THE SURPRISING EQUALITY OF RETIREMENT TIME: EVIDENCE FROM THE HEALTH AND RETIREMENT SURVEY

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This article discusses the impact changes to the retirement age may have on the distribution of retirement time. The author investigates the length of time men and women are alive between the date of their retirement and their death, finding that the most critical factor in determining length of retirement time is and individual's socio-economic status. As a result, the author opines that because individuals in lower economic classes tend to die earlier, increasing the retirement age will impact these individuals disproportionally and increase retirement time inequality.

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I.   INTRODUCTION

In 2012, economic inequality in the United States reached its highest level in 100 years.[1] Increasingly, inequality is considered by global

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[1] Every year from 1913 to 2012 (the earliest and latest years for which data is available) the top 10%, 1% and 0.1% of income earners won a greater share of national 2012-value-income than in any previous year (this is true whether one includes or excludes capital gains). *See* Facundo Alvaredo et al., *The Database*, THE WORLD TOP INCOMES DATABASE, http://topincomes.gmond.parisschool ofeconomics.eu/ (last visited Feb. 22, 2012) (accessed by selecting the "The Database" link and then selecting the corresponding country and years). Census data for the Gini coefficient (which is negatively related with the degree of equality) has steadily increased since 1967 when records began. In 2012 (and 2011) the Gini coefficient was 0.477 – roughly equal to the Gini measure of inequality for Singapore, Kenya, and the Dominican Republic. *See Historical Income Tables: Households* tbl.H-4, U.S. CENSUS BUREAU, http://www.census.

economic and financial leaders to be the principal barrier to economic growth.[2] However, the disparity of wealth and income do not alone convey the deepening stratification of American society. An equally important dimension of well-being is access to time at the end of a person's working life. We identify "retirement time" as a resource that employees consume after permanently exiting the labor market. Retirement time is simply the time between retiring and dying: the difference between the age at death and the age at the start of retirement. Upper income individuals live longer than lower income workers and the longevity gap has grown wider by socio-economic status (SES) over time.[3] We expect the growing inequality of longevity due to SES, coupled with the increasing effort that lower-income older people are making to stay in the labor force, will cause retirement time to become more unequally distributed between SES groups. A growing time-inequality should be avoided because retirement time is one of the only areas where the nation has made significant progress achieving equality among working people.[4]

On average, Americans over age sixty-five are living longer, but longevity gains are unequally distributed between people of different races, between men and women, and among those of different socio-economic status.[5] For example, white men's longevity at age seventy-five increased 25% between 1980 and 2000, whereas black men's increase in life expectancy at age seventy-five grew by 22.9% over the same time period.[6]

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gov/hhes/www/income/data/historical/household/ (follow "Table H-4" hyperlink) (last visited Feb. 17, 2014).

[2] *See* Larry Elliot, *Income Gap Poses Biggest Threat to Global Community, Warns WEF*, THE GUARDIAN, Jan. 16, 2014, *available at* http://www.the guardian .com/business/2014/jan/16/income-gap-biggest-risk-global-community-world-economic-forum.

[3] That is, not only has income and wealth grown wider, so too has the gap in longevity. *See* Julian P. Cristia, *Rising Mortality and Life Expectancy Differentials by Lifetime Earnings in the United States*, (Inter-American Dev. Bank, Working Paper No. 665, 2009); Elizabeth Arias, *United States Life Tables, 2007*, U.S. DEP'T OF HEALTH & HUMAN STATISTICS NAT'L VITAL STAT. REP., Sept. 28, 2011, at 48.

[4] *See infra* App. A.

[5] NAT'L INST. ON AGING, U.S. DEP'T OF HEALTH & HUMAN SERVS., NIH PUBL'N NO. 07-5757, GROWING OLDER IN AMERICA: THE HEALTH & RET. STUDY 20 (2007).

[6] Number of years expected to live from age seventy-five onwards is 10.1 and 12.5 years respectively for white males and females, and 11.7 and 14.1 years respectively for black males and females. *See infra* App. A.

But small differences in rates of change compound over time.   The white/black gap in age seventy-five life expectancy in 2010 was only nine months. If trends continue however, in twenty years the difference will be over one year and three months. Though longevity is on track to become more unequal, analysis of the Health and Retirement Survey (HRS)[7] demonstrates that retirement time is still remarkably equal among the last generation of workers – our current retirees – primarily because lower income people tend to retire earlier.

While retirement time had been an equalizing asset between members of different income classes,[8] there is nascent evidence that the distribution of retirement time may become more unequal.[9] Income, of course, is not the only factor driving the distribution of retirement time. Not surprisingly, healthier individuals consume more retirement time because they live longer.[9] Further, although it was not expected, men have more retirement time than women who have retired.[10] Also unexpected is that since lower income workers retire earlier than higher income workers, the lower income groups have, on average, more retirement time. [11] However, these results are reversed among middle class elderly persons (i.e., among the group excluding retirees in the top 20% and bottom 20% of the income distribution). [12] When focusing on the middle 60% of the distribution, there is evidence that retirement time inequality may be on the rise.[13]

Retirement time inequality will also likely increase as a result of the continuing weakness of the U.S. labor market as older workers (especially those with less income) work, or search for work, later into life than previous cohorts. We also expect, as the panel grows larger, the bias in the data set (containing a disproportionate share of people who die earlier than normal) will dissipate. The HRS panel data has only a small

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[7] *See infra* note 41.

[8] Although SES is the key conceptual division, we will avoid the complications of defining precise SES criteria and instead focus simply on full-time labor market income as a rough proxy for SES.

[9] *See* NAT'L INST. ON AGING, NIH PUBL'N NO. 07-5757, *supra* note 5, at 56-60.

[9] *Id.* at 40.

[10] *Id.* at 22, 35, 40.

[11] *Id.* at 51-65.

[12] *Id*.

[13] NAT'L INST. ON AGING, NIH PUBL'N NO. 07-5757, *supra* note 5, at 51-65.

number of respondents who have died after living an average life span,[14] which means the sample is not perfectly representative of the population. However, the large sample currently available is representative in some key dimensions, such as health status. Despite the limitations in the data, we find support for the hypothesis that the distribution of retirement time remains relatively equal because upper-middle class income men work longer and retire at older ages. However, there is nascent evidence that this equity is eroding.

