Earnings, Mortality, and the Distribution of Longevity

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Extended Abstract

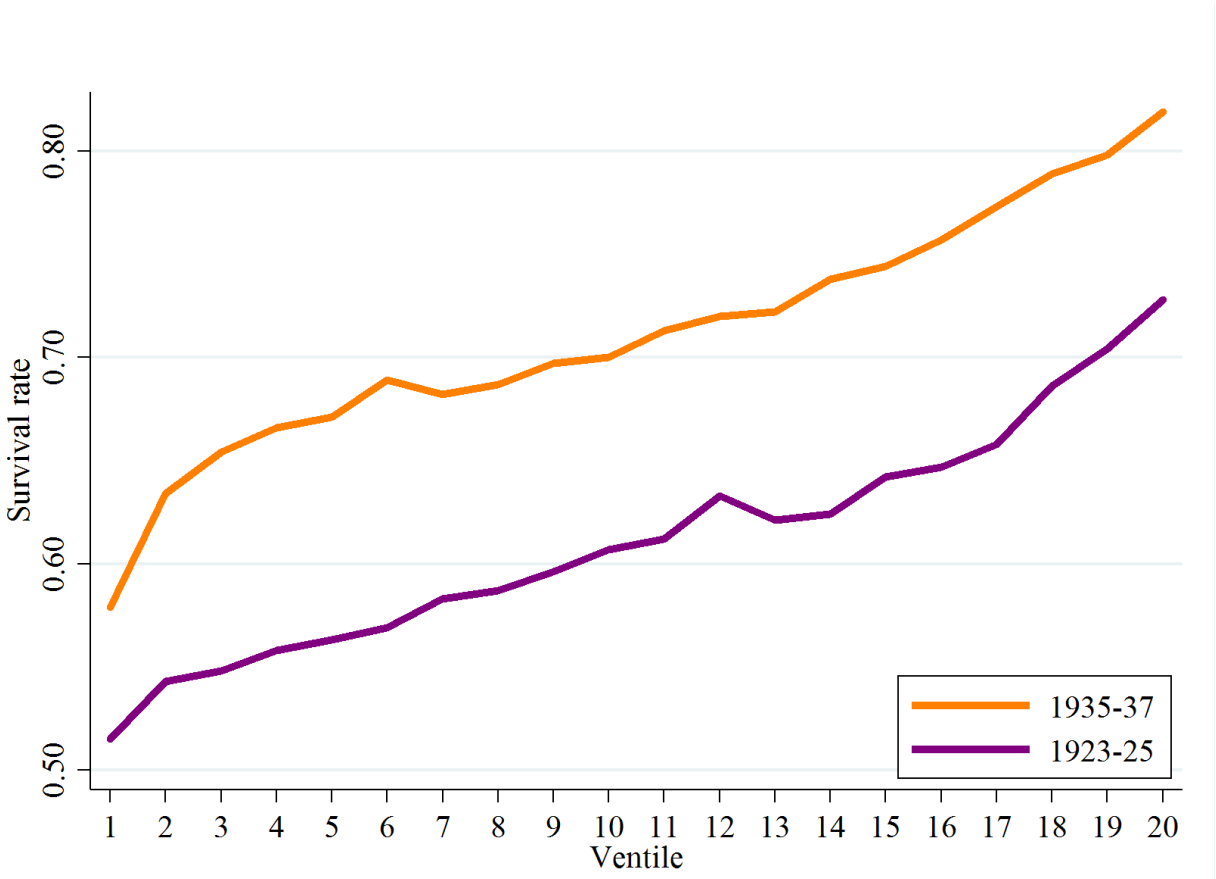
We study the distribution of longevity using a unique Canadian administrative dataset covering fifty years of public pension contributions and benefits. We have two main goals. First, to assess the gradient of longevity across lifetime earnings quantiles. Second, to assess how this earnings gradient has changed across birth cohorts. These questions are important for understanding the redistributive and insurance value of pension policies related to actuarially-adjusted benefits or eligibility ages. Our work builds on the findings of Chetty et al. (JAMA 2016), who use a 15 year span of data to estimate life expectancy by family income percentile, finding a large and steepening gradient with income.

We contribute in three ways relative to earlier work. First, we have a longer and deeper administrative database covering forty-one birth cohorts (1916-1956) over 50 years (1966 to 2015) which allows very precise measurement of lifetime earnings and older-age mortality. Second, we can assess the sensitivity of measured earnings-mortality gradients to different lifetime earnings measures, improving on previous research that used only a single year of income. Finally, we can assess whether the results in the US hold up in another similar country with different institutions.

Our preliminary results suggest that there is an age-mortality gradient in Canada. Moving from the first to the twentieth ventile of lifetime earnings increases longevity by about three years for men between the ages of 50 and 75. As with other countries, we find that longevity has been increasing across cohorts. However, in contrast to the US, the gains in longevity appear to be roughly balanced across the earnings distribution. Finally, we find that the earnings-mortality gradient is insensitive to different measures of lifetime earnings, providing support for the one-year income measure used by Chetty et al. (2016).

