Poor-Quality data and cohort life tables
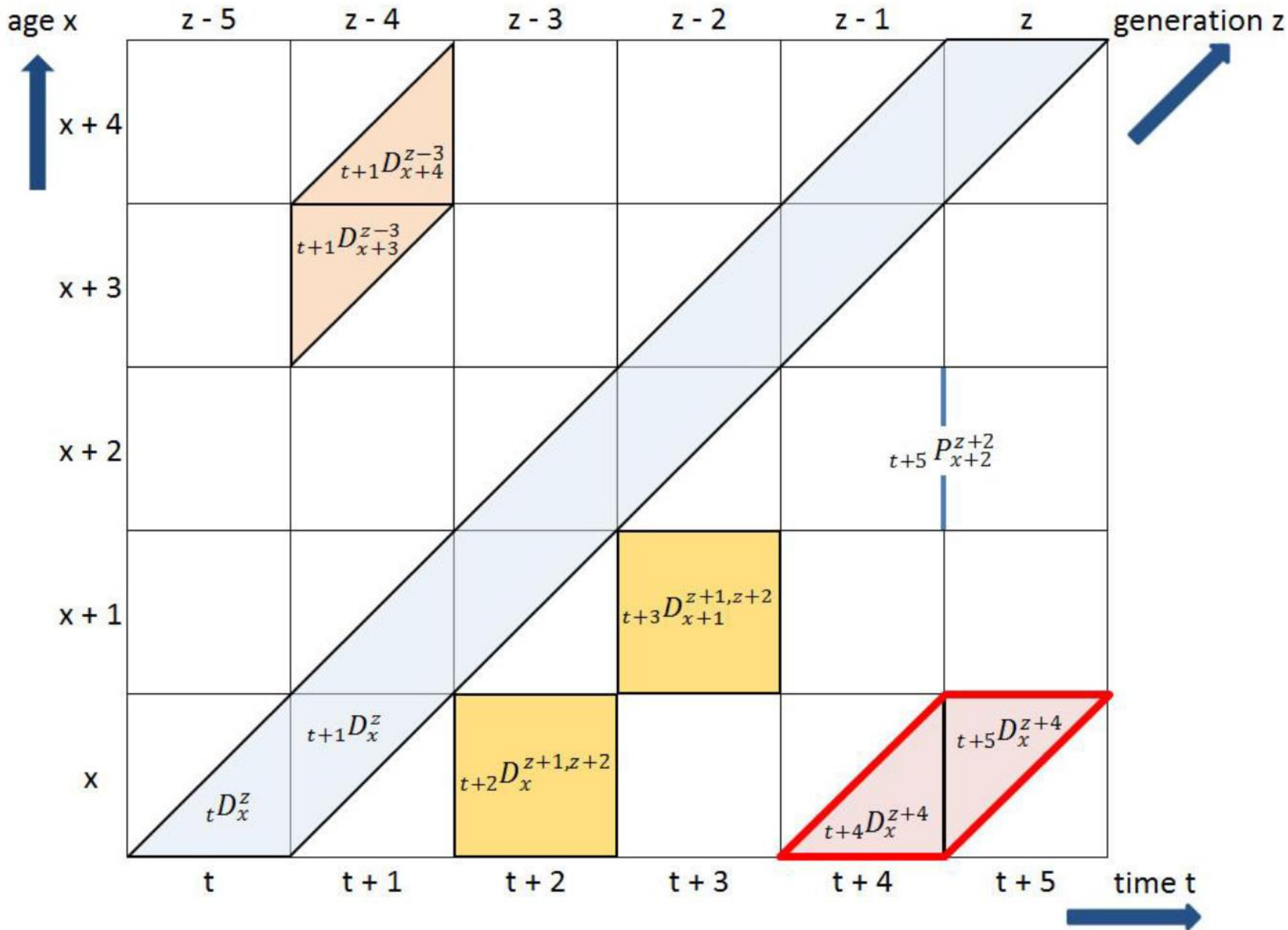
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Cohort life tables

