A Century of Super–Rich Longevity

Authors Benjamin Bridgman, U.S. Bureau of Economic Analysis[1]

Contact Benjamin.Bridgman@bea.gov

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Abstract Longevity contributes to welfare, but little is known about the relationship between wealth and longevity prior to World War II. This paper examines longevity of the very highest income people during the 20th century using several "rich lists." I find that the very wealthy did not have lower mortality early on. Life expectancy at age 40 flipped from a 1.9 year penalty to a 7.5 year bonus. This increase in longevity inequality has a welfare impact that is an order of magnitude larger than increasing consumption inequality from 1950 to 1985. The urban longevity penalty of the early 20th century, particularly due to poor air quality, likely contributed to the rich penalty. The rich, a very urban population, died from causes that were more common in urban areas, particularly pneumonia.

Keywords Wealth distribution, longevity, beyond GDP

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1. Introduction

Measuring the distribution of economic indicators has developed into a large literature recently. There are several ways within traditional national accounts to measure them, including income (Fixler, Gindelsky & Johnson 2019), consumption (Garner, Martin, Matsumoto & Curtin 2024), and wealth (Batty, Briggs, Bricker, Friedman, Nemschoff, Nielsen, Sommer & Volz 2024). In addition, there are several factors outside the national accounts, sometimes called "Beyond GDP," that affect welfare that are often not distributed evenly, including longevity (Chetty, Stepner, Abraham, Lin, Scuderi, Turner, Bergeron & Cutler 2016) and leisure (Aguiar & Hurst 2009). Each indicator reports a different aspect of economic well-being, which can interact with other indicators. If they are correlated, inequality can either be compounded or mitigated depending how they are correlated. Positive correlation, such as if those holding above average wealth also have higher consumption, would imply that well-being is more disparate that any one measure would imply. Negative correlation has the opposite effect. Economic accountants have been working to link these different measures to get a more comprehensive view.[1] This paper contributes to this literature by linking the distribution of wealth and longevity.

Longevity is an important contributor to differences in well-being. For example, Jones & Klenow (2016) find that longevity is the largest non-pecuniary contributor to welfare differences between countries. Longevity scales up all the other factors that affect welfare. More years of life mean more years to consume, enjoy leisure, and all the other benefits of life. However, surprisingly little is known about the relationship between longevity and wealth due to a lack of data. Applied work is often forced to use proxies such as education (Brown, Liebman & Pollet 2002). Coverage of even these proxies is limited and is even thinner in the past. Applied work looking at long time series, such as Kopczuk & Saez (2004), must extrapolate back using current estimates. These are likely a poor proxy for a century ago. The hazards to health were different, as infectious disease was a more important source of mortality. Medical care was also more rudimentary, sometimes to the point of being counterproductive.

This paper estimates the wealth-longevity relationship back to 1900 and what the impact of this relationship is on welfare inequality. I use newly collected data on the very top echelons of wealth (super-rich) to examine whether the rich did live longer. I calculate mortality of people on various "rich lists" during 20th century by collecting the life-spans of people on six rich lists in the 20th century spanning 1900 to 1985. Then, I compare the mortality risk with the general population with the same demographics. I use the Jones & Klenow (2016) framework to examine the impact on welfare inequality. I then collect causes of death for evidence on causes of changing bonus.

[1] These efforts include linking income and consumption (Gindelsky & Martin 2024).

I find a longevity *penalty* before World War II that becomes a bonus more recently. Life expectancy at age 40 flipped from a 1.9 year penalty for the 1900 list to a 7.5-year bonus for the 1985 list. The early penalty and late bonus are both highly statistically significant. The evidence firmly rejects a longevity bonus before World War II.

Increasing inequality in longevity implies increasing welfare inequality relative to measures that only include consumption. The early penalty compresses welfare inequality, since the people consuming the most live fewer years than the average person. This effect reverses at the end of the 20th century, and so becomes a force increasing inequality. It is quantitatively important. The welfare impact of longevity inequality is an order of magnitude larger than increasing consumption inequality from 1950 to 1985.