Retirement time inequality should inform policies concerning the appropriate "normal retirement age" in Social Security, Medicare, and other old age programs. If benefits are cut by raising the age participants can collect full benefits, then lower income workers will likely work later into life, eroding their retirement time relative to wealthier and/or healthier individuals. To date, the nation's old age programs are among the few mechanisms that mitigate the impacts of deepening inequality of wealth, income, opportunity and mortality in the United States.

II.   RETIREMENT IN AMERICA – BACKGROUND AND
         RECENT FINDINGS

Since the 1950s, the labor force participation of men over age fifty declined across all income groups as the expansion of Social Security made retirement income more equally distributed than preretirement income.[15] Defined benefit (DB) pension plans were more prevalent in jobs that were physically taxing, so those with lower than average longevity were able to retire sooner.[16] This recent success in achieving some equity in retirement time stems from the design of the American retirement and disability income system, which has its roots in social systems developed for state and municipal employees at the turn of the last century.[17] These systems were extended to most private sector workers with the adoption of Social

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[14] *Id.*

[15] Edward N. Wolff, *Pensions in the 2000s: The Lost Decade?* (Nat'l Bureau of Econ. Research, Working Paper No. 16991, 2011), *available at* http://www.nber .org/papers/w16991.

[16] NAT'L INST. ON AGING, NIH PUBL'N NO. 07-5757, *supra* note 5, at 51.

[17] *See* ROBERT L. CLARK ET AL., A HISTORY OF PUBLIC SECTOR PENSIONS IN THE UNITED STATES 1, 167-71 (2003).

Security in 1935.[18] More workers were able to retire when Social Security old age benefits and disability programs expanded significantly from the 1950s through to the 1970s.[19] This came with the coincident growth of unions and employer-based DB pension plans in the 1940s and continuing until the 1970s.[20] Further, Medicare was established in 1965, providing universal health insurance for those over age sixty-five, which significantly improved the health and longevity of the aged.[21] As a result of these changes, workers in all socioeconomic groups were able to control some of their own leisure time before they died.

In 2008, Teresa Ghilarducci was the first scholar to measure the distribution of retirement time, finding that the distribution of retirement time was strikingly equal for people who died before age sixty-five.[22] Relying on the 2006 HRS sample, Ghilarducci found that the top income-earning quintile of retirees between ages fifty and sixty-five had approximately the same share of retirement time as the other four quintiles in the same age range.[23] The analysis added together retirement times of these retirees before age sixty-five and then found each quintile's relative share of the total sum of retirement time.[24] The top quintile accounted for their proportionate share of retirement time consumed before the age of sixty-five. Specifically, retired men in the top 20% of the asset distribution – those with assets worth over $271,000 – had 5.57 years of retirement time before the age of sixty-five and accounted for 22% of the total amount of retirement time.[25] Men in the bottom 20% – those with an average debt of $6,000 – accounted for 18% of the total retirement time before the age of sixty-five.[26] Furthermore, Ghilarducci noted that although the top 20% of the men had 85% of all the wealth and the poorest 20% were in debt, the distribution of retirement time before age sixty-five was almost equal.[27] For

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[18] *See* Patricia P. Martin & David A. Weaver, *Social Security: A Program & Policy History*, 66 SOC. SEC. BULL. 1, 1-3 (2005).

[19] *Id.* at 1, 7-9.

[20] *Id.*

[21] *Id.* at 8.

[22] *See* TERESA GHILARDUCCI, WHEN I'M SIXTY-FOUR: THE PLOT AGAINST PENSIONS AND THE PLAN TO SAVE THEM 200-01 (2008).

[23] *Id.*

[24] *Id.* at 200.

[25] *Id.*

[26] *Id.* at 201.

[27] Ghilarducci, *supra* note 22, at 201.

women the distribution of pre-sixty-five retirement time was also equal.[28] The top and bottom fifths of women accounted for the same share of retirement time – 22.6% for the top and 22.7% for the bottom.[29]

Furthermore, Ghilarducci found that women and men, blacks and whites, high and low income, have approximately the same amount of retirement time prior to age sixty-five.[30] She argued retirement time is distributed relatively equally because in the United States the "retirement date" is flexible.[31] Many defined benefit plans allow pension collection before age sixty-two, when workers become eligible for early Social Security benefits.[32] Similarly, Social Security and workplace disability pensions are available before age sixty-two for eligible workers (albeit at the cost of reduced benefits).[33] In some pension plans, American workers can start collecting a defined benefit pension as early as age fifty.[34]

Because age discrimination is illegal in the United States,[35] many older workers are able to stay in the labor market beyond age sixty-five.[36] Since professionals are likely to work later into life than blue-collar workers,[37] a retirement system can be more balanced and fair even in the face of longevity differences among social economic classes. In fact, pension systems that allow and encourage people who die sooner than average to retire sooner than average – Social Security and DB pensions have these features[38] – are potentially very progressive. If people who die earlier also retire at younger ages they could conceivably have the same amount of retirement time as higher-income people who live longer. In contrast, 401(k)-type pensions (defined contribution (DC) pensions) accumulate significantly as a person ages and pays out lump sums so that retiring earlier is often difficult for lower income individuals.[39] Finally, people without employer-based pensions or independent assets would need to work longer, as they can rely only on Social Security benefits. Workers

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[28] *Id.*

[29] *Id*.

[30] *Id.* at 214.

[31] *Id.* at 215.

[32] NAT'L INST. ON AGING, NIH PUBL'N NO. 07-5757, *supra* note 5, at 57-62.

[33] *Id.* at 62.

[34] *Id.*

[35] 29 U.S.C. § 623 (2008).

[36] *Id.*

[37] NAT'L INST. ON AGING, NIH PUBL'N NO. 07-5757 *supra* note 5, at 43-44.

[38] *Id.* at 51.