- Started being more frequently during last decades (before just period life tables)
- Data for more than 100 years needed
- Cohort effect impact
- Better information for institutions (pension system etc.)

age x

generation z

z - 5   z - 4   z - 3   z - 2   z - 1   z

x + 4

$_{t+1}D_{x+4}^{z-3}$

$_{t+1}D_{x+3}^{z-3}$

x + 3

x + 2

$_{t+5}P_{x+2}^{z+2}$

x + 1

$_{t+3}D_{x+1}^{z+1,z+2}$

$_{t+1}D_x^z$

$_{t+2}D_x^{z+1,z+2}$

$_{t+5}D_x^{z+4}$

x

$_tD_x^z$

$_{t+4}D_x^{z+4}$

t   t + 1   t + 2   t + 3   t + 4   t + 5   time t

Constructed cohort life tables available in Human Mortality Database

Country	Notes
Denmark	Generations 1835–1917
Finland	Generations 1878–1918
France	Generations 1816–1916
Iceland	Generations 1838–1917
Italy	Generations 1872–1916
Netherlands	Generations 1850–1917
Norway	Generations 1846–1917
Sweden	Generations 1751–1917
Switzerland	Generations 1876–1916

# Countries with constructed and published cohort life tables (out of HMD)

Country	Notes	Citation of a publication or source
Canada	Generations 1801–1991	Bourbeau, R. – Légaré, J. – Émond, V. (2004)
New Zealand	Generations 1876–1935	Statistics New Zeland (2006)
United Kingdom	Based on historical mortality rates from 1981 to 2008 and on projections	
Poland	10-year periods from 1801 to 1950	Piasecki E. (1984)
USA	For births in decennial years 1900 through 2000 Bell, F. C. – Miller, M. L.	
Germany	Generations 1903–1993	Bomsdorf, E. (1993)
England and Wales	Generations 1841–1960	Case, R. A. M., et al. (1962)
Australia		Lancaster, H. O. (1959), Young, C. M. (1969)
Belgium		Veys, D. (1981)
United States	Generations since 1840	Jacobson, P. H. (1964)
Bulgaria, Russia	Life tables for various life course events, constructed for four real cohorts, 1940-44, 1950-54, 1960-64 and 1970-74	Philipov, D. – Jasilioniene, A. (2008)

Data needed for construciton of cohort life table

- We need complete cohort – extinct cohort
  - Do we?
  - Example: Data starts in 1870 (we have 40 complete cohorts)
- What kind of data we need?
  - Number of deaths (D)
  - Number of population (P)

