PAA 2011 Abstract

The remarkable pace of mortality decline in eastern Germany after the German unification - The role of regional availability of health care

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Abstract

Since the social, economic and political transformation following the German unification, eastern Germans have experienced large increases in life expectancy almost closing the gap to their western compatriots. This remarkable catch up process started virtually in the aftermath of the fall of the Berlin Wall. By making use of the natural experiment setting, we investigate to what extent the availability of modern western health care was responsible for mortality improvements after the unification. First results indicate that within the former communistic part of Germany, the elderly population in East Berlin and the bigger cities benefited first from the fall of the iron curtain. Life expectancies both for males and females approached earlier and faster the western German level than in smaller towns and rural areas in the rest of eastern Germany. The advantage in gained years of life is foremost attributable to a reduction in cardiovascular mortality. Hence, we assume that modern pharmaceuticals and state of the art medical facilities were made available first in bigger cities and metropolitan areas while rural areas and smaller towns followed later.

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1 Introduction

Within the two decades since the German unification eastern Germans have experienced a remarkable increase in life expectancy. Between 1990 and 2008 females have gained 6.0 years and males 7.4 in median life expectancy whereas their western compatriots witnessed an increase of 'only' 3.4 and 4.9 years respectively. Hence, at the same time, the gap in life expectancy between East and West has narrowed from 2.7 years for females and 3.4 for males in 1990 to 0.05 and 1.1 years in 2008 (HMD, 2010). The progress in gained life years during this period is even more astonishing if it is contrasted with the life expectancy eastern Germans would have today if their living situation had remained constant since the 1980s (see Figure 1).

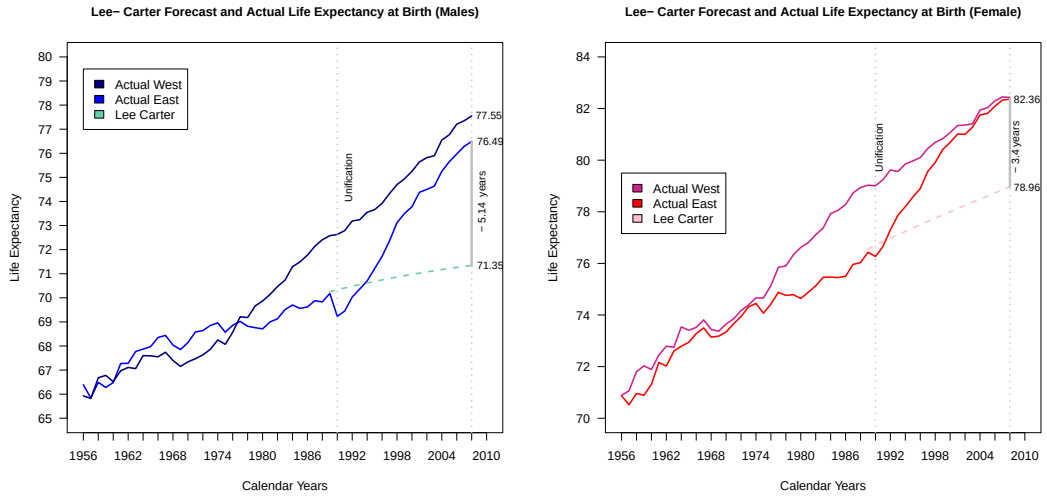

Figure 1: Lee- Carter Forecast vs Actual Life Expectancy for eastern Germans
Source: HMD (2010) and author's own calculations (Vogt 2010, forthcoming)

Instead of gaining additional life expectancy a newly born male in East Germany would expect to live more than 5 years shorter than today and more than 6 years shorter than a boy born today in western Germany. This is almost a doubling of the gap in live expectancy since the German unification back in 1990[1]. On this background, the question arises which were the drivers for this tremendous increase of life expectancy. The case of the German unification allows not only for the understanding of this single case but provides the opportunity to assess the general impact of political and socio- economic changes on human mortality. In this context, the German unification may be perceived as a large natural- experiment setting comprising a population sharing virtually the identical cultural, historic and genetic preconditions and undergoing an antagonistic political and socio- economic treatment for more than four decades. The unforeseen Fall of the Berlin Wall in November 1989 suddenly terminated this separation and within less than a year the political union was accomplished. In the course of a few years, eastern Germans