Below we present three graphs to show the preliminary results. Our data includes the universe of Canadians who paid into the Canada Pension Plan and were born in the birth cohorts between 1916 and 1956. We characterize lifetime earnings using the average earnings between ages 45 and 49, and then study mortality conditional on reaching at least age 50. Our preliminary results separate the sample into lifetime earnings ventiles, but we will refine these results to percentiles in future revisions. The results below are only for men.

Figure 1: Survival to age 75 for men, conditional on survival to age 50.

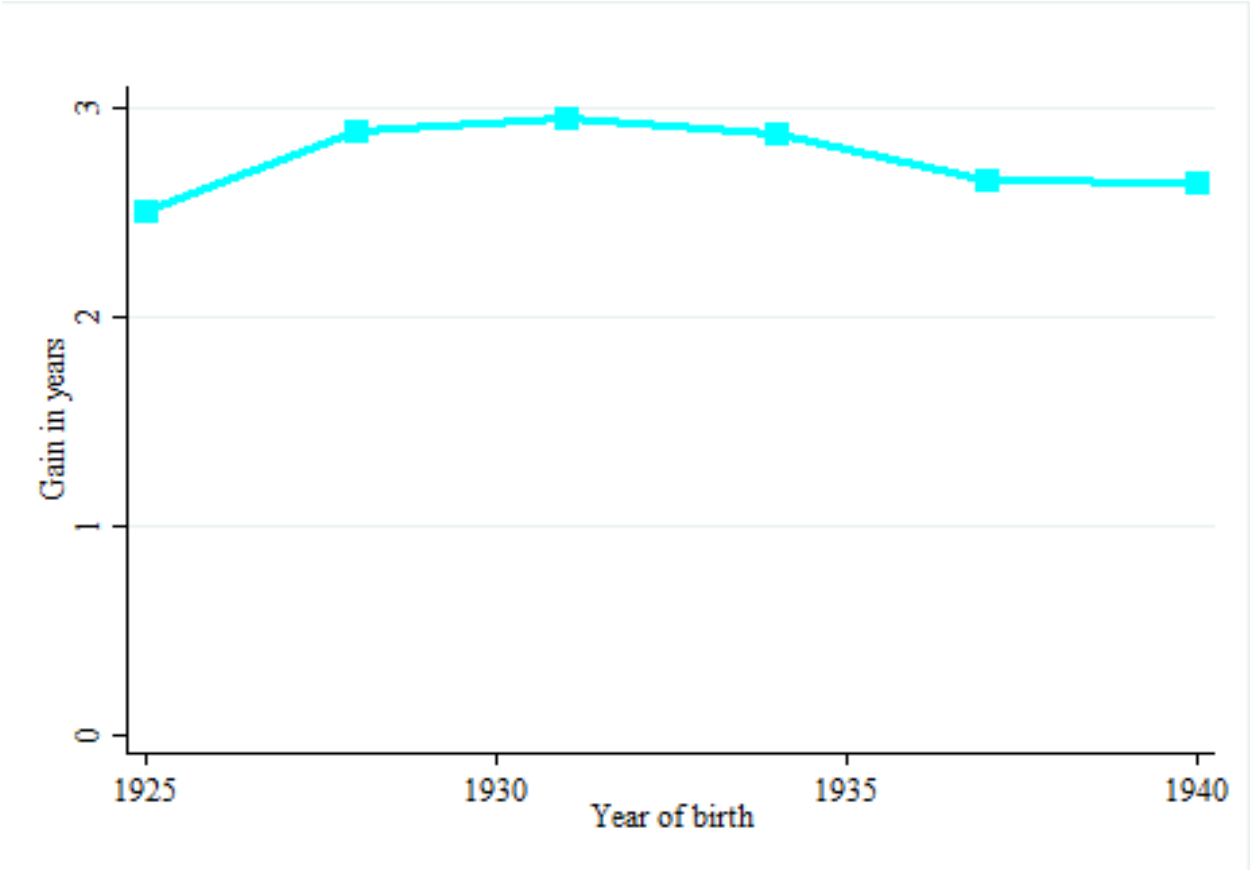


Notes: Authors' calculations based on Canada Pension Plan administrative records

In Figure 1, we show the proportion of men surviving to age 75, conditional on survival to age 50. The two lines show birth cohorts 1923-1925 vs birth cohorts 1935-1937. There is a strong

gradient of survival with earnings, with an increase of more than 20 percentage points in the survival rates as one moves from the first (lowest) to the twentieth (highest) ventile.

