Post-War Trends in Labor Income in the Social Security Earnings Public-Use File

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Washington, DC

15th Annual Joint Conference of the Retirement Research Consortium

August 1-2, 2013
Washington, D.C.

This research was supported by a grant from the U.S. Social Security Administration (SSA) as part of the Retirement Research Consortium (RRC). The findings and conclusions are solely those of the author and do not represent the views of SSA, any agency of the Federal Government, the Center for Retirement Research at Boston College, or the Brookings Institution. I gratefully acknowledge the excellent research assistance of Kan Zhang of Brookings.

Introduction

The release of the Social Security Administration's Earnings Public-Use File (EPUF) offers an unparalleled source of information for analyzing trends in lifetime earnings patterns. The file contains summary earnings information on individual-level Social-Security-covered earnings before 1951 as well as individual-year data on covered earnings between 1951 and 2006 (Compson 2011). The data cover a random sample of 3.13 million Americans who had covered earnings in at least one year between 1951 and 2006. Over this span of years there were 10 recessions, a notable rise in women's employment and relative earnings, an increase in early retirement followed by a trend toward later retirement, and a substantial increase in annual wage inequality. Each of these trends has affected the shape of workers' career earnings paths, aggregate earnings subject to the Social Security tax, the accumulation of Social Security earnings credits, and Social Security benefit payments. Shifts in lifetime earnings patterns may have affected the relative attractiveness of DC-type pension plans, which are increasingly important, compared with traditional DB plans, including Social Security.

Compared with more familiar sources of information about earnings and career work patterns, such as the March Current Population Survey, the EPUF has some important advantages. It contains information about workers' annual labor income, up to the Social Security annual earnings cap, for all calendar years between 1951 and 2006. Even though the earnings data have been "perturbed" slightly to protect the confidentiality of earners, the resulting file almost certainly contains more accurate information about earned income below the taxable cap than earnings data provided in Census Bureau interviews. The EPUF has some important limitations, however. The only demographic identifiers on the EPUF file are workers' gender and year of birth. Users do not know where workers live, their family circumstances, or, indeed, whether they are alive in years after their last reported earnings. Nor do we know in which years earners or nonearners in the file collected a Social Security benefit, possibly based on another person's earnings record.

In the remainder of this paper I consider three topics on which earnings data in the EPUF can shed light. First, I consider the evolution of age-earnings profiles, separately for men and women. Second, I use the voluminous earnings data to evaluate the shift in

women's relative earnings over their careers in comparison with men's earnings at the same stages of their careers. Finally, I examine the link between the ages of entry and exit into Social-Security-covered employment, on the one hand, and the peak earnings that workers attain at the high point of their careers.

Age-Earnings Profiles

Figure 1 shows the age-earnings profiles of workers in Social-Security-covered employment in selected calendar years over a five-decade period, 1951-2001. I have calculated median earnings amounts for workers with positive reported earnings, by year of age, in six calendar years. Earnings amounts have been converted into 2010 prices using the BLS CPI-U-RS deflator. The top panel of Figure 1 shows age-earnings profiles among men; the lower panel shows equivalent results for women. The results for men are affected by the Social Security taxable earnings cap, especially in years before the mid-1970s. The effect of the cap is vividly illustrated in the age profiles for 1951, 1961, and 1971. Note, for example, that in 1971 men between 29 and 58 have the same median capped earnings, about $38,500 measured in 2010 prices. This was, of course, the maximum wage amount subject to the Social Security payroll tax in 1971. The taxable earnings cap has no effect on our estimate of women's median earnings. The bottom panel accurately captures the growth in women's real earnings in successive decades and at successive ages. In 1951 women's median earnings were relatively flat from age 22 up through age 62. By 2001 the shape of the age profile of women's earnings looked much more similar to that of men.

The age-earnings profile in Figure 1 is based on cross-sectional data in each of six years. Figure 2 examines the age earnings profile of a single birth year cohort, the one born in 1936. This cohort turned 15 in 1951, the first year of annual earnings available in the EPUF, and reached 70 in 2006, the last year with earnings data in the file. Each panel of Figure 2 shows the mean, median, and maximum reported capped earnings of workers with reported earnings at the indicated ages. The annual earnings amount in this chart is measured as a percent of the economy-wide average wage as estimated by the SSA. SSA's estimate of the economy-wide annual wage accounts for estimated wage earnings above the taxable earnings cap (Social Security Administration 2013, 2.14-2.17). Note in the lower panel of Figure 2 that the median female earner in this birth cohort never

earned enough to approach the maximum taxed earnings amount. In contrast, the median male earner in the cohort had earnings close to or above the maximum taxable amount at every age between 27 and 37. One lesson of Figure 2 is that the Social Security taxable earnings cap places severe limits on our ability to measure average and median earnings among prime-age working men in years before the mid-1970s.

To deal with these limits we can use career earnings profiles from a number of birth year cohorts to form an estimate of the typical median earnings of workers at a given age. I derived such estimates using capped earnings information for four sets of birth cohorts, 1925-39, 1940-54, 1955-69, and 1970-82. At each year of age I calculated the average of the median earnings amounts for members of the cohorts, measured as a percentage of the economy-wide average wage when an individual birth-year cohort attained the indicated age. In calculating this average I excluded estimates affected by the Social Security taxable earnings cap. The estimates displayed in Figure 3 thus show the averaged age-median earnings profiles of four groups of birth cohorts, largely purged of the effects of the taxable earnings cap. The top panel shows results for male earners, and the bottom panel shows results for women. Measured relative to the economy-wide average wage, the earnings profiles of men and women have moved in the opposite direction. At most ages past 28 median male earnings have declined over time; in contrast, median earnings of women have increased. The basic shape of women's age-earnings profile has also changed. The dip in earnings after age 25, which is noticeable among working women born between 1925 and 1939, is absent from the earnings profiles of younger cohorts. It is possible, of course, that the earnings dip would be evident if our estimate of women's earnings included zero earnings amounts for women who temporarily ceased working in their mid- or late-20s. Even so, the sustained rise in employment among mothers in the three decades after 1970 means that the earnings dip must be smaller in recent cohorts compared with earlier ones.

The implications of Figure 3 for the relative median earnings of women compared with men are displayed in Figure 4. At each age between 22 and 70 I show ratio of the median earnings of women in the indicated birth cohorts to the median earnings of men in the same cohorts. As in Figure 3, the results in Figure 4 are calculated to minimize the effects of the earnings top code on the estimated earnings ratios. For all the birth cohorts

shown, women's median earnings represent a relatively high percentage of male median earnings at age 22 but then decline at higher ages. The decline was especially sharp for women born between 1925 and 1939. Successive cohorts have suffered smaller reductions in their relative earnings. Note that the median earnings of working women begins to rise compared with that of men at some age after women reach their mid- to late 30s. However, it is only at ages past 65 that median women's earnings climb to 80% of the median earnings of the men who continue to work.