[39] *Id.*

in such situations are predominantly low-income earners with shorter life spans. As DC plans replace traditional DB pensions and as coverage by any employer based retirement plan has stagnated,[40] one of the key equalizing mechanisms of the American retirement system will be lost.

III.   HRS DATA ON RETIREMENT TIME DISTRIBUTION AND METHODOLOGY[41]

HRS is administered by the University of Michigan every two years as a series of in-depth interviews with people age fifty and over.[42] The first cohort began in 1992 and included more than 10,000 respondents.[43] The latest available survey is data from 2010.[44] Our sample comes from each of the ten surveys. Every sixth year (or third survey), the HRS adds approximately 5,000 new participants in order to maintain a sample.[45] The panel nature of the HRS data is essential to determining individuals' time spent in retirement since we need to know the year and month of both retirement and of death. The key variable, retirement time, is measured as the difference between the respondent's year of death and year of retirement, plus the numeric difference between her or his month of death and the month of retirement where months are coded sequentially, with January equal to one and December equal to twelve.[46]

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[40] Craig Copeland, *Employment-Based Retirement Plan Participation: Geographic Differences and Trends*, 2011, 378 EMP. BEN. RES. INST. ISSUE BRIEF 1, 26, 36 (2012), *available at* http://www.ebri.org/pdf/briefspdf/EBRI_IB _11-2012_No378_RetParticip.pdf.

[41] *Health and Retirement Study*, U. MICHIGAN, http://hrsonline.isr.umich.edu/ (last visited Mar. 19, 2014).

[42] *Id.*

[43] *Id.*

[44] *Id.*

[45] *Id.*; *Sample Sizes and Response Rates*, U. MICHIGAN, http://hrsonline.isr.umich.edu/sitedocs/sampleresponse.pdf (last visited Mar. 19, 2014).

[46] This coding pattern assumes that reported dates occur at the end of the reported month. Alternatively, one could code months as January = 0, February = 1, … December = 11. The reported result would not differ.

$Retirement\ Time$
$$= \left[Death\ Year + \frac{Death\ Month}{12} \right] \\ - \left[Retirement\ Year + \frac{Retirement\ Month}{12} \right] \quad (1)$$

Defining the start of retirement can be difficult since many people continue to work, volunteer, or do other activities after they leave a long-term career. Judging what is or is not retirement from work is difficult. We use HRS respondents' own declaration of whether or not they are retired. Specifically, the survey asks respondents if they are retired, disabled or working, and the date of their retirement.[47] However, if an individual reports she is retired in 1994, working in 1996, and then retired again in 1998, equation (1) uses her most recent statement of retirement year and retirement month (i.e., whatever year and month she states in the 1998 survey wave).

To calculate retirement and death ages, we use a similar formula as (1). We calculate individuals' age of retirement based on their latest answer to their year/month of retirement by subtracting the respondent's year and month of birth.

$Retirement\ Age$
$$= \left[Retirement\ Year + \frac{Retirement\ Month}{12} \right] \\ - \left[Birth\ Year + \frac{Birth\ Month}{12} \right] \quad (2)$$

Finally we compute age at death with a similar subtraction:

$Death\ Age$
$$= \left[Death\ Year + \frac{Death\ Month}{12} \right] \\ - \left[Birth\ Year + \frac{Birth\ Month}{12} \right] \quad (3)$$

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[47] *Health and Retirement Study*, *supra* note 41; *2010 Questionnaire*, U. MICHIGAN, http://hrsonline.isr.umich.edu/modules/meta/2010/core/qnaire/ online /10hr10JCore.pdf (last visited Mar. 19, 2014).

Once these core values are computed, we restrict the data set to respondents who report at least one instance of full-time labor market income.[48] In addition to dividing the sample of 12,033 respondents by their labor market status, this restriction ensures that we analyze the retirement patterns of workers. Since workers report labor market income in various years, we adjust all values to 2008 dollars according to the Census Bureau's consumer price index (CPI) for the appropriate year.[49] After adjusting for inflation, we calculate each respondent's mean full-time income. Thus, if a respondent reports full-time income in only one survey year, this amount is his average real income; if a respondent reports full-time income in three separate surveys her average real income is one-third of the sum of the adjusted values.

The sample sizes for retirement time, retirement age and death age are different because more respondents (5,557) consider themselves retired (and provide the interviewer with a valid retirement year and month) than have died. Since the first HRS wave was in 1992, and the latest available data is from 2010, the youngest respondent would be fifty years old (the age one enters the HRS) plus eighteen years, or sixty-eight years old. This limitation leads to a much smaller number of observed death ages (1,418) since these individuals must have reported at least one year of full-time labor market income before retiring and dying. However, since many respondents may have worked and died without ever retiring, the number of those with a retirement time is about half of those with a death age.[50]

A. Downward Longevity Bias

Because the survey is only eighteen years old, the majority of respondents are still alive. Due to this, we cannot know living retirees' total retirement time, which creates a bias in our data set because less than 12% (1,418/12,033 = 11.7%) of the eligible sample are deceased. Among

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[48] We define full-time labor market attachment as respondents who described the "usual" working time as at least thirty-five hours per week and "usual" work frequency as forty weeks per year.

[49] *See* Minn. Population Ctr., Univ. of Minn., *Note on Adjusting Dollar Amount Variables for Inflation (CPI-U)*, IPUMS-CPS, https://cps.ipums.org/cps/ intro.shtml (last visited Feb. 12, 2014) ("The IPUMS variable CPI99 provides an easy way to adjust dollar amounts to constant dollars").

[50] An individual could also have no measured retirement time because not all the necessary data points (year of death, month of death, year of retirement and month of retirement) were recorded, so retirement time was not computed.

the deceased, only half (725/1,418 = 51.3%) have a corresponding retirement date by which retirement time can be calculated. The resulting problem is a downward bias in longevity as shown by the low mean death age of 67.9 in our sample. Therefore, the results reported here must be recognized as representing an unfortunate (early death) subgroup of the population. Key variables are summarized in Table 1.

