

Women Working Longer: Facts and Some Explanations

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Abstract

American women are working more, through their sixties and even into their seventies. Their increased participation at older ages started in the late 1980s before the turnaround in older men's labor force participation and the economic downturns of the 2000s. The higher labor force participation of older women consists disproportionately of those working at full-time jobs. Increased labor force participation of women in their older ages is part of the general increase in cohort labor force participation. Cohort effects, in turn, are mainly a function of educational advances and greater prior work experience. But labor force participation rates of the most recent cohorts in their forties are less than those for previous cohorts. These factors may suggest that employment at older ages will stagnate or even decrease. But several other factors will be operating in an opposing direction and leads us to conclude that women are likely to continue to work even longer.

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Women have been working longer for a long time in U.S. history. Their labor market participation increased decade after decade during the twentieth century, as more women were drawn into the labor force. But that is an old story. The new story is that a large portion of women are working a lot longer into their sixties and even their seventies. Their increased participation at older ages started in the late 1980s before the turnaround in older men's labor force participation and before the economic downturns of the 2000s.¹

Women's increased participation beyond their fifties is a change of real consequence. Rather than being an increase in marginal part-time workers, the higher labor force participation of older women disproportionately consists of those working at full-time jobs. Women are remaining on their jobs as they age rather than scaling down or leaving for positions with shorter hours and fewer days.²

Why have women as a group increased their participation at older ages? Increased labor force participation of women in their older ages, we will emphasize, is part of the general increase in cohort labor force participation rates. Successive cohorts, for various reasons, increased their participation at all ages, resulting in an upward shift of participation by birth cohort. As more women graduated from college, held jobs with greater advancement potential, enjoyed their jobs more, were not currently married or were married to men who also extended employment into their senior years, more remained active in the labor force into their sixties and beyond.

Rising cohort effects in labor force participation across successive birth cohorts of U.S. women are clearly visible in the micro-data from the Current Population Survey (CPS)

¹ According to OECD data, most nations from around 2000 have had increased labor force participation of women in their sixties. These countries include: Canada, France, Germany, Sweden, and the UK. Increases have also been experienced among women 65-69 years old. In terms of levels for 60-64-year-olds, the US and Japan had been the highest but most are now at about the 50 percent level. Levels are much lower for 65-69 year olds and considerably lower than that for the US. Other than the US and possibly Sweden, part-time work is reasonably high for older women in the nations mentioned. In only a few cases are changes in social security regulations obviously related to these increases. For the data, see the Introduction to *This Volume* and OECD.STAT, LFS by Sex and Age, Indicators, http://stats.oecd.org/Index.aspx?DataSetCode=LFS_SEXAGE_I_R

² Maestas (2010) discusses the emergence of nontraditional retirement paths including the increasing role for planned transitions out of retirement and the greater fraction of those who state they are retired but who have positive and often substantial hours of work.

Annual Social and Economic Supplement (ASEC) and the Health and Retirement Survey (HRS). But these cohort effects are considerably dampened when education is considered. Higher participation at all ages has been due to greater levels of education, particularly college graduation. The increase in cohort effects in labor force participation for women in their late fifties and early sixties is also lessened by including work experience at younger ages and by adding information on the main prior occupation. We find some (negative) impact on employment at older ages from having been a teacher and discuss why that is the case.

Most important is that we find that those who “enjoyed” their jobs earlier in life remained employed for much longer later in life independent of their hours and earnings on the job six to eight years earlier. The difference between those who agree with the statement about enjoying their job versus those who disagree with the statement is 10 percentage points (on a base of 70) and the effect is twice that between those who strongly disagree with the statement and those who agree. Women who work more hours when 59 to 63 years old are far more likely to have worked more hours six years before. But that is in addition to their greater satisfaction in the job earlier and their greater fulfillment contemporaneously. That is clearly not the case for all older workers, but it is the case for most.

Many of the cohorts we consider were those that also experienced greater divorce. Therefore, current marital status is related to employment at older ages. Because couples often coordinate their work and leisure, current employment of the spouse is an additional correlate of whether a woman is working longer.

Most of the factors just mentioned, particularly educational attainment and earlier employment continuity, were determined prior to the employment decision under question. The addition of these factors almost nullifies the cohort effects, except in one important case. For the most recent cohorts of college graduate women we can study to their sixties (those born from 1949 to 1955), the predetermined, observable factors do not eliminate the cohort effect. Something else, yet undetermined, is keeping them in the labor force at older ages.

Labor force participation rates of women in their early sixties can be observed today for cohorts born up to the mid-1950s. Participation rates of forty- and fifty-year old women born in the late 1950s and early 1960s have not increased relative to those of prior cohorts. Lifecycle cohort labor force functions are no longer the humped functions they once were. They have become flat lines, more like those of men than they had been. These flat lines, moreover, have intersected the humped lifecycle participation functions of prior cohorts, showing the decrease in participation relative to previous cohorts. But these new and flatter participation functions appear not to be decreasing at older ages relative to prior cohorts. That may indicate that women will continue to work longer even though their participation rates at mid-age had stagnated relative to prior cohorts.³

Several factors may operate to offset the stagnation or dip in the participation of US women in mid-age. One of the reasons for the dip in women's participation in their late thirties and early forties is that women in these cohorts have had their children later. Therefore, the dip had been accompanied by an increase in their participation in their twenties relative to previous cohorts.

We find in our exploration of the correlates of participation that college graduate women currently in their early sixties have positive cohort effects that remain substantial even after controlling for their earlier lifecycle participation rates. Today's younger women will likely retire later than one would have predicted based on their educational attainment and lifecycle participation rates. The finding is particularly noteworthy since female college graduation rates are continuing to increase by birth cohort.⁴

³ See Goldin and Mitchell (2017) on changes in lifecycle labor force participation. Hurd and Rohwedder (2014) use questions in the HRS on subjective probabilities of employment to predict future labor force participation rates. See also Maestas and Zissimopoulos (2010) for participation forecasts at older ages to 2030 and for an excellent summary of the issues.

⁴ The college graduation rate (the share with a bachelor's degree) for women aged 25 to 29 years increased from 30 percent in 2000 (for the 1971 to 1975 birth cohorts) to 39 percent in 2015 (for the 1986 to 1990 birth cohorts). See U.S. Department of Education (2015), table 104.20.

A. Labor Force Participation Rates

1. By Age, Sex and Education Level

The central facts concerning the labor force participation of women by age are shown in Figure 1, which uses the March CPS-ASEC micro-data samples and gives contemporaneous labor force participation rates during the survey reference week for women by five-year age groups since 1962. Throughout much the period shown, participation rates increased for women in the 35 to 54-year group. The 35-49-year-old group flattens out in the early 1990s. In contrast, rates for women 55 years and older were flat until the 1980s, when an almost continuous increase ensued, even for the 70 to 74-year-old group.

The labor force participation data are also given, in Figure 2, for college graduate women since school attainment increases by birth cohort. The series is restricted to currently married women because a large fraction of the earlier cohorts of college graduate women—those born from the 1890s to the 1910s—never married or married late. In consequence, a large fraction of college graduate women, even those who eventually married, never had children and had higher labor force participation rates (Goldin 1997). Considering only the group who were currently married dampens the selection problem but does not eliminate it because of later marriage ages. Participation rates for college graduate women, therefore, decline somewhat over time as their marriage and child bearing rates become more like others in their cohort.

If one ignores cohorts born before around 1920, the series for all women and that for college graduate women 55 years or older are first relatively constant and then increase, particularly after the mid- to late-1980s.⁵ The percentage point increase during the past 25 years, shown in Table 1, is not much different between the aggregate group of women and the college graduates. But because college graduate women have had considerably higher participation rates than lesser-educated women, the shift toward

⁵ For the 60 to 64-year-old group, participation rates after 1980 are for individuals born after 1920.

college has increased participation rates for older women and the growth of women's employment at older ages.

Also clear in Table 1 is that the increased participation of older women exceeds that of older men in the last 25 years, both absolutely and relative to the base levels. Among 60 to 64-year-old women, for example, participation increased by 17 percentage points on a base of 34 percent but for males the increase is just 6 percentage points on a base of 55 percent. The percentage point increase for 65 to 69 year olds males and females is similar in absolute magnitude, but the initial base for women is far lower (15 versus 26 percent).

The relative increase for older women has meant that the gender gap in participation at older ages has greatly decreased, as can be seen in Figure 3. Differences in participation by sex have, of course, decreased more generally. But the absolute percentage point difference at some of the older ages is now smaller than for the younger age groups. For 60 to 64 year olds, for example, the difference in participation rates between men and women was about 50 percentage points in 1962. In 2014, the difference was just 9 percentage points, when that for males and females in their thirties to mid-forties was around 16 percentage points.

Men and women are doing more of the same things throughout their lives and this is even truer at older ages. But is that also true within couples? The answer is that, for women 59 to 63 years old and presently married, far more of these couples are both currently working than currently retired.⁶ In addition, in 2014 about as many of these couples had a wife who was working and a husband who was not than the reverse. More women are working into their sixties and more are coupled with men who are also working. But there are also substantial numbers of women who are working into their sixties even though their husbands are retired. We return to the issue of joint employment and leisure below.

2. Full-time versus Part-time Employment of Women at Older Ages

The labor force participation rate for older women increased largely because of an

⁶ This statement is true for HRS couples in which the wife is between 59 and 63 years old. For couples in which the woman is 62 or 63 years, the statement holds beginning in 2008.

increase in those working full-time and full-year. The expansion of full-time employment among participants has been especially evident for the 65 years and older group.

As seen in Figure 4, the fraction of 65 to 69-year-old women in the labor force who worked full-time and full-year increased from around 30 percent to almost 50 percent, with much of the increase occurring after 2000.⁷ The fraction of 70 to 74-year-old labor force participants working full-time and full-year increased from 20 percent to almost 40 percent. We emphasize that Figure 4 gives the fraction working full-time, full-year among those in the labor force rather than among the population in that age group. Although the timing could indicate the impact of changes in the Social Security earnings test, the increase began before 2000 for both younger and older age groups of women.⁸

3. Cohort Trends

Increased employment among older women would appear to be related to their increased participation earlier in their lives. The conclusion can be deduced from the fact that all cohorts in Figure 5.A that have had increased participation in their sixties, relative to earlier cohorts, also had increased participation relative to the same cohorts when they were younger. That is, the cohorts that have begun to “work longer” had higher participation rates throughout their lifecycles than did previous cohorts.

Figure 5 begins with the cohort born in 1930, but the pattern just mentioned is evident as well for some of the earlier birth cohorts not shown. However, cohorts born in the early 1920s show no discernible increase in participation among women in their sixties

⁷ The pre-1970 data also show somewhat high fractions working full time among participants and it is not clear why there was a subsequent decrease.

⁸ The retirement earnings test was changed in 2000 to apply only to individuals below normal retirement age (NRA). The NRA had been 65 but has been gradually increased to 67 years for those born after 1959. Earnings taxed above the exempt amounts are repaid after NRA. From 1975 to 1982 the upper age was 71 and it was decreased to 69 until 2000. See Gelber, Jones and Sacks (2016) on the retirement earnings test, its history and impact. Changes for men may, however, be related to the change in the retirement earnings test. See Gustman and Steinmeier (2009) and Mastrobuoni (2009). Gelber, Isen, and Song (*This Volume*) show that a slowdown in the rate of growth of Social Security benefits starting in the mid-1980s altered women’s retirement.

despite modest increases earlier in their lives.⁹ The data for college graduates given in Figure 5.B reveal similar findings but participation levels are higher.

As will be emphasized later, regressions of the labor force rate at older ages on birth cohort dummies indicate that cohort effects are greatly muted by the addition of various predetermined factors such as education, earlier employment continuity, and women's past occupations. That is, cohort differences in labor force participation later in life are largely, but not entirely, a function of earlier changes in human capital accumulation. These human capital advances occurred because women perceived that their investments would pay off in the labor market and that their employment would be higher and more continuous than for previous cohorts.

We noted before that the function tracing out lifecycle labor force participation was transformed from being hump-shaped to being almost a flat line after the mid-1950s birth cohorts. Participation rates around age 25 to the early 30s greatly increased from the 1930s to the 1950s birth cohorts because women with infants had much higher labor force participation and because the birth rate decreased.

The new flatter cohort lifecycle functions have begun to cross each other. The crossing creates an interesting "twist" in participation for the most recent cohorts in Figures 5.A and more so for college graduate women in Figure 5.B. The twist is the cohort analog of the oft-mentioned decrease in the participation of women in their thirties and forties.¹⁰ One clear way to see the change is to observe that slicing the cohort graphs at ages 30 and 50 yields the usual cohort progression. Younger cohorts have higher participation rates than older cohorts. But slicing the cohort graphs in between, say at age 40, does not yield higher rates for the most recent cohorts, such as those born from 1959 to 1973. The cohort lines appear to have twisted.

Does this mean that participation rates for these women in their fifties, sixties and

⁹ These general trends are also apparent in Figure 1. For example, the participation line for those 65 to 69 years begins to increase around 1987, therefore for women born in the early 1920s.

¹⁰ See Goldin and Mitchell (2017) for a discussion of the "new lifecycle of women's employment."

beyond will also be lower? Their increased education and labor force participation in their younger years would argue the opposite. Why they have decreased participation is still an on-going research question, although some of the answers concern the delay of births, on the one hand, and an absence of mandated leave policy of more than 12 weeks, on the other. The decrease in participation is not large, but the disruption of the increasing trend is clear and could argue for a break in the increase of women's working longer.¹¹

The bottom line for cohort change is that increased participation at older ages has occurred for cohorts that had greater attachment to the labor force throughout their lives. The upshot is that greater attachment to the labor force earlier in the work life, means longer employment at older ages. We now turn to using longitudinal information from the HRS matched to Social Security earnings records to understand the role of cohort effects.