Figure 5 shows women's relative earnings at positions in addition to the mid-point of the distribution. The top panel shows relative earnings at the 10^{th} and 25^{th} percentiles in addition to the median; the bottom panel shows relative earnings at the 75^{th} and 90^{th} percentiles as well as the median. Note that the bottom panel only shows these earnings ratios for the period after 1974, that is, in years when increases in the taxable earnings cap made it possible to observe the 75^{th} percentile of the male earnings distribution. (Male earnings at the 90^{th} percentile is only observable starting in 1989.) The results in Figure 5 show that in the lower ranks of the earnings distribution the ratio of female to male earnings remained nearly unchanged between 1951 and the early 1970s. Women's earnings then began to climb relative to men's, a trend that continued through the beginning of the last decade, though at a slower rate than in the period from the mid-1970s through the early 1990s. The lower panel shows that these trends are mirrored in the top half of the female earnings distribution, though the improvement in women's relative earnings gains has been slower at the 90^{th} percentile of the distribution than it has been in the middle and at the bottom.

Career Earnings Patterns

The EPUF not only provides earnings information on a remarkably large number of workers from each birth cohort, it also provides detailed information on the shape of worker careers that is not easy to duplicate in other publicly available files. For example, it contains data on earnings early in workers' careers for cohorts reaching age 30 over much of the past half century. The EPUF contains earnings data starting at age 15. Figure 6 shows the average age of first earnings for successive cohorts born from 1936 through 1964. About 93% of workers in these cohorts who eventually have earnings in the EPUF reported their first earned income between ages 15 and 30. The figure shows

estimates of the average age of first earnings in successive birth cohorts. The age of labor force entry rose in the early 1950s (that is, for cohorts born between 1936 and 1944), and then began a period of sustained decline. Males born in the early 1960s on average reported their initial earnings at approximately the same age as workers born in the Great Depression. A notable feature of the chart is the convergence in labor force entry patterns of young women and young men.

For birth cohorts whose prime working years are spanned by the EPUF we can calculate the number of years in which they received Social-Security-covered earnings during their potential careers. Workers born between 1933 and 1944 have at least 48 years of potential earnings in the file. Figure 7 shows the distribution of years of covered earnings for all sample members who reported earnings in at least one year. Results are shown separately for women and men. About half of men had covered earnings in at least 40 years. About 1 in 10 male earners and 17% of female earnings received earnings in nine or fewer years. It is unclear, however, whether the low number of earnings years is explained by joblessness, by employment in a job not covered by Social Security, or by an early death.

Career earnings records can be used to determine and analyze the last age at which workers report covered earnings. Figure 8 shows tabulations for EPUF sample members who had at least 10 years of covered earnings. We analyze workers in three birth cohorts for which it is plausible to assume that nearly all workers will have ceased paid employment by 2006. The chart shows the percentage of workers in each of the cohorts whose last year of covered earnings occurs at the age indicated on the horizontal axis. (The percentages indicated by the vertical axis are calculated over a sample of workers whose last year of covered earnings occurred between ages 50 and 70. For all birth cohorts an overwhelming percentage of labor force exits occur in this age range.) The oldest cohort, born in 1901-1905, has an exceptionally large proportion of age-65 retirements. Age 65 was of course the earliest age for entitlement to an unreduced retired-worker benefit. Nearly all workers who attain age 65 in a calendar year will be 64 during at least part of that calendar year. Among women in the oldest cohort, 62 was also a favored age to cease working. For the two younger cohorts, born in 1911-1915 and 1926-1930, age-62 retirements became more popular among both women and men.

Indeed, for the 1926-1930 cohort age 62 is a more popular job-leaving age than age 65. The rising popularity of age-62 retirements is undoubtedly linked to the introduction of early retirement benefits (at age 62) in Social Security. This reform was implemented in the mid-1950s for women and in the early 1960s for men.

Ages of labor force entry and exit may be linked to the peak earnings that workers achieve in their careers. To examine the association between age of entry and peak earnings I sorted workers into classes defined by their age of first covered earnings. For each of these ages I ranked workers according to their peak career earnings (measured as the ratio of the worker's annual earnings and the economy-wide average wage for that year) and calculated the median peak earnings for workers in the cell. Figure 9 shows the results of these tabulations for workers born between 1936 and 1940. The estimation sample consists of all workers in these birth cohorts who accumulated at least 10 years of covered earnings during their careers. Both among men and women there is a pronounced tendency for workers who begin covered employment at younger ages to attain higher peak earnings in their careers. Workers with covered earnings at age 15 attain higher peak earnings than workers entering the covered workforce at any later age. Relative to the economy-wide average wage, the peak career earnings of a man entering the workforce at 15 is about one-quarter higher than that of a man who enters the workforce at 20. For women, the peak earnings for someone who enters covered employment at 15 is about one-eighth greater than that of someone who delays entering employment until 20. These differences seem startlingly large, but they are evident for all of the birth cohorts for which we can observe entry patterns into covered employment and several decades of earnings after labor force entry. One possible explanation for the association is the expansion of employment covered by the Social Security system. Some classes of employment that may lead to low career earnings, including farm self-employment and military service, only received coverage under Social Security in mid-1950s. However, we find evidence for a negative association between age of entry into covered employment and peak career earnings even among birth cohorts reaching age 15 after the expansions of coverage were substantially complete.

The EPUF data also permit us to examine the link between workers' peak career earnings and their age of exit from covered employment. Once again I classify workers

within a given birth-year cohort by their last age of covered earnings. Workers in each birth-year and age-of-exit cell are ranked by their peak career earnings, and I calculate the median peak earnings amount in the cell. I restrict the analysis to workers who have at least 10 years of covered earnings. Figure 10 shows the results of these calculations, separately for men and women and separately for three sets of birth-year cohorts. The tabulations show a clear and strong positive association between workers' age of exit from covered employment and the peak earnings they attain in their careers. Workers who retire later also tend to earn higher incomes during the best earnings years of their careers. For the oldest male cohorts it is conceivable that the positive association between age of labor force exit and peak career earnings is due to the legislated increases in the Social Security taxable earnings cap. Workers who remained in the workforce longer were more likely to work when the cap was relatively high, whereas workers who left the workforce at a younger age did not have the opportunity to earn exceptionally high covered earnings.