$$q_x^z = \frac{D_x^z}{P_x^z}$$

where q_x^z is the probability of dying for a person aged x from a generation z.
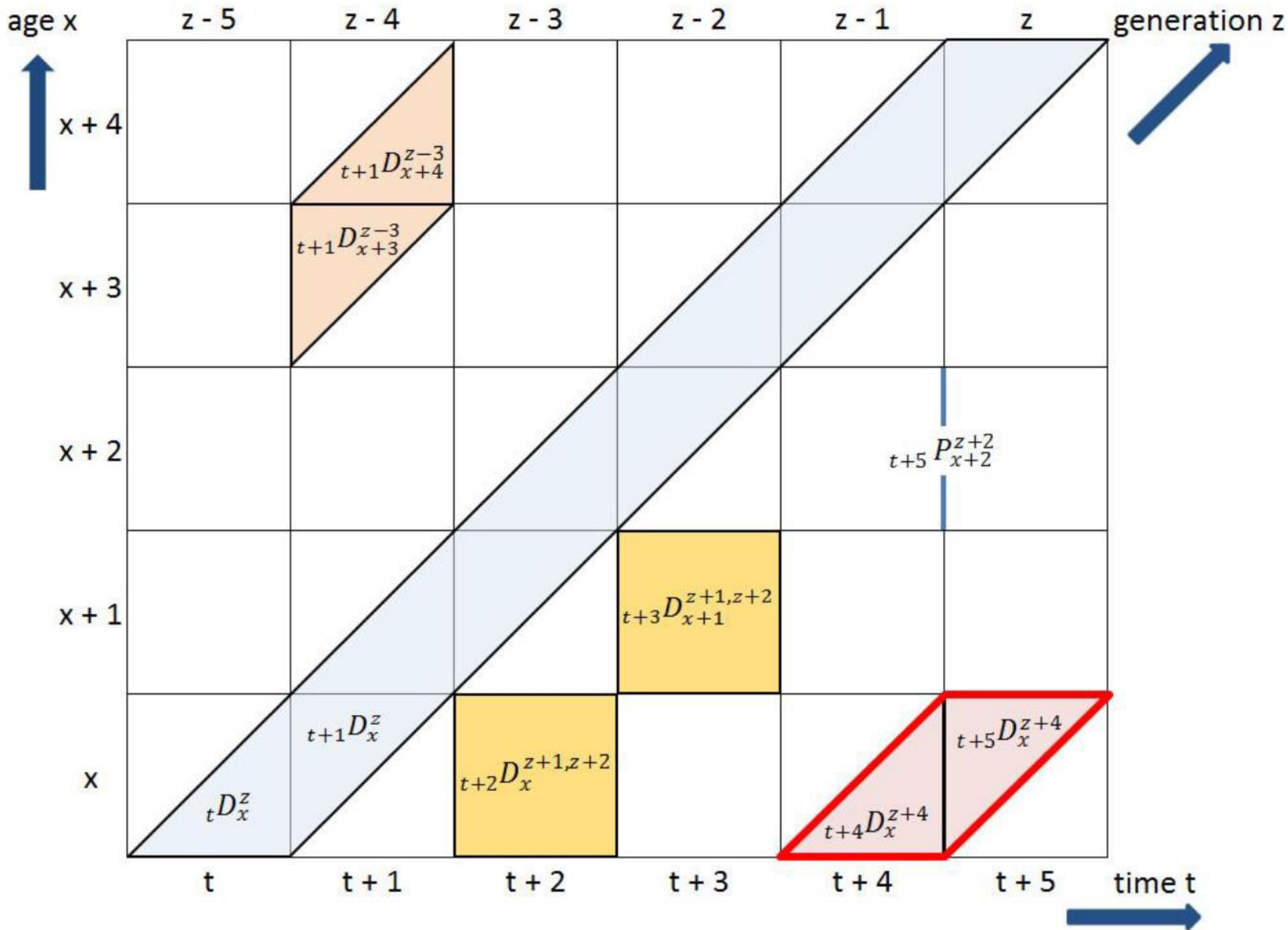
Example from the Czech Republic before 1950

- Deaths
  - From 1945 to 1950 complete data in triangles of Lexis diagram
  - From 1939 to 1945 also but only for part of region (and for Czech citizens only and without some violet crimes and without jewish population)
- Population
  - From 1945 to 1950 complete data about final number of population for each year
  - From 1939 to 1944 no information about population (we can do some estimates based od backward or forward methodhology)

