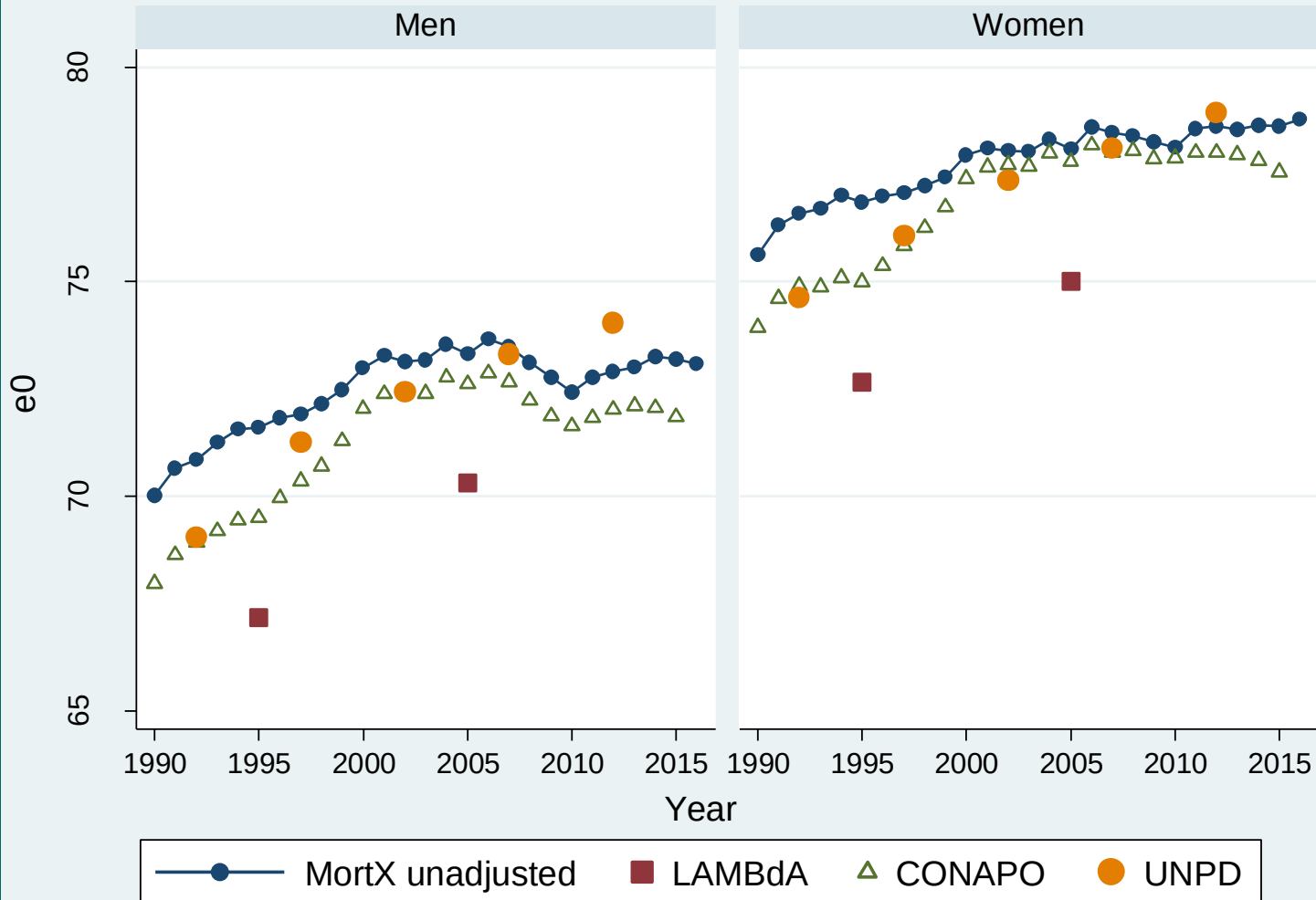
Comparison of q_0 with external estimates