Table 1: Sample Summary for HRS Respondents with Some Full-Time Income

	Observations	Mean Value	Standard Deviation
Total Number of Respondents	12,033		
Death Age	1,418	67.86	7.57
Retirement Age	5,557	62.10	5.57
Retirement Time	725	8.71	5.68
Average Real Income (Full-Time)	12,033	$51,173	$58,550

Employing different techniques or restrictions to correct for the downward bias in death age, however, does not alter the central results of our analysis. One method is restricting the sample to respondents aged sixty or older when they first entered the HRS. To partially mitigate the large reduction in sample size of this approach we drop the *full-time* restriction on labor market income. These two changes generate a sample of approximately 3,100 – about one-quarter the size of our chosen sample. The benefit of this smaller sample is that the downward longevity bias is largely removed as the average age of death increases from 67.9 to 77.4, which is comparable to this generation's expected longevity.[51] However, not only does this approach require an arbitrary age cut off, but the inclusion of part-time income greatly skews the *average real income*

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[51] The current longevity estimate for those born in the 1930s is 83.8 years. *See generally* Arias, *supra* note 3, at 48.

variable downward.[52] Therefore, correcting for one skew in the sample's distribution introduces another, but at the additional cost of many lost observations.

Yet, in spite of these imposed restrictions, the overall results did not substantially change: men still had more retirement time than women, working men retired earlier than working women, and having a pension continues to appear to have little impact on retirement time. Moreover, retirement time in the restricted sample is still negatively related to income overall, but it is positively correlated among the middle 60% of the distribution. Therefore, given the larger, non-arbitrary and more robust results of the sample presented in Table 1, as well as the importance of full-time labor market income to proxy socio-economic status, we proceed with the analysis acknowledging the downward longevity bias and eagerly await more waves of the HRS.

B.   RETIREMENT DISTRIBUTION BY DEMOGRAPHIC AND ECONOMIC
       CATEGORIES

In our sample, 725 people retired and died with an average retirement time of 8.7 years. This group retired at ages 4.5 months (0.38 of a year) older than the average of all the 5,557 retirees. Table 2 displays retirement age, death age and retirement time by sex, race, pension coverage, and health status. The subgroup sizes are listed below the mean value. The last column reports the retirement age of those who died, which are the individuals for whom we calculate their retirement time.

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[52] Approximately one-third of this sample of persons aged sixty or older had an annual labor market income of under $4,500 since, in this case, labor market income is not restricted to full-time workers.

Table 2: Retired, Deceased and Retirement Time Averages by Demographics

Subgroups	Retirement Age	Death Age	Retirement Time	Retirement Age (Deceased)
All	62.10	67.86	8.715	62.48
	5,557	1,418	725	
Women	62.05	66.86	8.46	62.75
	2,535	475	216	
Men	62.14	68.37	8.823	62.37
	3,022	943	509	
Nonwhite	61.6	66.61	9.111	61.02
	1,002	285	141	
White	62.2	68.18	8.619	62.83
	4,555	1,133	584	
No Pension in 1992	63.21	68.2	8.325	63.38
	986	342	173	
Has Pension in 1992	62.05	67.93	8.431	61.74
	2,755	627	393	
Health: Good to Poor	62.02	67.30	8.454	62.44
	2,319	800	397	
Health: Excellent to Very Good	62.15	68.59	9.03	62.52
	3,238	618	328	

   Although men and women retire at roughly the same age (62.14 and 62.05, respectively), the 509 retired men who died had over four extra months of retirement time than did the 216 deceased women (8.82 versus 8.46, respectively) because the men lived longer than the women who retired. Also surprising, the non-white workers have half a year more of retirement time than white workers (9.11 versus 8.62) because they retired earlier, at age 61.6 compared to 62.2. Since the number of observations differs for each variable, Table 2 lists the subgroup sizes below each group's mean value. The last column reports the retirement age of those who have died, which are the individuals for whom we calculate retirement time.

The difference in retirement age and death age between those with and without pensions was not significant. Those without pensions had, on average, 8.32 years of retirement time compared to 8.43 years for those with access to pensions – a difference of about five weeks. [53] Not surprisingly those with self-described 'excellent' or 'very good' health had a mean 9.03 years in retirement time, whereas those with 'good', 'fair' or 'poor' health had only 8.45 years of retirement time on average.[54] Since the healthy and less healthy have approximately the same retirement age (62.52 and 62.44, respectively), the difference in retirement time comes entirely from the healthier group's longer-than-average lifespan (68.59 versus 67.30).

Now that we have presented differences by race, sex and health, we examine two income categories:

(i)   Respondents with income above and below the median full-time labor market income $40,000, and;

(ii)   Respondents groups by full-time average real income quintiles.[55]

The bottom 50% of income earners had an average retirement time of 9 years, which is significantly greater than the top half's retirement time of 8.3 years, or 8.4 months more retirement time enjoyed by the lower income half of retired workers, as can be seen in Table 3. Table 3 shows that this negative relation between income and retirement time is driven, to a significant extent, by the top and bottom quintiles which have an average of 7.4 and 10.2 years of retirement, respectively. These extreme differences are not apparent between the second, third and fourth quintiles, which have retirement times of 8.4, 8.2 and 8.9 years, respectively. These stark differences in retirement time are discussed further below, but first we

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[53] Although restricting this part to individuals in the 1992 HRS reduces our potential sample size, for these rows, only a very few individuals not in the 1992 wave have pensions in later waves *and* have a valid retirement time. Thus, the substantive results are not affected by this restriction.

[54] The HRS question regarding personal health status is asked of each respondent in each wave. We have relied on an individual's first reported personal health status – making it perhaps even more surprising that there is such a large division between the self-assessed healthy and unhealthy. We collapse the HRS's five categories into a binary one for ease of analysis.

[55] The minimum average annual incomes to be included in each quintile are $0, $21,906.64, $33,362.48, $47,328.59 and $69,543.62.

consider the distribution of retirement time among income groups of men and women separately.