# Probability of dying between 1935 and 1950 for cohorts 1890 – 1930, Czech Republic, Males
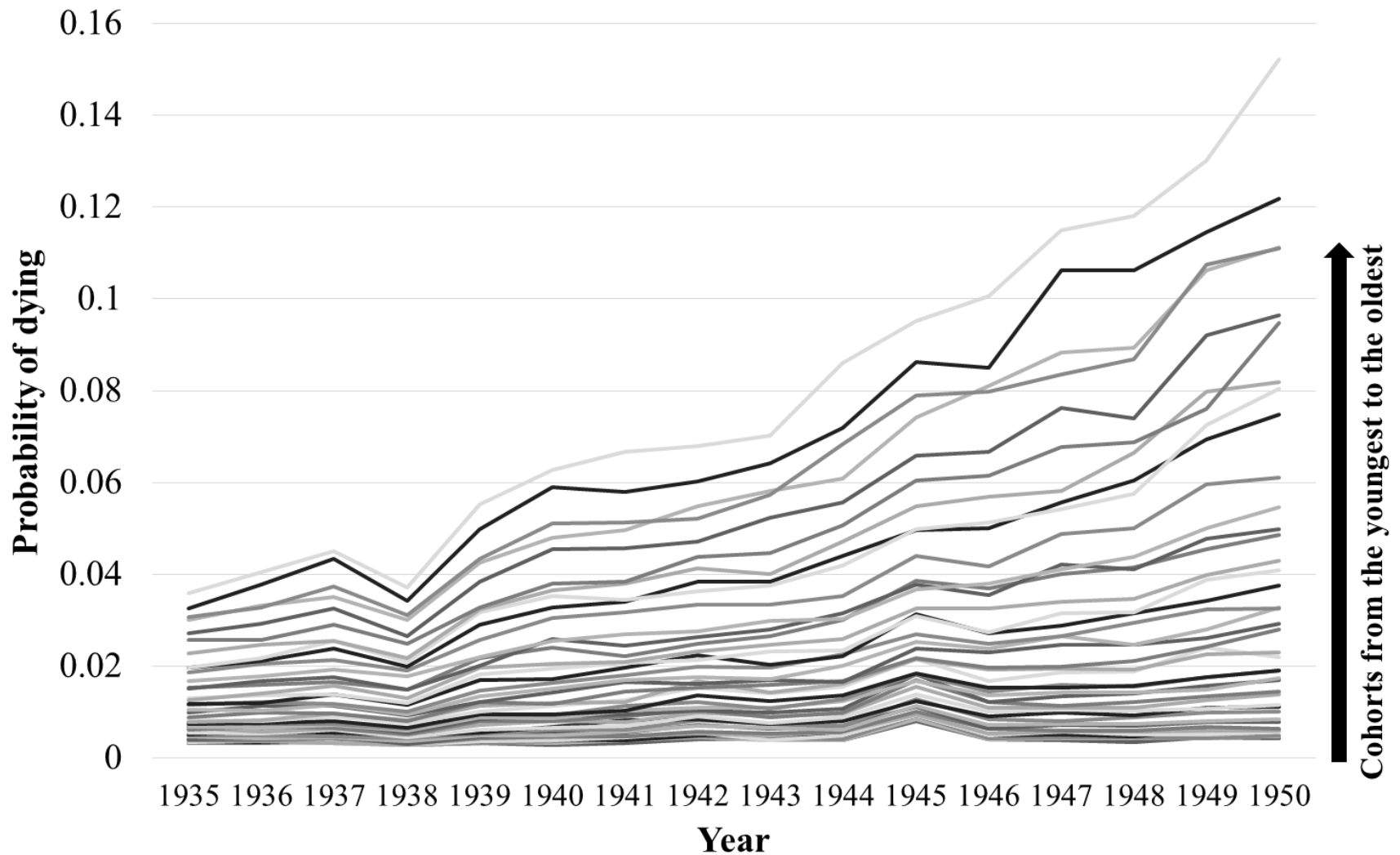
How to „bridge" periods with poor data?

- Use model which respects period before and after this period

  - constant growth rate of the mortality rate

- What about some effect of this period?