I conclude by examining why the wealthy had a penalty early on. I analyze the causes of death of the very rich. The rich died from causes that were more common in urban areas, particularly a high prevalence of pneumonia. This finding suggests that the urban longevity penalty of the early 20th century contributed to the rich penalty. The super-rich were overwhelmingly urban at a time when the general population was not. The high prevalence of pneumonia suggests that airborne hazards were important. Before midcentury, medical interventions were less effective. So wealth did not provide access to life-extending care to counteract urban hazards.

This paper contributes to a large literature examining the longevity impact of wealth. (See Pijoan-Mas & Rios-Rull (2014) for a treatment of this literature.) Administrative data sources that link income and longevity do not arrive until the mid-20th century. The Census began asking about income in 1940, and Social Security began in the late 1930s. Even contemporary data sources do not have good coverage of the very top. The Survey of Consumer Finances, the highest quality wealth data source, exempts members of the Forbes 400. This paper provides insight into a period and population where we have little information. My methodology is similar to Hollingsworth (1957), Cummins (2017) and Hacker (2024), who examine lifespans of elite populations prior to the 20th century when good vital statistics are limited.

It also contributes to the literature looking "Beyond GDP" to include non-market production factors in economic well-being (Stiglitz, Fitoussi & Durand 2018). Dynan & Sheiner (2018) provide survey of this literature. One strand of this literature examines the economic value of longevity. These include valuing medical innovations by their impact on mortality, as in Dunn, Hall & Dauda (2022).

The results are also helpful for measuring wealth distribution. The wealth of the very top of the U.S. wealth distribution cannot be measured directly, so we must rely on indirect measures. One method to indirectly measure this distribution is to scale up wealth at death by mortality risk (the "estate multiplier" method) (Giffen 1913). The scaling factor is based on thin data for earlier data, as discussed above. This paper provides additional information about the early 20th century.

The paper proceeds as follows. I begin by describing the data and estimating life expectancies of the super-rich. I show the impact of longevity inequality on welfare inequality. I then discuss why wealth did not reduce mortality relative to the national average in the early 20th century.

2. Data

In this section, I introduce the data and describe the attributes of the sample.

2.1. Data Sources

The basis of the analysis are six lists of the richest Americans from four sources. This section describes these sources.

2.1.1. A Classification of American Wealth

A Classification of American Wealth lists several hundred of the wealthiest Americans every 25 years up to 1950. I use the 1900, 1925, and 1950 lists, as digitized by Kopczuk & Edlund (2009). The methodology is uncertain, stating only that it is "based on various historical sources." The members of the lists are almost certainly very wealthy. For my research design, it is only important that members be wealthy. I am not using wealth estimates, which have a higher degree of uncertainty.

I examine the top 500 where possible. I end up with fewer than 500 for several reasons. The 1900 list only lists 420 people. All the lists include the estates of recently deceased people, whom I exclude. The very young and old are excluded from the analysis, since there are too few of them to calculate mortality rates.

2.1.2. Forbes 400

The Forbes 400 list is a well-known list of the wealthiest Americans. Like the Classification of American Wealth, its methodology is uncertain and conducted by analysts without access to internal documentation (e.g., tax records). It is widely accepted. Its members are exempted from the Survey of Consumer Finances, so adding their wealth back is a major task of the wealth measurement literature (Saez & Zucman 2016, Smith, Zidar & Zwick 2023). It has been used in research on wealth, including Moretti & Wilson (2023).

Comparisons to administrative records show that the list is largely accurate. Raub, Johnson & Newcomb (2010) match the deaths of list members with estate tax returns. They find that all the included people were above the inclusion threshold. They identified about a dozen people that were not included that were above the threshold, compared to 376 properly included estates. Therefore, I am confident that the people on Forbes list are among the very wealthiest and any exclusions are likely to be minor.

The list began in 1982, but I use 1985. This matches the 5-year structure of data analysis and the other lists in the sample.

2.2. Fortune Magazine List

Fortune Magazine published a list of U.S. wealthiest in 1968, and followup articles in 1973 and 1979.[2] The methodology is similar to the Forbes 400. However, the reporting is less systematic. Of the 153 individuals identified as qualifying for the 1968 list (those being worth over $100 million), only the 66 above $150 million are listed. To obtain a significant sample, I augment the 1968 list with the 1973 followup, which includes 39 newly qualifying individuals who did not inherit their wealth.