Because we rely on the CPS for the general trends and the HRS for analysis, we provide evidence that the HRS reasonably tracks general trends in the CPS for these cohorts and age groups. Appendix tables and figures show the close relationship between CPS and HRS participation rates (Figure A1), marital status (Table A2), education (Table A3) and number of children (Figure A2). Labor force participation rates in the HRS and the CPS are almost identical for women in their fifties and sixties, however the HRS has higher participation rates than the CPS for women in their seventies.¹²

B. Exploring the Role of Cohort Effects Using the HRS

Cohorts born later have higher labor force participation rates at older ages than do those born earlier. We explore whether these cohort effects are primarily due to changes in

¹¹ Hurd and Rohwedder (2014) note that subjective probabilities of future work at ages 62 and 65 are reliable predictors of actual employment and that current HRS respondents in their early fifties have subjective probabilities of future work that exceed the actual participation rates of individuals in their sixties. Lusardi and Mitchell (*This Volume*) also find using the HRS that the share of women in their early 50s who anticipate working at age 65 continues to rise in recent cohorts even as women's labor force participation rates in their early 50s has flattened across cohorts. These findings indicate a further increase in the participation rates of older women.

¹² The reason for the difference in participation at older ages is not clear since each survey is supposed to cover those in nursing homes and similar care units. The HRS, in addition, has a lower fraction of women who state they never had a first birth.

factors determined largely prior to the retirement option. These variables can include educational attainment, number and ages of children and earlier lifecycle labor force participation. We will also consider the degree to which the individual had relatively high earnings when employed, which we term the “career condition.” These largely predetermined characteristics will be measured in our empirical work prior to around age 55 whereas the retirement option is considered from ages 59 to 63.

The retirement decision may instead be determined primarily by factors that are contemporaneous, such as a set of shocks or transitory factors. These factors may have served to increase participation at older years in the post-1980s period and may include marital status change, fluctuations in the value real estate or financial assets, pension losses, reductions in Social Security payments, and deteriorating health status.

The evidence points to a large impact of changes in the predetermined factors. Education reduces cohort differences in labor force participation from ages 59 to 63 by about a half. Lifecycle labor force participation from 35 to 44 years produces an overshooting of the cohort effects. Our measure of high career earnings does not perform better than the simpler measure of life cycle participation.

Once these variables are considered, adding information on the number and birth years of children has no impact. Children serve to reduce participation in the 25 to 44-year range but have no separate effect in later life.¹³ The many contemporaneous factors mentioned are related to the variance within cohorts but do not do much to explain changes across cohorts.

The one interesting anomaly concerns the most recent of the cohorts of college graduate women that can be followed to their sixties. Those born from 1949 to 1951 have higher participation at ages 59 to 63 even given measures of their lifecycle participation prior to age 55 and their educational attainment. That is, the cohort effect for the 1949 to

¹³ Lumsdaine and Vermeer (2015) find that a grandchild’s arrival increases the hazard of a woman’s retirement independent of her opportunity cost. It is not clear that the partial or total grandchild effect has decreased with time, thus that it can help to explain the working longer phenomenon.

1951 group remains significant even including the various predetermined factors, including lifecycle participation.

The finding that later cohorts have higher participation given their earlier lifecycle participation may be useful in forecasting what more recent cohorts will be doing when they reach their sixties. Recall that labor force participation rates across the lifecycle have become relatively flat from ages 25 to 45 and that the most recent cohorts of women do not always have higher participation compared with previous cohorts. In fact, the most recent data indicate a backtracking of younger cohorts of women in their forties. That is, for the college graduate group, as well as for others, participation rates have not increased relative to prior cohorts and have even decreased at various ages.

The finding about those born between 1949 and 1951 may indicate that participation rates for even younger cohorts may be higher still in their sixties and seventies than prior generations at least for college educated women.

To explore the role of cohort and predetermined variables, data from the Health and Retirement Study (HRS) are used together with information on the earnings history of the respondents from Social Security earnings data and W-2 forms (starting with 1980).¹⁴ Each of the respondents to the HRS, beginning with the first cohorts in 1992, was asked whether her Social Security earnings history could be linked. If the individual agreed to the linkage, then all past records were linked.¹⁵ If not, then the individual was asked again in the subsequent biennial survey. Therefore, the older cohorts had more chances to agree to a linkage than the younger cohorts and linkage rates are higher in consequence.

Across all cohorts about 80 percent of respondents agreed to the linkage with Social

¹⁴ The W-2 data are also provided for 1977-79 but are incomplete in the HRS-SSA linked data.

¹⁵ A curious aspect of the HRS is that until 2006 individuals were asked every year if they would continue the linkage to the Social Security earnings data. If at any point they decided not to, the prior data were allowed but the contemporaneous and future data were not. For most HRS respondents, the break in the linkage will not matter since the HRS itself collected information on labor supply and earnings. But the break will matter for a spouse who entered the HRS at a younger age and who was folded when the individual's birth cohort relevant HRS cohort was added. See Appendix, especially the section Social Security Earnings Record Linkage in the HRS, for details.

Security (and W-2) records. For birth cohorts from 1931 to 1945 the response rate ranges from 85 to 90 percent; the range is 71 to 79 percent for birth cohorts from 1946 to 1951. (Linkage rates are given in Appendix Table A1 by birth cohort.) When we use information on lifecycle labor force participation, we must restrict the sample to individuals who gave permission to have their Social Security earnings (and W-2 forms) linked. Otherwise the full HRS sample is used, given age and other restrictions that may apply.

We mainly explore labor force participation rates of women 59 to 63 years old and always include three-year birth cohort dummies. We begin in Table 2, cols. (1) to (5) by including characteristics largely determined prior to age 55, such as educational attainment and lifecycle participation during various intervals.¹⁶ We add in col. (6) current marital status and a summary measure of current health status.

Table 3 divides the group into two education levels, college graduates and those who did not graduate college.¹⁷ Cols. (1) to (4) of Table 3 include the predetermined characteristics and cols. (5) and (6) add current marital status and health status. Table 4 includes only college graduate women. In addition to the previous variables, we add information on whether the individual was ever a teacher. About 45 percent of college graduate women in the 1930s cohorts were teachers for much of their working lifetimes and teachers generally had defined-benefit pensions.

The use of the HRS linked to the Social Security earnings records (called the “linked” sample) reduces the number of observations, less so for the earlier than for the more recent cohorts as previously mentioned. When we use the data with Social Security earnings we adjust the HRS person weights for selection into the linked sample.¹⁸ In Tables

¹⁶ The addition of variables for children ever born adds no explanatory power for older women’s labor force participation after including controls for earlier life cycle participation. Thus, we do not report specifications adding controls for children.

¹⁷ Similar regressions to those in Table 3 for women 56 to 58 years old are in Appendix Table A5.

¹⁸ The adjustment multiplies the person weight by the inverse of the predicted linkage rate, based on individual predetermined characteristics at the time of their birth cohort’s entry into the HRS. Linkage rates are predicted using a logit model for whether the woman allowed the linkage on HRS cohort wave dummies and HRS measures of employment history, race, marital status, education and financial wealth at HRS cohort entry.

2 and 4 we explore the sensitivity of the results to using the full HRS sample and the linked sample. Because the HRS is a longitudinal data set, many of the respondents are in the sample more than once between the ages of 59 and 63 and we cluster the standard errors at the individual level. We also include dummy variables for the single-year ages.

In Table 2, col. (1) the baseline regression is provided for the full sample and col. (2) gives the baseline for the smaller linked sample. The variables of interest are those showing the effect of birth cohort in three-year bins from 1931 to 1951 (where 1931-33 is the omitted cohort group).¹⁹

The impacts of birth cohort on labor force participation from ages 59 to 63 are highly similar between the two samples and both demonstrate the increase in participation at older ages for birth cohorts after 1943 and especially after 1949. The most recent cohort that can be analyzed for the 59 to 63-year-old group, born from 1949-51, has a participation rate that is around 10 percentage points higher in the full sample (9 for the linked sample) than for cohorts born in the 1930s. The only additional covariates included in the first two columns are single year of age and race dummies.

Educational attainment is added in col. (3) and lifecycle participation between ages 35 and 44 is included in col. (4). The lifecycle labor force variables give the fraction of years in the interval that the woman was in the labor force. These have been computed mainly from the restricted-access Social Security earnings data (since 1951) and W-2 forms (when available). Additional information is used from the HRS to add labor force data for individuals exempt from Social Security taxes generally because they were government employees, such as teachers. The HRS provides information concerning two periods prior to the start of the HRS interviews in which the respondent was a government employee. When HRS survey responses are available regarding participation, they are used in place of Social Security earnings and W-2 data. (For more details, see Appendix: Construction of Variables.) Various life cycle employment variables were created for each of the three decades from age 25 to 54 and for the entire period.

¹⁹ The last year of the HRS available is 2012. The 1952-54 cohort is incomplete and thus is omitted.

The addition of educational attainment eliminates the economic and statistical significance of the cohort coefficients for all but the most recent of the birth cohorts. Although only the linked sample coefficients are given, those for the full sample change in the same manner. The addition of the lifecycle participation variable in col. (4) further reduces the coefficient for the most recent of the birth cohorts to a slightly negative value. It also produces some modest reduction of the impact of educational attainment since the more educated have greater continuity in employment.

Instead of a variable that measures lifecycle participation, one that measures the degree to which a woman reaches some career level may be more important in determining future participation. Since women with greater prior employment when first beginning their careers have greater attachment to the labor force later in the lives, those with higher earnings when employed should have even greater attachment.

To test whether employment per se or years of better earning performance matter we create a variable giving the fraction of an age interval that a “career condition” was met. The condition used here is achieving an earnings level that is some fraction (50 percent in this case) of the median earnings of a full-time, year-round male worker for the ten-year age group considered during the relevant period.²⁰ That is, the career condition for a woman when she was in an age group is judged relative to the earnings of the median male in the same age group during the identical period. Women who were never in the labor force in the age interval are assigned a value of zero, as do those who never earned more than the condition but were in the labor force. We find that the variable giving the career condition, in col. (5), is related to later employment but less strongly than the simpler variable giving the fraction of the interval a woman was employed.

²⁰ Earnings of the median male, in the same age group and year, are used. These data are available in published documents (U.S. Census Bureau *P-60 Reports*) prior to the micro-data for the CPS, which begins in 1962. The calculation of all the career conditions considered requires data from 1956 (1931 + 25 years). A fraction of the male median is used because the median is too high a bar for employed women during much of the period considered. Women in the exempt occupations are assumed to exceed the bar. See Appendix: *Health and Retirement Survey: Construction of Variables*.

Col. (6) augments the col. (4) specification by adding two contemporaneous variables: current marital status and current health status. The birth cohort coefficients were already extinguished with controls for education and earlier lifecycle participation, and the added contemporaneous variables have little further impact on the cohort effects. The addition of health status reduces the impact of education and, in most instances, almost halves the schooling level coefficients in col. (4). The more highly educated are also the healthiest or, at least, they consider themselves to be so. The coefficient on earlier lifecycle participation remains substantial and is only slightly reduced.

It is useful to explore the impact of current marital status even if it does little to change the birth cohort coefficients. Being currently married decreases participation for older women but the effect is reduced if the woman's spouse is employed and the total impact is about equal to that of the omitted group (never married) and to widowed women.²¹ Divorced women have participation rates about 8 percentage points higher than the base group of never married women.²²

Disaggregating by education, as in Table 3, reveals substantial differences between the higher (college graduate) and lower (below a college graduate) educated groups in the correlates of their later employment. Note that within the college graduate group, dummy variables are added for degrees above the bachelors (MA and the various graduate and professional degrees) and, within the non-college group, dummy variables are added for high school diploma and having some college.

The regressions in cols. (1) and (2) of Table 3 include only cohort effects (plus age, race and education dummies). Cohort effects for college graduates (relative to the 1931-33 cohorts) are modest but the most recent of the cohorts has a participation rate about 12.6 percentage points higher. For the group that did not graduate from college, cohort effects are insubstantial. Because there was upgrading within each of the education groups as

²¹ We discuss, below, changes in the joint employment and retirement of couples.

²² Note that the mean labor force participation rate for a woman age 59, who is other race and in the 1931-33 birth cohort is given by the constant term in col. (2).

more attended college, participation rates for the entire group increased by birth cohort, even though within each of the groups there was no birth cohort trend.

In cols. (3) and (4) we add lifecycle participation variables including whether the woman was never in the labor force during the interval. The addition of the lifecycle measures has little impact on the cohort effect for the college graduate women born most recently. Earlier labor force participation matters more for the less educated group than for the college educated. For college graduates, what matters most is whether the women did not work at all in the interval, even though that group is small. The much higher labor force participation for the 1949-51 cohort of college graduate women remains unexplained even with controls for current marital and health status, as seen in col. (6).

Lastly, Table 4 looks in more depth at college graduates in part because their participation rates are the highest at all ages, especially among those in their sixties. In addition, the fraction of older women who are college graduates has greatly expanded and will continue to do so given the increase of college graduates at younger ages. Both the increase of college graduation for future cohorts and their higher participation at older ages would imply an increase in the future employment of older women.

Table 4 includes the predetermined (lifecycle participation and education) and contemporaneous (marital and health status) variables. In addition, we include whether the woman was ever employed as a teacher.

Cohort effects are large for the most recent in Table 4, echoing the finding for college graduate women in Table 3. The coefficient remains large and statistically significant despite the inclusion of current marital status and lifecycle participation variables. Only in col. (5), with the inclusion of the fraction of years from 25 to 54 that the woman was in the labor force does the coefficient greatly decline.

Teaching was the single most important occupation for college graduate women among many of HRS cohorts. Around 45 percent of college graduate women in the cohorts born from 1931 to 1941 were teachers at some point, as seen in Figure 6. A much smaller

fraction of women (around 30 percent) for the later cohorts considered here, 1945 to 1951, were teachers. And an even smaller fraction (around 20 percent) were teachers in the late 1950s birth cohort, a group still too young to be observed in their sixties.

Those who were ever a teacher had participation rates when they were 59 to 63 years old that were about 5 percentage points lower than other college graduate women. The impact of ever being a teacher increases when controlling for lifecycle participation, showing that teachers work more than others earlier in their lives but are less likely to work later in their lives. Their earlier work would indicate they would be more likely to work later, but they are less likely. Part of the reason why teachers have lower employment as they age is due to their defined-benefit pensions, and thus their long-term plans to retire after a fixed period. Other possibilities include “burnout” on the job and lack of advancement.²³

The Table 4 analysis reinforces the findings from Table 3 that the cohort effect for the most recent birth group is not extinguished by the other covariates even when the lifecycle participation rate variable is included, as in cols. (3), (4) and (5). The coefficient for the 1949-51 birth cohort is around 10 to 12 percentage points, a bit smaller than without the “ever a teacher” variable but still large and significant.