The experience of the youngest cohort, born between 1932 and 1936, suggests that the rising earnings cap plays only a minor role in this association, however. During the middle and late parts of their careers the earnings cap was uniformly high relative to the economy-wide average wage. Workers who left covered employment later also tended to earn higher peak earnings. Moreover, the same strong association between the workforce exit age and peak career earnings is also evident for women, relatively few of whom were affected by the earnings cap, even in years when the cap was low. Therefore, it seems quite likely that the positive association between later workforce exit and a higher level of peak career earnings represents a genuine characteristic of career earnings patterns rather than an artifact produced by legislated increases in the Social Security earnings cap.

Conclusion

Compared with other sources of information about U.S. earnings patterns, the EPUF has distinctive strengths and weaknesses. Its main strength is that it permits analysts to look at individual workers' earnings patterns over a substantial portion of their careers. In addition, the sample is large enough to yield considerable precision in estimation, and the annual earnings reports are likely to be unusually reliable. The

limitation of the file is the absence earnings information for jobs not covered by Social Security and for wages and self-employment income above the annual cap. Secondarily, the file also lacks crucial demographic information, data on Social Security benefits, and any indicator of mortality in years after a worker's earnings cease.

Nonetheless, the availability of earnings information covering full careers permits us to examine relationships that are invisible in files that cover time spans of a month to two or three years. One striking relationship uncovered in this paper is the link between age of entry into employment and a worker's peak career earnings. Young men and women who enter the workforce at age 15 earn considerably higher labor incomes at the peak of their careers than men and women who enter the workforce after age 20. Similarly, workers who exit the workforce at later ages tend to earn higher labor incomes at the peak of their careers than workers who exit earlier.

References

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Social Security Administration. 2013. *Annual Statistical Supplement to the Social Security Bulletin, 2012.* Washington, D.C.: Social Security Administration.

Figure 1. Age Profile of Median Capped Earnings in Selected Years

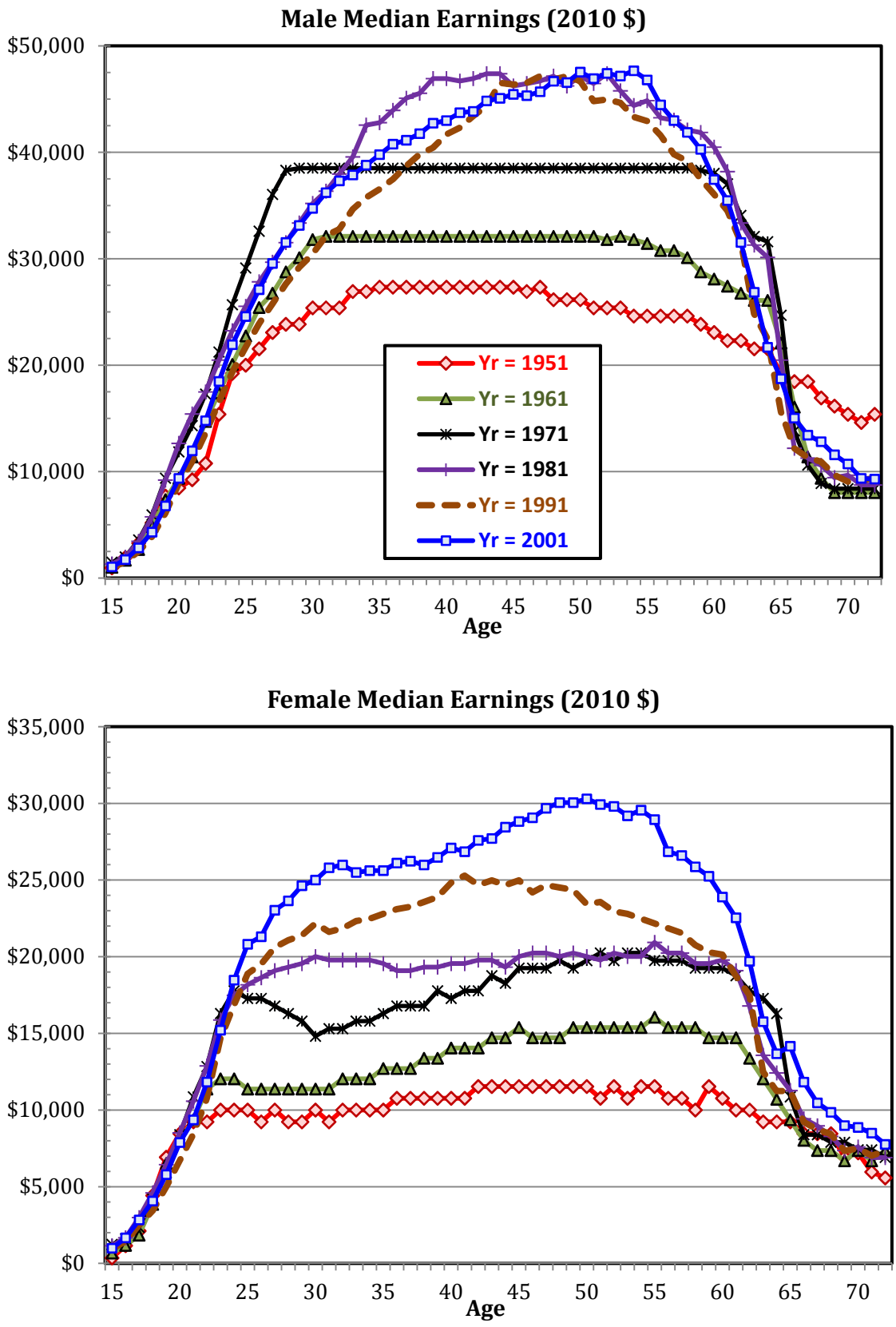
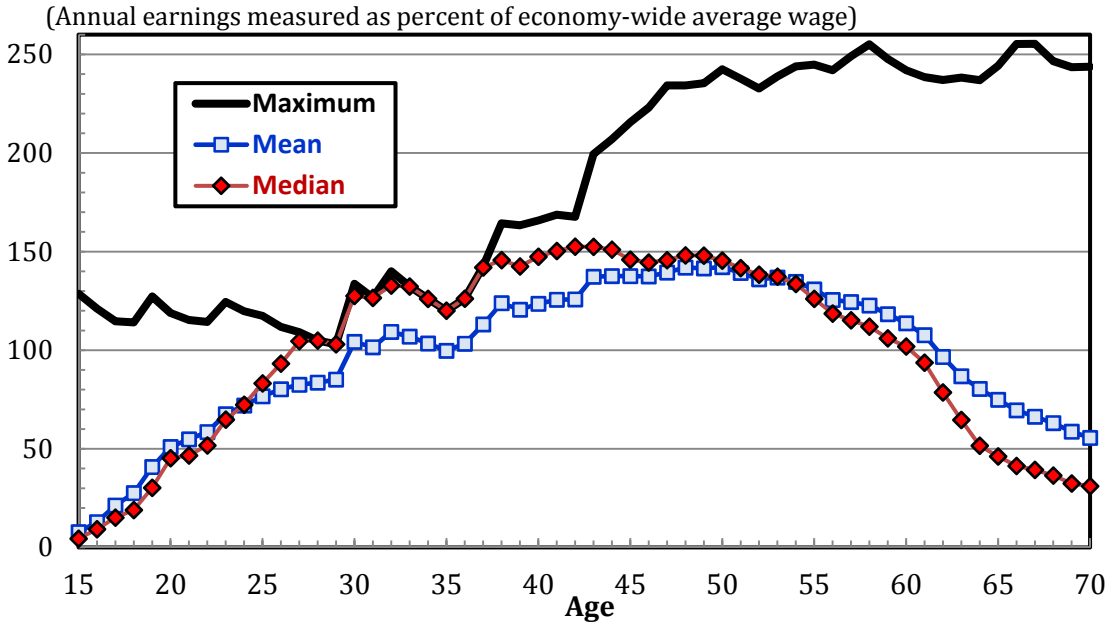


