CENTER for RETIREMENT RESEARCH at BOSTON COLLEGE

CALCULATING EXPECTED SOCIAL SECURITY BENEFITS BY RACE, EDUCATION, AND CLAIMING AGE

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Abstract

The option to claim Social Security before the full retirement age (FRA) has been around for over 50 years. But claiming benefits early has an inherent trade-off: more years of income are received in exchange for an actuarially reduced monthly benefit. The actuarial reduction is designed to be "fair" for the average worker in that, regardless of the age at which a person claims, he can expect to receive the same expected present value (EPV) of his lifetime benefits. Aside from a period of high interest rates in the 1980s, this equality has roughly held for the average worker since the inception of the actuarial reduction. But the key word here is average. Workers who live less long than the average might maximize the EPV of benefits by claiming early, while those who live longer than average might benefit more from delay. This paper analyzes this issue by calculating the EPV of Social Security benefits by race, education, and gender, all three of which are correlates of both mortality and earnings.

This paper found that:

- Non-Hispanic men, both black and white, who do not hold a college degree maximize their EPV of benefits by claiming before the full retirement age, especially using a 3-percent interest rate in the EPV calculation.
- On the other hand, white men with a college degree and white women with at least a high school degree maximize the EPV of their benefits when claiming after their FRAs.
- Within some groups, delayed claiming can result in a substantially higher EPV than early claiming, given today's low interest rates. For white female college graduates, the maximum EPV occurs at age 70 and is 16 percent higher than the EPV at 62, assuming an interest rate of 1 percent.

The policy implications of this paper are:

- More educated workers have more incentive to delay claiming than less educated workers, and non-blacks have more incentive to do so than blacks.
- Since the EPV is not a welfare measure, this result does not necessarily advocate early claiming for some, but it does point to differential incentives across socioeconomic groups.

- Since some workers can maximize their EPV by claiming at 62, policies that delay the early eligibility age to 64 but hold the actuarial reduction constant would cause some workers to sacrifice expected lifetime benefits, although the decrease is small.

Introduction

The option to claim Social Security benefits before the Full Retirement Age (FRA) has been in place for over 50 years. But the decision to claim early comes with a trade-off for the beneficiary: they get a reduced benefit for a longer period of time. While this "actuarial reduction" decreases the beneficiaries' monthly payment, it is designed to leave the expected present value (EPV) of a worker's lifetime benefits unchanged for those with the average life expectancy. But the key word in the last sentence is *average* life expectancy. The reductions may not maintain the EPV of the typical member of low socioeconomic status (SES) groups, given that their mortality is above average. This study documents the extent to which this inequality results in low-SES individuals having more incentive to claim early than high-SES workers.

To accomplish this goal, the paper estimates the EPV of Social Security benefits at each possible claiming age (62-70) for various SES groups defined by race and education and identifies the claiming age at which the EPV is the highest. Because the EPV is not a measure of welfare, the results are not intended to suggest what these workers should do. Instead, the goal is to quantify the extent to which some groups have more incentive to delay than others.

Calculating the EPV of Social Security benefits at different claiming ages requires three inputs: 1) interest rates; 2) mortality rates; and 3) lifetime earnings. For the interest rate, the paper tests the sensitivity of results to rates of 1 percent (a likely value given recent trends) and 3 percent (a more traditional long-run level). For the other two inputs, no single dataset contains a large enough sample to accurately estimate mortality rates and lifetime earnings for smaller SES groups. Instead, this paper combines data from two different sources to calculate mortality and lifetime earnings respectively: the *National Longitudinal Mortality Study* (NLMS) and the *Survey of Income and Program Participation* (SIPP) linked to administrative W-2 data.

To estimate mortality rates, this paper updates the procedure followed by Brown, Liebman, and Pollet (2002), which used mortality data from 1979-1987, to estimate cohort mortality rates from 2004-2011. This procedure estimates cohort mortality in two steps: 1) the mortality of different SES groups is calculated relative to the average in the NLMS; and 2) these estimates are applied to the average cohort mortality rates maintained by the Social Security Administration (SSA) to obtain an SES-adjusted cohort mortality rate. For SES, the paper uses the same definition as Brown, Liebman, and Pollet and divides people into 12 SES groups – six for each gender. The six groups are: 1) white, less than high school; 2) white, high school graduate plus some college; 3) white, completed four years of college; 4) black, less than high school; 5) black, at least high school; and 6) Hispanic.

To calculate lifetime earnings and, ultimately, each SES group's average benefit at each claiming age, the paper uses the SIPP linked to administrative W-2 data made available through the U.S. Census's SIPP Synthetic Beta project. This project allows researchers to access a subset of essential SIPP variables linked, via Social Security number, to an SSA-produced extract from W-2 tax records, including an individual's total Social Security eligible earnings for each year from 1960-2011.[1] The study uses these records to estimate respondents' Primary Insurance Amount (PIA) as of age 62 and averages these PIAs within the SES groups. These PIA averages are then used in each groups' EPV calculation.

The findings suggest that, as expected, better-educated SES groups increase their EPV by delaying claiming well past the Early Eligibility Age (EEA) and, for some groups, well past the FRA. Lower SES groups benefit from claiming early. However, the extent of the differences in their EPVs depends on the interest rate assumed: all else equal high rates increase the value of early claiming. If one assumes a 3-percent interest rate, a five-year gap exists between the SES group with the lowest claiming age that maximizes the EPV and the SES group with the highest maximal claiming age, with several groups maximizing the EPV at the EEA of 62. The differences among SES groups are slightly smaller among women, with a gap of four years. At an interest rate of 1 percent, all SES groups have a higher EPV by delaying claiming past age 62. Of course, variance across groups still exists – for men a gap of four years exists between the group with the earliest maximal claiming age and the highest maximal claiming age and for women that same gap is two years.

The paper also conducts a counterfactual exercise to consider the effect of increasing the early eligibility age to 64. Pushing back the EEA by two years would cause the least-educated men to claim later than their maximum EPV, but the loss of EPV is just $3,000 over their lifetimes. This finding does not necessarily suggest the effect of pushing back the early eligibility age is trivial – workers who claim early are often in poor health and less educated than others, making working longer difficult (Haverstick et al., 2007).

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[1] The SSB alleviates privacy concerns by allowing researchers to first run their analyses on synthesized data and then, through a U.S. Census employee, re-run the analysis on actual data. The synthetic data aim only to match unconditional means of the public-use SIPP variables, so conditional analysis for selected subsamples is not meaningful. With this consideration, the results reported in this paper are the average of the estimates produced from the Completed Data Files.

The paper is organized as follows. The next section reviews the literature. The following section discusses how mortality estimates are obtained and how lifetime earnings are estimated. The fourth section provides the results. The final section concludes that the inequality in mortality rates among various SES groups results in variations in the age at which the EPV of benefits are maximized and, in some cases, the difference in EPV is non-trivial.

Literature Review

The literature on Social Security's actuarial reduction has tended to focus on individuals with average mortality. In the 1960s, when the actuarial reduction was introduced, the 20 percent reduction in monthly benefits for claiming at 62 instead of 65 made sense – average life expectancy at 65 was 15 years, so claiming at 62 yielded a 20 percent (3/15) longer benefit receipt period. The size of the reduction for claiming at 62 relative to 65 has remained mostly unchanged, despite the fact that mortality has decreased; in theory, this should mean delaying has become more valuable. But, remarkably, the effectiveness of the actuarial reduction has endured, because interest rates have generally been higher than they were at its inception, making delaying more costly. Jivan (2004) found that the EPV of claiming at 62 was still equal to the EPV of claiming at 65. Munnell and Sass (2012) found that decreasing interest rates between 2004 and 2010 affected this equality, reducing the EPV at 62 to 92 percent of claiming at 65 — still close to 1 but showing some benefit to delay. In any case, an extensive literature has documented a large and growing inequality in mortality, meaning the benefit of delay will be very different for different SES groups.

One of the earliest studies documenting differences in mortality across SES was Kitagawa and Hauser (1973), who defined SES by education, race, income, and other covariates using death records linked to the 1960 Long-Form Census. More recently, in a paper that provides a roadmap for this study's mortality calculations, Brown, Liebman, and Pollet (2002) used NLMS data from the 1980s to show extensive inequality across socioeconomic groups defined by race and education. These studies find blacks and the less educated have shorter life expectancies. Studies that use income instead of race or education come to similar conclusions: Waldron (2013) found an inverse correlation between lifetime earnings and mortality. This inequality means that the EPV of Social Security benefits for some socioeconomic groups will differ by claiming age – for groups with higher-than-average mortality, earlier claiming will produce higher EPVs, with the reverse holding for groups with lower-than-average mortality.

Furthermore, because inequality in mortality has increased over time, this fact is likely more true today than in the past.