Another important finding for forecasting women’s future participation at older ages is that employment in the 45 to 54-year-old range is the best predictor of whether an individual will remain employed into her early sixties. Therefore, even though participation rates have twisted, as noted in the discussion of Figure 5, the fact that participation is still higher for the most recent cohorts when they have reached their fifties suggests that recent cohorts of college graduate women will remain in the labor force through their sixties and seventies even more than did their predecessors. The same does not appear true for the non-college graduate group.

²³ Fitzpatrick (*This Volume*) explores reasons for the decrease in employment at older ages among those who were ever a teacher.

We have also run the same regressions as in Tables 2, 3, and 4 where the outcome is working full-time, rather than just being in the labor force. The results (given in Appendix Table A4 for the Table 3 comparison) for full-time work, for both college graduates and those below college graduation level, reveal similar cohort trends.²⁴ Thus, the cross-cohort increases in labor force participation for older women are substantially driven by increases in full-time work. These findings are consistent with those from the CPS, given in Figure 4, showing an increase in the fraction of female labor force participants employed full time among those 55 to 74 years old.

What about the role of job enjoyment? The HRS allows us to explore the answer for women 59 to 63-year-old for whom information exists on their attitude towards their job six years previously. Because of the restriction on having a job six years ago, we omit the earlier birth cohorts and include those born from 1937 to 1951. We ask how a woman's attitude about her job six years earlier impacts her contemporaneous employment. The attitude variable inquired in all years except 1992 whether an employed person enjoyed her job a lot or not at all in four gradations of strength.

We present the analysis in several ways. In Table 5 cols. (1) to (5) we include all who were employed six years before and in col. (6) we add those not employed six years previously and give them a separate dummy for the job attitude response. Cols. (1), (2), (4) and (6) contain the basic variables and cols. (3) and (5) add the lifecycle labor force variable, marital status, spousal work and health status.

Col. (1) provides baseline results excluding the attitude variable but using the same sample limited to those employed six years ago. Cols. (4) and (5) explore the characteristics of the job held six years prior by adding that the hours and earnings on that job.

Those who had expressed greater enjoyment about their jobs six years previously

²⁴ We also run the same labor force regressions as in Tables 2, 3, and 4 for women 56 to 58 years old and give the Table 3 results in Appendix Table A5. Using women 56 to 58 years old allows us to include another birth cohort, 1952-54. Like the Table 3 results, college graduate women in cohorts born after 1948 show larger cohort effects than for earlier cohorts. Including the full set of pre-existing characteristics lowers the cohort effect estimates for the more recent cohorts at age 56 to 58 somewhat more than for the older group of women in Table 3.

have a higher probability of being in the labor force from 59 to 63 years old.²⁵ The differences, moreover, are large: 10 percentage points (on a base of around 70) between those who agree and disagree with the statement and 20 to 22 percentage points between those who strongly disagree and those who agree or strongly agree.²⁶

The addition of the job attitude question results in few changes in the other coefficients. Most important is that the impact of education is about the same, as can be seen by comparing the coefficients for education in cols. (1) and (2). Therefore, the impact of job enjoyment adds to the influence on working longer of the type of jobs that more highly educated women have. Self-reported job enjoyment is not the mediating factor for why education matters in women's working longer.

The results are not materially altered by the addition of various covariates including current health, marital status and the fraction of years the woman worked from age 35 to 44. Also of interest is that the additions of the hours and earnings in the job six years prior have little impact on the attitudinal coefficients. Those who worked longer hours in the past are more likely to work now, and that is in addition to their enjoyment on that job.

The summary finding is that older women have had substantial increases in labor force participation. The inclusion of covariates, such as education and lifecycle participation, reduces the pattern of rising cohort effects. But for the college graduate group, the labor force increase for the most recent cohorts now in their sixties is not reduced by the inclusion of the additional covariates. The most recent cohorts with less than college completion, however, have had smaller increases and these do get extinguished with the expanded set of predetermined covariates (detailed education attainment and earlier labor force participation), although the increase in education within the non-college graduate group served to increase participation rates.

²⁵ We have also done the same regressions for work eight years previously with similar results.

²⁶ The fraction agreeing with the statement about enjoying a current job is large, around 60 percent. An additional 25 to 30 percent strongly agreed with the statement. Only about 10 to 15 percent did not agree with the statement and college graduate women had a somewhat larger fraction who greatly agreed with the statement.

Another finding of note is that job enjoyment six years earlier has a strong influence on women's later employment. As jobs become less onerous and more enjoyable and as occupations become part of one's identity, women work longer.

C. Lifecycle Labor Force Participation

Given the importance of lifecycle labor force participation for later work, we now explore how lifetime employment changed across cohorts born from 1931 to 1954.²⁷ We divide lifetime employment into five quintiles—from 0 to 20 percent of the years under consideration to 80 to 100 percent. Figure 7, part A, shows the percentage in the labor force in the five quintiles covering the 30 years from age 25 to 54 for all women. Part B gives these figures for the group in the youngest ten-year grouping, 25 to 34 years old. To avoid complicating the figure, we show only the earliest and the most recent cohorts: 1931-1936 and 1949-1954 in two-year brackets.

The fraction of women in the labor force 80 to 100 percent of the time when they were 25 to 54 years old expanded from 20 percent to more than 50 percent across these cohorts (see Figure 7, part A). The flip side is the sharp decrease of those who spent fewer than 20 percent of the 30-year period shown in the labor force. The middle three quintiles changed little in terms of the fraction of the total.

More extreme changes occurred for women in the 25 to 34-year-old group (see Figure 7, part B) than for the other ten-year age groups (not shown). Once again, the middle three quintiles show little change. All the change arises because of an increase in the highest and a decrease in the lowest quintiles.

The earliest cohorts shown had lifecycle participation rates that were almost uniformly distributed across the quintiles. But by the 1949 to 1954 cohorts about 50 percent were in the labor force for more than 80 percent of the 30 years and few were in the labor force for less than 20 percent of the interval.

²⁷ For a detailed discussion of life cycle labor force participation see Goldin and Mitchell (2017).

To make sense of these lifecycle trajectories, the concepts of heterogeneity and homogeneity will be useful.²⁸ When participation rates for a birth cohort increase with age, all women in the cohort could be working more weeks per year or more women could be entering the labor force. That is, change could be at the intensive or extensive margins (or a combination). The group that exhibits more of the former is termed “homogeneous,” since all women are increasing their work level, and the group that exhibits more of the latter is termed “heterogeneous,” because only some women increase their participation. The weight of the evidence historically is that most women are “heterogeneous” and that persistence is substantial.

Looking back at the constructed cohort lines in Figure 5, the most recent cohorts display flat and even somewhat decreasing participation rates over their brief lifecycles. That is, participation rates are higher at the lower ages than at the middle. But if most working women persist in the labor force, then the finding that early participation matters significantly implies that the reduction in participation, or the absence of an increase, for the most recent cohorts in their midyears will not matter much for their employment later in life. The key point is that for earlier cohorts, women who entered (or reentered) the labor force in mid-life were probably the least persistent.

D. Working Women, Working Couples

The regressions revealed a commonly known relationship that couples generally work together and enjoy leisure and consumption together. Currently married women are far more likely to be in the labor force in their older years if their husbands are also working. In the Table 2, col. (6) regression, married women with a working spouse are 20 percentage points more likely to be in the labor force than are other married women.

Figure 8 demonstrates two additional points. The data use three categories of women 59 to 63 years old: those currently married with a husband working, those

²⁸ See Goldin (1989) and Heckman and Willis (1977) on the concepts of heterogeneity and homogeneity applied to labor force participation over the lifecycle. Olivetti (2006) models an underlying reason for greater persistence in the returns to experience and demonstrates the increased returns from the 1970s to the 1990s.

currently married with a non-working husband and those not currently married. Participation rates of all currently married women rose relative to the third group. In addition, the rates for currently married women with a working spouse increased the most.

A greater fraction of married couples today are both working rather than being retired together whereas 20 years ago a greater percentage was retired together.²⁹ For married couples in which the wife was born from 1931 to 1936, 34 percent were both retired and 25 percent were both working when she was 59 to 63 years old. Those fractions have changed to just 22 percent retired together for the most recent cohorts (1949 to 1951 birth years) and 41 percent both working. Furthermore, in the most recent cohorts an almost equal fraction had the wife working and the husband not working (18 percent) as had the husband working and the wife not working (19 percent).

E. Concluding Remarks

We have explored the increase in the labor force participation of older women. Our main findings and conclusions regarding “women working longer” are:

- Increased participation of women from their late fifties and beyond began in the late 1980s, before the rise in older men’s labor force participation and long before the economic downturns of the 2000s, especially the Great Recession.
- The increases have been large. Among women 60-64 years old, participation increased from 34 to 51 percent during the last 25 years and from 45 to 61 percent for college graduates.
- Increased labor force participation of older women has been disproportionately for those working full-time and full-year.
- Women who worked more when young, work more when they are older.
- Women are working longer not mainly because of an insufficiency in retirement savings, although that is an important issue for many in recent years. Better health

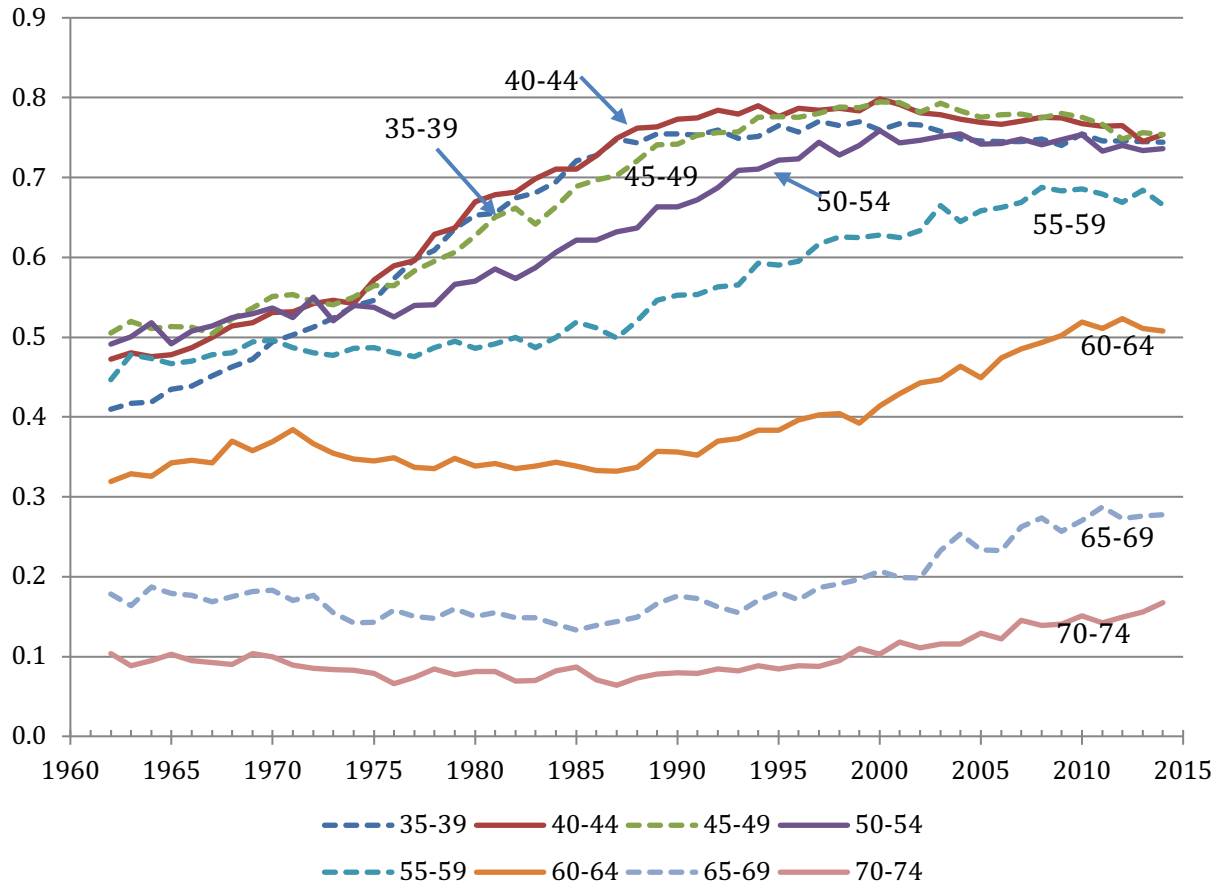
²⁹ These findings are consistent with the complementarity of the leisure time of older husbands and wives. Schirle (2008) demonstrates, for three countries, that the increase in women’s labor force participation at older ages has led to increased men’s participation. See also Blau (1998).

is a mediating factor; those with low wealth are far more often in worse physical condition.

- A greater fraction of married couples are now working together rather than being retired together, whereas 20 years ago a greater fraction of couples were both retired.
- Women who enjoyed their jobs six to eight years before their sixties, are far more likely to remain employed.