Figure 2. Mean, Median, and Maximum Capped Earnings of Workers Born in 1936, by Year of Age

Men



Women

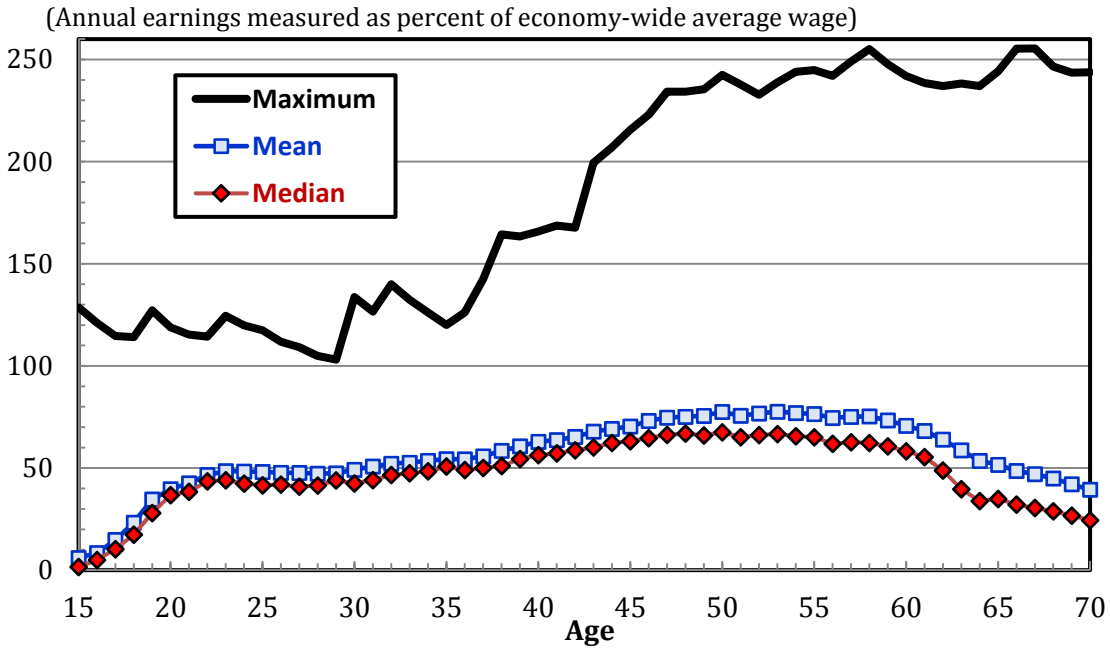
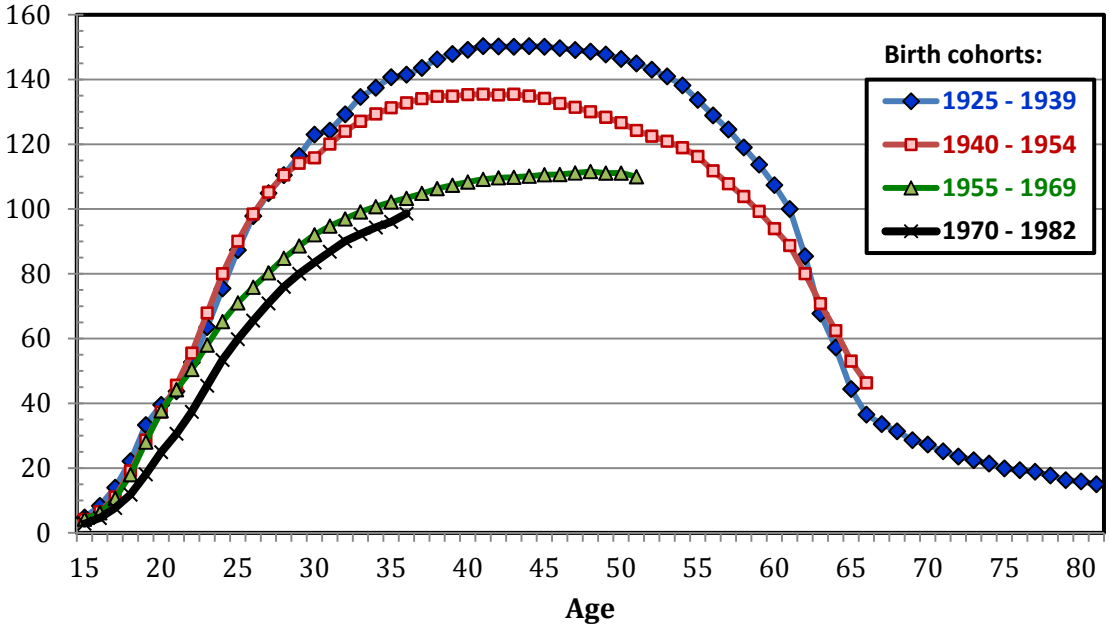


Figure 3. Age-Earnings Profiles of Successive Birth Cohorts

Male median earnings at indicated ages

(Economy-wide average wage in year = 100)



Female median earnings at indicated ages

(Economy-wide average wage in year = 100)

