Small-area mortality variation in Germany: trends, dispersion, and explanatory factors

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Small-area mortality differentials in Germany have gained only limited attention in the past although it is yet another dimension of social inequality. Especially how small-area mortality differentials developed over time has been little explored.

Existing literature on small-area mortality differentials points out that spatial differences between East and West are predominant while a North-South gradient exists as well (Luy and Caselli, 2007). Analyses of time trends in regional mortality variation for German federal states highlight that spatial patterns change little over time (Cromm and Scholz, 2002; Kuhn et al., 2006). International evidence shows that favourable socio-economic and -demographic conditions in regions are associated with favourable mortality conditions in these regions (Spijker, 2004). This was found to be true also in the German context although a generalisation is impeded due to the incomparability of regions and study set-ups. As an example, Bavaria exhibits high mortality in the regions of the North-East compared to the other regions which has been existing for decades. Along with this mortality gradient, there is a gradient in the economic structure. Low mortality in Bavaria relates to economic wealth, large migration flows and a high share of well-educated people (Kuhn et al., 2006). Other studies dealing with small-area mortality variation in Germany found similar relationships, such as Strohmeier et al. (2007) for North Rhine-Westphalia or Luy and Caselli (2007) for the relationship between the migration-related population composition and small-area mortality.

Nationwide small-area mortality comparisons may encounter different situations than regional comparisons as the German reunification brought about major changes greatly affecting East Germany districts. This work therefore shows how mortality is spread over small areas in Germany and how this pattern developed over time. Mortality dispersion trends will be highlighted. In a second part, explanatory factors of small-area mortality variation are analysed.

In the analyses, life expectancy is used as a mortality measure. The small areas under study are 438 NUTS-3 level districts in Germany. The observation period covers the years 1995-2006. A dispersion measure indicates small-area inequality in life expectancy and its trends over time (Moser et al., 2005). A decomposition of this mortality dispersion measure indicates which age groups contribute to what extent to the spatial inequality. A pooled-cross-sectional time series analysis reveals the impact of explanatory variables at the small-area level on the distribution of life expectancy over space and time. As explanatory factors, a wide range of indicators on the districts' economic performance, social cohesion, educational level, population structure and medical care are considered. Data were obtained by the federal state offices of statistics. Analyses are carried out for

all German districts and where appropriate, also separately for the East and West German districts.

Life expectancy is lower in the eastern compared to the western part of Germany and lower in the northern compared to the southern part. Highest life expectancy prevails in the South of Germany. Apart from the general pattern, areas of low life expectancy are found in Saarland, the Ruhr area and the north-eastern border of Bavaria while large parts of Saxony can be considered high-life expectancy areas. Small-area mortality differences are greater among men. In 2006, the difference in life expectancy between those 5% of districts with highest and lowest life expectancy constituted 4.5 years among men and 3 years among women. Life expectancy increased in all of the 438 districts between 1995 and 2006. The largest gains were experienced by districts in the East.

Dispersion in life expectancy across the 438 districts decreased by the late 1990s and has been approximately stable since. Decreasing dispersion in Germany by the late 1990s resulted from steady life expectancy gains in districts of West Germany and the disproportionally high life expectancy gains in districts of East Germany during the 1990s. However, dispersion trends differ between the eastern and the western part. Across the West German districts, dispersion increased between 1995 and 2006 while dispersion across East German districts slightly decreased.

Decomposing the dispersion measure yields the contribution of each age group to the overall inequality level. Most dispersion is produced by small-area mortality variation at older ages. Among men, the greatest peak is at 60-74 years and at 70-79 years for women. Relative peaks are in infants and young adult ages, the latter foremost among East German men.

Explanatory factors at the small area level which drive the spatial and temporal pattern of life expectancy are to a large extent of economic nature, i.e. life expectancy is higher in wealthier districts as well as life expectancy gains are larger when the economic achievement is greater. This relationship appears even stronger in the East German districts. Economic prosperity however is highly correlated with measures of social cohesion and population migration.

Although often neglected in the past, small-area variation in life expectancy in Germany exists. The results show the complexity of the situation. Trends within West Germany or within East Germany may be different from nationwide trends. The convergence between life expectancy levels in districts of East and West Germany, which constituted major area-level differences, mainly took place by the late 1990s. In order to further reduce small-area mortality differentials, focus must be on the reduction of excess mortality mainly at older ages. Evidence shows that widespread economic prosperity supports small-area equality.

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