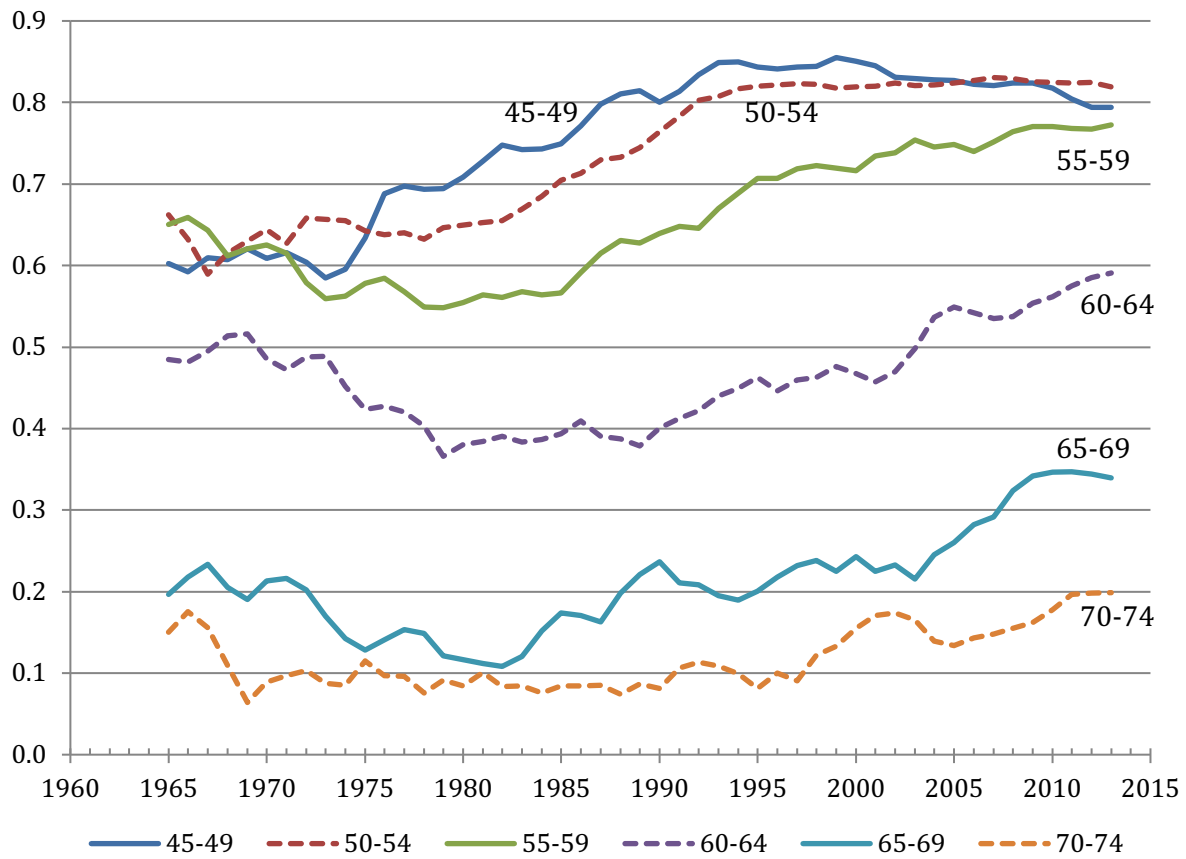
What about the future of women working longer? The two-decade stagnation of participation rates for women in their thirties and forties could indicate that increases at later ages will not continue. But the stagnation may not impact working longer because there have been upticks for cohorts in their forties and there is an increased fraction of the population who are college graduates. The cohort effect for college graduates in the most recent birth cohort that can be explored, that from 1949 to 1951, remains large and statistically significant even after controlling for earlier labor force participation. The current challenge is to understand how the various factors included in our analysis are likely to impact the labor force participation of current cohorts as they age.

Figure 1: Female Labor Force Participation by Five-Year Age Groups, 1962 to 2014



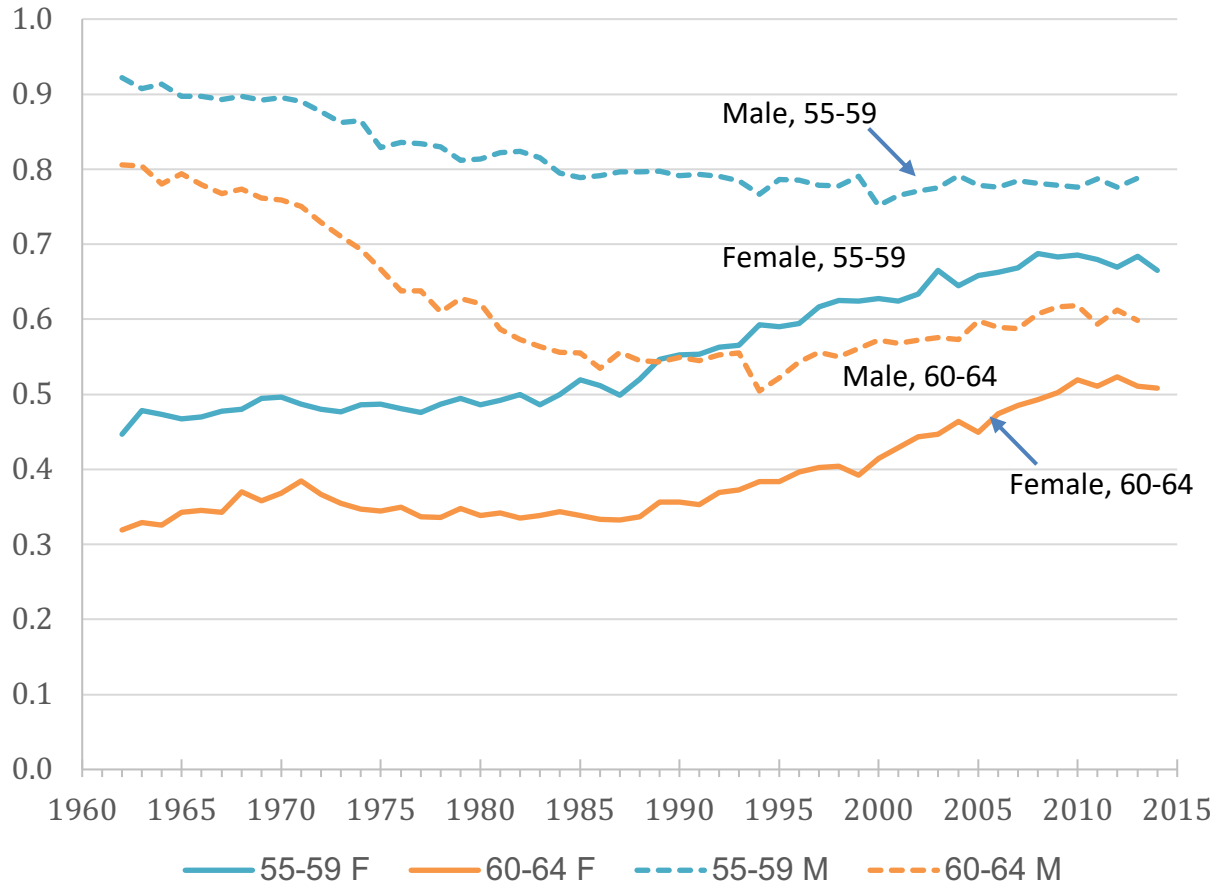
Source: CPS-ASEC micro-data, March, 1962 to 2014.

Figure 2: Female Labor Force Participation by Five-Year Age Groups for Currently Married College Graduates, 1965 to 2013 (three-year centered moving averages)



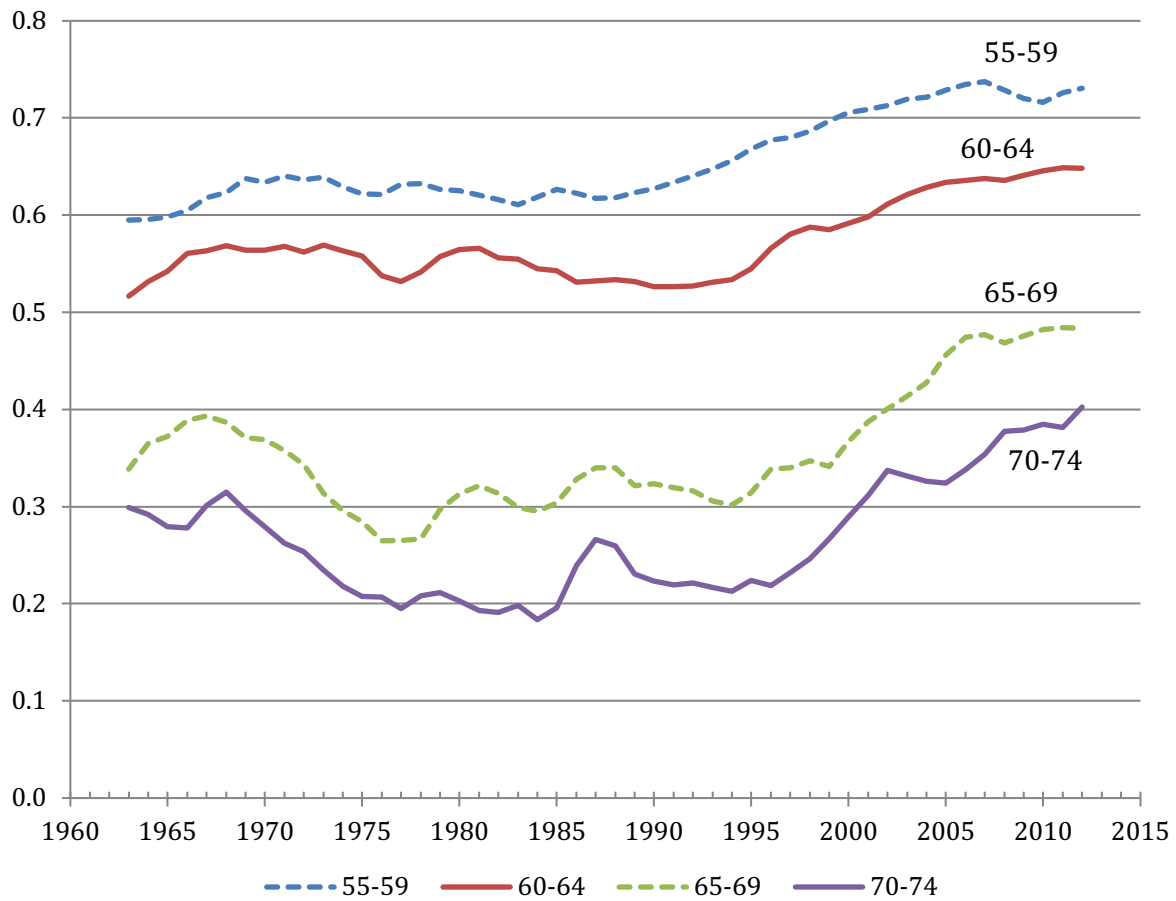
Source: CPS-ASEC micro-data, March, 1962 to 2013.

Figure 3: Gender Gap in Labor Force Participation at Older Ages, 1962 to 2014: CPS



Source: CPS-ASEC micro-data, March, 1962 to 2014.

Figure 4: Women Employed Full-Time, Full-Year among Labor Force Participants during the Year, 1963 to 2013: CPS

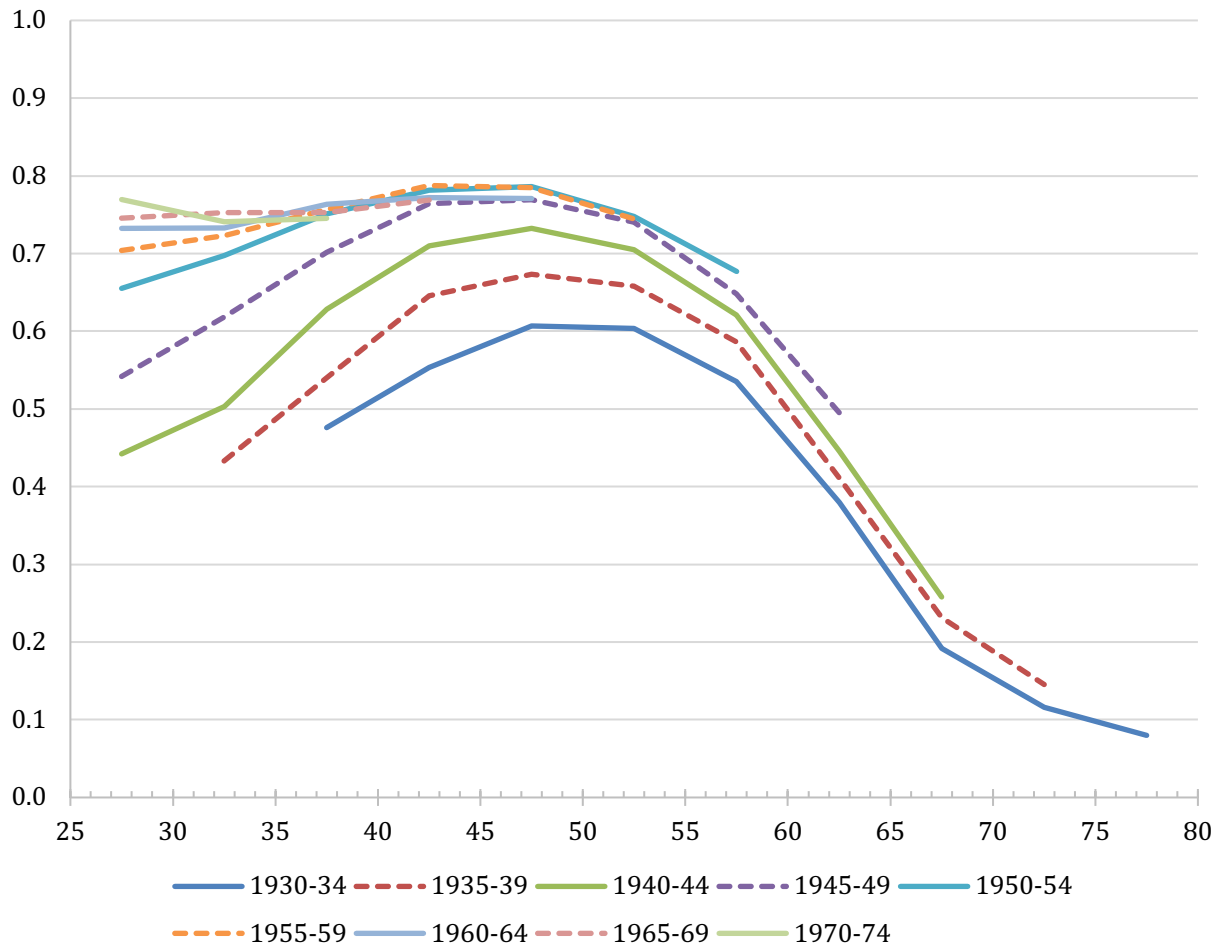


Source: CPS-ASEC micro-data, March, 1962 to 2013.

