Bismarck's Health Insurance and the Mortality Decline

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1 Introduction

It is largely agreed that improvements in health and life expectancy are an important social objective whose role as a crucial determinant of development and economic growth is still debated (Acemoglu and Johnson, 2007; Ashraf et al., 2008; Bleakley, 2007; Clark and Cummins, 2009; Lorentzen et al., 2008; Weil, 2007). The historical decline in mortality during the demographic transition is usually explained by improvements in nutrition and public health (Cutler et al., 2006; Preston, 1975). Recently, Strittmatter and Sunde (2013) argued that the introduction of public health care systems across European countries strongly decreased infant mortality and crude death rates, translating into positive effects on growth in income per capita and aggregate income.

In Germany, the health system strongly expanded at the end of the nineteenth century due to Chancellor Otto von Bismarck's decision to introduce a compulsory health insurance. The sickness insurance was the first of the three main branches of the German Social Insurance System, to be complemented by the accident insurance in 1885, and the invalidity and old-age insurance in 1891 (Guinnane and Streb, 2011). Being the first compulsory health insurance ever introduced in the world, it not only acted as a blueprint for Germany's current health system but also served as a role model for many subsequent European health systems.

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From December 1st, 1884, the statutory health insurance was "compulsory for all industrial wage earners (i.e., manual laborers) in factories, ironworks, mines, shipbuilding yards, and similar workplaces" (Act of June 15, 1883, see Leichter, 1979). Other occupations, such as farmers, civil servants, domestic servants, day-laborers or the self-employed were not eligible. Contributions were earnings-related, amounted to a minimum of 1.5 percent (and a maximum of 3-6 percent) of the wage, and were paid jointly by employees (two-thirds) and employers (one-third). The insured could benefit from free routine medical and dental care, prescribed medicines, incidental care for up to 13 weeks, and medical care in hospitals for up to 26 weeks. Moreover, the insured were eligible to receive sick pay amounting to at least 50 percent of the average local wage for 13 weeks.

This paper investigates the effect of the introduction of the insurance on mortality rates. Our empirical analysis exploits the fact that Bismarck's health insurance was mandatory for blue collar workers but not for other occupations such as farmers. To quantify the effect of the health insurance on mortality, we draw on unique administrative data reporting the number of deceased by occupational groups. These newly digitized Prussian district level data allow us to compute occupation-specific mortality rates over 24 years spanning the period from 1877 to 1900. In order to analyze the role of Bismarck's health insurance for mortality, we estimate simple difference-in-differences models, in which we compare the mortality trend of blue collar workers (treatment group) to the mortality trend of farmers (control group). We estimate that the health insurance was responsible for a mortality reduction of 4 deaths per 1000 which is equivalent to 15% of the "mortality penalty" paid by blue collar workers.

The panel structure of the data allows generalizing the difference-in-differences model by allowing the reduced form effects to vary over time. This is particularly useful in our setting as we can observe that the treatment effects after 1885 are all highly significant and gradually increase over time. Furthermore, this approach allows us to show that occupation specific mortality followed a common trend in the years preceding Bismarck's health insurance.

Previous research has identified improvements in nutrition, the introduction of sewage and fresh water supply in cities as well as improvements of medical treatment as potential causes of the conspicuous mortality decline at the end of the 19th century (see Alsan and Goldin, 2015; Costa, 2015; Costa and Kahn, 2015; Ferrie and Troesken, 2008; Meeker, 1974). We show that our findings are robust to the inclusion of confounding factors which might have driven the mortality decline at
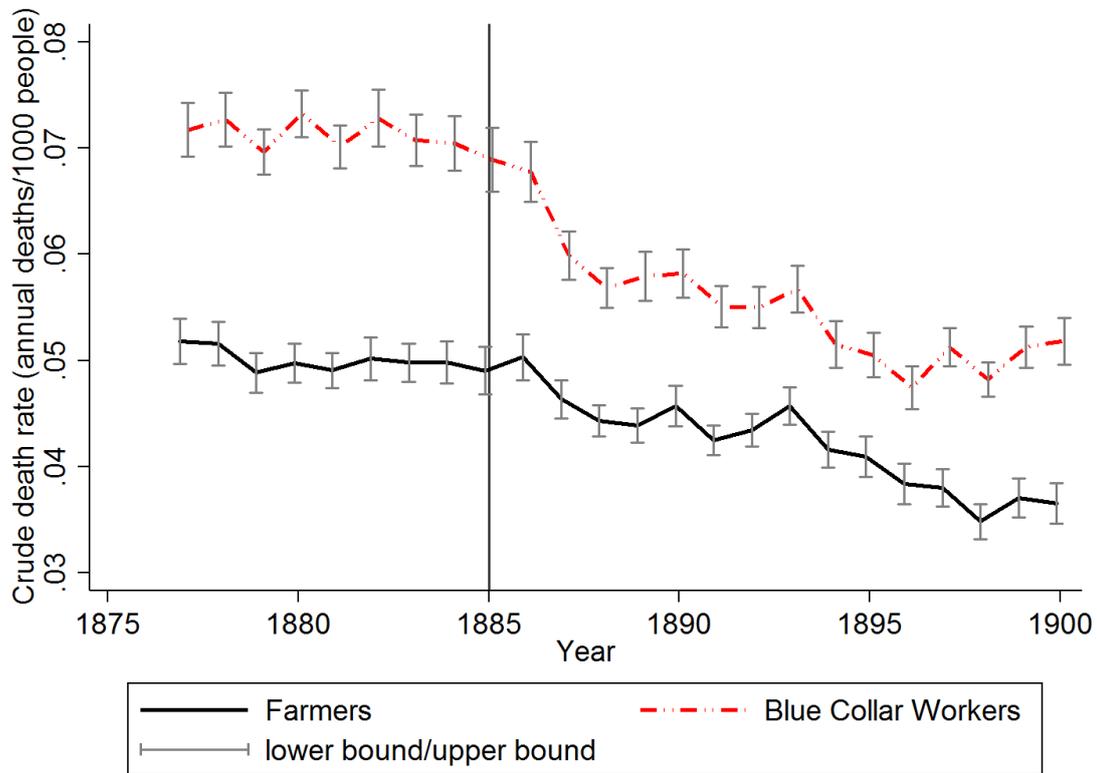
Figure 1: Crude Death Rates: Blue Collar vs. Farmers

the end of the nineteenth century. Even allowing for occupation-specific effects of urbanization, water supply, and sanitation does not change our main findings. Disregarding occupation-specific outcomes and moving to the analysis of aggregate district level mortality rates allows us to draw on rich data on causes of death, recently digitized for the purpose of this project. These data that consistently report the number of deceased for all thirty causes of death until 1902 provide a source of heterogeneity that allows us to speculate on the potential channels through which the health insurance affected the health and mortality of the population. Tuberculosis was among the leading causes of death and responsible for about 30% of the deaths among the working age population. German health insurance funds were thus particularly keen on reducing tuberculosis given its spread among their contributors (Hennock, 2007). Our findings suggest that the health insurance was successful in preventing tuberculosis. Further findings suggest that mortality rates from typhus, a waterborne disease, remained unaffected by the health insurance. This finding lends further support to the assumption that changes in the water supply were not the main drivers of the Prussian mortality decline after 1884.

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