  - Lower or higher (or stable) level of mortality

- How big is the impact of this period to Life Expectancy of the generation?
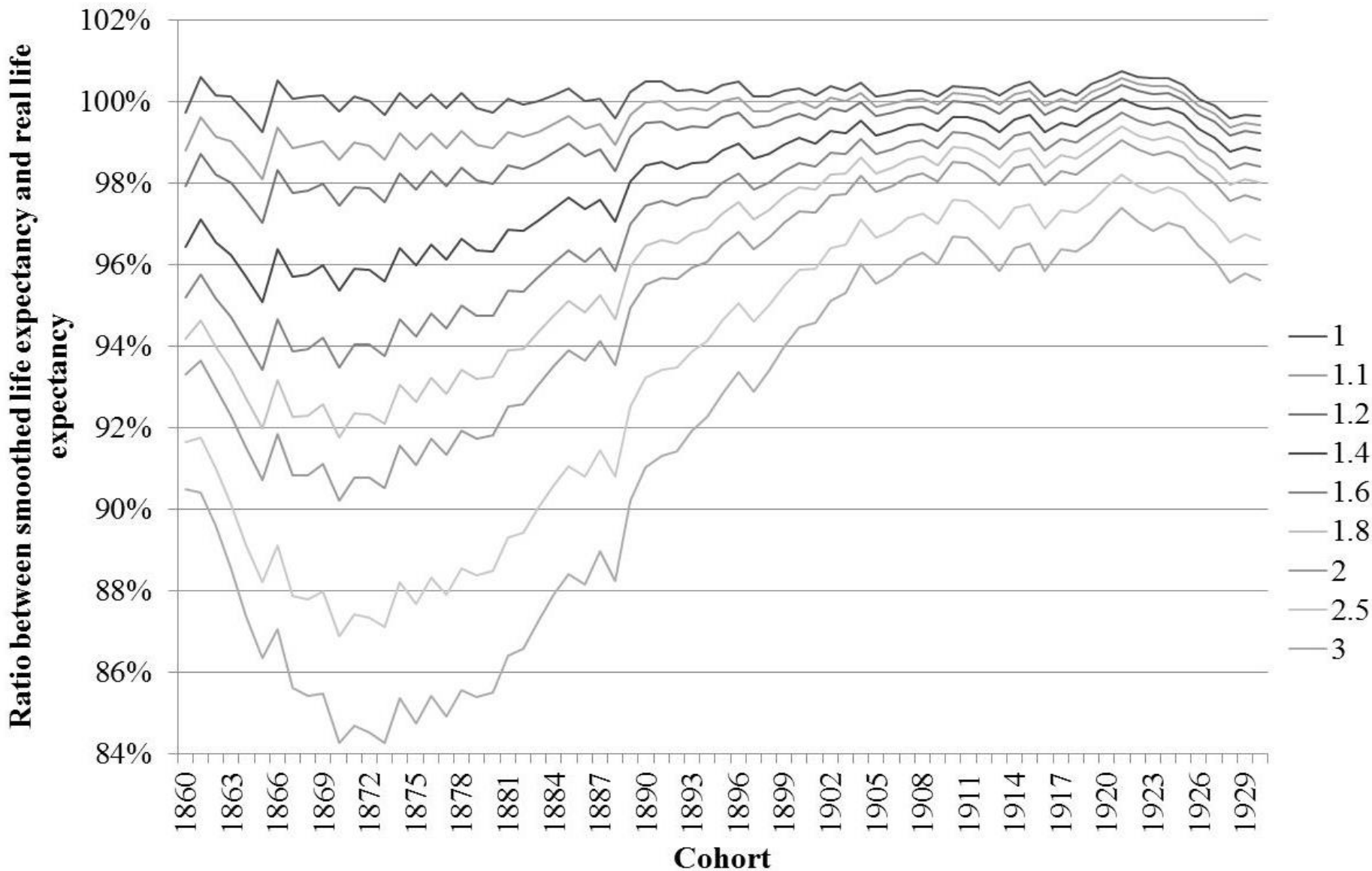
Effect of the period

- data from the war are probably under estimated and for sure very variable
- hypothetical increase of the mortality level during the war.
- Illustrated variants are increase of
    - 10 % (coefficient 1,1),
    - 20 % (coefficient 1,2),
    - 40 %, 60 %, 80 %, 100 % (coefficient 2),
    - 150 %
    - and 200 % (coefficient 3)
- Coefficient 1 is for smoothed data with no theoretical increase.