Table 3: Retired, Deceased and Retirement Time Averages by Income Groups

Subgroups	Retirement Age	Death Age	Retirement Time	Retirement Age (Deceased)
Lower Half of Incomes	62.55	68.27	9.04	62.86
	2,668	776	384	
Upper Half of Incomes	61.67	67.37	8.348	62.05
	2,889	642	341	
Bottom 20%	62.4	69.04	10.16	62.84
	1,065	340	164	
20-40%	62.52	68.02	8.367	63.22
	1,070	293	145	
40-60%	62.61	67.21	8.229	62.68
	1,106	297	152	
60-80%	61.32	67.41	8.934	61.36
	1,235	279	153	
Top 20%	61.74	67.27	7.393	62.25
	1,081	209	111	

We find lower-income women and men retire at approximately the same age, 62.50 and 62.63, respectively. While there is a larger gap (approximately seven months) between the retirement ages of higher-income women (61.27) and men (61.87), higher earning individuals of both sexes retire at earlier ages than their lower-income counterparts, as shown in Table 4. Yet, this equality between the sexes in retirement age does not carry over into retirement time. Both upper- and lower-income women – for whom we can determine retirement time – have almost identical amounts of retirement time: 8.46 and 8.45 years, respectively.[56] However,

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[56] It must be noted that at this level of data, parsing our cell counts (i.e., the number of observations per variable type) are approaching the limit of what can be

higher income men have nearly one year less of retirement time than lower income men. The 281 higher-income males have an average of 8.33 years of retirement, whereas the 228 lower-income males have 9.43 years. Thus, in contrast to our initial expectations, among retired workers, retirement time is not positively correlated with labor market income. However, as demonstrated in Table 5, the "reverse inequality" result (i.e., the poor have more) is driven by including the richest and poorest quintiles of retired men.

Table 4: Retirement Age and Time by Sex and Income Group

Income Class	Women		Men	
	Lower Income	Upper Income	Lower Income	Upper Income
No. Retired	1,596	939	1,072	1,950
Mean Retirement Age	62.50	61.27	62.63	61.87
Obs. Retirement Time	156	60	228	281
Mean Retirement Age if Deceased	62.86	62.46	62.86	61.96
Mean Retirement Time	8.464	8.450	9.434	8.327

Restricting the sample to the middle 60% of the income distribution yields a different income and retirement time relationship than in the full sample. Table 5 presents the same data as Table 4, but with the sample restricted to the middle 60% of the income distribution. In the middle class, the lower income women work for a longer period of time: women in the lower half of the middle class retiree distribution retire a full year later than the upper middle-income class women (62.4 years versus 61.4 years). For men, the 1.2 years gap is even larger. Lower-income, middle class men work until nearly age 63 and upper-income middle class men retire at age 61.8 years. Furthermore, the difference in retirement time is positively related to income. Men in the 50th to 80th percentile range

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considered useful. The smallest cell counts are 60 and 49, which demand one to extrapolate the results with much caution.

have about 8.8 years of retirement, and their counterparts in the 20th to 50th percentile range have less time in retirement, at an average of 8.5 years. Therefore, the negative relationship between retirement time and income class shown in Table 3 is driven entirely by the top 20% and bottom 20% of male income earners.

Table 5: Middle Income Retirees -- 60% of Distribution -- Retirement Age and Time by Gender and Income Group

Binary Income Class	Women		Men	
	Lower Income	Upper Income	Lower Income	Upper Income
No. Retired	920	716	683	1,092
Mean Retirement Age	62.42	61.41	62.98	61.78
Obs. Retirement Time	85	49	135	181
Mean Retirement Age if Deceased	62.54	62.48	63.08	61.81
Mean Retirement Time	7.727	8.825	8.503	8.805

We conclude that the anomalous results of retirement time – that the lower income fare better – for the full sample is driven in particular by the extreme experiences of men in the top 20% and bottom 20% of the income distribution. As discussed, the top 50% and bottom 50% of females have near-identical retirement time. Yet, Table 5 reveals that this similarity evaporates for the middle 60% of women. The upper-half of middle income women have 8.8 years of retirement time, while the lower-half of middle income women have 7.7 years of retirement time. Note the observations are small – involving eighty-five and forty-nine women, respectively. Nevertheless, these observations are numerically important in calculating average retirement times (insofar as they represent a sizeable portion of the total retirement time sample). Therefore, these data for women reinforce the conclusion that it is the top and bottom quintiles of men, specifically, which account for the entirety of the negative relation between income and retirement time.

Next we consider the income class differences according to the health status of respondents.[57] When the bottom and top quintiles are included, lower-income individuals, regardless of health, garner more retirement time than their higher-income counterparts (8.7 versus 8.1 for poorer health individuals; 9.4 versus 8.6 for healthier individuals) even though lower income individuals retire later – at ages 62.4 for the less healthy and 62.7 for the healthier – than the higher income individuals, at ages 61.5 and 61.7, respectively. Note that the retirement time benefit from being healthy is larger for of the lower half of retirees (0.72 years) than wealthier retirees (0.52 years). Overall we confirm, in Table 6, that health status is a key driver of retirement time: healthier individuals, regardless of income, enjoy more time in retirement than their unhealthy counterparts.

Table 6: Retirement Age and Time by Health Status and Income Group in the Full Sample

Health	Good, Fair, Poor		Excellent, Very good	
Income Class	Lower Income	Upper Income	Lower Income	Upper Income
No. Retired	1,298	1,021	1,370	1,868
Mean Retirement Age	62.42	61.51	62.68	61.76
Obs. Retirement Time	222	175	162	166
Mean Retirement Age if Deceased	62.78	62.02	62.97	62.09
Mean Retirement Time	8.736	8.095	9.456	8.615

Excluding the extreme 20% at the top and bottom of the income distribution, we see, in Table 7, that healthy and/or wealthy individuals share approximately equal retirement times. Among the lower-income middle class, healthier retirees have nearly a full year more of retirement

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[57] The cross tabulation of retirement time by income class and race does not provide further insights beyond what has been discussed above: nonwhites have more retirement time than whites, and in both cases, the relation is negatively associated with income class for the full sample and positively associated with the restricted, middle 60% sample. More importantly, we do not include these results here because the cell counts for nonwhites becomes unjustifiably small in both cases.

time (8.7 years) than the less healthy lower-income middle class (7.8 years). However, the retirement time differential among the upper-income middle class is insignificant at a mere 0.09 years (although this happens to be in favor of the less healthy). Moreover, these retirement time figures for the upper half of income earners are nearly equal to that of the healthy but poor segment of the middle class. Thus, among the middle 60% of the distribution, it is only the unhealthy, lower middle class that is at a significant disadvantage in obtaining retirement time.