While early studies examining trends in mortality inequality over time found mixed results, more recent studies have tended to find large increases.[2] For example, Waldron (2007) used lifetime labor market earnings as a measure of SES and found that mortality has declined more rapidly in the top half of the earnings distribution than in the bottom half. Christia (2009) also looks at lifetime earnings – this time in quintiles – and finds substantial increases in life-expectancy inequality between 1983 and 2003.

Authors using education as their measure of SES come to similar conclusions. A study by Cutler et al. (2011) examines two educational groups – those with at least some college and everyone else – and found increasing mortality differentials. Bound et al. (2014) examine mortality between 1990 and 2008, and find a large increase in inequality between the bottom and top quartiles.[3] Bosworth, Burtless, and Zhang (2015) examine rising mortality inequality by both income and relative education for sample members in two relatively small datasets, the HRS and the SIPP. In both samples, and using varying measures of education, they find evidence of rising inequality. Finally, the National Academy of Sciences used the HRS to estimate an increasing relationship between income and mortality between the 1930 and 1960 birth cohorts (National Academy of Sciences, 2015). The whole of this literature makes one thing clear: inequality across SES exists and is getting worse. What does this mean for the EPV of Social Security benefits across SES groups and for various claiming ages?

Empirical Approach

The EPV of claiming Social Security at a given age is the sum of the individual's annual benefits over his remaining lifetime, discounted by the interest rate and their probability of death. This quantity can be expressed in the following equation:

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[2] For examples of earlier studies that came to conflicting conclusions, see Rogot, Sorlie, and Johnson (1992), which found little increase in mortality inequality and Pappas et al. (1993), which found widening inequality.

[3] Bound et al. (2014) was a refinement of work by Olshansky et al. (2012), who found an *increase* in mortality among white high school dropouts between 1990 and 2008. Bound et al. did not find an increase in mortality among the lowest quartile of whites by education and argues the difference is because Olshansky's finding incorporates both rising inequality by SES and the fact that high school dropouts became a more disadvantaged group over the time period studied. Another study finding an increase in mortality around the same period is Case and Deaton (2015), but they focused only on whites aged 45-54.

$$EPV_{x,c} = \sum_{a=62}^{120} \frac{1}{(1+r)^{a-62}} s_{x,a} SS_{x,c} * I(a \geq c) \quad (1)$$

where x is the individual's SES group; c is the claiming age being used to calculate the EPV; r is the interest rate; a is the age at which the benefit is received; $s_{x,a}$ is the probability of a person in group x surviving to age a; $SS_{x,c}$ is the estimated average Social Security benefit of group x claiming at age c; and $I(a \geq c)$ indicates whether the benefit has been claimed as of age a. Equation (1) calculates the EPV of claiming at various ages for individuals as of age 62. This approach answers the question, "What is the EPV of each potential claiming age for a 62-year-old individual deciding what age to claim?" Calculating the results of equation (1) for individuals making the decision as of each claiming age (e.g., for a 67-year-old deciding to claim at 67) would assume individuals have survived to that age, understating the effect of differential mortality.

Equation (1) makes clear that estimating the EPV of Social Security benefits across SES groups requires: 1) the interest rate; 2) mortality estimates for each group; and 3) estimates of the typical PIA for each group to calculate the benefit at each claiming age. This section describes how the final two components are estimated, with sensitivities for the EPV estimates to various interest rates provided in the results section.

Estimating Mortality by SES

To estimate mortality by SES for individuals who turn 62 in 2012 (the 1950 birth cohort), this paper follows the methodology of Brown, Liebman, and Pollet (2002) and applies a two-step process. The first step uses the NLMS to calculate annual mortality rates for each SES group relative to the average mortality rate. The NLMS is used for this purpose because it consists of individual-level data from the *Current Population Survey* (CPS) – which provide data on SES – matched to data from death certificates obtained from the National Center for Health Statistics. The data are from 2004-2011, a span of years recent enough to be relevant and long enough to have a reasonable sample size in each SES group.[4] Table 1 provides the number of observations and deaths in each SES group and makes clear that lower-educated and minority groups have higher average mortality.

[4] 2011 was the most recent year the NLMS made a link to death certificates, although more recent data will be available in the future.

To estimate the relevant mortality rates, a Census Bureau statistician provided us with tables containing the number of individuals alive in the NLMS at each age and in each SES/gender group between 2004 and 2011. The study calculated age-specific mortality rates using these tables and the following formula:

$$m_{x,a} = \frac{l_{x,a} - l_{x,a+1}}{l_{x,a}} \qquad (2)$$

where x represents the demographic group and l the number of individuals living at age a from the NLMS sample.

In theory, these rates contain enough information to estimate the relative mortalities, which are each SES/gender group's mortality rates relative to the average mortality rate for that gender. However, even given the use of data across several years, in some age-SES-gender cells the number of deaths is small enough that the estimated mortality rate is non-monotonic with age: at some ages it may appear mortality rates decrease with age even though this does not actually in the population. For this reason, the project fits a non-linear, least squares regression using the Gompertz-Makeham formulation:

$$q_{x,a} = 1 - sg^{c^{x,a+1} - c^{x,a}} \qquad (3)$$

where $q_{x,a}$ is the mortality rate for a given SES/gender group at age a; s is the age-invariant aspect of mortality (e.g., some groups are more likely to die at any age); and the parameters g and c are group-specific age-mortality profiles. The predictions following this regression are then used to calculate the relative mortality rates of each SES and gender.

For example, Figure 1 illustrates both the raw data and the fitted regression for black men and for the average male, and Figure 2 shows the relative mortalities for black men implied by Figure 1. Figure 1 also illustrates one nice feature of the approach – it uses data from the years prior to age 62 (the EEA) to calculate the mortalities after age 62, since the relationship estimated by the Gompertz-Makeham model applies to all ages in the middle of the life-span. Appendix A contains the estimates of mortality relative to the average at each age from 25 to 100 for each of the 12 SES groups.

The fitted mortality rates presented in Figure 1 represent “period” estimates of that group’s mortality. Period estimates illustrate mortality by age at a given point in time, namely 2004-2011. However, the EPV calculations need to take into account improving mortality – an individual turning 62 in 2012 will turn 72 in 2022 when, presumably, their mortality will be lower than a 72 year old’s was in 2012. Such estimates are called “cohort” mortality estimates. To go from a period estimate to a cohort estimate, the project applies the relative mortality for each SES and gender group to that group’s average cohort mortality as calculated by the Social Security Administration in 2012.[5]

As an example of how the calculation works, to estimate cohort mortalities for blacks with at least a high school diploma at age 70, the project multiplies 1.25 (the ratio of their mortality to average male mortality) by 2.5 percent (the mortality rate of the average man according to SSA cohort mortality) to arrive at an estimated cohort mortality rate of 3.2 percent. As Figure 2 indicates, for black men that did not finish high school, the calculation would have a larger adjustment of 1.57 to arrive at a mortality rate of 4.0 percent. Once the adjustments are made for all groups, the project has estimates of cohort mortality that reflect both Social Security’s assumptions on mortality improvements in the future and the differences in relative mortality estimated in the NLMS data. These mortality estimates are contained in Appendix B for each SES group. These estimates can be used to calculate the survival probabilities required for equation (1), as illustrated for black men in Figure 3. The estimates can also be used to calculate life expectancies at age 62, as illustrated by Table 2. Not surprisingly, Table 2 shows that life expectancies at 62 are increasing with education. For example, white men with less than a high school degree have age 62 life expectancies that are five years shorter than those with a college degree.

One interesting exercise is to see how life expectancies have changed since Brown, Liebman, and Pollet conducted their analysis with 1980s data. To accomplish this, we re-ran the calculations using the relative mortalities from the Brown, Liebman, and Pollet study and the SSA cohort mortality tables for the 1920 birth cohort – approximately when 62-year-olds in their sample would have been born.

The second column of Table 2 shows how long individuals would be expected to live past age 62 in their sample and illustrates that inequality has increased along the dimension of

[5] Note that this assumes that the mortality of blacks and whites improve in the future at the average rate assumed by SSA, although Table 2 suggests that over the last several decades blacks have generally seen faster improvements.

education but has decreased across race. To illustrate this, the third column calculates the change in life expectancy over the 30 years and shows that within each gender the smallest improvements were for white high school dropouts, while white college graduates and blacks with at least a high school degree saw the largest gains. For white women who dropped out of high school, the study actually finds a very slight *decrease* in life expectancy. However, when viewing these results, it is important to remember that over the 30 years considered, the group of high school dropouts shrank considerably. This fact means that some of the rise in inequality may be because this SES group became increasingly disadvantaged over time.

Estimating Primary Insurance Amounts by SES

The second piece needed to calculate the EPV of claiming at different ages is the expected Social Security benefit of each gender and SES group at each claiming age. To estimate this quantity, the paper uses data from the SIPP linked to administrative W-2 data from 1960 to 2011 through the SIPP Synthetic Beta Project (SSB). The SSB allows researchers to write computer code that estimates a desired quantity on synthetic earnings data and then provide that code to a Census researcher to run on administrative W-2 data. This paper presents results based on the actual W-2 data.

