PAA 2010 Abstract

# Does Rising Income Yield Higher Life Expectancy?
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# Findings from Eastern Germany after Unification.

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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. By making use of the natural- experiment setting, this elaboration seeks to shed some light on the role of rising income in lowering mortality after unification. The estimation draws upon process data taken from the German pension fund which covers 98% of recipients of public retirement benefits in Eastern Germany. In terms of life- expectancy, we expect firstly, that not only higher incomes in general entailed these gains but, secondly, that pensioners above 65 benefited most of higher retirement benefits.

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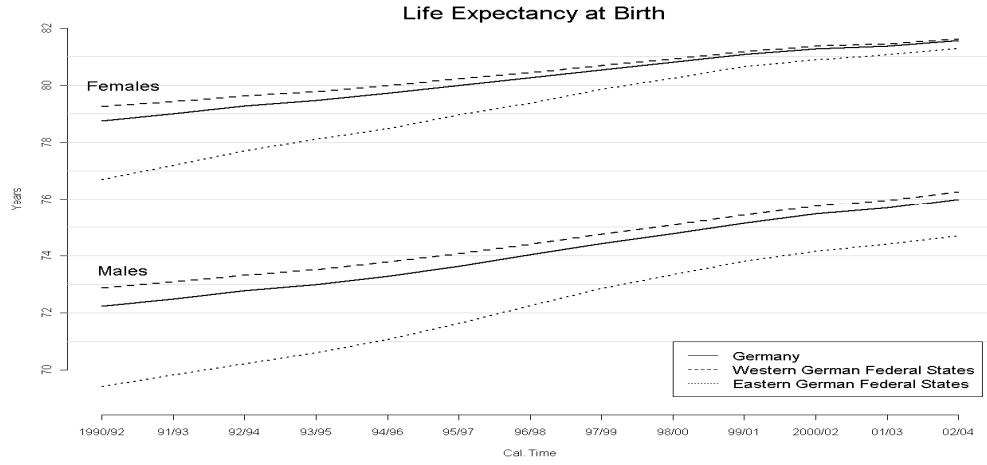
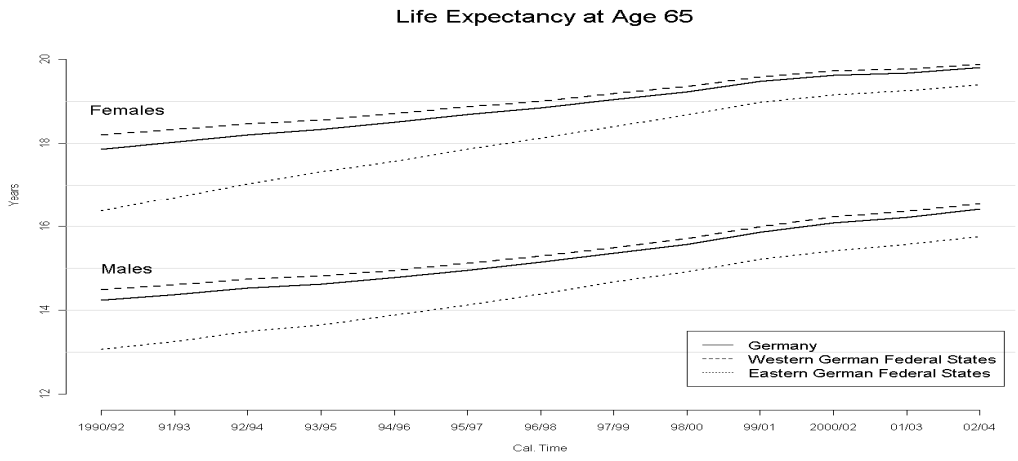
**Background:**

Within the two decades since the German unification Eastern Germans have experienced a remarkable increase in life- expectancy. Between 1990 and 2004 females have gained 4.59 years and males 5.27 in median life-expectancy whereas their Western compatriots witnessed an increase of 'only' 2.38 and 3.38 years respectively (GBE 2006). Hence, at the same time, the gap in life- expectancy between East and West has narrowed from 2.55 years for females and 3.46 for males in 1990 to 0.34 and 1.57 in 2004 (see tables below).




Source: GBE 2006

Although the direction of causal pathways between increasing income and declining mortality remain still to be clarified, there is increasing empirical evidence that income changes are indeed strongly correlated to health and mortality (Kitigawa & Hauser 1973, Marmot 1999, Deaton 2003). From this theoretical point of view, this project seeks to estimate the contribution of rising income to higher life- expectancy in Eastern Germany since 1990 (Gaudecker & Scholz 2007).