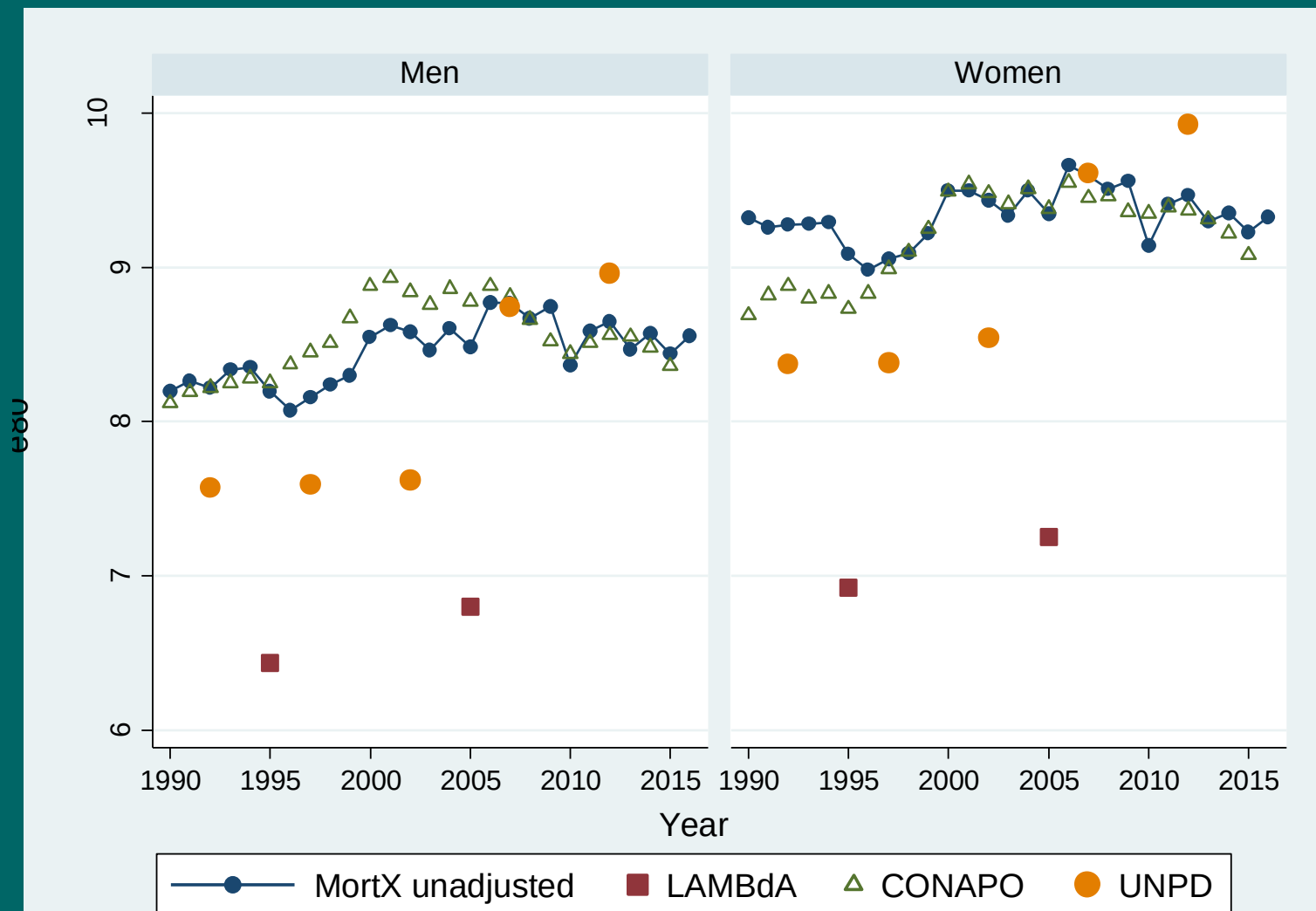
Unadjusted estimates of q_0 too low?

- Our unadjusted estimates of q_0 are much lower than the official estimates (CONAPO).
 - Official estimates have been adjusted.
- Our estimates are also lower than those produced by the UNPD and LAMBdA.
- **Conclusion:** Unadjusted estimates probably under-estimate infant mortality.