The analysis is restricted to individuals turning 62 between 2004 and 2011 and calculates their PIA as of age 62 based on their highest 35 years of actual reported earnings adjusted using the average wage index.[6] The sample also includes only individuals who would qualify for a Social Security retirement benefit, i.e., individuals whose FICA earnings exceeded the amount required to receive a quarter of coverage credit in at least 10 years. The benefit at any claiming age is then simply the PIA adjusted by whatever actuarial adjustment would apply. This calculation implicitly assumes that individuals claiming after age 62 either: 1) do not work and, thus, do not accrue additional years of earnings that could affect their benefits; or 2) they do work but any additional year yields earnings low enough that they do not factor into the top 35 years of earnings. While this is a simplifying assumption, average earnings after age 62 are lower than during workers' primes (Reznick, Weaver, and Biggs 2009).

For purposes of this calculation, the PIA for each man or woman is calculated based on their own earnings and ignores the fact that in some cases they may qualify for a spousal benefit.

[6] 2011 was the last year the SIPP was linked to administrative W-2 records.

Once the PIA is calculated for each individual in the SIPP sample, the average is taken within each SES group to come up with the PIA used to calculate Social Security benefits at each claiming age as required by equation (1). Table 3 contains the estimated PIAs for each gender and SES group. As expected, Table 3 shows that the PIAs of men are higher than those of women with comparable educations and that PIAs within each racial/gender group are increasing with education.

Results

Calculating the EPV of the Social Security benefit requires the estimates of mortality and the PIA described above, but also an estimate of interest rates. Because it is unclear which interest rate will prevail in the future, this section presents the results of the analysis under two scenarios: 1) 1 percent to reflect the current level; and 2) 3 percent to reflect a more typical situation. The section first presents an analysis of the claiming age that maximizes the EPV of benefits for each SES group and then discusses what the results mean for policies such as increasing the EEA to 64.

Claiming Ages that Maximize the EPV of Social Security Benefits

Equation (1) is used for each claiming age from 62 to 70 to calculate the point at which each SES group maximizes the EPV of its Social Security benefits. Increasing the claiming age by a year has offsetting effects, since each year of delay increases the EPV through a larger monthly benefit but also reduces the EPV for two reasons: 1) the individual is less likely to survive to receive the benefit at all, and if it is received, the length of time is shorter; and 2) the amount is discounted by the interest rate. The contention of this paper is that the mortality effect will cause different SES groups to have different ages that maximize the EPV of their benefits.

Table 4 shows the estimates for equation (1) for all 12 SES/gender groups for claiming ages 62 to 70 and highlights the age maximizing the EPV of benefits. The results show that the higher mortality of blacks and whites with less than a high school diploma means that they maximize the EPV of benefits by claiming earlier. Under a 1-percent assumed interest rate – when delaying makes more sense than under a 3-percent rate – the claiming age at which the EPV is maximized for white men ranges from 65 to 69. For blacks the range is smaller, from 67 to 68.[7] Hispanics actually look more like college-educated white males, with the maximum age at 69. The reason is that when examining U.S. datasets like the NLMS, Hispanics actually have relatively low mortality, a fact referred to in the literature as the Hispanic mortality paradox.[8] Under an interest rate of 1 percent, the maximum EPV of women is typically fairly late – the lowest maximal EPV claiming age is 68.

Under an assumed interest rate of 3 percent, the highest EPV for several male groups is actually at age 62– when delaying is more costly. Compare this result to white male college graduates, whose EPV is maximized at 67 even under the 3-percent rate assumption. For women, the results are similar with smaller magnitudes. Several low-SES groups maximize the EPV of their benefits by claiming at 64, while white female college graduates maximize benefits at age 68. Again, Hispanic men and women are most comparable to white college graduates.

Still, while the difference in the ages at which the EPVs are maximized can appear quite large, the differences in the values of the EPVs across claiming ages are modest. Figures 4A to 4B show the ratios of the EPV at each claiming age to the maximum EPVs each male SES group could receive. Figure 4A does the calculation for whites at interest rates of 1 and 3 percent, respectively, and Figure 4B does the same for blacks and Hispanics. Figures 4C and 4D show the same estimates for women. The results show that, regardless of the claiming age or SES, the EPV of benefits falls within 16 percent of the maximum level.

Even though differences in the EPVs are modest, interesting variations do exist. At an interest rate of 1 percent, white, female college graduates would decrease their EPVs by 16 percent if they claimed at 62 (EPV of $277,400) instead of their maximum EPV age of 70 ($321,200). Compare this result to white females with some college who decrease their EPVs by 10 percent by claiming at 62 ($205,100), since their maximum claiming age is 69 ($230,100). And at an interest rate of 3 percent, some groups clearly have higher EPVs when claiming well before their FRAs. The most glaring example of this finding is white high school dropouts whose EPV of benefits is highest if they claim at age 62 ($163,100) and decreases by 13 percent if they delay claiming all the way to 70 ($141,900).

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[7] Somewhat counterintuitively, white men with the same level of education have a lower maximal claiming age. This occurs because even though black men with less than a high school degree have higher mortality than whites over much of their lives, blacks after age 62 have slightly lower mortality and slightly longer life expectancies – see Table 2.

[8] Although it is somewhat unclear whether Hispanic mortality is actually lower or if it is a data quality issue, for example, because unhealthy Hispanics return to their home countries and drop out of the data used for analyses like this one. For a discussion of this issue, see Turra et al. (2008).

Pushing the EEA Back to 64

The data in Table 4 can be used to determine which groups would lose out on expected benefits if they were forced to claim no earlier than age 64.[9] As is implied by the discussion above, less educated males are the most affected, but the differences are small and only appear when the assumed interest rate is 3 percent. For white high school dropouts, pushing the EEA back to 64 would cost them less than $3,000 in EPV since claiming at 64 results in an EPV of $160,500 in benefits but claiming at 62 is an EPV of $163,100. For black high school dropouts, a similarly small difference exists, with a reduction in EPV from $139,900 to $137,800. For the other 10 SES groups, claiming at 64 has a similar or higher EPV than claiming at 62. Policies that increase the EEA may have other detrimental effects, for example, eliminating the only source of income some workers have should they be forced to retire before they can claim. But the policy would not significantly reduce the expected lifetime value of benefits for any SES group.

Conclusion

The actuarial reduction in monthly benefits is meant to equate the expected present value of Social Security retirement benefits no matter when a worker claims them. This equality is meant to hold for the average worker. But for disadvantaged SES groups – who tend to have higher mortality than average – the expected value of benefits could be higher when claiming early, while high SES groups benefit from delay. Indeed, this paper shows that the gap between claiming ages that maximize the EPV can be as large as 5 years for men and 4 years for women.

At the same time, the differences in EPVs between earlier and later claiming are modest. Within SES groups, the largest difference that exists between the lowest and highest EPV of benefits is 16 percent for female college graduates: if they claim at 70, their EPV is $321,200 dollars, but if they claim early at 62, it is just $277,400 dollars. The results highlight that members of different SES groups face different claiming incentives, due to inequality in mortality. Low-SES groups have more incentive to claim early, while high-SES groups have an extra incentive to delay. While this research does not suggest that low-SES individuals should

[9] An extensive literature exists on the effects of pushing back Social Security's EEA to 64. For example, Olsen (2012) explores the distributional effects of raising the FRA only or the raising the EEA and FRA in tandem. Gustman and Steinmeier (2005) explore the effects on retirement timing of increasing the EEA from 62 to 64. And Vinkenes et al. (2007) discuss the various policy issues that would need to be addressed were the EEA actually increased.

claim their Social Security benefits as early as possible – after all, the EPV is not a measure of welfare – it quantifies the extent to which their higher mortality rates diminish the gains of delay.