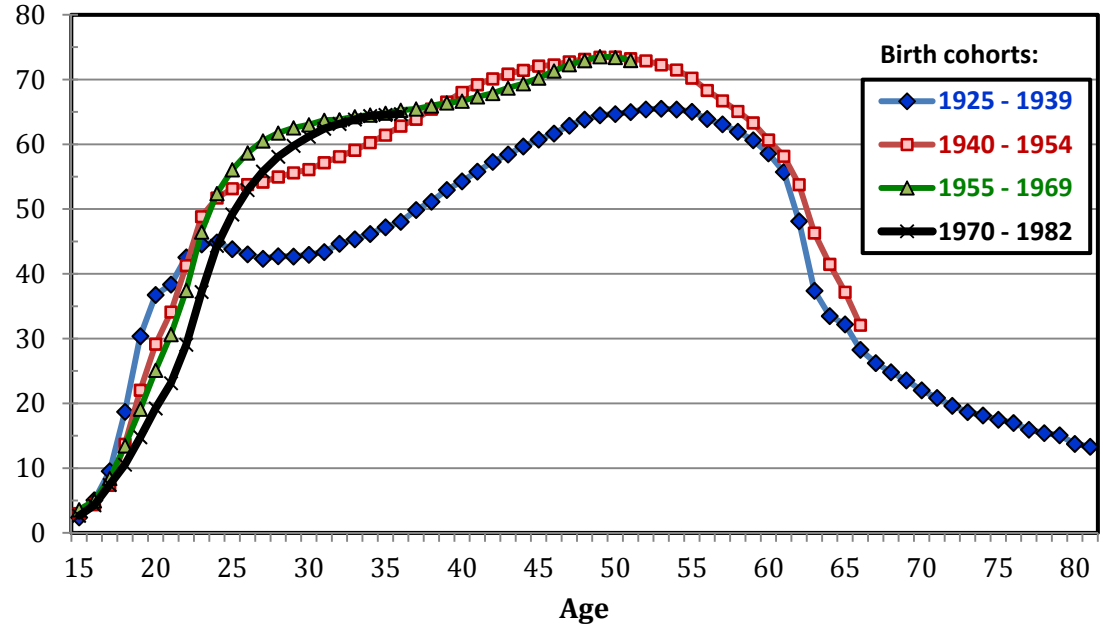


Figure 4. Female Median Earnings as a Fraction of Male Median Earnings at Successive Ages, by Birth Cohort

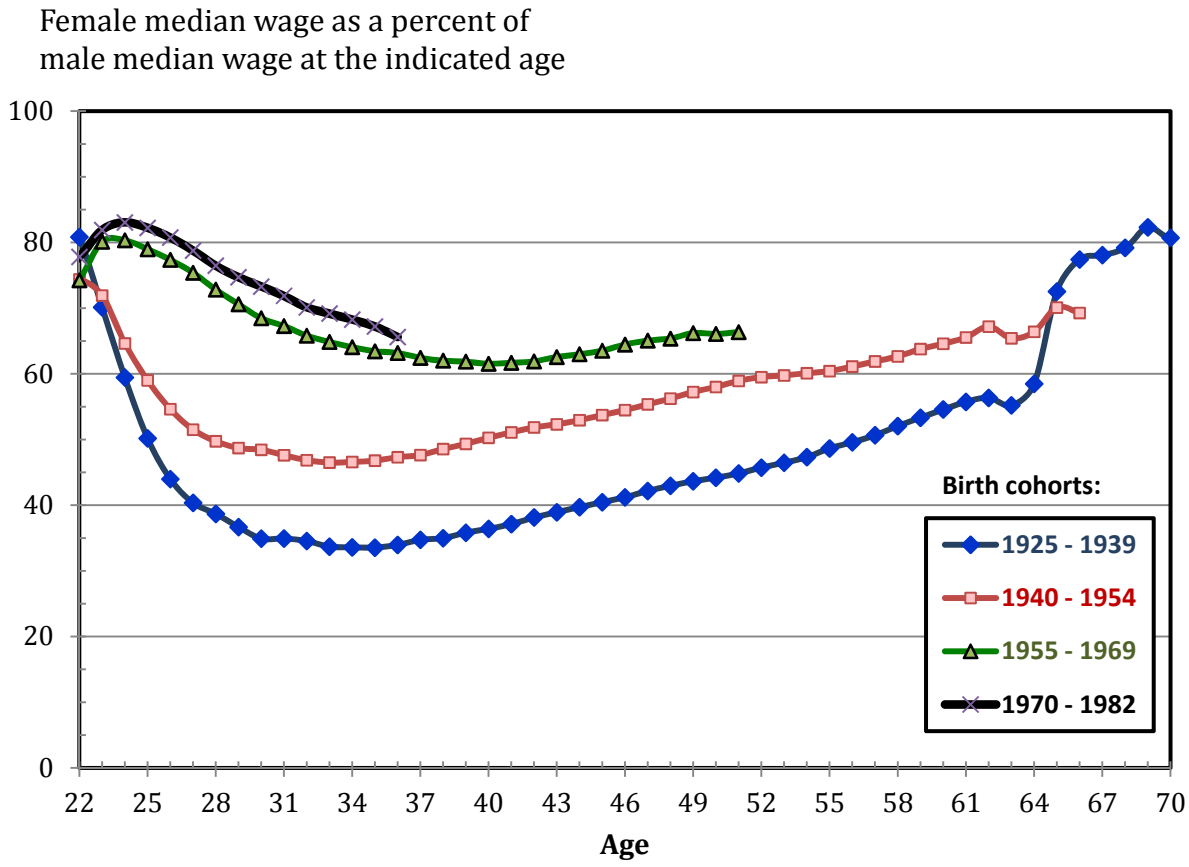
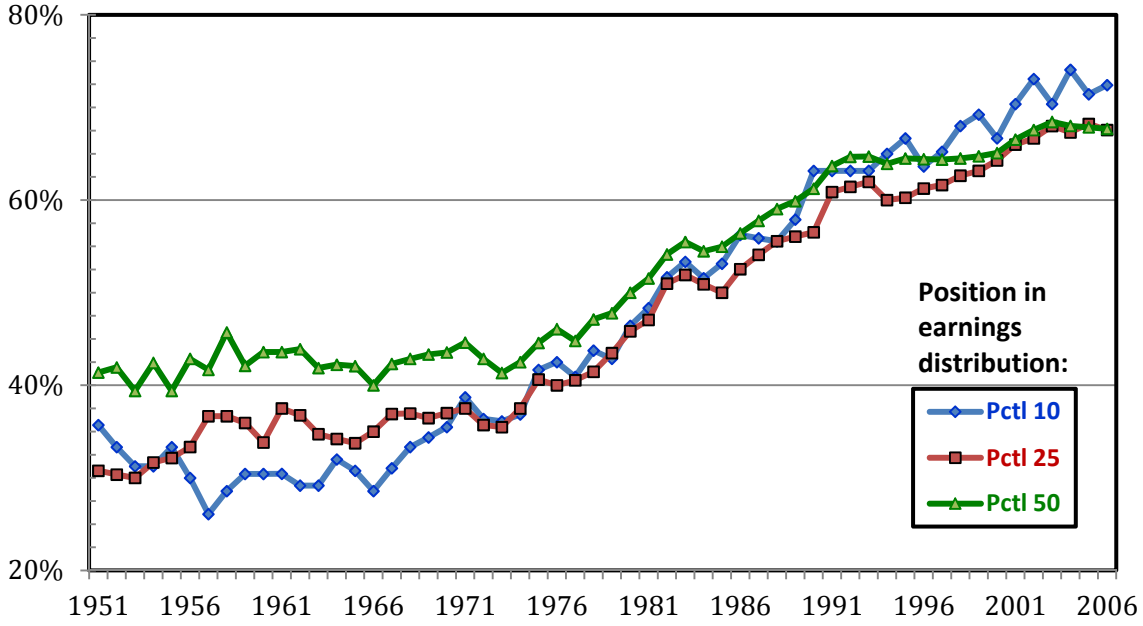