This introduces some selection bias as the members of the 1973 list definitely survived from 1968 to 1973. This list is imperfect but gives coverage of 1970s, which is an important time for mortality change.

[2] The also published a list in 1957. I do not code this one since it is so close to the 1950 list but with many fewer observations.

2.2.1. Nye Committee

The Special Committee on Investigation of the Munitions Industry, or Nye Committee, published a list of taxpayers with very high incomes in 1934. Led by isolationist North Dakota Senator Gerald Nye, the committee investigated whether financial interests had pushed for and profited from WWI. As part of their investigation, the committee released the name and city of residence of all U.S. taxpayers with more than $1 million in taxable income during the years 1915 to 1920.[3] The list has 176 distinct names.

The Nye sample is selected on income, not wealth like the other lists. If there is a longevity benefit to wealth during this period, this sample should reflect it. There is a lot of overlap between very high incomes and wealth in the sample. Most of the famously wealthy people of that era are on the list, such as the DuPonts, Astors, and Rockefellers. Most of the 1918 Forbes list of the wealthiest are included. Below I show that the nine Forbes entries who were not included in the Nye sample have similar average age and lifespan.

Most theories linking wealth and longevity would suggest that the people in the sample would benefit from any longevity effects of wealth. Earning $1 million of taxable income in the 1910s meant they were extraordinarily rich, even among the very wealthy. In 1915, an income above $107,000 would put an earner in the top 0.01 percentile, and the average earnings of that percentile was $322,000. For example, such people would be able to pay for any medical care they wanted and all the food they needed. Or if people are wealthy because they are naturally healthy, earning that much is a sign of healthiness.

2.3. Methodology

I collect basic biographical information about each person: birth and death dates, and gender. I do an internet search to obtain these data. Most people on the list were very prominent (including major historical figures like John D. Rockefeller and Henry Ford), so this information is readily available from Wikipedia and newspaper obituaries (primarily those in the New York Times). Others are listed in the Business Leaders of the 20th Century database, hosted by the Baker Library of Harvard University (named after banker George F. Baker, who is included in the analysis). For the remaining names, I used searches of Google Books (which includes directories of prominent people) and record searches in Ancestry.com and Findagrave.com.[4]

[3] The list was reported in the December 14, 1934, *New York Times*, p. 6.

[4] People who earned that much all left a paper trail, though obtaining full information required some detective work. For example, one of the most difficult people to track down was Oregon grain wholesaler Max Houser. He appears in newspaper articles in 1920 after being charged with (and cleared of) corruption in his role managing grain purchases for

2.4. Data Summary

This subsection summarizes the sample. The life tables to which I will compare the sample's mortality are functions of age, race and gender, so I examine those attributes.

Table 1. Summary Statistics

	1900	1915	1925	1950	1968	1985
Avg Age	55.7	53.1	55.7	56.8	59.8	60.5
Avg age at death	73	73.2	76	78.9	82.7	83.5
Observations	403	174	457	477	104	407
Female share	15.4	14.8	27.6	35.8	11.5	16.0

The sample is dominated by older people. The average sample member is in the mid 50s early in the 20th century and increases to 60.5 in 1985. This makes the sample very old, particularly early on. The average age entering 1915 was 53.1 years old, and 79 percent were 40 years old or older entering 1915. 40 percent of White men born in 1880 died before age 40. (That cohort would be 45 in 1915.) This is not simply a function of infant mortality. Life expectancy at age 20 for White men born in 1860 was only 40 years (Haines 1998).

It is also overwhelmingly male, though that becomes less true at midcentury. This is similar to the Kopczuk & Edlund (2009) finding that decendents in the top 0.01 percent of the wealth distribution in the 1920s were about 80 percent male.

I do not explicitly collect race, but I use the White population as a comparison group. The vast majority of the sample is White. In collecting biographical information, I only found two cases on non-White members: one Black and one Asian man on the 1985 list. Given how unusual wealthy non-White people were in this period, it is likely that the historical record would mention if a sample member was not White. Therefore, using White people as a comparison group is reasonable.