Table 7: Retirement Age and Time by Health Status and Income Group Middle 60% of Distribution

Health	Good, Fair or Poor		Excellent/Very good	
Income Class	Lower Half	Upper Half	Lower Half	Upper Half
No. Retired	754	704	849	1,104
Mean Retirement Age	62.47	61.66	62.82	61.62
Obs. Retirement Time	124	122	96	108
Mean Retirement Age if Deceased	62.56	61.61	63.28	62.34
Mean Retirement Time	7.79	8.85	8.74	8.76

Before moving to the regression analysis, we provide a brief explanation of the observed biasness of our sample. If an individual entered the HRS in the first survey wave in 1992, they would have been followed for eighteen years (1992 through 2010). Many individuals have simply not been a part of the survey long enough to have died. Those who have died, and for whom we calculate a retirement time, are those from groups with lower-than-average life expectancy. Since it is well documented that longevity is positively correlated with income, the people who died are more likely to be lower income workers. Moreover, since longevity is normally distributed, the HRS data captures a disproportionate share of lower-income individuals' left tail of their death age distribution, relative to the death age distribution of higher income individuals. That is, because the average death age of wealthier individuals is higher, we observed a smaller segment of this distribution's left tail.

This assessment is borne out in the data present in Tables 8 and 9. The middle three quintiles have roughly equivalent rates of death (12.1%, 12.3% and 11.6%), whereas 14.13% of the bottom 20% of the income distribution died compared to a mere 8.69% of the top 20%. Further, far more men (15.2%), than women (8.14%) have died. The sex disparity, in fact, is larger than the difference between the very healthy individuals who died (8.9%) and the proportion of deceased people with worse health (15.6%) as seen in Table 8. Each of the large differences – between women and men, health status and the top and bottom 20% of the income distribution – are associated with unexpected outcomes in the distribution of retirement time. These rates of death support our focus on the middle 60% of the income distribution. Moreover, given the near-equal death rates among the middle three quintiles, this middle class is likely more representative of the true population. In other words, the middle class subset is a reasonable representation of retirement times.

Table 8: Number and Proportion of Deceased Individuals, Plus Death Age, Retirement Age and Time in the Full Sample

		Proportion Dead	Deceased Individuals with a Retirement Time Value			
			No. Deceased	Mean Death Age	Mean Retirement Age	Mean Retirement Time
Gender	Women	8.14%	216	71.21	62.75	8.460
	Men	15.22%	509	71.19	62.37	8.823
Health Status	Good - Poor	15.63%	397	70.90	62.44	8.454
	Excellent - Very Good	8.94%	328	71.56	62.52	9.030
Income Group	Lower Half	12.89%	384	71.90	62.86	9.040
	Upper Half	10.67%	341	70.40	62.05	8.348
Income Quintile	Bottom 20%	14.13%	164	73.00	62.84	10.160
	20-40%	12.17%	145	71.58	63.22	8.367
	40-60%	12.35%	152	70.91	62.68	8.229
	60-80%	11.59%	153	70.30	61.36	8.934
	Top 20%	8.69%	111	69.64	62.25	7.393

However, the final two rows of Table 9 show that the lower death rate variation among the middle class does not hold across gender and health categories. The proportion of deceased men (16.5%) is still far greater than that of women (7.7%), as is the proportion of the deceased who reported poorer health (16.0%) over those who reported being healthy (9.1%). As a result, we are unable to entirely eliminate all biasness in health and gender dimensions, even though we have eliminated the bias for income groups. Therefore, in the regression analysis, we look at both the full sample and the middle 60% subsample to provide some early insights into the state of retirement in America.

Table 9: Number and Proportion of Deceased Individuals, Plus Death Age, Retirement Age and Time in the Middle Class (Middle Three Quintiles)

		Proportion Dead	Deceased Individuals with a Retirement Time Value			
			No. Deceased	Mean Death Age	Mean Retirement Age	Mean Retirement Time
Gender	Women	7.66%	134	70.65	62.52	8.129
	Men	16.52%	316	71.03	62.36	8.676
Health Status	Good - Poor	16.00%	246	70.41	62.09	8.314
	Excellent - Very Good	9.08%	204	71.53	62.78	8.753
Income Group	Lower Half	12.07%	220	71.08	62.87	8.203
	Upper Half	12.00%	230	70.77	61.96	8.809

D. REGRESSION ANALYSIS

Using an ordinary least squares regression on the full sample, we find higher income reduces retirement time, retirement age, and death age. In fact, average full-time labor market income is the only significant variable in each of the three regressions. Note income and retirement age are negatively correlated: higher income people work longer. That higher income individuals remain longer in the workforce explains much of the anomalous results that higher income workers have less retirement time.

After controlling for income and health, men still have more retirement time than women, but the difference is not statistically

significant. Healthier individuals, after controlling for sex and income, die 1.36 years later and the result is highly significant (p-value = 0). The age of death, seen in the final column of Table 10, is negatively correlated with income. Thus, as expected from the cross tabulations, the top 20% of this sample tend to retire older and die a bit sooner.