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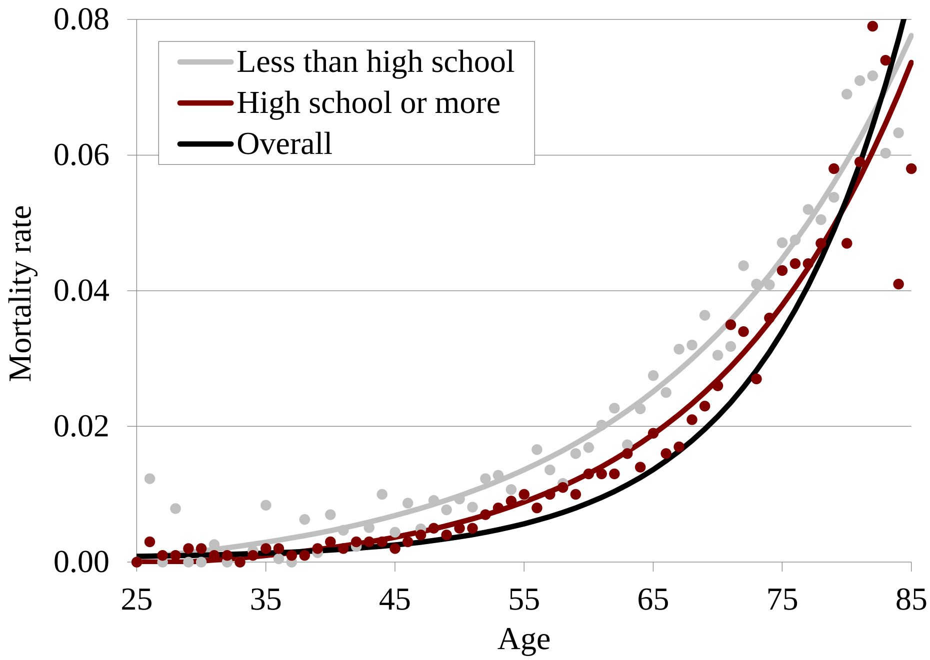
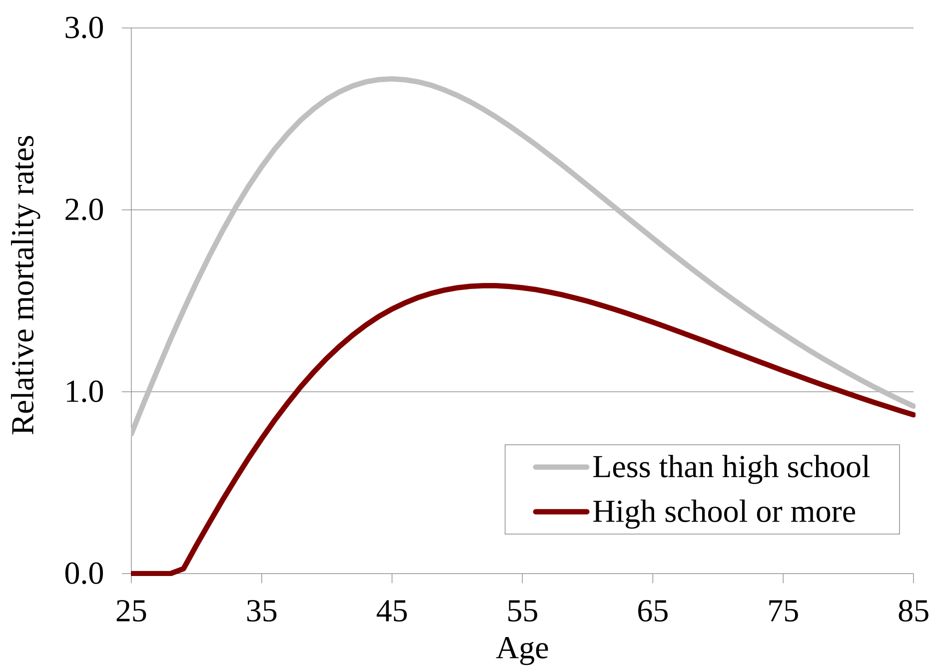
Figure 1. *Raw and Gompertz-Makeham Smoothed Mortality Rates for Non-Hispanic, African American Men, Ages 25-85*



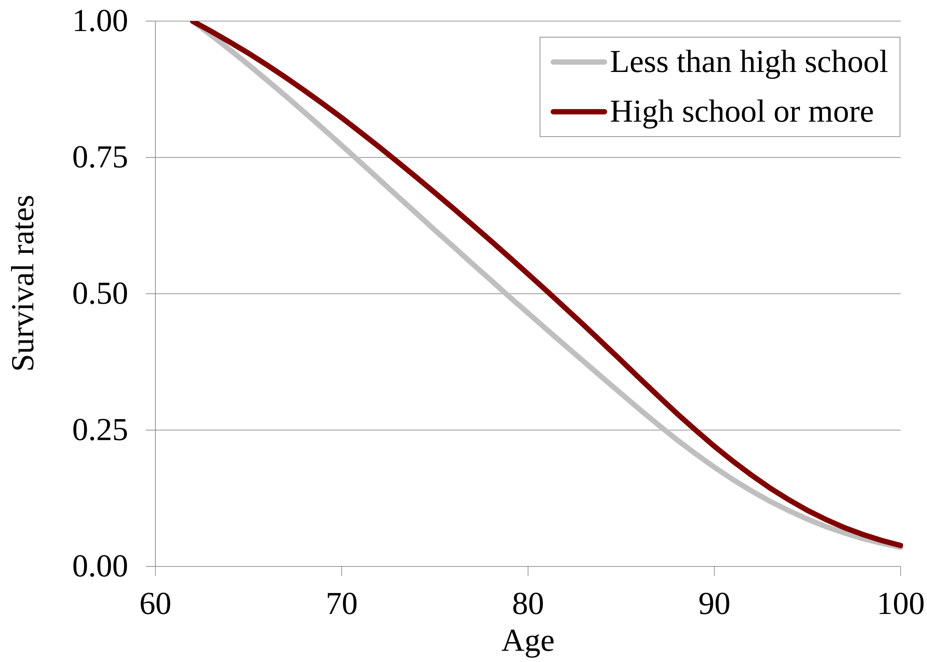
Source: Authors' calculations based on restricted *National Longitudinal Mortality Study* (NLMS) data provided by the U.S. Census.

Figure 2. *Relative Mortality Rates for Non-Hispanic, African American Men to the National Average Mortality Rate for All Men, Ages 25-85*



Source: Authors' calculations based on restricted NLMS data provided by the U.S. Census.

Figure 3. *Survival Rates of Non-Hispanic, African American Men at Age 62*

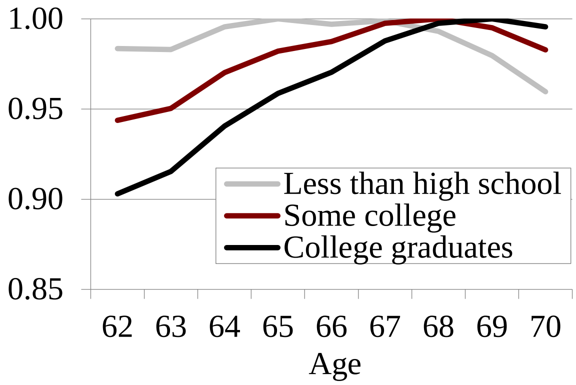


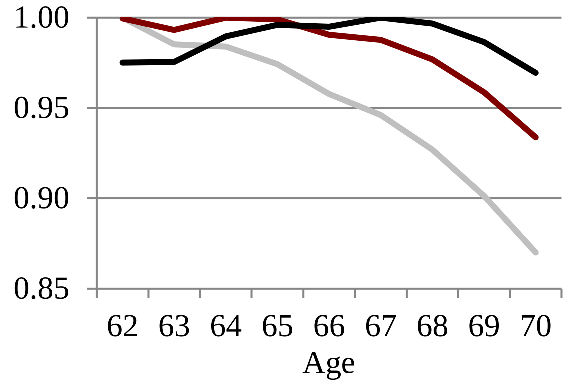
Sources: Authors' calculations based on restricted NLMS data provided by the U.S. Census and 1950 Birth Cohort Mortality Rates from the Social Security Administration.

Figure 4. *Ratio of the SSA Lifetime Benefit to Maximum Benefit by Claiming Age, Gender, Race/Ethnicity, and Educational Attainment*

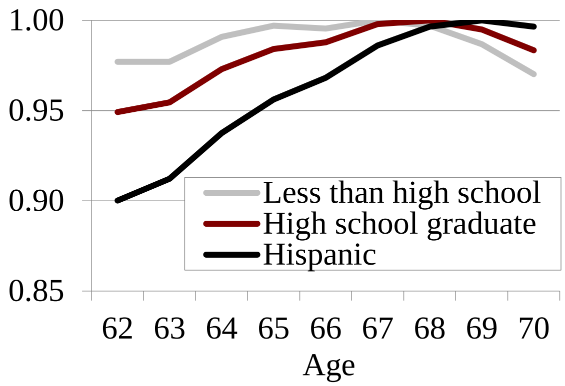
1% Interest Rate Assumption | 3% Interest Rate Assumption