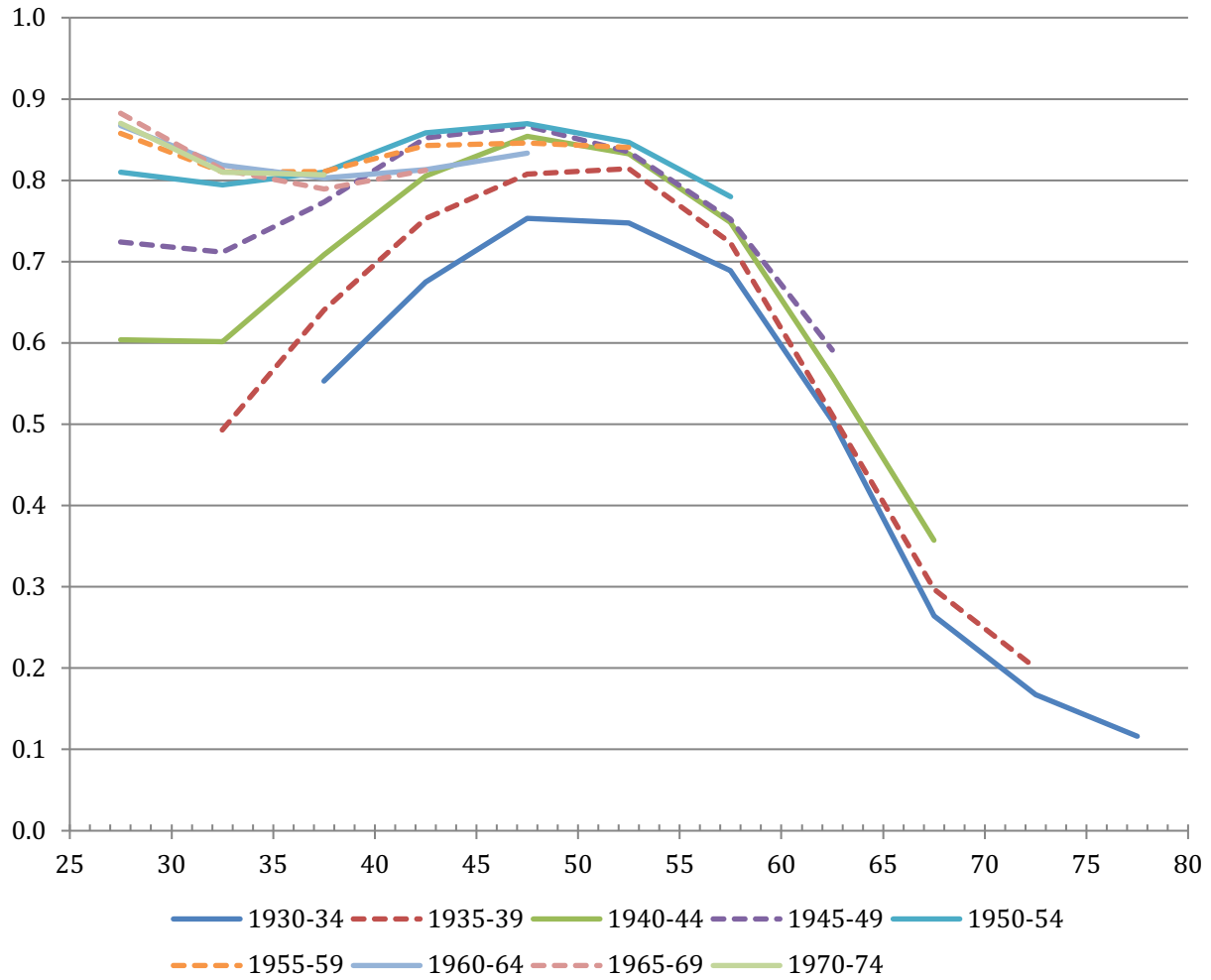
Notes: Both numerator and denominator refer to the calendar year. A “labor force participant during the year” is anyone who worked during the year. Three-year centered moving averages are shown. Full-time, full-year workers are those who worked 40 or more weeks and 35 or more hours per week.

Figure 5: Labor Force Participation Rates for Women by Five-Year Birth Cohorts (1930-34 to 1970-74) and Five-Year Age Groups (25-29 to 74-79 years): CPS

A. All Education Groups



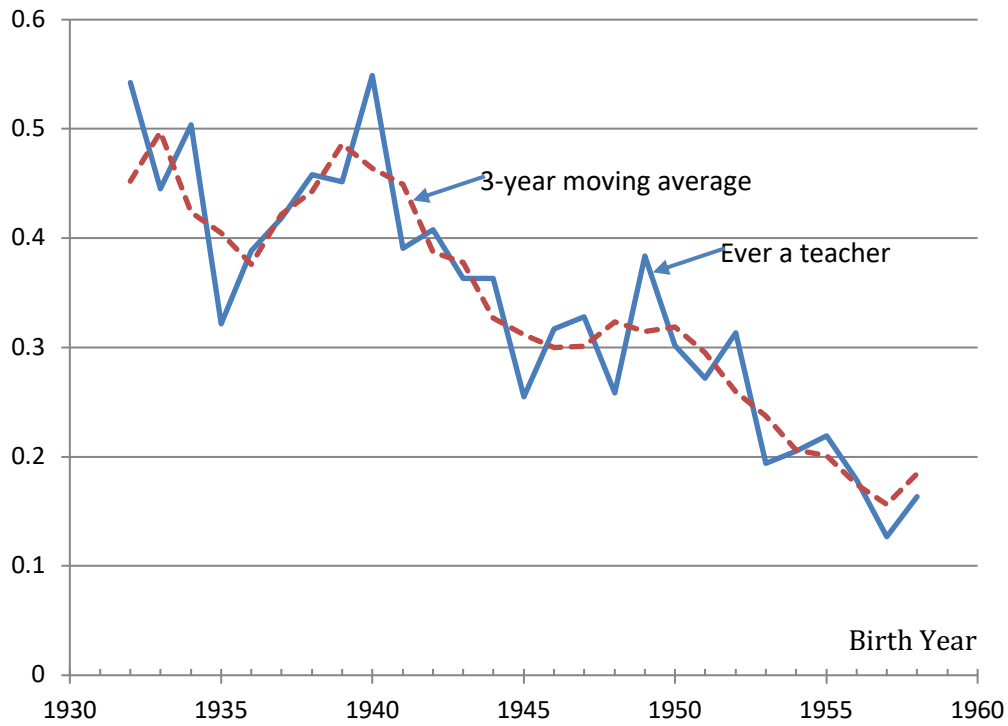
B. College Graduates



Source: CPS-ASEC micro-data, March, 1962 to 2013.

Notes: Every data point in each graph contains 25 birth years and ages.

Figure 6: Fraction of College Graduate Women Ever Employed in Teaching, for 1931 to 1959 Birth Cohorts: HRS

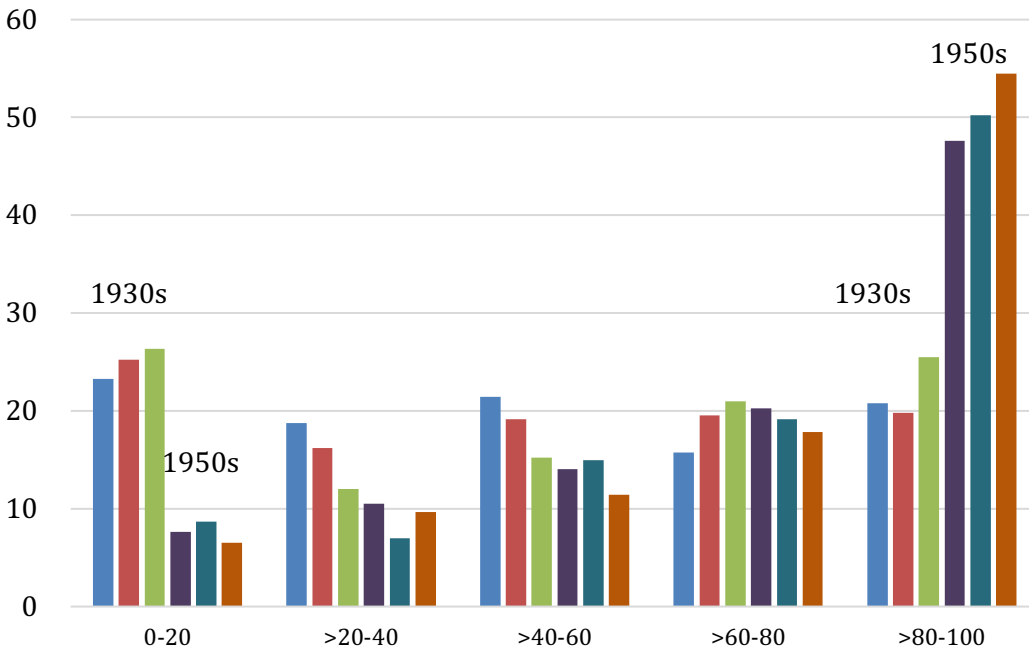


Source: HRS, Restricted Access Data.

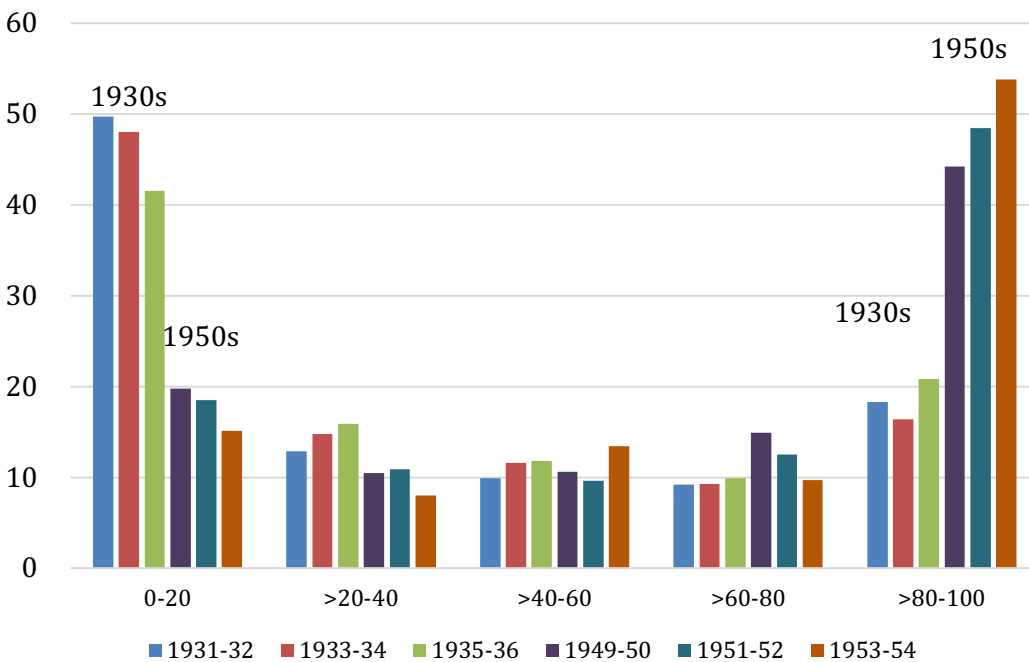
Notes: “Ever employed in teaching” is calculated with code provided by Maria Fitzpatrick (see Fitzpatrick, *This Volume*), which uses detailed occupations of respondents prior to their first HRS interview. The dashed line is the three-year centered moving average.

Figure 7: Lifecycle Labor Force Participation in the HRS and Social Security Earnings Data for Selected Birth Cohorts

A. All Women, 25 to 54 Years

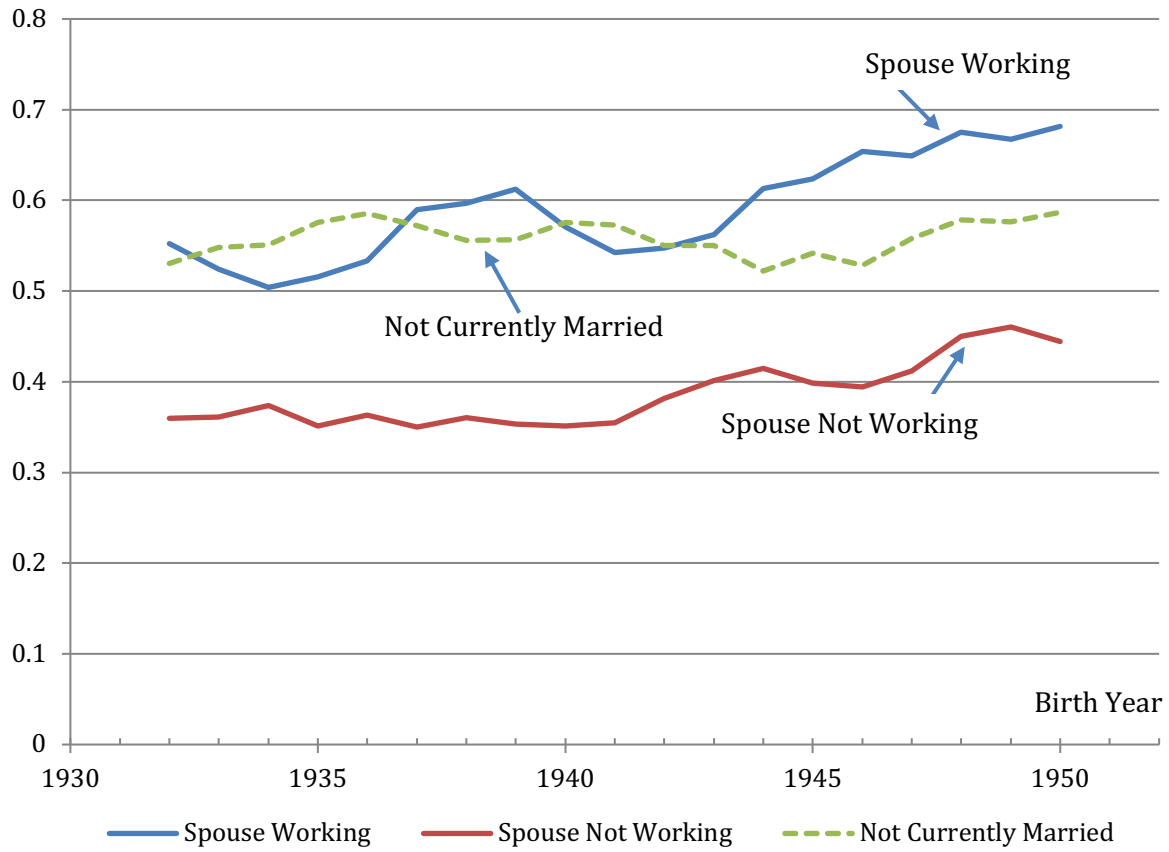


B. All Women, 25 to 34 Years



Source and Notes: Figures give the distribution of years spent in the labor force by women in various cohorts and by age group. Labor force participation is defined as having at least one of the following: (a) having SS earnings above (10 hours \times 52 weeks \times minimum wage in that year) in the years prior to the HRS survey of the respondent; (b) Responding in the HRS that the person was “in the labor force” when the person has a positive HRS weight; (c) Having W-2 earnings above minimum yearly wage in that year; (d) Working for the state, federal or municipal government in years prior to the HRS survey. HRS person weights are used adjusted for sample selection into the linked sample.