As noted above, the 1915 list is selected on income, not wealth. A comparison to the 1918 Forbes list indicates that the people on the Forbes list that are not included in the sample are very similar to those who are included. The nine people on the Forbes 1918 list who are not on the 1915 list died at an average age of 73.6 and were an average age of 58 at the beginning of 1915. They were 78 percent male, and all were White. All attributes are quite similar to the 1915 list.

the U.S. Food Administration, a wartime federal agency that mobilized food resources. I used his World War I draft card to obtain his birth date and middle name, which helped locate his death certificate in Idaho, all through Ancestry.com.

3. Mortality in the Data

This section compares the mortality rates of the super-rich with the broader population. I collect the data into birth cohorts and calculate mortality rates at 5-year intervals. I compare these data to life tables for the same age-gender-race mortalities in the broader population. I use two common ways of summarizing mortality to implement this comparison, survival curves and estimating Gompertz equations.

3.1. Data Structure

I use the birth and death date information to calculate survival rates by cohorts. I place individuals in 10-year birth year bins centered on census years. For example, a person is placed in the 1880 bin if he or she was born between 1876 and 1885. This exercise assumes that everyone born within the bin has the same probability of surviving another 5 years.[5]

I use this structure for several reasons. Life tables are available for Population Census years. It also has the advantage of generating enough observations to calculate survival rates. For this reason, I only use men. There are too few women to calculate their mortality rate. Pooling them would bias the results toward finding a longevity benefit to wealth, since women have slightly better survival rates. The average age at death is consistently higher for sample women, as it is in the larger population.

I compare these mortality rates with life tables. Since the super-rich data reflect contemporaneous risks, I calculate conditional survival rates using rolling decennial life tables. For example, I use the 1940 life table for 1940 to 1945 and 1945 to 1950 survival rates for same gender/age/race combination. This contrasts with how life expectancy is often reported, where mortality is projected from the mortality risks in that person's birth year. Although mortality rates are quite stable for the older ages of most of the richest, there are periods of change. For example, older mortality fell beginning in the 1970s. My measure reflects these changes. That is, if a middle-aged man on the 1950 list survived to 1980, I compare his mortality risk with that of old men in 1980, not 1950.

[5] To implement this, I rebase individuals' birth year to the Census year. For example, suppose someone was born in 1867 and died at age 70. I shift their birth year to 1870 and their death year to 1940. I treat such a person as if they survived to the beginning of 1940, when they did not. This rebasing puts people on exactly the structure of the life tables I use for comparison.

3.2. Life Expectancy Estimates

The measure of mortality difference that I will use is life expectancy. This is a very common measure. It also is an input into the welfare calculation I do below.

I estimate life expectancy by estimating Gompertz equations and using the estimated age-mortality relationship to obtain life expectancy. Gompertz (1825) proposed that mortality is log-linear in age. This relationship has been used extensively in the mortality literature. This simple representation is useful in this context due to the small sample size. The Gompertz equation explains mortality $\mu(a)$ as a function of age:

$$log(\mu(a)) = \alpha + \beta a \tag{1}$$

where a is age. This exercise uses the data described above. That is, an observation is a cohort five-year mortality rate conditional on living to age a.

Estimating log-linear relationships has econometric challenges. The most obvious is that it drops zero values because log of zero is undefined. This is an issue in this application, since some young-rich cells have zero mortality. It also imposes unattractive assumptions on error process. Log-linearizing an equation also logs the error term, which imposes atypical assumptions on the error process.

Empirical trade economists have developed methods to deal with the above econometric issues since the widely used gravity equation has same form as the Gompertz equation. The gravity equation posits that bilateral trade flows are log-linear in the size of the trading economies.

I use methods from the trade literature to solve the econometric challenges. Trade economists have adopted Pseudo-Poisson Maximum Likelihood (PPML) to estimate the gravity equation. This method allows zeros and is much less restrictive on the error process. It is also effective in the presence of heteroskedacity. A full description of the method can be found in Silva & Tenreyro (2006).