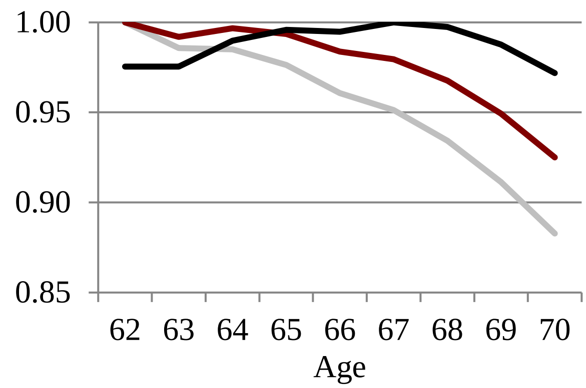
A. *Non-Hispanic white men*



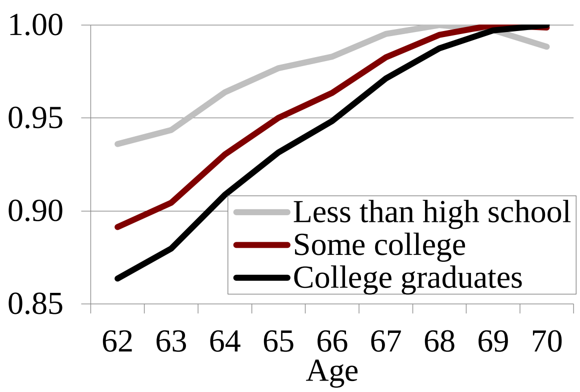


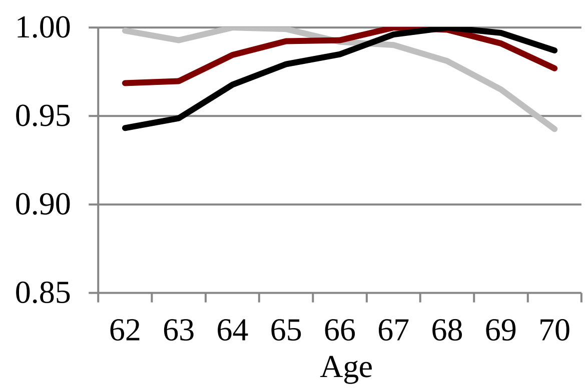
B. *Black men by education and Hispanic men*





C. *Non-Hispanic white women*

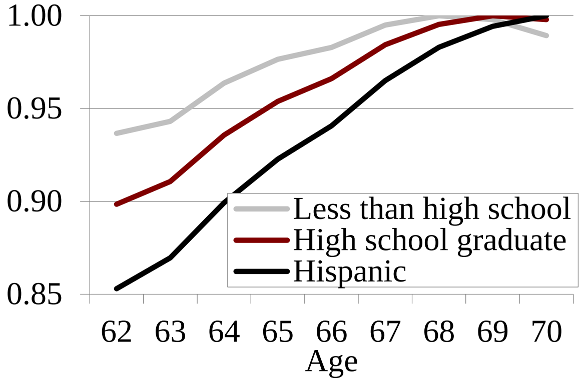


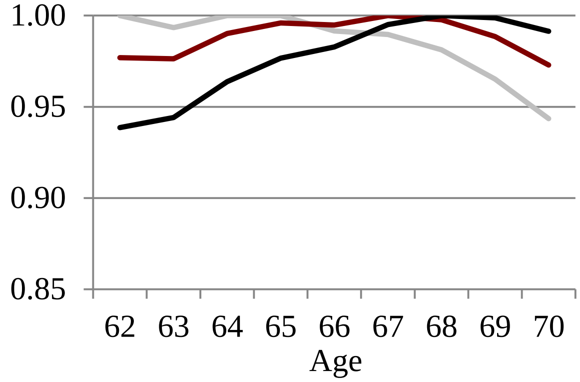


1% Interest Rate Assumption

3% Interest Rate Assumption

D. *Black women by education and Hispanic women*





Sources: Authors' calculations based on restricted NLMS data provided by the U.S. Census, 1950 Birth Cohort Mortality Rates from the U.S. Social Security Administration, and the U.S. Census and Cornell University *Survey of Income and Program Participation*.

Table 1. *Number of Deaths, Observations, and Mortality Rates by Gender, Race/Ethnicity, and Educational Attainment Groups for those Aged 25-84, 2004-2011*

Gender	Race/ ethnicity	Education	Total number of deaths	Person-year observations	Overall mortality rate
Men	White	Less than high school	10,437	386,902	0.0270
		High school/some college	24,048	2,048,772	0.0117
		Bachelors and more	7,953	1,111,940	0.0072
	Black	Less than high school	2,163	84,863	0.0255
		High school or more	3,133	297,583	0.0105
	Hispanic		3,481	579,539	0.0060
Women	White	Less than high school	9,227	418,168	0.0221
		High school/some college	23,366	2,528,067	0.0092
		Bachelors and more	4,094	988,550	0.0041
	Black	Less than high school	2,538	122,342	0.0207
		High school or more	3,314	428,614	0.0077
	Hispanic		2,820	647,208	0.0044

Source: Authors' calculations based on restricted NLMS data provided by the U.S. Census.

Table 2. *Life Expectancy at Age 62 by Gender, Race/Ethnicity, and Educational Attainment*

			Life expectancy at 62		
Gender	Race/ ethnicity	Education	Current differentials (1950 birth cohort)	Brown et al. differentials (1920 birth cohort)	Change
Men	White	Less than high school	16.6	15.1	1.5
		High school/some college	19.1	16.5	2.6
		College grads	21.7	18.2	3.5
	Black	Less than high school	17.0	13.0	4.0
		High school or more	18.6	14.4	4.2
	Hispanic		21.8	18.7	3.1
Women	White	Less than high school	19.4	19.5	-0.1
		High school/some college	22.3	20.7	1.6
		College grads	24.3	21.7	2.6
	Black	Less than high school	19.3	17.4	1.9
		High school or more	21.7	19.2	2.5
	Hispanic		25.0	21.9	3.1

Sources: Authors' calculations based on restricted NLMS data provided by the U.S. Census, 1950 and 1920 Birth Cohort Mortality Rates from the Social Security Administration, and Brown, Liebman, and Pollet (2002).

Table 3. *Primary Insurance Amount by Gender, Race/Ethnicity, and Educational Attainment, 2004-2011*.

Gender	Race/ ethnicity	Education	Primary insurance amount
Men	White	Less than high school	$16,500
		High school/some college	20,000
		College grads	22,600
	Black	Less than high school	14,100
		High school or more	17,400
	Hispanic		15,700
Women	White	Less than high school	10,100
		High school/some college	13,300
		College grads	16,600
	Black	Less than high school	9,700
		High school or more	14,100
	Hispanic		11,500

Source: Tabulations provided by U.S. Census Bureau and Cornell University, *Survey of Income and Program Participation*.

Table 4. *Expected Present Value of Lifetime SSA Benefits by Claiming Age, Gender, Racer/Ethnicity, and Educational Attainment, in Thousands*

Gender	Race/ ethnicity	Education	62	63	64	65	66	67	68	69	70
			1% interest rate assumption								
Men	White	Less than high school	$197.2	$197.1	$199.6	$200.5	$199.9	$200.3	$199.1	$196.4	$192.4
		HS/some college	270.0	271.9	277.6	281.0	282.5	285.4	286.1	284.7	281.2
		College grads	341.5	346.2	355.7	362.6	367.0	373.6	377.3	378.2	376.5
	Black	Less than high school	170.5	170.5	172.9	174.0	173.7	174.5	174.0	172.2	169.3
		High school or more	228.0	229.3	233.7	236.4	237.3	239.7	240.2	239.0	236.2
	Hispanic		238.0	241.2	247.9	252.8	256.0	260.7	263.5	264.4	263.5
Women	White	Less than high school	137.5	138.6	141.6	143.5	144.4	146.2	146.9	146.5	145.2
		HS/some college	205.1	208.1	214.1	218.6	221.7	226.1	228.9	230.1	229.8
		College grads	277.4	282.6	291.9	299.2	304.6	312.0	317.2	320.3	321.2
	Black	Less than high school	131.6	132.5	135.4	137.2	138.1	139.8	140.5	140.2	139.0
		High school or more	212.3	215.2	221.1	225.4	228.3	232.6	235.2	236.3	235.8
	Hispanic		195.5	199.3	206.1	211.5	215.6	221.2	225.3	227.9	229.2
			3% interest rate assumption								
Men	White	Less than high school	$163.1	$160.7	$160.5	$158.9	$156.2	$154.3	$151.2	$147.0	$141.9
		HS/some college	220.3	218.9	220.4	220.2	218.3	217.7	215.3	211.3	205.8
		College grads	274.7	274.8	278.8	280.6	280.3	281.7	280.8	277.9	273.1
	Black	Less than high school	139.9	137.9	137.8	136.6	134.4	133.1	130.7	127.5	123.5
		High school or more	185.4	183.9	184.8	184.2	182.4	181.6	179.4	176.0	171.5
	Hispanic		190.6	190.6	193.4	194.6	194.4	195.4	194.9	193.0	189.9
Women	White	Less than high school	111.3	110.7	111.5	111.4	110.6	110.4	109.4	107.6	105.1
		HS/some college	163.4	163.6	166.1	167.4	167.5	168.7	168.5	167.2	164.8
		College grads	219.2	220.5	224.9	227.6	228.9	231.5	232.4	231.7	229.4
	Black	Less than high school	106.3	105.6	106.3	106.3	105.4	105.2	104.3	102.6	100.3
		High school or more	169.3	169.2	171.6	172.6	172.4	173.3	172.9	171.3	168.6
	Hispanic		153.0	153.9	157.1	159.2	160.2	162.2	163.0	162.8	161.6

Sources: Authors' calculations based on restricted NLMS data provided by the U.S. Census, 1950 Birth Cohort Mortality Rates from the Social Security Administration, and the U.S. Census and Cornell University *Survey of Income and Program Participation*.