Table 10: Retirement Time, Age and Death Age by Income, Gender and Health Status

Full Sample	(1)	(2)	(3)
VARIABLES	*Retirement Time*	*Retirement Age*	*Death Age*
Average Full-time Labor Market Income (Thousands of 2008 $)	-0.0116** (0.00471)	-0.00333** (0.00157)	-0.0109** (0.00488)
Gender (Male = 1; Female = 0)	0.577 (0.468)	0.167 (0.154)	1.721*** (0.433)
Health Status (Excellent/ V. Good = 1; Good to Poor = 0)	0.604 (0.422)	0.168 (0.153)	1.358*** (0.403)
Constant	8.576*** (0.455)	62.07*** (0.151)	66.62*** (0.412)
Observations	725	5,557	1,418
R-squared	0.012	0.001	0.019

Notes: **OLS coefficients with standard errors in parentheses**
*** p<0.01, ** p<0.05, * p<0.1

Working past age sixty-five is correlated with higher income and earlier death in the full sample, but not for the middle class sample, represented in Table 11. Labor market income is now associated with more retirement time, which confirms the findings from the simple cross tabulations. For the middle class, every $10,000 of labor market income increases retirement time by 0.139 years (approximately 6 weeks). Unfortunately, with the reduced sample size, from 725 observations in the full sample in Table 10, to 450 in middle class sample in Table 11, the

coefficient on retirement time is not statistically significant. Nevertheless, the negative relationship between retirement age and labor market income is significant in this sub-sample regression. Therefore, although this second regression loses some of its explanatory power compared to the full sample regression, it supports the hypothesis that, for now, the U.S. retirement system enables lower income individuals to obtain retirement time on an equal basis by enabling them to overcome their shorter life expectancy through earlier retirement.

Table 11: Retirement Time, Age and Death Age by Income, Gender and Health Status

Middle 60% VARIABLES	(1) *Retirement Time*	(2) *Retirement Age*	(3) *Death Age*
Average Full-time Labor Market Income (Thousands of 2008 $)	0.0139 (0.0184)	-0.0464*** (0.00692)	-0.0344* (0.0192)
Gender (Male = 1; Female = 0)	0.497 (0.521)	0.522*** (0.180)	1.488*** (0.529)
Health Status (Excellent/ V. Good = 1; Good to Poor = 0)	0.441 (0.471)	0.197 (0.179)	1.519*** (0.491)
Constant	7.382*** (0.846)	63.70*** (0.312)	67.31*** (0.857)
Observations	450	3,411	869
R-squared	0.006	0.014	0.020

Notes: **OLS coefficients with standard errors in parentheses**
*** p<0.01, ** p<0.05, * p<0.1

IV.   INCOME INEQUALITY AMONG OLDER WORKERS IS
GETTING WORSE[58]

Finding that the U.S. retirement system equalizes retirement time is in sharp contrast to the growing inequality of income over the past two decades. Using the same data set, we find the income distribution for full-time workers and their households has become more unequal. In 1992, looking at Table 12, the mean full-time labor market income of middle-income earners (i.e., those in the third quintile – the 40th to 60th percentile) was 31.7% of the average full-time labor market income of those in the top quintile.[59] By 2010, the middle quintile of workers' average income was only a quarter (25.3%) of the average income of the top 20%. The disparities in median incomes also grew. In 1992, the middle-quintile's median income was 40.7% of that in the top quintile; by 2010, the median middle-income individual had only one-third (33.3%) of the top 20%'s median income.

Table 12:   Ratio of Third Quintile (40-60%) to Fifth Quintile (80-100%) of Full-time Labor Market Income

Year of HRS Sample	Quintile's Mean Income	Quintile's Median Income
1992	31.7%	40.7%
1994	31.5%	41.8%
1996	32.1%	40.8%
1998	28.2%	35.9%
2000	29.8%	37.3%
2002	27.9%	33.3%
2004	27.3%	34.7%
2006	26.4%	35.0%
2008	26.8%	34.5%
2010	25.3%	33.3%

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[58] *See* NAT'L INST. ON AGING, NIH PUBL'N NO. 07-5757, *supra* note 5, at 57.

[59] Note that these figures for the distribution of full-time income come from the entire full-time workers sample in the HRS and thus are not subject to the sample bias that exists when restricting the sample retirees or the deceased.

V.   RETIREMENT TIME EQUALITY AND THE IMPLICATIONS
        FOR RETIREMENT AGE POLICIES

This study aimed to uncover retirement trends hidden by averages. That the average American man is retiring earlier and living longer hides the potential erosion in a major social accomplishment: Social Security, Medicare, and pension programs allow rich, middle class, and low income workers alike to retire before they die.

The lowest income groups in this sample are retiring early, while others in the middle class are working longer and not enjoying as rapid improvements in longevity. This means retirement time could grow more unequal by social economic class if the age at which Social Security beneficiaries collect full Social Security benefits is raised. It is a mistake to assume that the facts that Americans are living longer and that Americans are retiring earlier are not connected. Retirement improves health, especially for men, so if people work longer, longevity improvements could decrease and access to retirement time could decrease as well.[60] Reforming policies regarding one aspect of aging (e.g., retirement time) because of changes in the average of another (e.g., death age) is, therefore, ill advised.

It is well documented that the average American's life expectancy has increased markedly since World War II.[61] The average American born in 1950 lived to 68 years old.[62] By 1980, life expectancy at birth had increased to 73.9 years and to then nearly 78 years by 2007.[63] These remarkable increases hide a growing disparity of life expectancies among different socio-economic groups. Longevity has not improved equally for all Americans. Life expectancy for those in the top half of the income distribution has improved much more than for those in the bottom half.[64] Stunningly, this increasing inequality of outcomes has occurred with remarkable speed. For example, the Inter-American Development Bank

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[60] *See* Kevin Neuman, *Quit Your Job and Get Healthier? The Effect of Retirement on Health*, 29 J. LAB. RES., 177–201 (2008).

[61] *Life Expectancy at Birth by Race and Sex, 1930-2010*, NAT'L CTR. FOR HEALTH STATISTICS, *available at* http://www.infoplease.com/ipa/A0005148.html.

[62] *Id.*

[63] Arias, s*upra* note 3, at 48.