The Gompertz relationship holds best for the middle–aged to younger elderly population, so I restrict the estimation to ages 40 to 80. Younger adult ages have very low mortality and few of the observations are younger than 40. The data are very thin at the oldest ages, since there are few survivors. This is similar to Chetty et al. (2016), who use data for the ages between 40 and 76. (I go to 80 to keep a larger sample size.)

I estimate the equation:

$$\mu(a) = \exp[\alpha + \beta a + d_R(\alpha_R + \beta_R a)] \tag{2}$$

where d_R is an indicator variable for the rich. This formulation allows us to test whether the relationship is different for the rich using a Wald test. Specifically, we can test for the hypothesis that the parameters α_R and β_R are jointly equal to zero.

Table 2. Life Expectancy at 40

Variable	1900	1915	1925	1950	1968	1985
Rich	67.6	69.6	72.2	73.2	80.4	85.0
White Men	69.5	70.3	73.8	73.3	73.0	77.5
Bonus	-1.9	-0.7	-1.6	-0.1	7.4	7.5

I use the Gompertz estimates to calculate life expectancies. They are the sum of annual survival rates $(1-\mu(a))$ until 100 or until the predicted survival rate is negative. Since the data are five-year conditional mortality rates, I convert the Gompertz equations into annual unconditional mortalities. I first convert the predicted conditional mortalities into unconditional mortalities. I multiply all previous five-year conditional survival rates back to age 40. For example, the age 50 unconditional survival rate is the product of age 45 and 50 conditional survival rates. I then interpolate the predicted five-year mortalities using a log-linear projection. Table 2 reports the total life expectancy at age 40, the total expected life years for those who live to 40[6].

There is a longevity *penalty* until the 1968 list. The longevity penalty is substantial for the 1900 to 1925 lists. (The 1950 list has a penalty but it is small.) In contrast, there is a large bonus late in the 20th century. This represents a swing of 9.4 years relative to the average White man.

The shift from penalty to bonus is statistically meaningful. Table 3 reports the Gompertz equation estimates. Wald tests reject same parameters for rich in 1900, 1968, and 1985 at 1 percent level and 1925 at the 10 percent level. The point estimate shows a small difference in life expectancy in 1950, so not rejecting same parameters across groups is not surprising.

Since the penalty is surprising, I discuss it below. However, a penalty is not inconsistent with the sparse information about the early 20th century. Most penalty cohorts were born during 19th century when aggregate income-health relationship was negative (Costa & Steckel 1997). There was a longevity penalty for U.S. senators in the early 20th century (Feldman 2003). Senators were an elite group, many of which are in my sample. A late emergence of a mortality bonus is seen in other developed countries (Bengtsson & van Poppel 2011). In some, like Sweden, the socioeconomic status-longevity bonus did not appear until after the 1970s for older men (Bengtsson, Dribe & Helgertz 2020).

[6] Typical demography practice reports additional years of life at the base age. This number is additional years of life plus 40.

Table 3. Gompertz Equations

	1900	1915	1925	1950	1968	1985
Age	0.0624	0.0648	0.0712	0.0726	0.0738	0.0837
(SE)	0.0020	0.0021	0.0040	0.0023	0.0038	0.0037
Const	-5.9597	-6.1775	-6.8936	-6.9443	-6.9998	-8.0943
	0.1450	0.1497	0.2721	0.1559	0.2629	0.2581
Age Inter	0.0082	0.0071	0.0226	-0.0156	-0.0202	-0.0085
	0.0071	0.0097	0.0133	0.0110	0.0229	0.0322
Const Inter	-0.3647	-0.4089	-1.3878	1.0650	0.8336	-0.0309
	0.5354	0.7036	0.9300	0.7782	1.6597	2.4689
Obs	58	66	82	58	40	46
Psuedo-R^2	0.1006	0.1036	0.1425	0.0815	0.0774	0.1086
Wald p-value	0.0007	0.3848	0.0685	0.3564	0.0039	0.0004

The magnitude of the recent gap matches other sources. Saez & Zucman (2020) examine the evidence on the recent bonus and find a small bonus in the 1970s which grows substantially in the 1980s. The large recent bonus is similar to 5.6 year bonus for the top 1 percent of earners relative to the 50th percentile in 2001 for men of all races that Chetty et al. (2016) find.