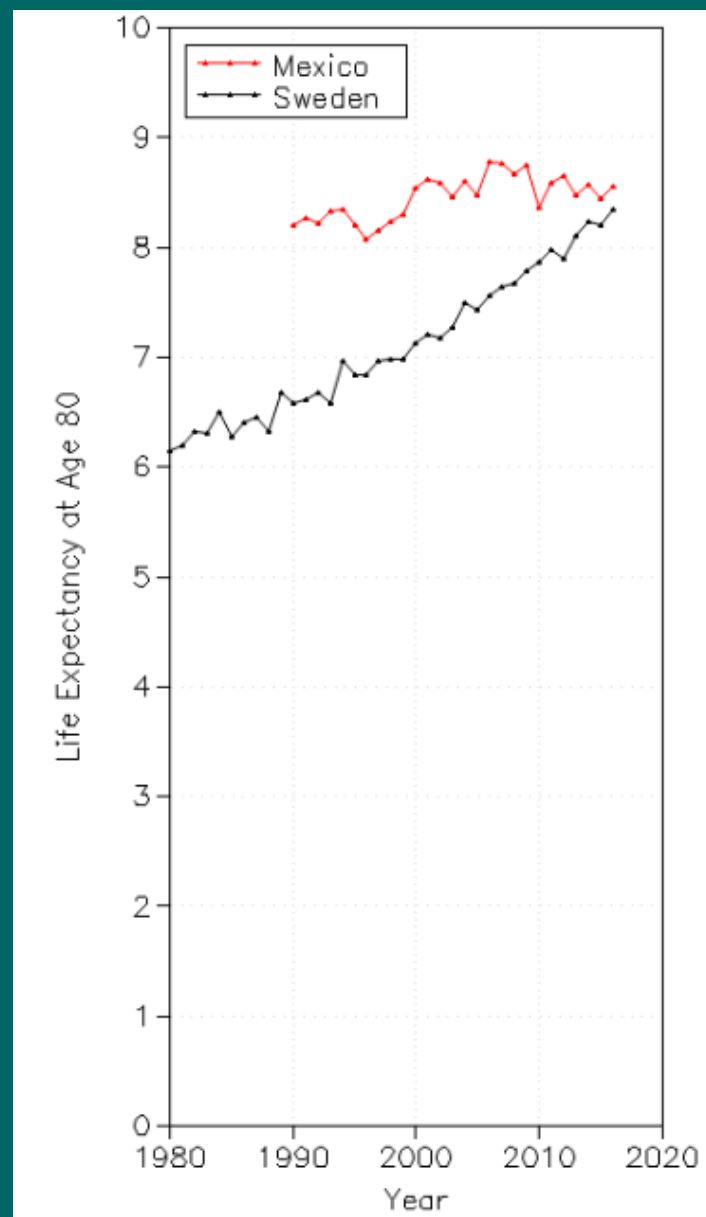
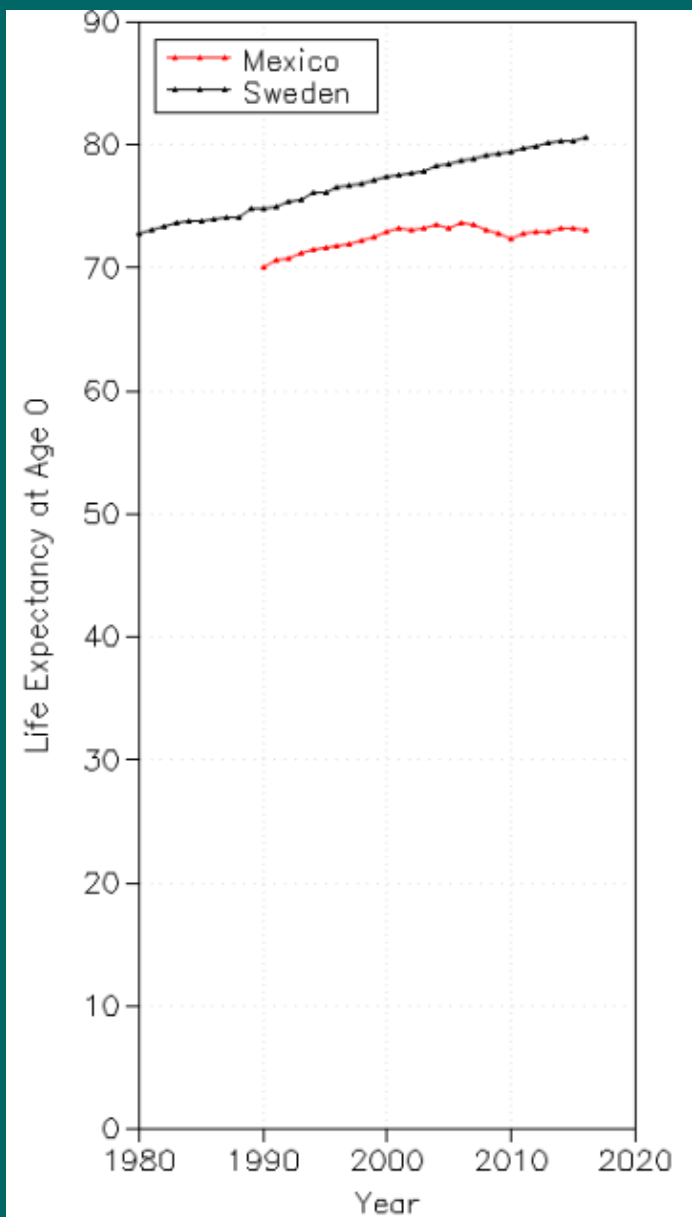
Unadjusted estimates of e_0 too high?