Figure 8: Labor Force Participation by Year of Birth, Current Marital Status and Husband's Employment for 59 to 63-Year-Old Women



Source: HRS

Notes: All women 59 to 63 years old are included; HRS person weights applied.

Table 1: Labor Force Participation Rates for Males and Females, 55 to 74 Years: CPS

Age Group	Educational Group	Labor Force Participation Rate in		Percentage Point Change c.1988 to c.2013
		1987-89	2012-14	
Women				
55-59	All	0.522	0.673	15.1
	College graduates	0.685	0.779	9.4
	Non-college grad.	0.499	0.627	12.8
60-64	All	0.341	0.514	17.3
	College graduates	0.454	0.612	15.8
	Non-college grad.	0.330	0.472	14.3
65-69	All	0.153	0.276	12.3
	College graduates	0.240	0.367	12.7
	Non-college grad.	0.145	0.244	9.9
70-74	All	0.072	0.157	8.6
	College graduates	0.130	0.214	8.3
	Non-college grad.	0.066	0.142	7.5
Men				
55-59	All	0.796	0.779	-1.8
	College graduates	0.886	0.896	1.0
	Non-college grad.	0.773	0.728	-4.6
60-64	All	0.548	0.607	5.9
	College graduates	0.682	0.727	4.5
	Non-college grad.	0.516	0.543	2.8
65-69	All	0.258	0.380	12.2
	College graduates	0.402	0.491	8.9
	Non-college grad.	0.231	0.321	9.0
70-74	All	0.155	0.232	7.7
	College graduates	0.254	0.324	7.0
	Non-college grad.	0.141	0.191	5.0

Sources: CPS-ASEC micro-data March 1987, 1988, 1989, 2012, 2013, and 2014.

Table 2: Female Labor Force Participation at Age 59-63 Years, All Education Groups: HRS

	Labor Force Participation at Ages 59 to 63 Years					
	Full Sample	Linked Sample				
	(1)	(2)	(3)	(4)	(5)	(6)
Year of birth						
1934-36	-0.00810 (0.0192)	-0.0110 (0.0207)	-0.0139 (0.0203)	-0.0158 (0.0197)	-0.0128 (0.0201)	-0.0143 (0.0186)
1937-39	0.0141 (0.0191)	0.00448 (0.0206)	0.000715 (0.0202)	-0.0146 (0.0199)	-0.00357 (0.0202)	-0.00521 (0.0186)
1940-42	0.0163 (0.0203)	0.0137 (0.0218)	-0.00832 (0.0211)	-0.0354 (0.0206)	-0.0178 (0.0210)	-0.0312 (0.0195)
1943-45	0.0464* (0.0229)	0.0320 (0.0247)	-0.00461 (0.0239)	-0.0402 (0.0235)	-0.0184 (0.0237)	-0.0321 (0.0223)
1946-48	0.0635** (0.0217)	0.0529* (0.0240)	0.00327 (0.0238)	-0.0389 (0.0235)	-0.0141 (0.0238)	-0.0257 (0.0220)
1949-51	0.0973*** (0.0217)	0.0888*** (0.0259)	0.0300 (0.0250)	-0.0110 (0.0246)	0.0120 (0.0249)	0.000839 (0.0234)
High school grad.			0.161*** (0.0180)	0.121*** (0.0176)	0.141*** (0.0180)	0.0583*** (0.0171)
Some college			0.251*** (0.0205)	0.199*** (0.0202)	0.217*** (0.0207)	0.106*** (0.0195)
College graduate			0.295*** (0.0252)	0.237*** (0.0252)	0.251*** (0.0260)	0.115*** (0.0250)
MA			0.348*** (0.0288)	0.280*** (0.0286)	0.292*** (0.0298)	0.159*** (0.0276)
PhD, MD, JD, etc.			0.468*** (0.0458)	0.364*** (0.0453)	0.400*** (0.0458)	0.227*** (0.0451)
Lifecycle LFP 35-44				0.233*** (0.0174)		0.216*** (0.0165)
Career cond. 35-44					0.128*** (0.0195)	
Currently married						-0.157*** (0.0309)
Divorced						0.0806* (0.0321)
Widow						0.0113 (0.0324)
Spouse in LF						0.186*** (0.0146)
Health status	no	no	no	no	no	yes
Age dummies	Yes	yes	yes	yes	yes	yes

Race dummies	yes	yes	yes	yes	yes	yes
Constant	0.456*** (0.0331)	0.430*** (0.0394)	0.326*** (0.0365)	0.261*** (0.0367)	0.323*** (0.0366)	0.165*** (0.0426)
N	18,383	15,431	15,431	15,431	15,431	15,431
R-squared	0.028	0.029	0.073	0.104	0.082	0.183

Sources: Health and Retirement Study (HRS) 1992 to 2012, RAND version with added variables from original HRS files. Social Security Administration earnings (and W-2) data are used to calculate life cycle labor force participation (Lifecycle LFP <ages>) and the career condition (Career cond. <ages>).

Notes: The dependent variable is 1 if the woman is in the labor force and 0 otherwise. The HRS asks respondents their labor force status and a woman is in the labor force if she reported being employed or unemployed and searching for work.

Health status is self-reported and is coded as 1 if “good” or better and 0 otherwise.

Marital status variables refer to current status.

“Lifecycle LFP <ages>” is the fraction of the interval the woman was in the labor force as determined by a combination of the data sources described in the Appendix.

The “linked sample” indicates that the individual gave permission for Social Security earnings data to be linked.

Omitted base group variables are: 1931-33 birth cohort; below high school graduate (overall or for the less than college graduate group); BA only for the college graduate group; never married; other race and age 59. Omitted from the table are dummy variables for missing variables regarding spouse in labor force, career condition 35-44, and health status.

The regressions are weighted by HRS person weights; the weights are adjusted for sample selection into the linked sample in cols. (2) to (6).

Standard errors in parentheses have been clustered at the individual level.

* p<0.05, ** p<0.01, *** p<0.001

Table 3: Female Labor Force Participation at Ages 59 to 63, by Education: HRS

	Labor Force Participation at Ages 59 to 63 Years					
	Not College Graduate	College Graduate	Not College Graduate	College Graduate	Not College Graduate	College Graduate
	(1)	(2)	(3)	(4)	(5)	(6)
Year of birth						
1934-36	-0.0234 (0.0219)	0.0308 (0.0522)	-0.0263 (0.0212)	0.0346 (0.0506)	-0.0246 (0.0200)	0.0390 (0.0472)
1937-39	-0.00195 (0.0217)	0.0182 (0.0543)	-0.0218 (0.0212)	0.0234 (0.0545)	-0.0102 (0.0197)	0.0182 (0.0521)
1940-42	-0.0133 (0.0231)	0.0357 (0.0515)	-0.0441* (0.0223)	0.0188 (0.0506)	-0.0388 (0.0212)	0.0160 (0.0475)
1943-45	-0.0101 (0.0266)	0.0509 (0.0537)	-0.0468 (0.0260)	0.0219 (0.0542)	-0.0370 (0.0245)	0.0212 (0.0526)
1946-48	-0.00304 (0.0268)	0.0589 (0.0522)	-0.0470 (0.0262)	0.0235 (0.0527)	-0.0345 (0.0247)	0.0377 (0.0489)
1949-51	0.00557 (0.0291)	0.126* (0.0498)	-0.0389 (0.0287)	0.103* (0.0504)	-0.0210 (0.0272)	0.0980* (0.0486)
High school grad.	0.158*** (0.0180)		0.115*** (0.0176)		0.0520** (0.0172)	
Some college	0.249*** (0.0205)		0.193*** (0.0202)		0.101*** (0.0197)	
MA		0.0502 (0.0316)		0.0420 (0.0313)		0.0370 (0.0295)
PhD, MD, JD, etc.		0.167*** (0.0483)		0.136** (0.0492)		0.111* (0.0489)
Lifecycle LFP 35-44			0.208*** (0.0273)	0.0739 (0.0573)	0.192*** (0.0254)	0.0709 (0.0589)
Never in LF 35-44			-0.0548* (0.0254)	-0.153* (0.0730)	-0.0522* (0.0238)	-0.150* (0.0716)
Currently married					-0.147*** (0.0350)	-0.243*** (0.0649)
Divorced					0.0613 (0.0368)	0.119 (0.0638)
Widow					0.00458 (0.0364)	-0.00416 (0.0712)
Spouse in LF					0.177*** (0.0160)	0.225*** (0.0357)
Health status	no	no	no	no	yes	yes
Age dummies	yes	yes	yes	yes	yes	yes
Race dummies	yes	yes	yes	yes	yes	yes

Constant	0.285*** (0.0385)	0.859*** (0.0629)	0.258*** (0.0434)	0.841*** (0.0751)	0.167** (0.0508)	0.638*** (0.0999)
N	12,789	2,642	12,789	2,642	12,789	2,642
R-squared	0.060	0.041	0.097	0.059	0.179	0.140

Sources: Health and Retirement Study (HRS) 1992 to 2012, RAND version with added variables from original HRS files. Social Security Administration earnings (and W-2) data are used to calculate life cycle labor force participation (Lifecycle LFP <ages>).

Notes: The dependent variable is 1 if the woman is in the labor force and 0 otherwise. The HRS asks respondents their labor force status and a woman is in the labor force if she reported being employed or unemployed and searching for work.

Health status is self-reported and is coded as 1 if “good” or better and 0 otherwise.

Marital status variables refer to current status.

“Lifecycle LFP <ages>” is the fraction of the interval the woman was in the labor force as determined by a combination of the data sources described in the Appendix. “Never in LF” is 1 if the individual was recorded as having no years in the labor force during those years. All columns use the “linked sample.”

Omitted base group variables are: 1931-33 birth cohort; below high school graduate (overall or for the less than college graduate group); BA only for the college graduate group; never married; other race and age 59. Omitted from the table are dummy variables for missing variables regarding spouse in labor force and health status.

Regressions are estimated separately for college graduates and those who did not graduate from college. For the college graduate degrees beyond a bachelors are added (MA, PhD, etc.), where MA includes all masters and PhD, MD, JD, etc. includes all graduate and professional degrees. For non-college graduates dummy variables are added for those with a high school diploma and some college.

The regressions are weighted by HRS person weights adjusted for sample selection into the linked sample.

Standard errors in parentheses have been clustered at the individual level.

* p<0.05, ** p<0.01, *** p<0.001

Table 4: Labor Force Participation among College Graduate Women at Ages 59 to 63: HRS

	Labor Force Participation at Ages 59 to 63 Years				
	Full Sample	Linked Sample			
	(1)	(2)	(3)	(4)	(5)
Year of birth					
1934-36	0.00774 (0.0497)	0.0272 (0.0524)	0.0308 (0.0507)	0.0458 (0.0470)	0.0294 (0.0508)
1937-39	0.00217 (0.0503)	0.0169 (0.0543)	0.0221 (0.0544)	0.0212 (0.0508)	0.00996 (0.0538)
1940-42	0.0389 (0.0484)	0.0327 (0.0518)	0.0154 (0.0508)	0.0193 (0.0473)	0.00204 (0.0509)
1943-45	0.0370 (0.0503)	0.0402 (0.0541)	0.00983 (0.0543)	0.0179 (0.0526)	-0.0172 (0.0550)
1946-48	0.0465 (0.0475)	0.0482 (0.0525)	0.0114 (0.0528)	0.0110 (0.0503)	-0.0256 (0.0544)
1949-51	0.0957* (0.0452)	0.117* (0.0500)	0.0931 (0.0505)	0.105* (0.0460)	0.0524 (0.0510)
Ever a teacher	-0.0477 (0.0288)	-0.0483 (0.0315)	-0.0545 (0.0309)	-0.0892** (0.0294)	-0.0591 (0.0305)
MA	0.0538 (0.0296)	0.0578 (0.0326)	0.0504 (0.0322)	0.0381 (0.0306)	0.0405 (0.0319)
PhD, MD, JD, etc.	0.160*** (0.0447)	0.164*** (0.0470)	0.133** (0.0479)	0.107** (0.0411)	0.111* (0.0461)
Lifecycle LFP 35-44			0.0673 (0.0573)		
Never in LF 35-44			-0.164* (0.0731)		
Lifecycle LFP 45-54				0.379*** (0.0710)	
Never in LF 45-54				-0.178 (0.0973)	
Lifecycle LFP 25-54					0.355*** (0.0655)
Health status	no	no	no	no	no
Age dummies	yes	yes	yes	yes	yes
Race dummies	yes	yes	yes	yes	yes
Marital status dummies	yes	yes	yes	yes	yes
Job status of husband	yes	yes	yes	yes	yes
Constant	0.855*** (0.0591)	0.876*** (0.0629)	0.866*** (0.0755)	0.580*** (0.0857)	0.675*** (0.0708)

N	3,137	2,642	2,642	2,642	2,642
R-squared	0.040	0.044	0.062	0.141	0.080

Sources: Health and Retirement Study (HRS) 1992 to 2012, RAND version with added variables from original HRS files. Social Security Administration earnings (and W-2) data are used to calculate life cycle labor force participation (Lifecycle LFP <ages>) and the career condition (Career cond. <ages>).

