Understanding recent mortality reversal in Central Europe: case of Czech Republic and Poland

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Introduction
Poland, together with the Czech Republic, represents a large fraction of the population of Central European region, which underwent a specific mortality trend (represented at Figure 1). Life expectancy at birth (e0) increased rapidly in these two countries after 1950, but since the early 1970s the increase decelerated or even reversed. As advances of infant mortality are known to be the main contributor to the postwar improvement, life expectancy at age 30 (e30) provides a more realistic picture of mortality developments before and after post-communist transition. In both countries the value of e30 underwent three decades of stagnation. Interestingly, after the fall of the Berlin Wall e30 recovered and has been increasing since then quickly and incessantly.

Figure 1 Life expectancy at age 0, 30, and 65 in the Czech Republic, Poland and France, 1950-2010

Source: based on Human mortality database.
Aim of the paper

There has been a great number of studies concerned with the life expectancy stagnation in Central European region before 1989. In this paper we are interested in the causes of such a long stagnation (i.e. has there been a universal impact of socialist environment across Central Europe?), but the core of our contribution is to find similarities, differences and explanations of the post-transitional mortality changes. For instance, while both Czech and Polish females have recently reached identical mortality levels, a gap between the life expectancy of Polish and Czech males (measured at age 30) appeared in the mid-1980s and has increased to reach the actual level of two years of difference. The life expectancy gap disappears at age 65 (e65) and it can therefore be assumed that Polish males particularly suffer from higher adult mortality than their Czech counterparts. Under the conditions of similar socioeconomic and cultural environment in both countries, this finding calls for further explanation.

We aim to explain these trends and disparities by the means of cause-specific analysis using unique and high-quality data source: long-term time series adjusted to the current classification of causes of death, which makes the data fully comparable in time. Our data allow to quantify the weight of individual diseases (categories of cardiovascular diseases, cancer types, accidents) in the recent decline, but also to estimate the contribution of other factors, such as health care or tobacco and alcohol consumption. The issues of the international comparability of causes of death are discussed as well.

Data and methods

A detailed longitudinal analysis of mortality changes requires long-term continuous time series by single causes of death. Due to regular revisions of International classification of diseases and related health problems (ICD) a comparison of cause-of-death time series in the long term is impossible. We are using a method that has been successfully applied to several European countries, to mention only France (Vallin, Meslé 1988, Meslé, Vallin 1996), Russia (Meslé et al. 1996), Ukraine (Meslé, Vallin 2003) or West Germany (Pechholdová 2009). The data for Poland was reconstructed for the period 1970-2006 through linking three different ICD revisions (8th, 9th and 10th, Fihel 2011). The reconstruction also included estimation of data lacking due to the strike of medical doctors that took place in Poland in the years 1996-2002 (Fihel, Meslé, Vallin 2012, forth.). Similarly, data for the Czech Republic originate from a reconstruction project covering last three ICD revisions and are now available for years 1968-2008 (Pechholdová et al., 2011, Pechholdová 2011).

At first, we are thoroughly checking the international comparability of the data. From previous experience, we expect difficulties in the domain of circulatory diseases (typically atherosclerosis) and these will therefore receive particular attention and treatment.

In the next step, we are proposing a shortlist of 20 categories of diseases with aim to compare the observed trends in life expectancy and to explain them. The first version of the list is given on Figure 3. Decomposition of life table changes is computed using following formula (Andreev 1982; see also Andreev, Shkolnikov, Begun 2002):

\[ e_x^2 - e_x^1 = \frac{1}{2} \sum_{x=0}^{6} \left[ I_x \left( e_x^2 - e_x^1 \right) - I_{x+1} \left( e_{x+1}^2 - e_{x+1}^1 \right) \right] - \left[ I_x^1 \left( e_x^1 - e_x^2 \right) - I_{x+1}^1 \left( e_{x+1}^1 - e_{x+1}^2 \right) \right] \]

Finally, to estimate potential influence of health care and some behavioural factors, we compute for Czech Republic and Poland the share of avoidable mortality and estimate the influence of smoking and alcohol consumption.

Results

For the purpose of this abstract, results of the decomposition of life expectancy change are presented for male population (Table 1 and Figures 2 and 3). For Poland, we have not
checked for comparability yet and therefore only large groups of causes are available for the moment. For the Czech Republic and France a more elaborated list is proposed. The results for the three countries are however comparable at the level of large groups of causes:


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<th>1970-1991 Change</th>
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<td>Circulatory</td>
<td>Cancer</td>
<td>External</td>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>-0.32</td>
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<td>-0.62</td>
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<td>0.62</td>
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<tr>
<th></th>
<th>1991-2006 Change</th>
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<td>External</td>
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<tr>
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<tr>
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<td>France</td>
<td>4.33</td>
<td>1.43</td>
<td>0.95</td>
<td>0.74</td>
<td>1.21</td>
</tr>
</tbody>
</table>

Source: own calculates.

In both periods (before and after the post-communist transition) Poland performed worse than the Czech Republic, in spite of the highest gains due to infant mortality. In 1970-1991, this unfavourable trend resulted from a combination of increasing premature circulatory (1.55 years), cancer (0.32 years) and accidental (0.54 years) mortality. In the Czech Republic, cardiovascular and cerebrovascular conditions played very little role in the mortality change between 1970 and 1991: only 0.12 years of the gain was due to them. Most important gains came from chronic respiratory diseases (0.99 years) and from accidental mortality (0.68 years). The detailed decomposition (Figure 3) shows that the main health problem of the socialist Czech state was tobacco and alcohol consumption: 0.40 years of life lost in total.

Figure 2 Decomposition of life expectancy change in Poland,

Source: own calculates.

After 1991, unfavorable cardiovascular mortality trend in Poland reversed and was responsible for most of the life expectancy increase. The drop in death rates from diseases of circulatory system was so sudden and substantial that it entailed the life expectancy increase by 2.82 years for males and 2.99 years for females. Similar process took place in the Czech
Republic – cardiovascular mortality (especially acute myocardial infarction [AMI] treatment) was responsible for more than a half of the improvement. The trend and its structure were similar to what happened in France between 1970-1991 and what is referred to as cardiovascular revolution.

Figure 3 Decomposition of life expectancy change in Czech Republic and France

Summary and perspectives
In the time of post communist transition life expectancy in the Czech Republic and Poland significantly increased. However, important similarities and dissimilarities in the mortality trends were found between these two countries and they need to be analyzed in bigger detail. We will focus on age-specific and cause-specific mortality rates and apply the method of life expectancy decomposition. Finally, we will also explain what has been hindering further improvement of Czech and Polish mortality since the 1990s.
References