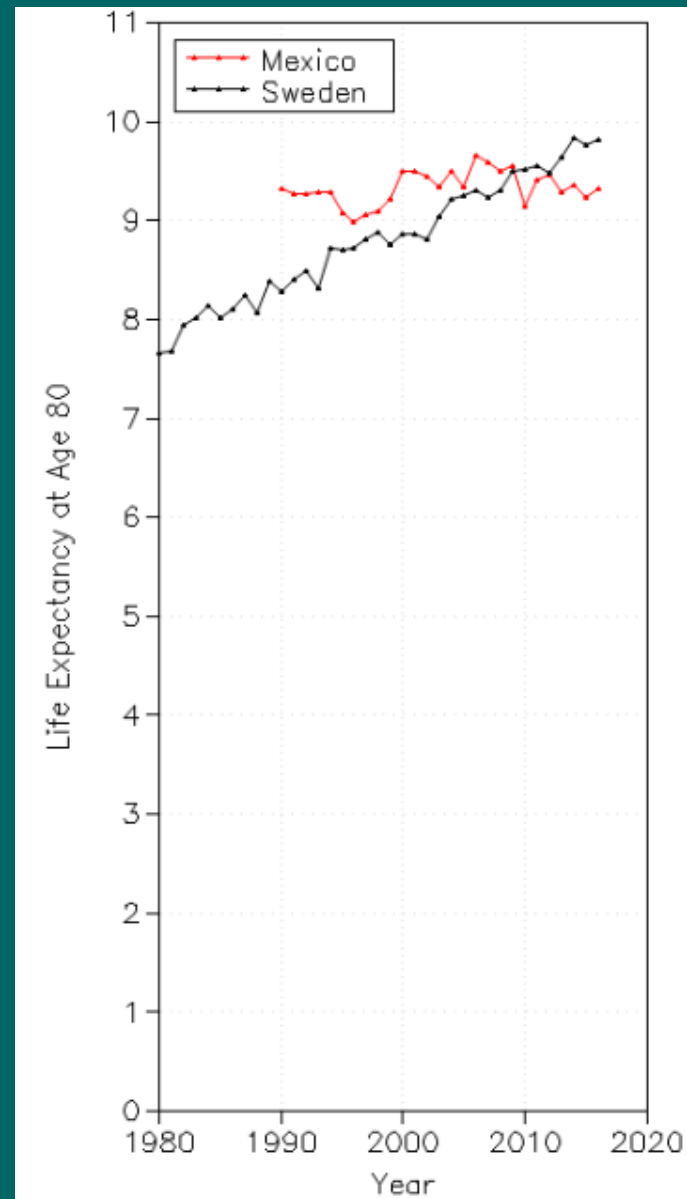
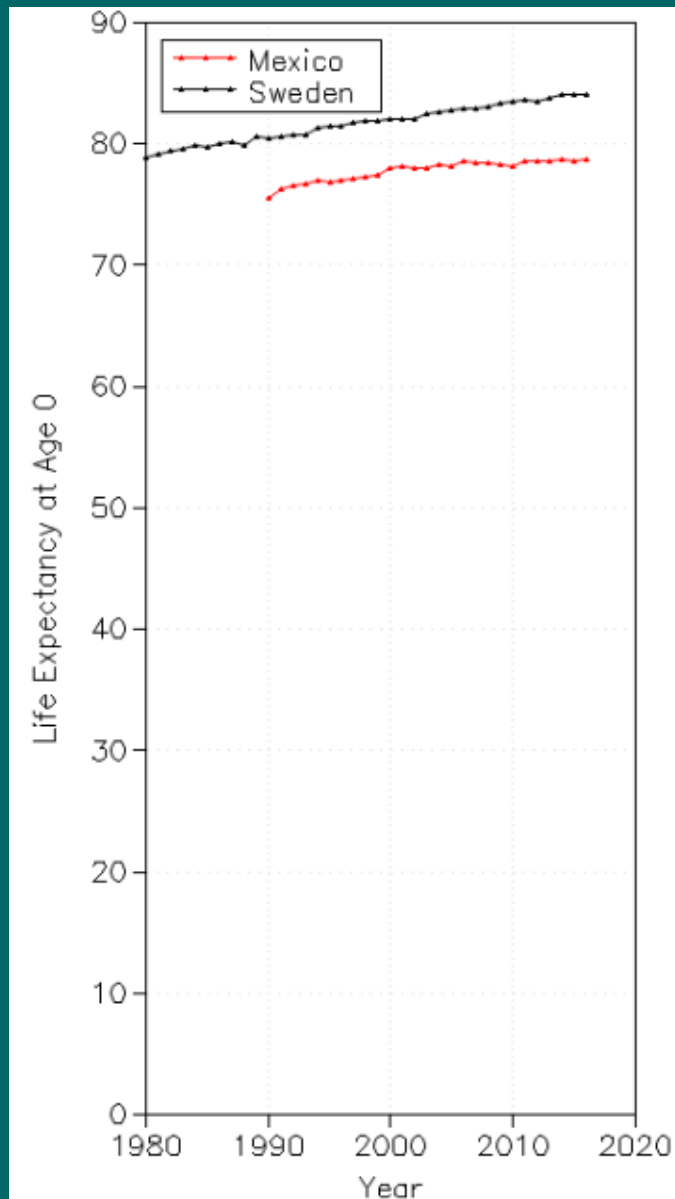
Unadjusted estimates of e_{80} also too high?