Notes: The dependent variable is 1 if the woman is in the labor force and 0 otherwise. The HRS asks respondents their labor force status and a woman is in the labor force if she reported being employed or unemployed and searching for work.

*Health status is self-reported and is coded as 1 if “good” or better and 0 otherwise.

Marital status variables refer to current status.

“Lifecycle LFP <ages>” is the fraction of the interval the woman was in the labor force as determined by a combination of the data sources described in the Appendix. “Never in LF” is 1 if the individual was recorded as having no years in the labor force during those years. The “linked sample” indicates that the individual gave permission for Social Security earnings data to be linked.

Omitted base group variables are: 1931-33 birth cohort; BA only for the college graduate group; never married; and other race and age 59. Omitted from the table are dummy variables for missing variables regarding spouse in labor force and health status.

The regressions are weighted by the HRS person weights; the weights are adjusted for sample selection into the linked sample in cols. (2) to (5).

Standard errors in parentheses have been clustered at the individual level.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5: Role of Past Work Attitude for Employment of Women 59 to 63 Years: HRS

	Labor Force Participation at Ages 59 to 63 Years					
	Worked 6 Years Ago					All
	(1)	(2)	(3)	(4)	(5)	(6)
Enjoy job 6 yrs ago						
Strongly agree		0.223** (0.0720)	0.203** (0.0694)	0.235** (0.0723)	0.212** (0.0693)	0.229** (0.0718)
Agree		0.198** (0.0709)	0.189** (0.0680)	0.209** (0.0713)	0.198** (0.0680)	0.202** (0.0708)
Disagree		0.101 (0.0710)	0.0932 (0.0686)	0.105 (0.0715)	0.0983 (0.0686)	0.103 (0.0709)
No job 6 yrs ago						-0.322*** (0.0708)
Year of birth						
1940-42	0.00466 (0.0253)	-0.00237 (0.0255)	-0.0113 (0.0243)	-0.0000308 (0.0255)	-0.00691 (0.0243)	-0.00659 (0.0182)
1943-45	-0.000282 (0.0281)	-0.00518 (0.0281)	-0.00894 (0.0271)	0.000100 (0.0280)	-0.0000508 (0.0270)	-0.00147 (0.0210)
1946-48	0.00712 (0.0285)	0.00303 (0.0285)	0.00475 (0.0270)	0.00565 (0.0286)	0.0116 (0.0271)	0.000706 (0.0213)
1949-51	0.0153 (0.0290)	0.00815 (0.0291)	0.0102 (0.0282)	0.0157 (0.0289)	0.0210 (0.0280)	0.00376 (0.0224)
High school grad.	0.0859** (0.0326)	0.0865** (0.0325)	0.0342 (0.0329)	0.0799* (0.0325)	0.0304 (0.0329)	0.0549** (0.0199)
Some college	0.145*** (0.0335)	0.138*** (0.0335)	0.0682* (0.0340)	0.130*** (0.0339)	0.0632 (0.0341)	0.0972*** (0.0217)
BA	0.164*** (0.0377)	0.153*** (0.0378)	0.0594 (0.0385)	0.143*** (0.0384)	0.0550 (0.0389)	0.119*** (0.0273)
MA	0.218*** (0.0384)	0.210*** (0.0381)	0.118** (0.0390)	0.198*** (0.0392)	0.112** (0.0397)	0.171*** (0.0296)
PhD, MD, JD, etc.	0.294*** (0.0505)	0.283*** (0.0516)	0.177** (0.0550)	0.257*** (0.0539)	0.165** (0.0569)	0.238*** (0.0445)
Lifecycle LFP 35-44			0.0456 (0.0265)		0.0165 (0.0271)	
(ln) Hours				0.0864*** (0.0208)	0.0775*** (0.0194)	
(ln) Earnings				-0.00252 (0.00966)	-0.00558 (0.00932)	
Health status	no	no	yes	no	yes	no
Age dummies	yes	yes	yes	yes	yes	yes
Race dummies	yes	yes	yes	yes	yes	yes

Marital status dummies	no	no	yes	no	yes	no
Job status of husband	no	no	yes	no	yes	no
Constant	0.560*** (0.0652)	0.385*** (0.0936)	0.293** (0.0991)	0.0942 (0.136)	0.0785 (0.136)	0.450*** (0.0794)
N	5050	5050	5050	5050	5050	7736
R-squared	0.032	0.041	0.104	0.051	0.112	0.288

Sources: Health and Retirement Study (HRS) 1992 to 2012, RAND version with added variables from original HRS files. Social Security Administration earnings (and W-2) data are used to calculate life cycle labor force participation (Lifecycle LFP <ages>).

Notes: The dependent variable is 1 if the woman is in the labor force and 0 otherwise. In cols. (1) through (5) only those with positive person weights and working six years ago (or who had a missing job attitude question) are included; col. (6) includes those not working. For variables that are identical to those in Tables 2 to 4, see notes to those tables.

All columns use the “linked sample.”

Omitted base group variables are: “enjoy job 6 yrs ago” strongly disagree; 1937-39 birth cohort; below high school graduate; other race and age 59. Omitted from the table are the coefficients on dummy variables for various missing variables. These include missing (or zero) hours six years ago and missing earnings six years ago. In addition, the dummy variable for the “other” job attitude category (together with the small fraction of missing observations for that variable) is omitted in the table.

“Enjoy job 6 yrs. ago” is from a question asked of respondents with a current job who are asked to express a level of agreement with the question “I really enjoy going to work.”

Cols. (4) and (5) add (ln) hours (hours worked per week in main job) and (ln) annual earnings (sum of wage or salary income plus added pay and earnings from a second job as well as those from professional practice or trade income. Earnings are deflated to 1992 using the CPI.

The regressions are weighted by HRS person weights adjusted for sample selection into the linked sample.

Standard errors in parentheses have been clustered at the individual level.

* p<0.05, ** p<0.01, *** p<0.001

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Appendix

Health and Retirement Study: General Comments

The Health and Retirement Study (known as the HRS and as the University of Michigan Health and Retirement Study) is a widely-used data set. More information can be found at: <http://hrsonline.isr.umich.edu/> and in the volume Appendix on the HRS.

Health and Retirement Study: Construction of Variables

Lifecycle Labor Force Participation

Lifecycle labor force participation is intended to measure the fraction of a period during which the individual was in the labor force. The time period we consider is from 25 to 54 years and we subdivide that into three decades. We primarily use the information from the Social Security earnings records (and the W-2 forms after 1977) to figure out whether an individual was employed during a year. We can do this only for individuals who gave permission to the HRS to link their survey to their Social Security earnings records. On average 80 percent of the sample agree to this linkage.

In general, we define someone as a labor force participant if during a year their annual earnings were at least equal to the federal minimum wage in that year times 10 hours times 52 weeks. Complications arise because some individuals were exempt from the Social Security earnings tax. These exempt employees were generally government workers and for our sample of women, teachers would have been an important exempt category. During the initial interview the HRS asked whether the individual had been employed by the government (including municipal, state and federal government positions) and if that was the case, the person could list two periods of employment. We count the individual in the labor force if the person did not pay the Social Security earnings tax in some year but stated that their employment was in the government for that period. It should be noted that when the W-2 forms become available, there is no problem with exempt status since the forms include all W-2 income. In addition, some HRS respondents were surveyed when they were in their early fifties and we use the HRS survey data when it exists. Thus we determine labor force status on the basis of various pieces of information including the HRS survey, the Social Security earnings records and the W-2 forms.

Career Condition Variable

Similar to the construction of the lifecycle labor force variable, we create a “career condition” variable that assesses whether individuals who were in the labor force earned above some amount. The amount is given by some fraction (we have used both 0.5 and

0.75) of the median annual wage of a (full-time, full-year) male worker in the given year. Because the period we are considering predates the micro-data for the CPS, we use the published surveys to obtain the male median annual wage. In our empirical work we define the career condition between ages 35 and 44 years (“Career cond. 35-44”) as the fraction of years in the age interval the individual exceeded 50 percent of the earnings of the median male full-time, full-year worker.

Earnings data for this calculation are obtained primarily from the Social Security earnings records, the W-2 forms when available, and the HRS earnings data when it exists for the individual. If the individual was in a tax-exempt employment (and did not have W-2 or HRS earnings data), we assume that the income was sufficient to exceed the given “career condition.”

[Social Security Earnings Record Linkage in the HRS](#)

The fraction of female HRS respondents who agreed at some point to the linkage of their HRS study to their Social Security earnings record is high. Just around 11 percent are not linked from the 1931 to 1942 birth cohorts. The fraction increases to 15 percent for 1943 to 1945 and then to 21 percent for 1946 to 1948. The high rate of non-linkage for the 1950s cohorts is probably because they have had fewer years to agree to have their records linked since respondents are asked during each wave. The fraction not linked will probably fall during the next waves of the HRS as more respondents agree to the linkage.

Individuals who did not agree to the linkage do not differ based on educational attainment and current marital status with those who did agree. The main determinant of linkage is the number of years the individual has been in the data set and, therefore, how many times the individual has been asked permission for the linkage.

[Comparisons of the HRS and the CPS](#)

Labor Force Participation Rates

The HRS closely tracks the labor force participation rates given by the CPS for the same age groups and birth cohorts. The only major differences occur for those 65 years and older. The HRS labor force data are always greater than the CPS data in every year from 1992 to 2010 for these age groups but are not for the younger groupings. The precise reason is unclear. One possibility is that the CPS does a better job interviewing individuals in group quarters.

Marital Status and Education

Both the HRS marital status and education variables track the CPS well for individuals 51 to 56 years old. Cohorts born from 1935 to 1952 are given in Appendix Tables A2 and A3. The HRS samples are fairly small and are subject to considerable sampling error. It should be noted that the education distributions for 51 to 56-year-old women differ from those for younger women in the same birth cohorts due to a common phenomenon that individuals gain education, for real or fictitious reasons, as they age.

The HRS contains a potential complication because some people did not list a degree and their highest degree was inferred. According to the RAND HRS Codebook (Chien 2013, pp. 132-33): “The highest degree is assigned by looking at reports from Tracker and all waves of data. The first non-missing value is used.” When the actual degree is missing, it is imputed and a bachelor’s degree is given to those with RAEDYRS = 16 or 17. Interestingly, the HRS and the CPS data for the same age groups and birth cohorts is remarkably similar.

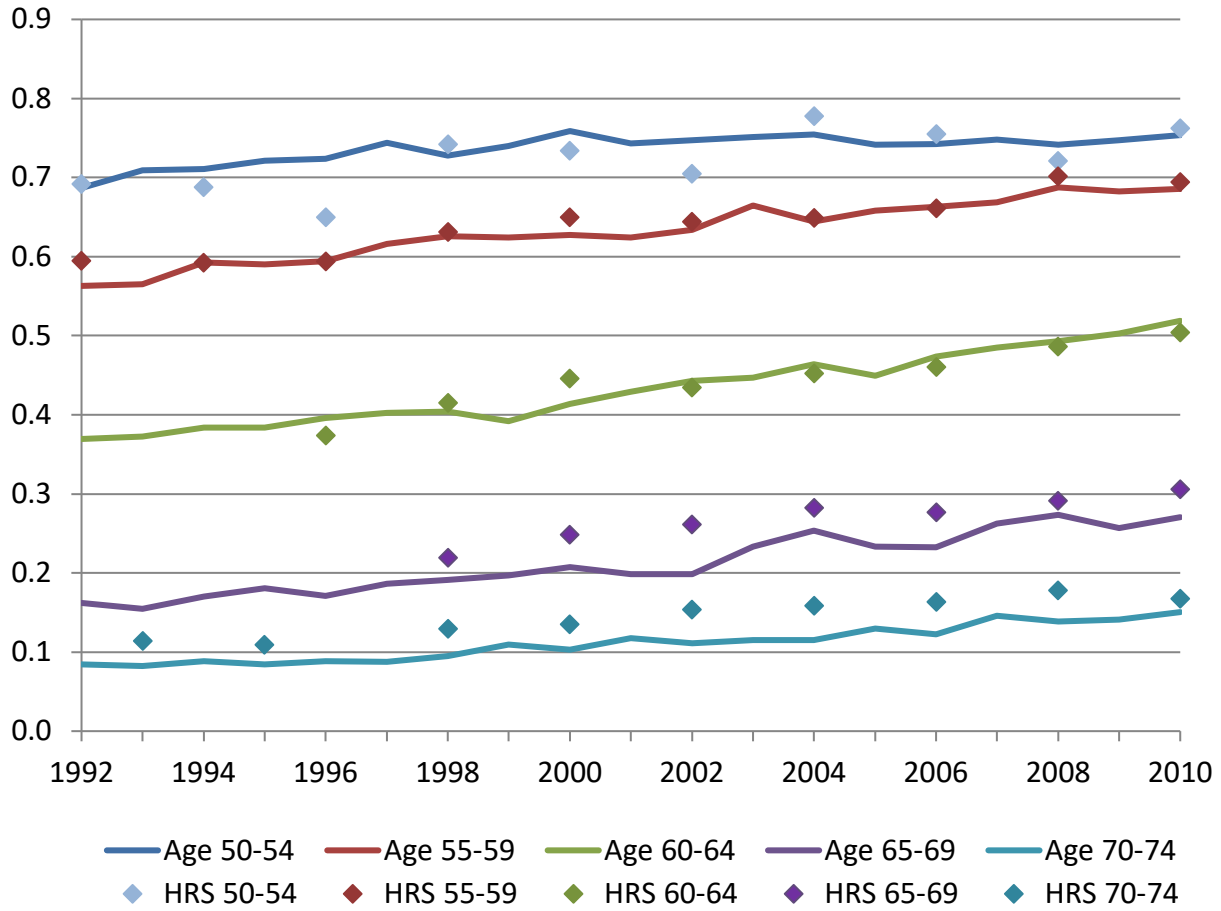
Children Ever Born

The information on children ever born in the HRS differs in various ways from that in the CPS June Fertility Supplements. But the mean number of children for the same cohorts in each of the two sources is not much different. It appears that the main difference is that the fraction of women who report no births in the HRS is lower than reported in the CPS. For example, for women with a college degree born from 1947 to 1951 the fraction with zero births in the HRS (all of the respondents are older than 44 years) is 19 percent. But in the CPS the fraction with zero births at 40 to 44 years old is about 25 percent. For women with less than a college degree, the fraction with no births in the HRS for those born for 1947 to 1951 is 10 percent but is 13 percent in the CPS June Fertility Supplements.