Appendix A1. *Male Mortality Rates by Race/Ethnicity and Education Relative to the Average*

	White			Black		
Age	Less than high school	HS/some college	College grads	Less than high school	High school or more	Hispanic
25	1.75791	1.43036	0.52194	0.76807	--	1.03828
26	1.80670	1.41601	0.51334	0.94562	--	1.02036
27	1.85411	1.40133	0.50477	1.11877	--	1.00218
28	1.89980	1.38639	0.49631	1.28652	--	0.98382
29	1.94346	1.37123	0.48799	1.44792	0.02720	0.96538
30	1.98478	1.35594	0.47989	1.60206	0.15640	0.94695
31	2.02348	1.34056	0.47207	1.74810	0.28243	0.92861
32	2.05931	1.32518	0.46458	1.88528	0.40464	0.91047
33	2.09202	1.30987	0.45749	2.01293	0.52240	0.89261
34	2.12143	1.29468	0.45084	2.13051	0.63516	0.87513
35	2.14738	1.27969	0.44469	2.23759	0.74242	0.85811
36	2.16974	1.26495	0.43909	2.33384	0.84374	0.84164
37	2.18845	1.25054	0.43409	2.41909	0.93878	0.82577
38	2.20346	1.23649	0.42970	2.49327	1.02723	0.81059
39	2.21476	1.22286	0.42597	2.55644	1.10891	0.79613
40	2.22241	1.20969	0.42292	2.60876	1.18369	0.78246
41	2.22647	1.19701	0.42057	2.65051	1.25153	0.76960
42	2.22704	1.18485	0.41894	2.68204	1.31244	0.75758
43	2.22426	1.17323	0.41802	2.70379	1.36651	0.74643
44	2.21827	1.16216	0.41782	2.71626	1.41389	0.73614
45	2.20925	1.15166	0.41834	2.72001	1.45478	0.72673
46	2.19739	1.14173	0.41958	2.71563	1.48942	0.71818
47	2.18288	1.13236	0.42152	2.70373	1.51809	0.71049
48	2.16591	1.12354	0.42416	2.68494	1.54110	0.70363
49	2.14671	1.11528	0.42747	2.65990	1.55876	0.69759
50	2.12546	1.10754	0.43145	2.62924	1.57143	0.69234
51	2.10238	1.10032	0.43607	2.59356	1.57944	0.68785
52	2.07766	1.09360	0.44132	2.55346	1.58315	0.68408
53	2.05150	1.08735	0.44718	2.50950	1.58291	0.68101
54	2.02406	1.08156	0.45363	2.46224	1.57905	0.67861
55	1.99553	1.07620	0.46065	2.41217	1.57192	0.67683
56	1.96607	1.07125	0.46823	2.35977	1.56182	0.67564
57	1.93582	1.06668	0.47635	2.30547	1.54907	0.67501
58	1.90494	1.06248	0.48499	2.24968	1.53395	0.67491
59	1.87355	1.05861	0.49415	2.19277	1.51674	0.67530
60	1.84176	1.05506	0.50380	2.13508	1.49769	0.67615
61	1.80970	1.05181	0.51394	2.07690	1.47704	0.67744

Appendix A1. *Male Mortality Rates by Race/Ethnicity and Education Relative to the Average* (cont.)

	Male cohorts					
	White			Black		
Age	Less than high school	HS/some college	College grads	Less than high school	High school or more	Hispanic
62	1.77746	1.04883	0.52456	2.01851	1.45502	0.67913
63	1.74513	1.04611	0.53564	1.96015	1.43183	0.68121
64	1.71279	1.04362	0.54718	1.90203	1.40765	0.68363
65	1.68051	1.04135	0.55917	1.84435	1.38266	0.68639
66	1.64837	1.03928	0.57160	1.78727	1.35702	0.68947
67	1.61641	1.03740	0.58448	1.73094	1.33087	0.69283
68	1.58469	1.03569	0.59780	1.67547	1.30434	0.69646
69	1.55326	1.03414	0.61155	1.62097	1.27754	0.70035
70	1.52216	1.03273	0.62573	1.56754	1.25059	0.70447
71	1.49142	1.03145	0.64035	1.51525	1.22358	0.70883
72	1.46107	1.03030	0.65540	1.46416	1.19659	0.71339
73	1.43115	1.02925	0.67088	1.41432	1.16970	0.71816
74	1.40167	1.02831	0.68679	1.36576	1.14299	0.72311
75	1.37265	1.02745	0.70313	1.31853	1.11650	0.72825
76	1.34412	1.02669	0.71991	1.27263	1.09030	0.73356
77	1.31609	1.02599	0.73712	1.22810	1.06443	0.73904
78	1.28858	1.02537	0.75476	1.18492	1.03894	0.74467
79	1.26159	1.02480	0.77284	1.14311	1.01386	0.75045
80	1.23514	1.02430	0.79134	1.10267	0.98923	0.75638
81	1.20924	1.02384	0.81026	1.06359	0.96508	0.76245
82	1.18389	1.02343	0.82960	1.02586	0.94142	0.76866
83	1.15911	1.02305	0.84935	0.98946	0.91830	0.77500
84	1.13490	1.02271	0.86950	0.95440	0.89572	0.78148
85	1.11126	1.02240	0.89002	0.92064	0.87370	0.78807
86	1.08822	1.02212	0.91091	0.88817	0.85227	0.79479
87	1.06577	1.02186	0.93213	0.85698	0.83144	0.80164
88	1.04392	1.02162	0.95365	0.82704	0.81121	0.80859
89	1.02269	1.02139	0.97543	0.79834	0.79161	0.81567
90	1.00208	1.02118	0.99743	0.77086	0.77265	0.82285
91	0.98209	1.02097	1.01958	0.74457	0.75434	0.83014
92	0.96275	1.02077	1.04182	0.71947	0.73668	0.83753
93	0.94406	1.02057	1.06405	0.69552	0.71970	0.84501
94	0.92605	1.02037	1.08620	0.67272	0.70340	0.85259
95	0.90871	1.02016	1.10813	0.65104	0.68781	0.86025
96	0.89207	1.01994	1.12972	0.63048	0.67292	0.86799
97	0.87615	1.01971	1.15082	0.61101	0.65876	0.87579
98	0.86097	1.01947	1.17126	0.59263	0.64534	0.88364
99	0.84654	1.01922	1.19084	0.57533	0.63268	0.89154
100	0.83291	1.01894	1.20935	0.55910	0.62080	0.89945

Source: Authors calculations based on restricted NLMS data provided by the U.S. Census.

Appendix A2. *Female Mortality Rates by Race/Ethnicity and Education Relative to the Average*

Age	White			Black		
	Less than high school	HS/some college	College grads	Less than high school	High school or more	Hispanic
25	2.04546	1.14403	0.95417	3.54499	1.17105	0.45752
26	2.06783	1.14015	0.94121	3.55590	1.18417	0.46079
27	2.09050	1.13600	0.92739	3.56549	1.19772	0.46432
28	2.11332	1.13159	0.91270	3.57352	1.21167	0.46812
29	2.13613	1.12690	0.89715	3.57972	1.22594	0.47219
30	2.15875	1.12195	0.88076	3.58382	1.24045	0.47655
31	2.18098	1.11674	0.86354	3.58552	1.25513	0.48119
32	2.20261	1.11128	0.84555	3.58455	1.26988	0.48612
33	2.22340	1.10558	0.82684	3.58064	1.28458	0.49132
34	2.24311	1.09966	0.80749	3.57351	1.29911	0.49679
35	2.26149	1.09355	0.78757	3.56293	1.31336	0.50253
36	2.27831	1.08725	0.76720	3.54867	1.32719	0.50851
37	2.29331	1.08082	0.74649	3.53055	1.34046	0.51471
38	2.30626	1.07427	0.72557	3.50842	1.35303	0.52111
39	2.31694	1.06765	0.70458	3.48219	1.36478	0.52769
40	2.32516	1.06099	0.68367	3.45180	1.37557	0.53442
41	2.33074	1.05433	0.66298	3.41727	1.38529	0.54126
42	2.33355	1.04772	0.64268	3.37864	1.39382	0.54817
43	2.33349	1.04120	0.62292	3.33604	1.40107	0.55513
44	2.33048	1.03479	0.60384	3.28963	1.40696	0.56210
45	2.32450	1.02855	0.58559	3.23963	1.41143	0.56905
46	2.31557	1.02251	0.56831	3.18628	1.41444	0.57593
47	2.30372	1.01669	0.55211	3.12989	1.41597	0.58273
48	2.28905	1.01112	0.53709	3.07077	1.41601	0.58940
49	2.27167	1.00583	0.52336	3.00928	1.41458	0.59593
50	2.25171	1.00084	0.51098	2.94575	1.41170	0.60229
51	2.22935	0.99616	0.50002	2.88056	1.40743	0.60845
52	2.20477	0.99180	0.49051	2.81405	1.40182	0.61442
53	2.17816	0.98776	0.48248	2.74658	1.39495	0.62017
54	2.14972	0.98405	0.47596	2.67848	1.38689	0.62569
55	2.11966	0.98066	0.47094	2.61006	1.37772	0.63098
56	2.08819	0.97760	0.46741	2.54160	1.36754	0.63604
57	2.05550	0.97484	0.46535	2.47338	1.35644	0.64087
58	2.02179	0.97239	0.46475	2.40562	1.34450	0.64547
59	1.98725	0.97023	0.46557	2.33855	1.33182	0.64985
60	1.95206	0.96834	0.46777	2.27235	1.31848	0.65402
61	1.91636	0.96672	0.47133	2.20717	1.30458	0.65797