Compared with Sweden, Men



Compared with Sweden, Women



Suspicious Patterns

- Both sexes: e_0 for Mexico well below Sweden during 1990-2016.
- Men: e_{80} was higher in Mexico than in Sweden?
- Women: e_{80} was higher in Mexico than in Sweden in 1990-2009 (but lower after 2010)?
- These implausible patterns suggest age exaggeration/mis-reporting.

An implausible mortality pattern

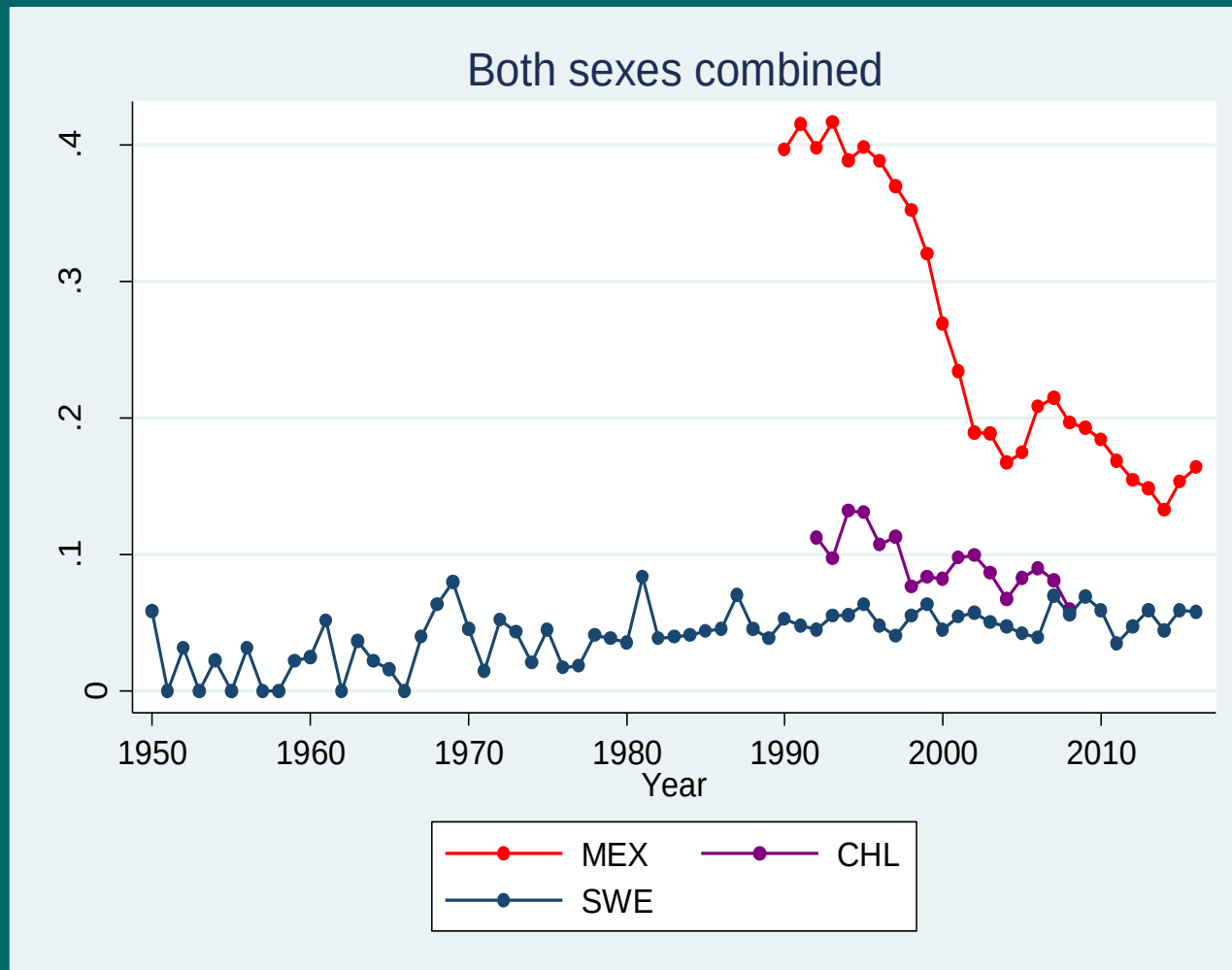
Relationship between mortality risks between ages 60 and 80 and child mortality (<5), Men



Even more implausible at higher ages

Death count ratio: 105+ years to 100+ years

Mexico (1990-2016), Chile (1992-2008) and Sweden (1950-2016)



Preliminary Conclusions

- We find numerous data quality issues.
 - Obvious age heaping which are typically an indication of low quality of age reporting in general
 - Our unadjusted estimates of e_0 are much higher than the official estimates (which have been adjusted)
 - Suspicious trends in e_{80} that lead us to suspect age exaggeration/mis-reporting
 - Implausibly low mortality at older ages relatively to younger ages
- We doubt that Mexico can be added to the HMD.
- Accurate estimates of life expectancy for Mexico will require adjustments to the raw data (or to the rates).

NEXT STEPS

Investigation into other possible sources of mortality information

- Post-censal surveys to verify census coverage.
- Statistical office own assessment of vital registration system.
- Representative surveys with mortality information (surveys with mortality follow-up; maternity histories, etc...).

Preliminary Conclusions

- We find numerous data quality issues.
 - Obvious age heaping
 - Unadjusted estimates of e_0 much higher than the official estimates (which have been adjusted)
 - Suspicious trends in e_{80} relative to e_0 suggesting age exaggeration/mis-reporting
- Accurate estimates of life expectancy for Mexico will require adjustment to the raw data.
- Mexico cannot be added to the HMD.

Determination of necessary adjustments

- We will explore the possible tools that might be used to adjust the data.
- Others (i.e., CONAPO, LAMBdA, GBD, UNPD) have produced adjusted estimates.
- The adjustment methods rely on various underlying assumptions.