[1]For Females the gap would have widened from 2.5 years in 1990 to 3.1 years in 2008.

faced a deep transformation of their society and had to adapt completely to the western German social, economic and political framework. Although the transformation process caused a massive loss of jobs (by 1991 about 35% of Eastern Germans were affected) and self- rated health dropped, objective measures of health indicated a rise in life expectancy (Bach et al., 1998; Hillen et al., 2000).

Our elaboration aims to emphasize the impact of changing health care provision as a pivotal determinant for rising life expectancy. In this context, we draw upon the theoretical framework of epidemiological transitions and assume that the decline in cardiovascular mortality due to improved medical care and changing life styles which western Europe already experienced since the 1970's, was postponed in eastern Germany to the 1990's (Omran, 1971; Vallin and Meslé, 2004). By the adoption of the western German health care system modern medical devices and pharmaceuticals became available to foster the reduction in cardiovascular mortality not only in terms of improved treatment but also due to enhanced diagnosis (Nolte et al., 2002; Nolte and McKee, 2004). Nevertheless, the more advanced health care provision may have impacted life expectancy rather heterogeneously over regions and time. Firstly, the development and organization of a network comprising general practioners and medical specialists may have occurred faster in metropolitan areas and larger cities than in rural regions. Secondly, regions suffering strongly from environmental contamination may have recovered differently than others. This might be accompanied by a general reduction of noxious exposures of workers to heavy industries predominantly in the South of eastern Germany.

According to Omran (1971) advancements in mortality reduction are based on steps of epidemiological transitions which are caused by either social, economic or medical developments. Following this assumption, human societies pass three successive stages in which life expectancy rises [2]. During the third stage of the transition, the *age of degenerative and man made diseases*, infant mortality is low and cardiovascular diseases and cancer replace pandemics like tuberculosis and smallpox as the predominant causes of death. Economic progress and improved living conditions lead to a rising life expectancy up to ages 70+. Omran's epidemiological transition model was further augmented as cardiovascular mortality began to decline in the course of the *cardiovascular revolution* (Olshansky and Ault, 1986). Modern medical technologies and diagnostics as well as pharmaceuticals entailed a further reduction of mortality with the elderly being the main beneficiaries of this advancements. This progress in public health was achieved mainly in the western affluent societies which is mirrored by record life expectancies among these countries (Oeppen and Vaupel, 2002). However declining mortality based on epidemiological transitions is not experienced simultaneously in all societies at the same time. There are rather precursors benefiting first from improvements and followers that catch up later which leads to an ongoing convergence divergence process in terms of life expectancy (Vallin and Meslé, 2004) .

[2]The first phase of *famine and pestilence* is characterized by rural societies suffering from poor economic performance and non available health care. This is followed by a second stage of *receding pandemics* where societies experience industrialization and following improvements in public health and medical service.

Following this theoretical framework and the work of Vallin and Meslé (2004) it becomes evident that since the end of the 1960s the former communistic countries of eastern Europe were lacking behind in terms of reducing degenerative and man made diseases. On this background, we assume that the fast catch up process of life expectancy in eastern Germany was to a large extent caused by the delayed progress toward the fourth stage of epidemiological transition which took place not until the fall of the iron curtain. We argue that the sudden availability of state of the art medical services resulted in a postponed cardiovascular revolution which occurred in western Germany already during the 1960s and 70s. Furthermore, we aim at demonstrating that the reduction in cardiovascular mortality was foremost beneficial for the elderly in the East. Additionally, this elaboration emphasizes that the convergence divergence framework may be spatially refined. It gives reason to assume that even within eastern Germany the catch up process took place rather heterogeneously with East Berlin, due to its proximity to modern medical facilities in the West, benefiting first. On this background, we seek to determine if the preliminary results are consistent for the rest of East Germany and if bigger cities were health forerunners and rural areas caught up later.