Appendix A2. *Female Mortality Rates by Race/Ethnicity and Education Relative to the Average*

Age	White			Black		
	Less than high school	HS/some college	College grads	Less than high school	High school or more	Hispanic
62	1.88032	0.96535	0.47620	2.14315	1.29017	0.66173
63	1.84407	0.96421	0.48234	2.08039	1.27536	0.66531
64	1.80774	0.96328	0.48972	2.01899	1.26019	0.66870
65	1.77143	0.96256	0.49830	1.95902	1.24475	0.67193
66	1.73525	0.96203	0.50805	1.90052	1.22908	0.67501
67	1.69927	0.96168	0.51893	1.84354	1.21325	0.67795
68	1.66358	0.96148	0.53091	1.78809	1.19729	0.68075
69	1.62825	0.96144	0.54397	1.73420	1.18127	0.68344
70	1.59332	0.96153	0.55809	1.68186	1.16522	0.68602
71	1.55886	0.96175	0.57324	1.63107	1.14917	0.68850
72	1.52489	0.96208	0.58942	1.58182	1.13315	0.69089
73	1.49146	0.96252	0.60660	1.53408	1.11721	0.69321
74	1.45859	0.96305	0.62477	1.48783	1.10136	0.69546
75	1.42630	0.96367	0.64393	1.44305	1.08562	0.69766
76	1.39463	0.96437	0.66408	1.39971	1.07003	0.69980
77	1.36357	0.96514	0.68519	1.35778	1.05458	0.70191
78	1.33315	0.96598	0.70729	1.31723	1.03932	0.70399
79	1.30338	0.96688	0.73035	1.27803	1.02424	0.70605
80	1.27425	0.96783	0.75438	1.24014	1.00936	0.70809
81	1.24579	0.96884	0.77938	1.20354	0.99470	0.71013
82	1.21799	0.96989	0.80534	1.16818	0.98027	0.71218
83	1.19085	0.97098	0.83226	1.13406	0.96608	0.71424
84	1.16438	0.97210	0.86011	1.10112	0.95214	0.71633
85	1.13859	0.97326	0.88889	1.06936	0.93847	0.71844
86	1.11347	0.97446	0.91857	1.03874	0.92507	0.72060
87	1.08904	0.97567	0.94912	1.00924	0.91197	0.72282
88	1.06529	0.97691	0.98049	0.98084	0.89916	0.72509
89	1.04222	0.97818	1.01262	0.95353	0.88667	0.72744
90	1.01986	0.97946	1.04543	0.92728	0.87450	0.72988
91	0.99819	0.98075	1.07882	0.90208	0.86268	0.73242
92	0.97724	0.98206	1.11266	0.87791	0.85122	0.73507
93	0.95702	0.98338	1.14680	0.85478	0.84014	0.73784
94	0.93752	0.98471	1.18104	0.83268	0.82947	0.74076
95	0.91878	0.98603	1.21516	0.81159	0.81921	0.74384
96	0.90081	0.98736	1.24886	0.79153	0.80941	0.74710
97	0.88362	0.98869	1.28183	0.77249	0.80007	0.75055
98	0.86725	0.99000	1.31367	0.75448	0.79125	0.75422
99	0.85172	0.99131	1.34394	0.73751	0.78296	0.75812
100	0.99259	1.37214	0.72160	0.77524	0.76229	0.76229

Source: Authors calculations based on restricted NLMS data provided by the U.S. Census.

Appendix B1. *Male Mortality Rates by Race/Ethnicity and Education, 2004-2011*

	White			Black		
Age	Less than high school	HS/some college	College grads	Less than high school	High school or more	Hispanic
25	0.00357	0.00290	0.00106	0.00156	0.00000	0.00211
26	0.00332	0.00261	0.00094	0.00174	0.00000	0.00188
27	0.00347	0.00262	0.00094	0.00209	0.00000	0.00187
28	0.00344	0.00251	0.00090	0.00233	0.00000	0.00178
29	0.00365	0.00258	0.00092	0.00272	0.00005	0.00181
30	0.00375	0.00256	0.00091	0.00303	0.00030	0.00179
31	0.00374	0.00248	0.00087	0.00323	0.00052	0.00172
32	0.00383	0.00246	0.00086	0.00351	0.00075	0.00169
33	0.00391	0.00245	0.00086	0.00376	0.00098	0.00167
34	0.00418	0.00255	0.00089	0.00420	0.00125	0.00172
35	0.00460	0.00274	0.00095	0.00479	0.00159	0.00184
36	0.00516	0.00301	0.00105	0.00555	0.00201	0.00200
37	0.00573	0.00328	0.00114	0.00634	0.00246	0.00216
38	0.00621	0.00349	0.00121	0.00703	0.00290	0.00229
39	0.00660	0.00364	0.00127	0.00762	0.00330	0.00237
40	0.00687	0.00374	0.00131	0.00806	0.00366	0.00242
41	0.00719	0.00387	0.00136	0.00856	0.00404	0.00249
42	0.00800	0.00425	0.00150	0.00963	0.00471	0.00272
43	0.00867	0.00458	0.00163	0.01054	0.00533	0.00291
44	0.00918	0.00481	0.00173	0.01125	0.00585	0.00305
45	0.00963	0.00502	0.00182	0.01186	0.00634	0.00317
46	0.00958	0.00498	0.00183	0.01184	0.00649	0.00313
47	0.00987	0.00512	0.00191	0.01222	0.00686	0.00321
48	0.01031	0.00535	0.00202	0.01278	0.00734	0.00335
49	0.01095	0.00569	0.00218	0.01357	0.00795	0.00356
50	0.01158	0.00604	0.00235	0.01433	0.00856	0.00377
51	0.01255	0.00657	0.00260	0.01548	0.00943	0.00411
52	0.01255	0.00661	0.00267	0.01542	0.00956	0.00413
53	0.01323	0.00701	0.00288	0.01619	0.01021	0.00439
54	0.01399	0.00747	0.00313	0.01701	0.01091	0.00469
55	0.01483	0.00800	0.00342	0.01792	0.01168	0.00503
56	0.01573	0.00857	0.00375	0.01888	0.01249	0.00541
57	0.01669	0.00919	0.00411	0.01987	0.01335	0.00582
58	0.01770	0.00987	0.00451	0.02090	0.01425	0.00627
59	0.01879	0.01062	0.00496	0.02199	0.01521	0.00677
60	0.02000	0.01146	0.00547	0.02319	0.01626	0.00734
61	0.02134	0.01240	0.00606	0.02449	0.01741	0.00799

Appendix B1. *Male Mortality Rates by Race/Ethnicity and Education, 2004-2011* (cont.)