Some caution is due since there is imprecision in estimates. The samples underlying the mortality estimates are small. Also, the comparison life tables do not cover the whole U.S. until 1931. However, the evidence firmly rejects a large wealth bonus in early years. The broader point, that mortality bonus has grown over the 20th century, is robust to there being no early penalty.

4. Welfare Inequality

This section evaluates the welfare implications of longevity inequality. I use the Jones & Klenow (2016) framework to get a rough idea of the welfare impact. Following the exercise in Brouillette, Jones & Klenow (2021), which estimates the welfare gap between Black and White Americans, I examine the welfare gap between the rich and average income population.

4.1. Theoretical Framework

I use a simplified version of the Jones & Klenow (2016) model where utility is a function of consumption $c_{i,a}$ and longevity. Utility is represented by:

$$U = \sum_{a=0}^{100} \beta^a S_{i,a}[\overline{u} + \log(c_{i,a})] \tag{3}$$

where $S_{i,a}$ is the survival probability for person i at age a and $\overline{u}$ is the intrinsic value of living.

This equation generates a welfare difference between the average A and rich R:

$$log(\lambda) = \frac{e_A - e_R}{e_R}[\overline{u} + \log(\overline{c}_A)] - \log(\gamma_R)$$

where $e_i = \sum_{a=t_0}^{100} S_{i,a}$ is life expectancy at age t_0 and $\gamma_R = c_R/c_A$ is the ratio of consumption.

The first term captures the contribution of mortality to welfare differences while the second captures impact of consumption inequality.

4.2. Implementation

I use the above framework to estimate the welfare gap between average and very rich White men from age 40.

The empirical implementation is done as follows. (The exact details are reported in the appendix.) I use the life expectancy estimates from the Gompertz equations as reported in Table 2. I use the Brouillette et al. (2021) value of $\overline{u}$, the intrinsic value of life, which is reported in 2017 dollars. Average consumption $\overline{c}_A$ is real per capita PCE from the BEA. Consumption inequality is the 2017 PCE top one percent-average ratio from Gindelsky & Martin (2024). I backcast this to earlier time periods using the Meyer & Sullivan (2022) growth rate of 90/50 consumption ratio.

4.3. Results

Table 4 reports the results of this exercise. The inequality data do not extend before World War II, so I cannot do a full accounting prior to the war. However, the longevity and consumption inequality terms are separable, so we can examine the longevity contribution in the pre-war period.

Table 4. Welfare Gaps (Log Points)

	1929	1950	1968	1985
LE Bonus	-0.32	-0.02	1.60	1.55
Cons. Inequality		0.65	0.66	0.76
Total Welfare		0.63	2.25	2.31

Mortality inequality increases growth in welfare inequality much more than the consumption inequality. The quantitative impact of the early mortality penalty turning into a bonus is large, larger than the entire welfare gap from consumption inequality. Consumption inequality is much smaller than income inequality, so provides a relatively modest impact on welfare inequality. Longevity shows strong movements and is multiplicative to period utility: More years alive means more years to enjoy consumption and the intrinsic value of life. The impact on welfare differences is an order of magnitude higher than consumption inequality. From 1950 to 1985, the consumption term contributes only 10 log points of welfare difference compared to 157 log points for longevity.

The quantitative impact is robust to small sample uncertainty. The point estimates predict a very small penalty in 1950 and no bonus before then. Most of the quantitative impact comes from the growth from that negligible penalty in 1950 to a large recent bonus. The recent bonus has support in other data, suggesting the increase in the longevity bonus is robust.

5. Why didn't wealth extend life?

It is surprising that wealth has a penalty in the early 20th century. In this section, I examine the historical record to see what accounts for the lack of a longevitybonus.[7] Explaining this finding contributes to the economic history literature that examines increasing longevity. It also helps us understand when the transition to a longevity bonus occurred, which is important for the time series of welfare inequality.