Figure 5. Ratio of Female to Male Earnings at Selected Positions of the Female and Male Earnings Distributions, 1951-2006

Ratio of female to male earnings at indicated position of the distribution, 1951-2006



Ratio of female to male earnings at indicated position of the distribution, 1975-2006

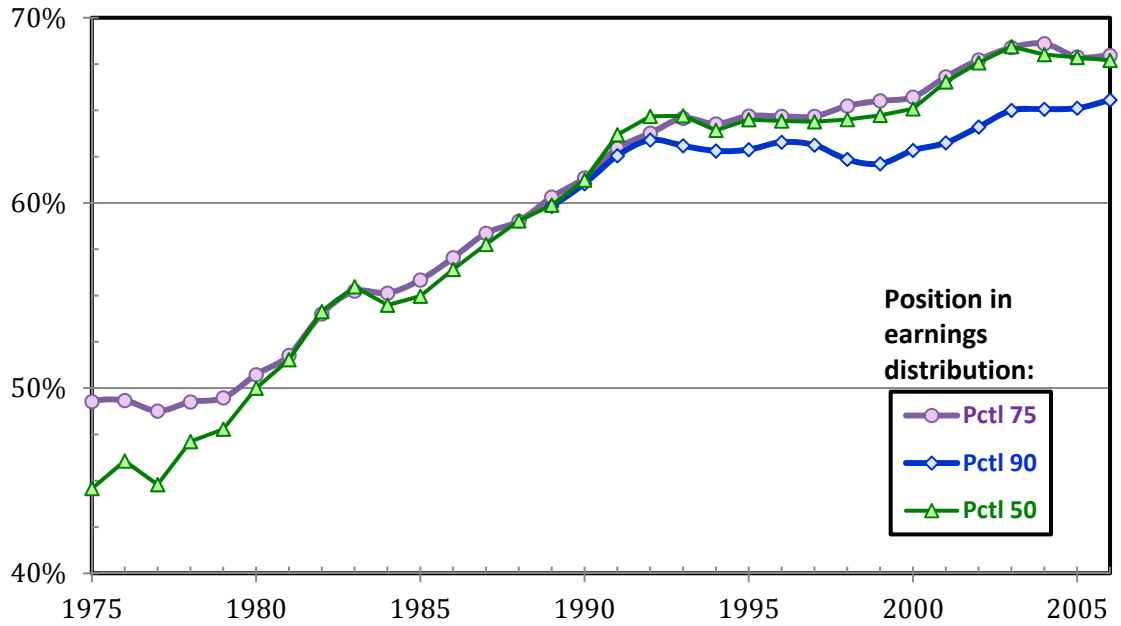
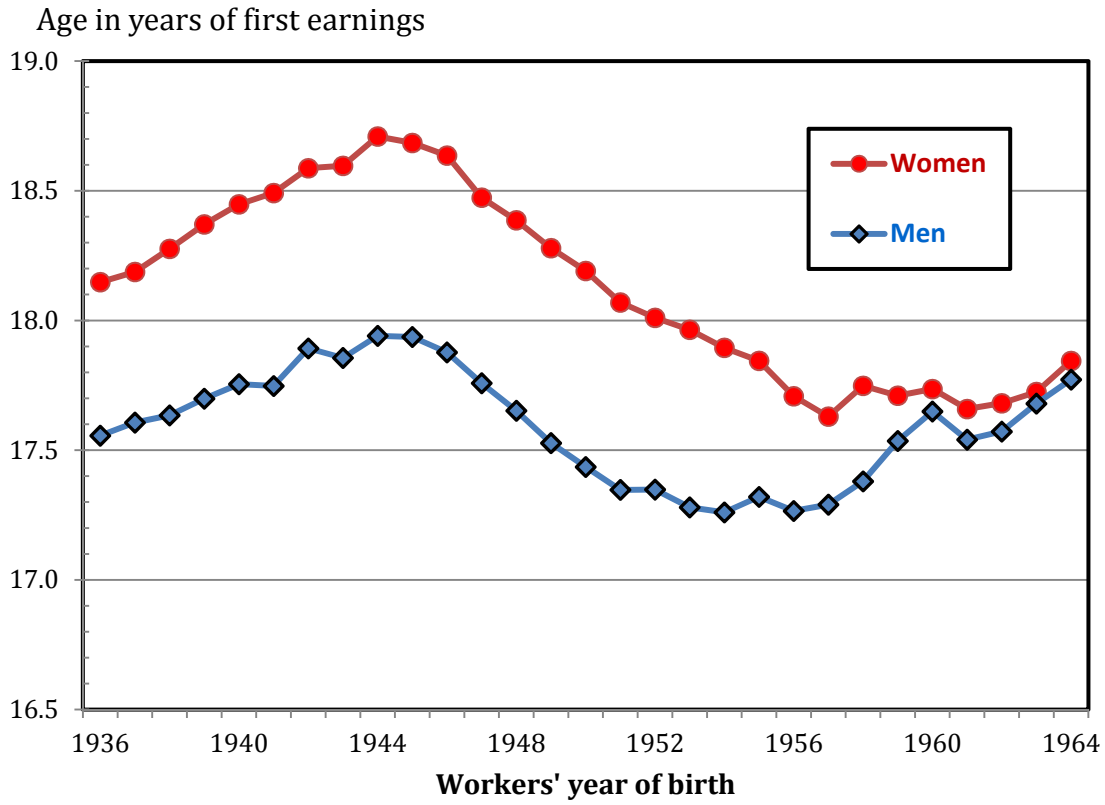


Figure 6. Average Age of First Social-Security-Covered Earnings, by Birth Cohort



Note: Youngest age with recorded earnings on EPUF is 15. Earnings received by workers under 15 are not reported in the file.