Age	White			Black		
	Less than high school	HS/some college	College grads	Less than high school	High school or more	Hispanic
62	0.02280	0.01346	0.00673	0.02590	0.01867	0.00871
63	0.02440	0.01462	0.00749	0.02740	0.02002	0.00952
64	0.02615	0.01594	0.00836	0.02904	0.02149	0.01044
65	0.02805	0.01738	0.00933	0.03078	0.02308	0.01146
66	0.03008	0.01897	0.01043	0.03262	0.02477	0.01258
67	0.03215	0.02063	0.01163	0.03443	0.02647	0.01378
68	0.03423	0.02237	0.01291	0.03619	0.02817	0.01504
69	0.03636	0.02421	0.01432	0.03795	0.02991	0.01640
70	0.03878	0.02631	0.01594	0.03994	0.03187	0.01795
71	0.04140	0.02863	0.01778	0.04206	0.03397	0.01968
72	0.04396	0.03100	0.01972	0.04406	0.03601	0.02147
73	0.04638	0.03336	0.02174	0.04584	0.03791	0.02328
74	0.04886	0.03585	0.02394	0.04761	0.03984	0.02521
75	0.05180	0.03878	0.02654	0.04976	0.04214	0.02748
76	0.05526	0.04221	0.02960	0.05232	0.04482	0.03016
77	0.05897	0.04597	0.03303	0.05503	0.04770	0.03312
78	0.06291	0.05006	0.03685	0.05785	0.05072	0.03635
79	0.06723	0.05461	0.04118	0.06092	0.05403	0.03999
80	0.07197	0.05969	0.04611	0.06425	0.05764	0.04407
81	0.07746	0.06559	0.05191	0.06813	0.06182	0.04884
82	0.08406	0.07266	0.05890	0.07284	0.06684	0.05458
83	0.09193	0.08114	0.06736	0.07847	0.07283	0.06147
84	0.10088	0.09091	0.07729	0.08484	0.07962	0.06947
85	0.11052	0.10168	0.08851	0.09156	0.08689	0.07837
86	0.12053	0.11321	0.10089	0.09837	0.09440	0.08803
87	0.13072	0.12533	0.11433	0.10511	0.10198	0.09832
88	0.14099	0.13798	0.12880	0.11170	0.10956	0.10921
89	0.15139	0.15120	0.14439	0.11818	0.11718	0.12074
90	0.16199	0.16507	0.16123	0.12461	0.12490	0.13301
91	0.17286	0.17970	0.17946	0.13105	0.13277	0.14611
92	0.18410	0.19519	0.19922	0.13758	0.14087	0.16015
93	0.19577	0.21164	0.22065	0.14423	0.14924	0.17523
94	0.20793	0.22911	0.24389	0.15105	0.15794	0.19144
95	0.21938	0.24629	0.26752	0.15717	0.16605	0.20768
96	0.22989	0.26284	0.29113	0.16247	0.17341	0.22368
97	0.23926	0.27846	0.31427	0.16686	0.17989	0.23916
98	0.24732	0.29285	0.33646	0.17024	0.18538	0.25384
99	0.25390	0.30569	0.35717	0.17256	0.18976	0.26740
100	0.26084	0.31910	0.37873	0.17509	0.19442	0.28168

Sources: Authors calculations based on restricted NLMS data provided by the U.S. Census and 1950 Birth Cohort Mortality Rates from the Social Security Administration.

Appendix B2. *Female Mortality Rates by Race/Ethnicity and Education, 2004-2011*

Age	White			Black		
	Less than high school	HS/some college	College grads	Less than high school	High school or more	Hispanic
25	0.00141	0.00079	0.00066	0.00245	0.00081	0.00032
26	0.00141	0.00078	0.00064	0.00242	0.00081	0.00031
27	0.00144	0.00078	0.00064	0.00246	0.00083	0.00032
28	0.00152	0.00081	0.00066	0.00257	0.00087	0.00034
29	0.00152	0.00080	0.00064	0.00254	0.00087	0.00034
30	0.00162	0.00084	0.00066	0.00269	0.00093	0.00036
31	0.00166	0.00085	0.00066	0.00272	0.00095	0.00037
32	0.00172	0.00087	0.00066	0.00280	0.00099	0.00038
33	0.00180	0.00090	0.00067	0.00290	0.00104	0.00040
34	0.00200	0.00098	0.00072	0.00318	0.00116	0.00044
35	0.00215	0.00104	0.00075	0.00338	0.00125	0.00048
36	0.00230	0.00110	0.00077	0.00358	0.00134	0.00051
37	0.00264	0.00124	0.00086	0.00406	0.00154	0.00059
38	0.00288	0.00134	0.00091	0.00439	0.00169	0.00065
39	0.00304	0.00140	0.00092	0.00456	0.00179	0.00069
40	0.00321	0.00146	0.00094	0.00476	0.00190	0.00074
41	0.00345	0.00156	0.00098	0.00506	0.00205	0.00080
42	0.00387	0.00174	0.00107	0.00561	0.00231	0.00091
43	0.00427	0.00191	0.00114	0.00610	0.00256	0.00102
44	0.00466	0.00207	0.00121	0.00658	0.00281	0.00112
45	0.00504	0.00223	0.00127	0.00703	0.00306	0.00123
46	0.00530	0.00234	0.00130	0.00730	0.00324	0.00132
47	0.00569	0.00251	0.00136	0.00773	0.00350	0.00144
48	0.00602	0.00266	0.00141	0.00808	0.00372	0.00155
49	0.00659	0.00292	0.00152	0.00873	0.00410	0.00173
50	0.00709	0.00315	0.00161	0.00928	0.00445	0.00190
51	0.00780	0.00349	0.00175	0.01008	0.00493	0.00213
52	0.00803	0.00361	0.00179	0.01024	0.00510	0.00224
53	0.00860	0.00390	0.00191	0.01085	0.00551	0.00245
54	0.00924	0.00423	0.00205	0.01152	0.00596	0.00269
55	0.00996	0.00461	0.00221	0.01227	0.00648	0.00297
56	0.01073	0.00502	0.00240	0.01306	0.00703	0.00327
57	0.01157	0.00549	0.00262	0.01393	0.00764	0.00361
58	0.01243	0.00598	0.00286	0.01479	0.00827	0.00397
59	0.01335	0.00652	0.00313	0.01572	0.00895	0.00437
60	0.01433	0.00711	0.00343	0.01668	0.00968	0.00480
61	0.01541	0.00777	0.00379	0.01775	0.01049	0.00529

Appendix B2. *Female Mortality Rates by Race/Ethnicity and Education, 2004-2011* (cont.)

Age	White			Black		
	Less than high school	HS/some college	College grads	Less than high school	High school or more	Hispanic
62	0.01655	0.00850	0.00419	0.01886	0.01135	0.00582
63	0.01778	0.00929	0.00465	0.02005	0.01229	0.00641
64	0.01907	0.01016	0.00517	0.02130	0.01330	0.00705
65	0.02050	0.01114	0.00577	0.02267	0.01440	0.00777
66	0.02200	0.01220	0.00644	0.02410	0.01558	0.00856
67	0.02352	0.01331	0.00718	0.02551	0.01679	0.00938
68	0.02504	0.01447	0.00799	0.02691	0.01802	0.01025
69	0.02659	0.01570	0.00888	0.02832	0.01929	0.01116
70	0.02835	0.01711	0.00993	0.02992	0.02073	0.01220
71	0.03026	0.01867	0.01113	0.03166	0.02231	0.01336
72	0.03216	0.02029	0.01243	0.03336	0.02390	0.01457
73	0.03401	0.02195	0.01383	0.03498	0.02547	0.01581
74	0.03591	0.02371	0.01538	0.03663	0.02712	0.01712
75	0.03820	0.02581	0.01724	0.03864	0.02907	0.01868
76	0.04088	0.02827	0.01946	0.04103	0.03136	0.02051
77	0.04366	0.03090	0.02194	0.04348	0.03377	0.02248
78	0.04651	0.03370	0.02468	0.04596	0.03626	0.02456
79	0.04958	0.03678	0.02778	0.04862	0.03896	0.02686
80	0.05311	0.04034	0.03144	0.05169	0.04207	0.02951
81	0.05729	0.04456	0.03584	0.05535	0.04575	0.03266
82	0.06225	0.04957	0.04116	0.05971	0.05010	0.03640
83	0.06809	0.05552	0.04759	0.06485	0.05524	0.04084
84	0.07479	0.06244	0.05524	0.07073	0.06116	0.04601
85	0.08222	0.07028	0.06419	0.07722	0.06777	0.05188
86	0.09024	0.07897	0.07444	0.08418	0.07497	0.05840
87	0.09873	0.08845	0.08605	0.09150	0.08268	0.06553
88	0.10766	0.09873	0.09909	0.09912	0.09087	0.07328
89	0.11700	0.10981	0.11368	0.10704	0.09954	0.08166
90	0.12678	0.12176	0.12996	0.11527	0.10871	0.09073
91	0.13702	0.13463	0.14809	0.12383	0.11842	0.10054
92	0.14775	0.14848	0.16822	0.13273	0.12870	0.11113
93	0.15899	0.16337	0.19052	0.14200	0.13957	0.12258
94	0.17075	0.17934	0.21510	0.15166	0.15107	0.13492
95	0.18205	0.19537	0.24077	0.16081	0.16232	0.14738
96	0.19267	0.21118	0.26711	0.16929	0.17312	0.15979
97	0.20240	0.22647	0.29362	0.17695	0.18326	0.17192
98	0.21105	0.24092	0.31968	0.18360	0.19255	0.18354
99	0.21843	0.25423	0.34467	0.18914	0.20080	0.19443
100	0.26829	0.37088	0.19504	0.20954	0.20604	0.20604

Sources: Authors calculations based on restricted NLMS data provided by the U.S. Census and 1950 Birth Cohort Mortality Rates from the Social Security Administration.

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