The evidence supports the idea that the wealth penalty reflects the urban longevity penalty in the early 20th century. I examine causes of death and find causes associated with urban areas, particularly pneumonia. This suggests that lower urban air quality is a mechanism for the penalty.

I collect the causes of death in the early period to provide evidence about what caused the penalty.

[7] This finding does not preclude an infant mortality bonus, such as the one Hacker, Dribe & Helgertz (2023) find in mid-19th century. The very wealthy were not infants.

Table 5. Distribution of Cause of Death

Cause	1900 Men	1915	1920 NYC (White 50+)	1920 US (All 50+)
Heart disease	33.1	36.0	23.2	19.3
Pneumonia	28.4	20.2	9.1	5.0
Stroke	10.8	14.0	8.7	12.3
TB/flu	2.0	4.4	5.8	6.8
Cancer	4.7	2.6	12.9	10.9
Included Causes	79.1	77.2	59.6	54.4
Included Infectious	30.4	24.6	14.9	11.8

Are the rich dying of different things than general population? Would wealth have an impact on those causes? I examine the historical record for the cause of death in the 1900 and 1915 samples. Tracking cause of death is resource intensive so I use resources on examining the early years with a penalty. I collect 1900 men only to reduce effort. 1915 is a small sample that reports the city or town that the person lived in, which allows calculate what share was urban.

I use the same sources used to collect the longevity data, primarily press reports. Ancestry.com includes death certificates for some states. I find definitive causes for 43 percent of men in the 1900 sample and 65 percent of the 1915 sample. For the remaining cases, press reports were either vague or omitted entirely. Vague language like "long illness" cannot be coded to a particular cause. I report the share of descendants for which a cause can be assigned.

I compare these data with two indicators from the broader population drawn from the U.S. Census Bureau's 1920 Mortality Statistics. I examine the total U.S. population and White New York City residents. The total population is the comparison group for the above exercise. I look at New York, since 43 percent of the 1915 sample are New York City residents. I look at the 50+ population, since the average age in 1915 was 53. I use 1920 as a comparison, since it has cause of death cross-referenced with age.

Table 5 reports the share of deaths by cause. I include the four top causes of death in the 1915 sample. I also include cancer, since it is an important cause of death in the comparison populations.

Heart disease is the most important among the very rich whose cause of death was reported, which is also true in the broader populations.[8] The ordering of the importance of each cause is similar, especially

[8] A concern with these data is that I cannot determine a cause of death for sizeable share of the sample so the reported data could systematically under-report certain causes. I do not think this is a major problem. The sample includes a higher

for New York City. Pneumonia is more important for the sample in New York City than in the broader United States. The only significant difference is that cancer share is lower for the rich samples. In all cases, infectious disease is a minority share. This is true despite the despite Spanish flu pandemic taking place within our period of observation (1918–19). (Three members of the 1915 sample are confirmed to have died from the Spanish flu.)

These data suggest that the rich penalty reflects the urban penalty of the time. The richest were overwhelmingly urban when the country was still very rural. Though the 1920 Census was notable for being the first where most people lived in urban areas, 49 percent of the population lived in rural areas. In contrast, 88 percent of the 1915 sample lived in cities with more than 10,000 residents. New York City was the center of wealth, with 43 percent of the sample living there. Much of the non-urban group was not truly rural. Half of them lived in small suburbs of larger cities (mostly New York City and Philadelphia), leaving only 5 percent living in small towns or country estates.

Cities had distinct longevity penalty in early 20th century even for older people. New York City life expectancy at age 50 was about 3 years lower than the nation until 1940. The gap persisted until 1970. This is a similar magnitude as the rich life expectancy penalty early in the 20th century (1.6-3.8 years).

The high prevalence of pneumonia suggests air quality may be a source of the penalty. Cities had a higher prevalence of airborne disease. They had high density (Ager, Feigenbaum, Hansen & Tan 2024) and worse air quality (Clay, Lewis & Severnini 2023). The rich were older, so this effect may persist after the urban penalty started to diminish. They were exposed to a worse urban disease environment at younger ages, which can have an impact on later disease. For example, early tuberculosis (TB) is associated with later mortality, and New York City had very high TB rates pre-1910. Some infectious disease is implicated in later heart disease (Costa 2015). Even today, air quality has been implicated in the relationship between incomes and health. Finkelstein, Notowidigdo, Schilbach & Zhang (2024) attribute big share of lower recession mortality to air quality.