Figure 2: Ventile 1 to Ventile 20 Gain in years lived between ages 50-75

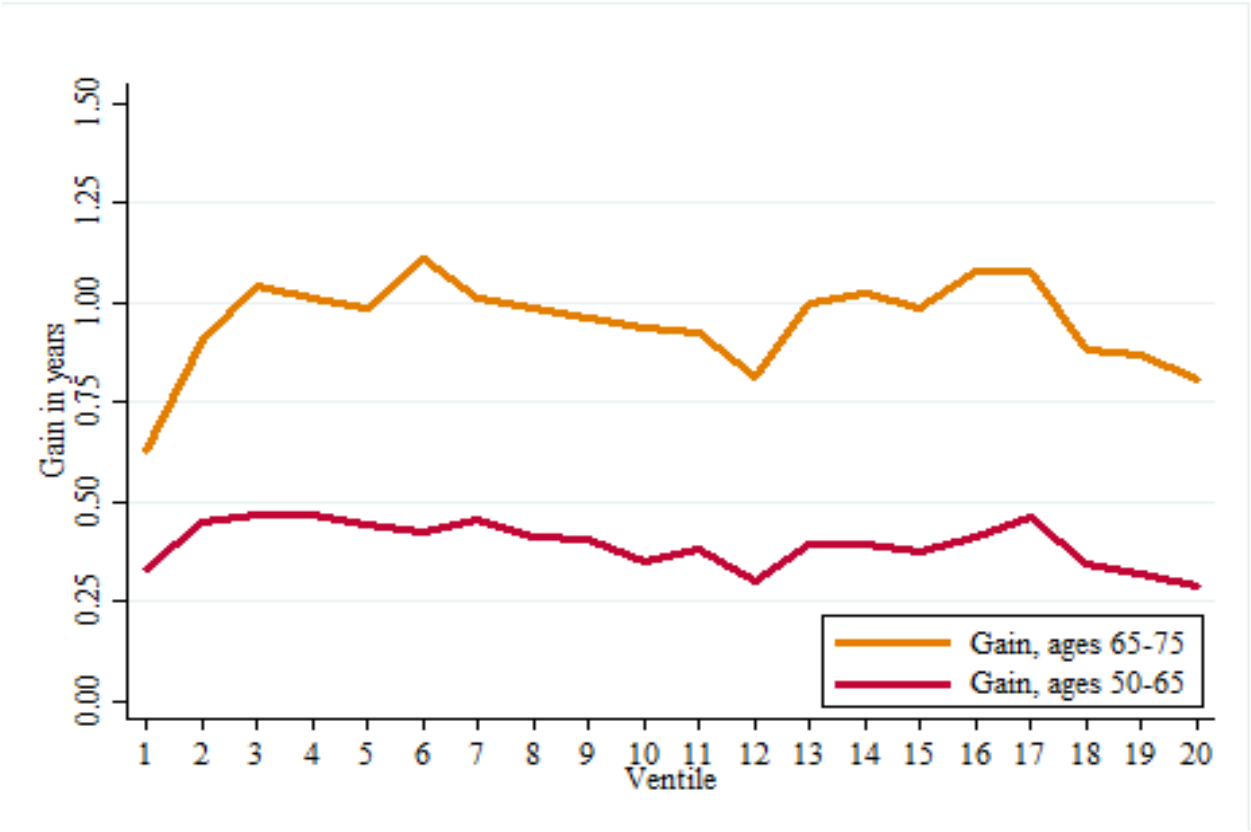


Notes: Authors' calculations based on Canada Pension Plan administrative records

In Figure 2, we plot the gain in years lived over the age range of 50-75 when someone moves from the 1st ventile to the 20th. Our results suggest a gain of approximately three years over this age range, and that this gain has been fairly constant over the birth cohorts in our sample.

Finally, in Figure 3 we show the gain between the 1925 and 1940 birth cohort in years lived for each ventile separately. This explores the gains in mortality across the earnings distribution, which Chetty et al. (2016) showed for the US to be biased toward higher earners. Here, we find that the gains in mortality have been approximately uniform across the earnings distribution for Canada.

Figure 3: Gain in years lived between ages 50-75 between YoB 1925 and 1940



To conclude this extended abstract, our work addresses a fundamental and understudied element of the distribution of wellbeing—expanded lifespans. We show that, for the case of Canada, there is a gradient in life expectancy across lifetime earnings quantiles, but this is less steep than in the United States. We also show that the improvements in life expectancy have shifted almost uniformly across the earnings distribution. In the final version of this paper, we will compare men and women, refine our approach to percentiles, and quantify the impact of absolute increases in earnings across birth cohorts on mortality.

References

Chetty, Raj, Michael Stepner, Sarah Abraham, Shelby Lin, Benjamin Scuderi, Nicholas Turner, Augustin Bergeron, and David Cutler (2016), "The Association Between Income and Life Expectancy in the United States, 2001-2014," *Journal of the American Medical Association*, Vol. 315, No. 16, pp. 1750-1766. http://dx.doi.org/10.1001/jama.2016.4226