2 Methods and Material

In order to test the hypothesis of a regionally postponed cardiovascular revolution, we use cause of death statistic data provided by the German Federal Statistical Office. They comprise sets of population and cause of death statistics for eastern and western Germany as a whole down to the community level. The data is grouped into 5 year age groups up to the age of 85+ whereas the age groups below 1 year and from 1 to 5 years of age are smaller units. The period of observation ranges from 1980 to 1997 for East and West Berlin and therefore, includes the immediate changes occurring as a consequence of the German unification. Unfortunately, data for the two parts of Berlin is not available after 1997 as the city from this time onwards is treated as one administrative unit. In case of regional variations in eastern Germany we have access to data for the period from 1992 to 2007. Causes of death in Berlin are classified according to the WHO ICD 9 framework where the focus for cardiovascular mortality is based on chapter 7 including all diseases from 390-459. For the regional analysis of East Germany cardiovascular diseases are coded from 1992 to 1997 according to ICD 9 and for 1998 to 2007 according to ICD 10.

Period life tables and multiple decrement life tables are used in order to estimate life expectancies for each age group and progress in reducing cardiovascular mortality before and after unification (Preston et al., 2001). Furthermore, the cause of death statistics for East German districts and municipalities are analyzed in a Geographic Information System (GIS). This allows controlling for the effect of distance to modern health care facilities predominantly in larger cities and university towns on cardiovascular mortality and its development over time.

3 Preliminary Results

Preliminary results show that the catch up process toward the life expectancy in western Germany proceeds faster both for males and females in East Berlin than in rest of East Germany (Vogt 2010, forthcoming). Still in 1989, the gap between life expectancy for females between East Berlin and East Germany was 0.2 years. In 1997 this gap has widened to 0.6 years. In the same time the gap in life expectancy for females between East Berlin and West Germany has narrowed from 2.4 to 0.3 years. The picture is slightly different for males but mirrors the trend observed for females. Males in East Berlin gained an advantage in life expectancy at birth throughout the 1980s compared to the rest of East Germany. In 1989, median life expectancy is 1.0 year higher in East Berlin than in East Germany. In the following 8 years this difference increase up to 1.4 years. In the same period the western German advantage decreases from 1.5 in 1989 to 0.6 years in 1997 (see Figure 2).

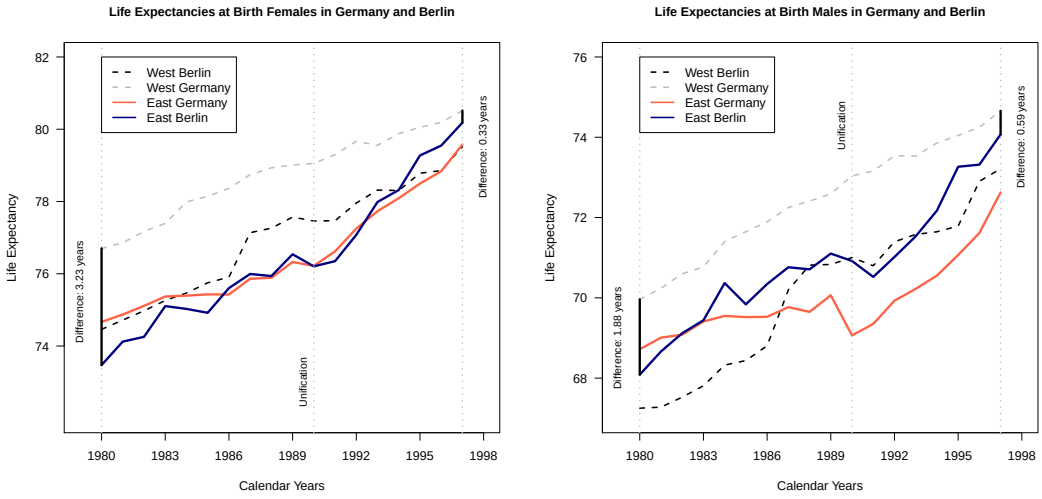

Figure 2: Life Expectancy in East and West Berlin compared to East and West Germany
Source: author's calculations (Vogt 2010, forthcoming)