Figure 7. Frequency Distribution of Years with Covered Earnings among Workers Born between 1933 and 1944, by Gender

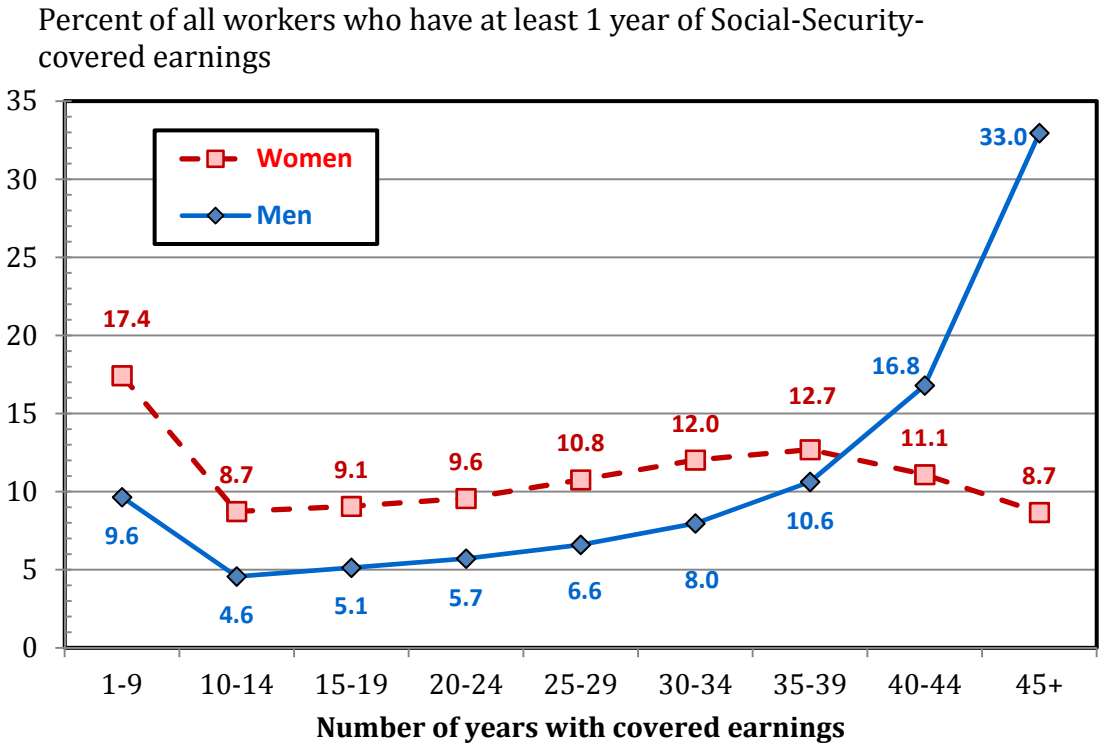
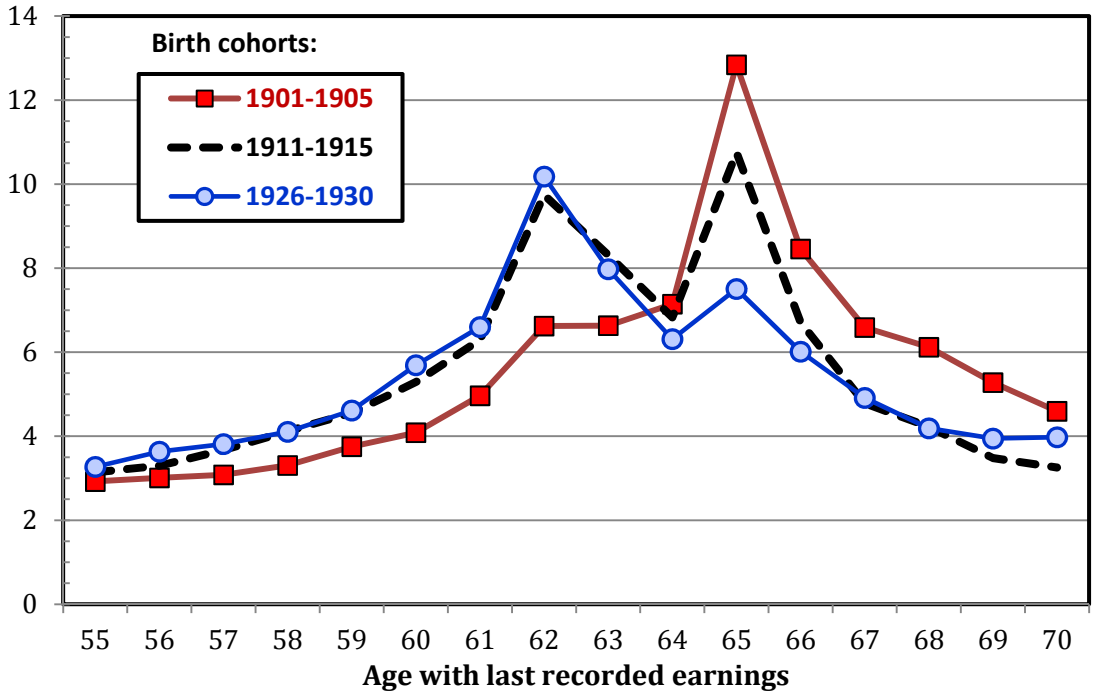


Figure 8. Frequency Distribution of Workers' Last Age with Covered Earnings, Selected Birth Cohorts