By the introduction of the monetary, economic and social union at the 1st of July 1990, Eastern Germans experienced not only an adaption to the Western German social insurance system but also an overnight 10 fold purchasing power increase of their incomes and pensions since the Eastern German mark was converted by an exchange rate of 1:1 into the Western German Mark[1] (Art.10 (5) Contract for the Establishment of a Monetary, Economic and Social Union 1990, Baylis 1993). For Eastern pensioners the adaption to the federal German social and economic system is deemed to be particularly beneficial as the former average pension benefit was around 300 marks and life at the poverty level was rather averted by subsidizing basic supplies. (Hockerts 1994).
The steep rise in real incomes coupled with the adoption of the Western social security system as facets of the political transformation process is considered as a large natural experiment which provides the unique opportunity to gain further insight into the complex determinants of rising life expectancy (Nolte & McKee 2004).

**Method and Material:**

In order to estimate rising life expectancy conditional on income, we make use of a large longitudinal set of process data provided by the Research Data Centre of the German Pension Insurance (Himmelreicher et al. 2006). As a pay- as- you- go system benefits granted by the German Pension system are

[1] Assets were converted 1:1 up to 6000 Deutsch Mark for Eastern Germans up to 60 years, up to 4000 for citizens between 14 and 59 and up to 2000 for those younger than 14. Assets exceeding this threshold were converted 1:2 (Galagas 2001).

directly related to personal earnings ever realized over the individual life-cycle. Therefore, it covers 98% of the Eastern and two thirds of the Western German Population. The high coverage in the East is explained by the fact that during GDR rule virtually everyone was insured within the public framework whereas Westerners had the opportunity to arrange their retirement provisions privately provided that their income exceeded a certain threshold[2]. The individual retirement benefits ($RB_t^{ind}$) are calculated according to the following basic formula (Börsch- Supan & Wilke 2003):

$$RB_t^{ind} = EP^{ind} CD^{ind} AF^{ind} PV^{ind}$$

At the core of the benefit system are earning points $(EP^{ind})$ which contributors are awarded according to the amount of their contributions during the work life[3]. Additionally, the duration of contributing to the pension fund ($CD^{ind}$), an adjustment factor applicable for early retirement ($AF^{ind}$) and a pension value mirroring the annual changes in earnings and wages ($PV^{ind}$) determine the individual benefits when entering retirement[4].

Therefore, we seek to estimate life expectancy at birth and age 65 by making use of different amounts of earnings points which provide information not only on the level of income during contribution durations before and after the German unification but also on the amount of individual pension benefits. As the data set lacks information on individual health, we assume unobserved heterogeneity and rely, therefore, on a frailty model (Vaupel et al. 1979, Thatcher et al.1998, Wienke 2003).

$$S(t|Z,X) = exp(-Z\int_0^t \mu_0(s)ds \;\; exp(\beta^T X))$$

[2] Likewise incomes below a certain level are contributing lower shares to the public pension fund (minor occupations, part- time jobs). Furthermore, the upper and lower thresholds are subject to right and left censoring in our further analysis.

[3] One $EP^{ind}$ corresponds to the average annual income in Germany. Likewise the double average income yields two $EP^{ind}$.

[4] As a simple example: In 2009 an Eastern German pensioner retiring at age 65 and having contributed over 50 year from the average income would receive: ($EP^{ind}$=1) * ($CD^{ind}$=50) * ($AF^{ind}$=1) * ($PV^{ind}$ = 24.13 €) = 1206.5€ per month (Deutsche Rentenversicherung 2009).

Beyond the amount of benefits, we take age, sex, region and their interaction with income into account for the further analysis. We expect that rising income entails increasing survival time after unification.

**Outlook:**

The present elaboration forms part of a more comprehensive project which seeks to identify determinants of the quickly increasing life expectancy in Eastern Germany after unification. Whereas here we draw upon rising income as one factor, in a second step we aim at shedding light on the transformed health system in the East and its contribution to almost even life expectancy between the two parts of Germany nowadays. Our particular emphasis on the two competing hypotheses, money vs. medicine, is explained by the fact that mortality improvements after unification were distributed remarkably uniform over the new German Laender. Hence, it allows for estimating the relative importance of shifts in monetary resources or the medical system as external factors in improving life expectancy between East and West Germany.

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