[64] *See* Cristia, *supra* note 3.

estimates that from the 1983-1997 period to the 1998-2003 period,[65] The differences in life expectancy between the highest 20% and lowest earning 20% of Americans (for those ages 35-76) grew from 0.7 to 1.5 years among women, and from 2.7 years to 3.6 years among men.[66]

To explain the growing disparities in longevity, other studies have sought to isolate a broader range of socio-economic variables. Education is a driving force behind longevity and mortality differentials.[67] Waldron, an economist, finds income is the driving force, though she did not have data on education.[68] Specifically, differentials in life expectancy among race-sex groups (at age twenty-five) remained constant from 1990 to 2000, but that differences significantly increase between high- and low-education groups.[69] Lower-educated women (both white and black) had a statistically significant lower average life expectancy in 2000, compared to better-educated women than they did in 1990.[70]

What are the implications for retirement policy? The evidence suggests that raising the retirement age and implementing other policies that encourage longer working lives may actually reverse longevity gains, so that higher labor incomes may result in a decrease in retirement time. Raising the normal retirement age in Social Security, which is equivalent to cutting benefits for workers, will reduce income for any person in a group that tends to leave the labor force early to compensate for a lower life expectancy. Higher income people also obtain more years of life, but the inequality of life expectancy can be counterbalanced by a well-designed pension system that allows lower income and lower educated workers to collect pensions or disability benefits earlier than higher income and higher educated individuals. On the other hand, pension systems that encourage lower-income, lower-educated people to work longer will create unequal distributions of retirement time.

In sum, sex and health are important factors in predicting who will have more or less retirement time, but economic class is a key factor. If

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[65] These periods were chosen so that the sizes of the two groups considered were approximately equal.

[66] Cristia, *supra* note 3, at 20, 29-30.

[67] *See* Ellen R. Meara et al., *The Gap gets Bigger: Changes in Mortality and Life Expectancy, by Education, 1981-2000*, 27 HEALTH AFFAIRS 350 (2008).

[68] *See* Hilary Waldron, *Trends in Mortality Differentials and Life Expectancy for Male Social Security-Covered Workers by Socioeconomic Status*, 67 SOC. SEC. BULL., no. 3, 2007.

[69] *Id*.

[70] *Id*.

lower socio-economic status individuals are forced to delay retirement because private and/or public pension payments shrink, then retirement time is bound to become more unequal.

Appendix A: Longevity at various ages, by race[71]

Table A: Longevity at Various Ages from 1980-2010, by Race

	White Male	White Female	Black Male	Black Female
At birth	8.2%	4.1%	12.5%	7.6%
At 65 years	25.4%	10.3%	22.3%	14.9%
At 75 years	25.0%	11.3%	22.9%	16.8%

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[71] *See* ROBERT D. GROVE & ALICE M. HETZEL, U.S. DEP'T OF HEALTH, EDUC., & WELFARE, VITAL STATISTICS RATES IN THE UNITED STATES 1940-1960 (1968), *available at* http://www.cdc.gov/nchs/data/vsus/vsrates1940_60.pdf; ELIZABETH ARIAS, U.S. DEP'T OF HEALTH & HUMAN SERV., UNITED STATES LIFE TABLES BY HISPANIC ORIGIN (2010), *available at* http://www.cdc.gov/nchs/data/series/sr_02/sr02_152.pdf; Sherry L. Murphy, et al., *Deaths: Final Data for 2010*, U.S. DEP'T OF HEALTH & HUMAN STATISTICS NAT'L VITAL STAT. REP., May 8, 2013, at 1, 3, 18-21, *available at* http://www.cdc.gov/nchc/data/nvsr/nvsr61/nvsr61_04.pdf.

Appendix B: Definition Variables

Variable Name	Stata code	Explanation	Other Notes
Entry Age	Y_age	Age of respondent when he/she first enters the HRS survey.	Here 'age' is simply the difference between year of birth and survey year
Death Age	death_age	Difference between year/month of death and year/month of birth. Month's (1=January; 12 = December) are divided by 12 and added/subtracted from the difference in years	HRS 2010 Tracker data. HRS records year of death and then verifies with CDC mortality tables.
Retirement Age	ret_age	Difference between year/month of stated date of retirement and year/month of birth	Year and month of retirement is asked if retired `year' == 1 (see below)
Disabled Age	dis_age	Difference between year/month of stated date of when a disability (keeping one from work) began and year/month of birth	
Time in Retirement	ret_time	Difference between retirement or disabled age and death age. If respondent has both a retirement and disability age, retirement age is used.	
Retired	retired{`year'} or retired (0 = not retired; 1 = retired)	Based on the respondents labor force status (reported in each survey), he/she is considered retired only if the first/primary response is "retired". Therefore a respondent may be coded as 1 for several survey years – and may switch to and from retirement.	Each respondent with retired `year' == 1 also states a year and month of retirement. For the calculations of retirement time and age we take the mostly recently reported retirement year and month.

Individual Income	inc{`year'}	Annual income from wages, salaries and business. Positive values only.	RAND income and wealth files, 1992 through 2010. (e.g., r1iearn)
Average Real Income	avg_inc_r	Constructed by adjusting individual incomes by CPI to 2010 US dollars. Average is constructed as the mean for each individuals across the survey years they report an individual income	CPI adjustment figures are taken from IPUMS CPS (CPI99) The variable is restricted to full-time income only (35+ hr/wk; 40+ wk/yr)
Top Half / Bottom Half	avg_topbottom (0 = bottom; 1 = top)	Binary value assigned to each respondent based on whether their average real income is above or below of the median income	The median average income is the median
Income Quintile	avg_quint (1 = poorest 20%; 5 = richest 20%)	Same as Top / Bottom, but dividing individuals into 5 income groups rather than 2.	Cut off points are based on average real income
Sex/Gender	GENDER (0 = Woman; 1 = Man)		HRS 2010 Tracker data
White/Non-White	white (0 = not white; 1 = white)		HRS 2010 Tracker data
Covered by a Pension Plan, 1992	inplan1992 (1 covered by a plan; 0 = not covered)	Whether employed persons in 1992 are or are not covered by a pension plan at work that year.	
Health Status	health1 (0 = not great; 1= great)	Health status is a self-reported 5-level variable with responses: 'Poor', 'Fair', 'Good', 'Very Good' and 'Excellent'. The latter two are coded as 0, the former three are coded as 1.	Health status is asked in each survey year. health1 takes the first reported status