Ratio between smoothed cohort life expectancy and real cohort life expectancy for cohorts from 1860 to 1930, variants of increase, CZ, females
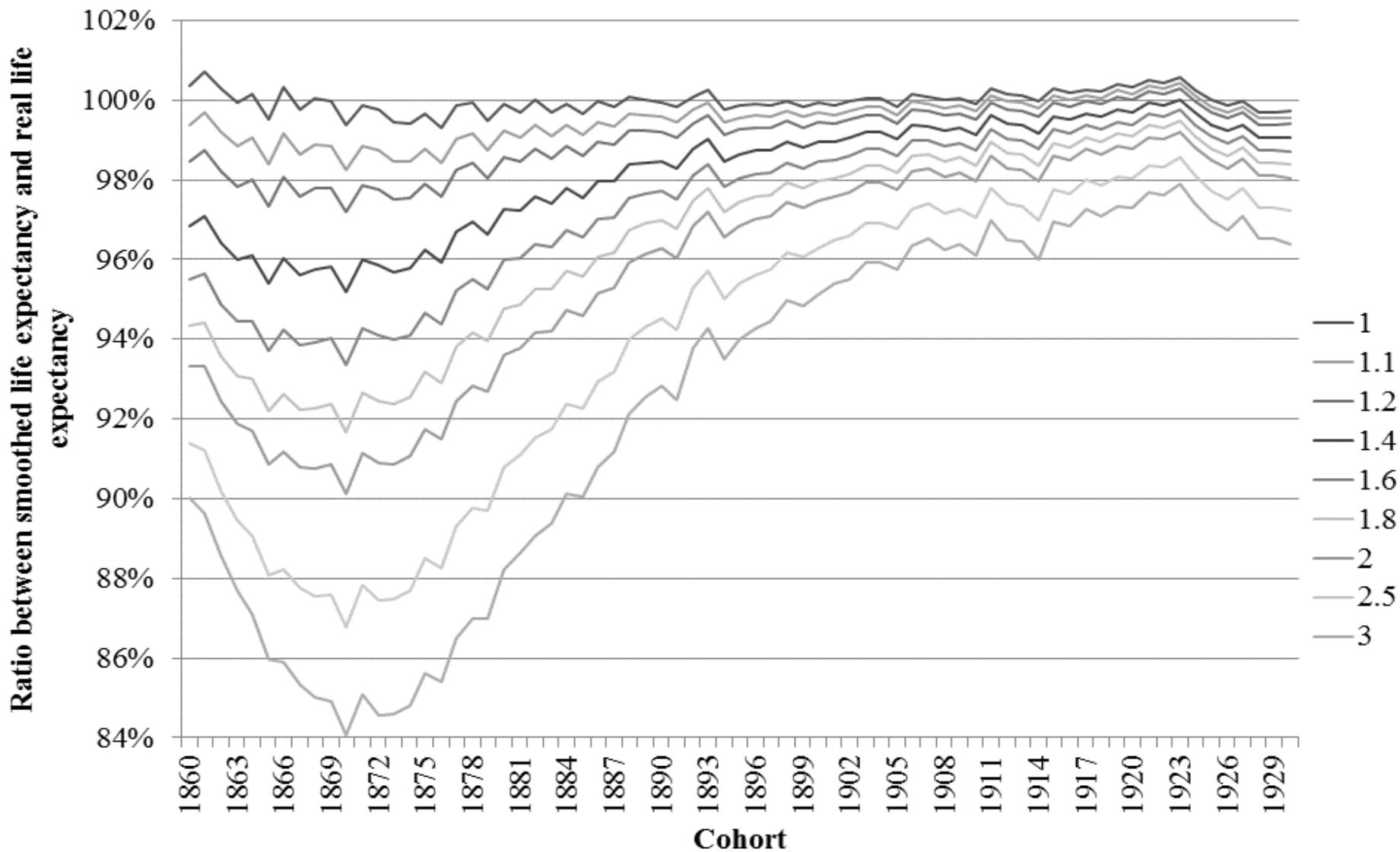
Ratio between smoothed cohort life expectancy and real cohort life expectancy for cohorts from 1860 to 1930, variants of increase, CZ, males

Conclusion

- Effect depends on the age period when the cohort was affected – higher effect to higher ages with higher level of mortality

- For males those periods are longer – effect is higher

- 40% increase of the mortality level is for cohort 1910 only 0,5 % of the total LE

Future research

- Estimate effect of the war to different age groups and apply this to cohort life tables

- Try to bridge WW I also

- Finish the cohort life tables for the Czech Republic!

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