The main driver for this catch up process was the reduction in cardiovascular diseases (see Figure 3). In 1980, males in East Berlin still lost around 1.0 year more of life expectancy due to cardiovascular diseases than males in West Germany. This value declined slightly to 0.9 years in 1989 and dropped afterward to 0.04 years in 1997. During the same time the gap in lost years between East Germany and East Berlin remain rather constant but began to decline strongly after the unification. Still in 1990, the advantage for eastern Berlin males was only 0.04 years higher than for males in the rest of East Germany. This advantage rose to 0.7 in 1997. Likewise, females in East Berlin lost 1.4 years more due to cardiovascular diseases than women in West Germany. Until unification, the difference remained constant and began to decline sharply afterward. From 1990 to 1997, this gap disappeared and females in East Berlin lose slightly less

years than females in the rest of Germany. Again, we observed an increasing advantage for East Berlin compared to East Germany. The gap widened from 0.4 to 0.9 years during the 7 years following unification.

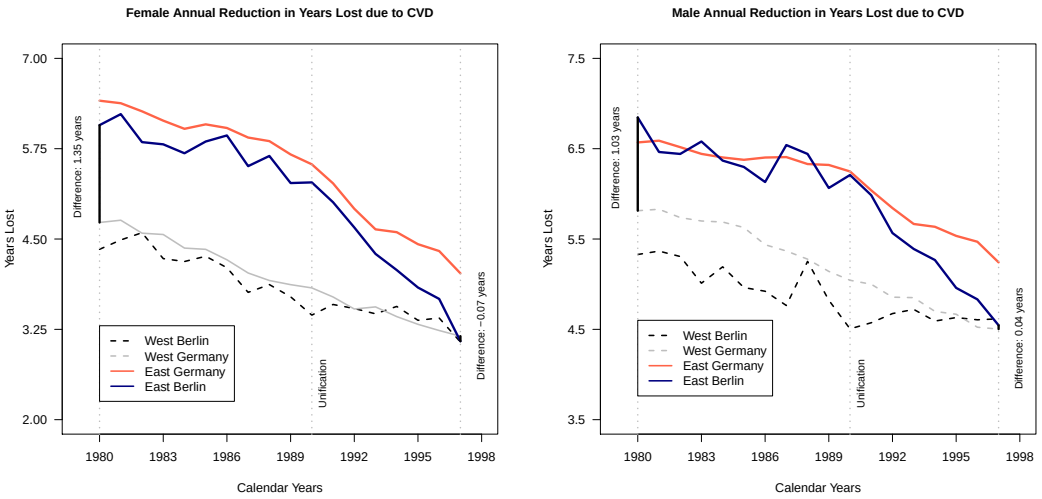

Figure 3: Years lost due to cardiovascular mortality in Berlin compared to Germany
Source: author's calculations (Vogt 2010, forthcoming)

4 Outlook

The results for Berlin indicate that the availability of modern western health care facilities may have had indeed a pivotal impact on rising life expectancy in eastern Germany after the unification. Following the hypothesis that mortality began to decline first where state of the art medical services were provided first, we showed that this holds true for East Berlin compared to the rest of eastern Germany. Mortality declined faster in East Berlin and led to a rapid convergence toward the western German mean life expectancy. The beneficiaries of this increase in life expectancy were mainly the elderly which took advantage of dramatically diminishing cardiovascular mortality. We expect that this pattern found for Berlin is consistent for urban areas compared to rural areas within the rest of eastern Germany.

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