Men

Percent of all workers with last earnings records between ages 50 and 70



Women

Percent of all workers with last earnings records between ages 50 and 70

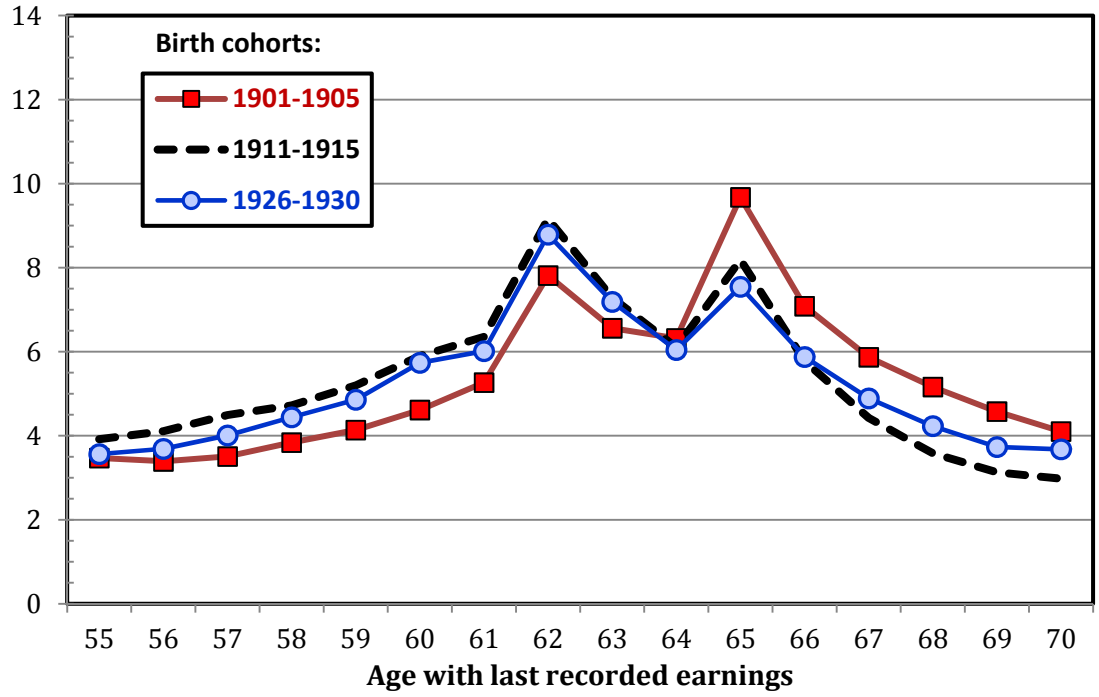
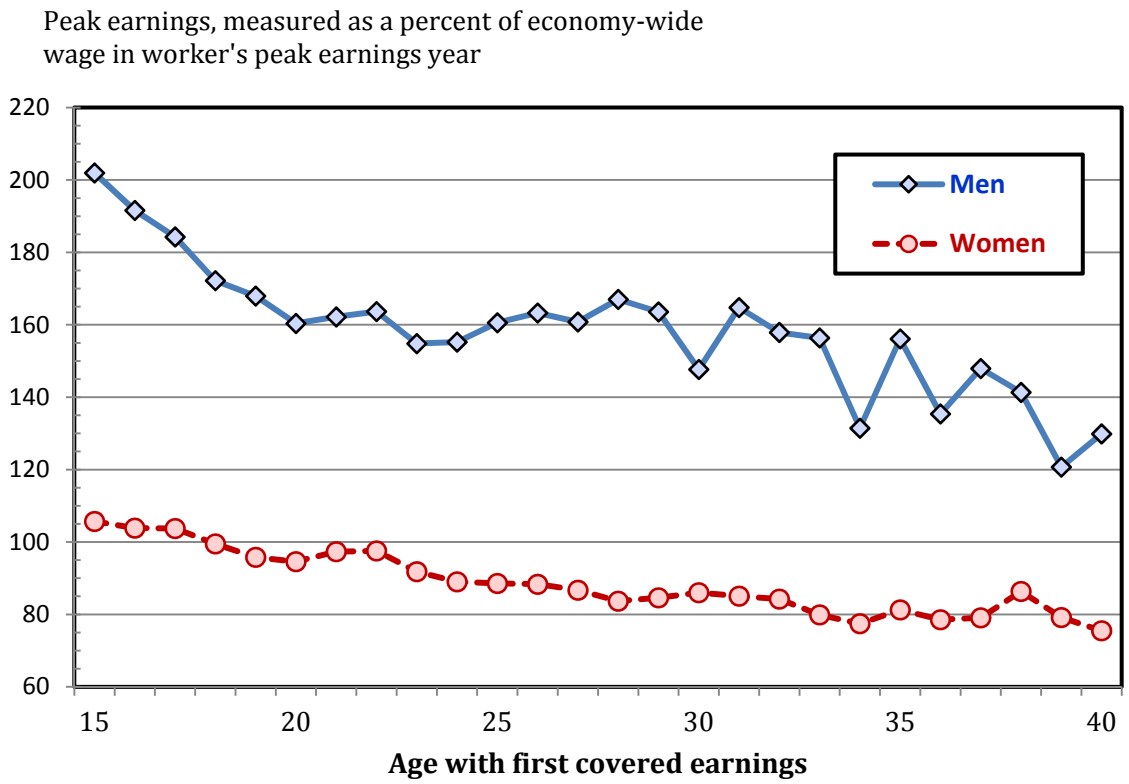


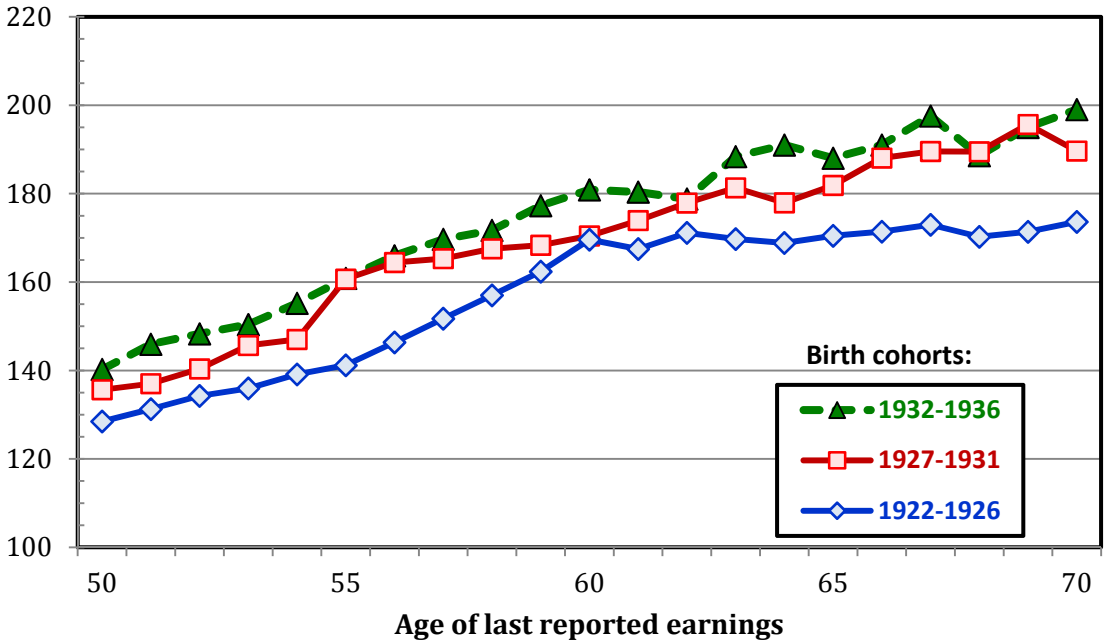
Figure 9. Relation between Age at Workforce Entry and Peak Earnings in Remaining Years of Career among Workers Born in 1936-1940



Note: To be included in estimation samples for Figures 9 and 10, workers must have at least 10 years of Social-Security-covered earnings.

Figure 10. Relation between Age at Workforce Exit and Peak Earnings in Remaining Years of Career among Workers Born in 1936-1940

Men



Women