Ability to obtain medical care did not counteract these urban risks. The rich had a high risk from disease hazards (heart disease and stroke) with little effective intervention at the time. (These continue to be the important causes of death among the elderly and are included among the "diseases of affluence.") While the super-rich could afford any medical intervention for chronic disease, there were few effective interventions, and some may have been dangerous in their own right (Shryock 1966). 4 percent of 1900 men died from surgery complications, which indicates medical care itself could be high-risk. Sulfa drugs had a significant mortality impact, but not until the late 1930s (Jayachandran, Lleras-Muney & Smith 2010). The richest faced similar hazards as other older White people in the interwar period.

share of suicides than the general population, suggesting that stigma is not skewing the results a great deal.

Public health interventions to reduce infectious disease hazards in cities early in the 20th century disproportionately benefited the poor. A consensus has held that the urban penalty was due to poor sanitation which led to infectious disease (Troesken 1999). This penalty declined as city infrastructure such as sewers and water treatment improved (Cutler & Miller 2005, Alsan & Goldin 2019, Beach 2021), though the quantitative impact is not settled (Anderson, Charles & Rees 2022). New York City introduced water filtration in 1911, and waterborne disease mortality rates collapsed. Other causes, such as chronic disease that was more important to the rich, were flat (Feigenbaum, Hoehn-Velasco & Wrigley-Field 2020). While the timing of the end of the urban penalty is unsettled due to limited data, it narrowed significantly during the WWI era (Gindelsky & Jedwab 2023).

At some point, wealth did confer greater longevity. This tracks the elimination of the urban penalty. New York City life expectancy begins to beat the national number around 2000. The population becomes much more urbanized, so the distinction between where the rich and average people live fades (Bureau of Vital Statistics various).

Better medical treatment for old age ailments likely contributed to the shift to a bonus. The switch to a bonus coincides with improvements in heart disease treatment in the 1970s. Aggregate expenditure on medical services was flat until 1950s which may reflect low effectiveness. It is notable that the mortality decline occurs in older people after the 1940s (Cutler & Meara 2003). It is plausible that this improvement was due to better access to medical treatments for wealthier people.[9]

The evidence is consistent with the following story. In the early 20th century, the rich lived in hazardous cities while most people did not. Medical technology was rudimentary, so it did not counteract these effects. In the late 20th century, the rich still lived in cities, but so did most of the population. Further, cities were no longer comparatively hazardous. Medical treatments for old age disease improved, generating a longevity bonus.

[9] The causes of the wealth gradient in health is an area of active study. Costa (2015) summarizes these theories. Another theory is that the wealthy have healthy habits, such as smoking less, exercising more, and eating healthful food. If so, the results suggest early 20th-century rich people did not have significantly healthier habits.

6. Conclusion

This paper examines the longevity of the highest income people during the 20th century. I find that the very wealthy did not have lower mortality early in the 20th century and may have even had a penalty, contrary to what has been assumed in the wealth inequality literature. While the very rich were unusually old, they did not have longer lives conditional on having survived to older ages. The early penalty may reflect the urban penalty of that time. The very rich were more likely to die of pneumonia, which is correlated with poor air quality in cities. Once the urban penalty faded, so did the longevity penalty.

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A. Data

A.1. Rich List Sources

American Wealth Data files from Kopczuk & Edlund (2009).

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Forbes Data files from Kopczuk & Edlund (2009).

A.2. Welfare Calculation

Average real consumption per capita is real PCE from BEA NIPA Table 1.1.6, line 2 divided by U.S. population from FRED, series B230RC0A052NBEA.

Consumption inequality is calculated as the 2017 PCE top 1%/average ratio from Gindelsky & Martin (2024). This level is backcast using Meyer & Sullivan (2022) growth rate of 90/50 consumption ratio reported in Table 2. The consumption inequality dates don't match. I use 1961 for the 1950 calculation and 1972 for the 1968 calculation.