Even though HRS respondents report a lower fraction with no birth, the mean number of children ever born, as given in Appendix Figure A2, is similar to that given in the CPS June Fertility Supplements. The HRS number is almost always slightly higher, especially for cohorts from after 1945.

One possibility is that women in the HRS are also including adopted and step children. That possibility has been explored and does not appear to be the source of the difference.

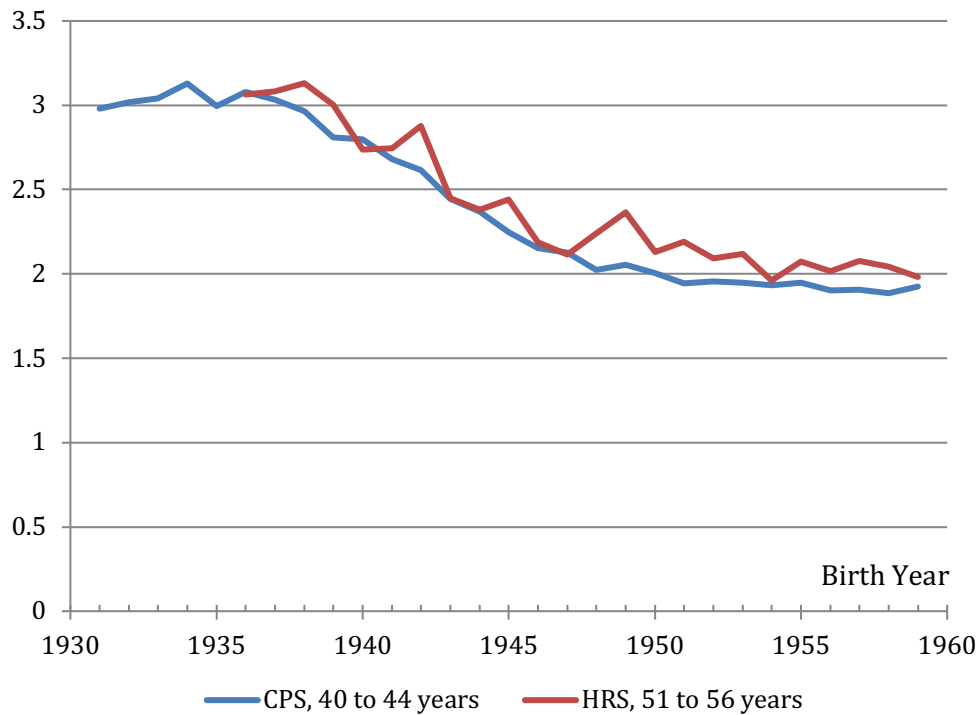
Appendix Figure A1: Comparing Labor Force Participation for the HRS and the CPS: Women 50-54 to 70-74 Years



Sources: CPS-ASEC micro-data, March, 1963 to 2014; HRS.

Notes: The HRS is a biennial survey. Some age groups are not shown for the HRS because the group is incomplete and the participation rate would be biased since it would omit some of the older ages in the group.

Appendix Figure A2: Children Ever Born for Women 51 to 56 Years Old in HRS and 40 to 44 Years Old in CPS in Birth Cohorts 1936 to 1951



Sources: CPS June Fertility Supplements, micro-data (1973 to 2014); HRS.

Notes: HRS person weights are used; no weights are used for the CPS. Children ever born is truncated below 10 in both samples. In both data sets, the variable is supposed to give the number of children ever born to the respondent and not the number of live children or adopted or step children

Appendix Table A1: Fraction of Female HRS Respondents Linked to Social Security Earnings Records by Birth Cohort

Birth Years	Fraction Linked
1931-33	0.886
1934-36	0.888
1937-39	0.868
1940-42	0.893
1943-45	0.852
1946-48	0.790
1949-51	0.714
1952-54	0.682

Sources: HRS, Restricted Access Data.

Notes: Person weights used. Linkage uses HRS to 2012.

Appendix Table A2: Comparing Marital Status for the HRS and CPS: Women 51 to 56 Years

Year of Birth	Fraction Currently Married			Fraction Ever Married but not currently married			Fraction Never Married		
	HRS-SS	Full HRS	CPS	HRS-SS	Full HRS	CPS	HRS-SS	Full HRS	CPS
1931-32	.	.	0.730	.	.	0.230	.	.	0.040
1933-34	.	.	0.731	.	.	0.225	.	.	0.044
1935-36	0.737	0.730	0.716	0.236	0.246	0.237	0.026	0.024	0.047
1937-38	0.741	0.730	0.712	0.230	0.240	0.244	0.029	0.029	0.044
1939-40	0.739	0.734	0.704	0.214	0.222	0.244	0.047	0.043	0.051
1941-42	0.641	0.647	0.684	0.330	0.322	0.262	0.030	0.030	0.054
1943-44	0.552	0.537	0.678	0.378	0.387	0.273	0.070	0.075	0.049
1945-46	0.716	0.731	0.683	0.229	0.221	0.259	0.054	0.047	0.058
1947-48	0.647	0.643	0.669	0.302	0.305	0.269	0.052	0.052	0.063
1949-50	0.628	0.604	0.666	0.314	0.328	0.259	0.058	0.067	0.075
1951-52	0.676	0.684	0.661	0.266	0.266	0.261	0.058	0.049	0.078

Sources: HRS. Restricted Access Data for HRS-SS columns. CPS.

Notes: The HRS-SS columns refer to the sample linked to the Social Security Administration earnings data. The number of observations for the HRS sample is about 500 for the 1949-50 and 1951-52 birth cohorts and 1,000 for the 1937-38 and 1939-40 birth cohorts. Missing values (.) indicate lack of coverage using the particular HRS cohorts.

Appendix Table A3: Comparing Education for the HRS and CPS: Women 51 to 56 Years

Year of Birth	Fraction College Education and Above			Fraction Some College			Fraction High School Diploma			Fraction Less than a High School Diploma		
	HRS-SS	Full HRS	CPS	HRS-SS	Full HRS	CPS	HRS-SS	Full HRS	CPS	HRS-SS	Full HRS	CPS
1931-32	.	.	0.121	.	.	0.146	.	.	0.450	.	.	0.282
1933-34	.	.	0.127	.	.	0.161	.	.	0.454	.	.	0.258
1935-36	0.150	0.145	0.143	0.183	0.191	0.174	0.453	0.435	0.432	0.214	0.229	0.251
1937-38	0.129	0.125	0.157	0.172	0.176	0.181	0.445	0.454	0.443	0.254	0.245	0.219
1939-40	0.176	0.171	0.172	0.225	0.224	0.206	0.376	0.379	0.431	0.222	0.226	0.191
1941-42	0.186	0.181	0.190	0.275	0.269	0.231	0.345	0.349	0.405	0.194	0.200	0.174
1943-44	0.254	0.251	0.211	0.214	0.217	0.245	0.369	0.378	0.395	0.163	0.155	0.148
1945-46	0.246	0.236	0.240	0.276	0.273	0.245	0.327	0.338	0.379	0.150	0.153	0.137
1947-48	0.197	0.227	0.265	0.334	0.304	0.272	0.360	0.371	0.358	0.109	0.098	0.105
1949-50	0.305	0.298	0.277	0.263	0.280	0.276	0.325	0.317	0.346	0.108	0.105	0.101
1951-52	0.295	0.288	0.296	0.275	0.282	0.288	0.339	0.333	0.315	0.091	0.097	0.102

Sources: HRS. Restricted Access data for HRS-SS columns. CPS-ASEC micro-data, March, 1963 to 2014

Notes: The HRS-SS columns refer to the sample linked to the Social Security Administration earnings data.

Appendix Table A4: Full-time Participation for Women at Ages 59 to 63, by Education: HRS

	Full-time Employment at Ages 59 to 63 Years					
	Not College Graduate	College Graduate	Not College Graduate	College Graduate	Not College Graduate	College Graduate
	(1)	(2)	(3)	(4)	(5)	(6)
Year of birth						
1934-36	-0.0340 (0.0192)	0.0423 (0.0524)	-0.0364* (0.0183)	0.0465 (0.0516)	-0.0375* (0.0177)	0.0463 (0.0481)
1937-39	0.000660 (0.0196)	0.0151 (0.0524)	-0.0179 (0.0190)	0.0205 (0.0521)	-0.0102 (0.0184)	0.0111 (0.0487)
1940-42	-0.00476 (0.0209)	0.0349 (0.0523)	-0.0343 (0.0202)	0.0120 (0.0518)	-0.0313 (0.0198)	0.00402 (0.0481)
1943-45	-0.00972 (0.0242)	0.0168 (0.0532)	-0.0448 (0.0235)	-0.0238 (0.0552)	-0.0364 (0.0232)	-0.0265 (0.0523)
1946-48	0.00969 (0.0250)	0.0360 (0.0501)	-0.0329 (0.0240)	-0.0128 (0.0499)	-0.0246 (0.0233)	-0.00276 (0.0476)
1949-51	0.00881 (0.0285)	0.120* (0.0521)	-0.0347 (0.0279)	0.0860 (0.0506)	-0.0231 (0.0273)	0.0853 (0.0479)
High school grad.	0.107*** (0.0151)		0.0659*** (0.0149)		0.0276 (0.0149)	
Some college	0.177*** (0.0187)		0.124*** (0.0184)		0.0677*** (0.0183)	
MA		0.0810* (0.0336)		0.0706* (0.0332)		0.0612 (0.0322)
PhD, MD, JD, etc.		0.190** (0.0670)		0.146* (0.0677)		0.118 (0.0640)
Lifecycle LFP 35-44			0.240*** (0.0247)	0.139* (0.0584)	0.225*** (0.0240)	0.127* (0.0610)
Never in LF 35-44			-0.00226 (0.0211)	-0.152* (0.0660)	-0.00113 (0.0206)	-0.156* (0.0639)
Currently married					-0.110** (0.0397)	-0.258*** (0.0703)
Divorced					0.0322 (0.0414)	0.0736 (0.0746)
Widow					-0.0118 (0.0406)	-0.0473 (0.0784)
Spouse in LF					0.0688*** (0.0149)	0.158*** (0.0357)
Health status	no	no	no	no	yes	yes
Age dummies	yes	yes	yes	yes	yes	yes
Race dummies	yes	yes	yes	yes	yes	yes

Constant	0.177*** (0.0326)	0.653*** (0.0849)	0.114** (0.0373)	0.593*** (0.0931)	0.0776 (0.0477)	0.505*** (0.120)
N	12789	2642	12789	2642	12789	2642
R-squared	0.043	0.052	0.084	0.079	0.125	0.134

Sources: Health and Retirement Study (HRS) 1992 to 2012, RAND version with added variables from original HRS files. Social Security Administration earnings (and W-2) data are used to calculate life cycle labor force participation (Lifecycle LFP <ages>).

Notes: The dependent variable is 1 if the woman is in the labor force full-time and 0 otherwise. A woman is in the labor force full-time if she reported being employed for 35 or more hours per week.

Health status is self-reported and is coded as 1 if “good” or better and 0 otherwise.

Marital status variables refer to current status.

“Lifecycle LFP <ages>” is the fraction of the interval the woman was in the labor force as determined by a combination of the data sources described in the Appendix. “Never in LF” is 1 if the individual was recorded as having no years in the labor force during those years. All columns use the “linked sample.”

Omitted base group variables are: 1931-33 birth cohort; below high school graduate (overall or for the less than college graduate group); BA only for the college graduate group; never married; other race and age 59. Omitted from the table are dummy variables for missing variables regarding spouse in labor force and health status.

Regressions are estimated separately for college graduates and those who did not graduate from college. For the college graduates degrees beyond a bachelors are added (MA, PhD, etc.), where MA includes all masters and PhD, MD, JD, etc. includes all graduate and professional degrees. For non-college graduates dummy variables are added for those with a high school diploma and some college.

The regressions are weighted by HRS person weights adjusted for sample selection into the linked sample.

Standard errors in parentheses have been clustered at the individual level.

* p<0.05, ** p<0.01, *** p<0.001

Appendix Table A5: Female Labor Force Participation at Ages 56 to 58, by Education: HRS

	Labor Force Participation at Ages 56 to 58 Years					
	Not College Graduate	College Graduate	Not College Graduate	College Graduate	Not College Graduate	College Graduate
	(1)	(2)	(3)	(4)	(5)	(6)
Year of birth						
1937-39	0.00933 (0.0238)	0.0128 (0.0552)	-0.0184 (0.0225)	0.0170 (0.0531)	-0.0141 (0.0214)	0.0120 (0.0509)
1940-42	0.0558* (0.0245)	-0.0112 (0.0519)	0.0120 (0.0227)	-0.0311 (0.0491)	0.0257 (0.0221)	-0.0248 (0.0454)
1943-45	0.0170 (0.0296)	0.0504 (0.0529)	-0.0419 (0.0281)	0.00718 (0.0516)	-0.0334 (0.0272)	0.00633 (0.0505)
1946-48	0.00282 (0.0283)	0.0269 (0.0529)	-0.0607* (0.0267)	-0.0217 (0.0507)	-0.0348 (0.0259)	-0.0139 (0.0483)
1949-51	0.0357 (0.0301)	0.0763 (0.0486)	-0.0296 (0.0289)	0.0324 (0.0482)	0.00586 (0.0274)	0.0309 (0.0460)
1952-54	0.00537 (0.0326)	0.110* (0.0510)	-0.0599 (0.0316)	0.0516 (0.0500)	-0.0219 (0.0286)	0.0484 (0.0498)
High school grad.	0.212*** (0.0223)		0.144*** (0.0220)		0.0719*** (0.0216)	
Some college	0.266*** (0.0247)		0.188*** (0.0249)		0.0999*** (0.0239)	
MA		0.0227 (0.0310)		0.0137 (0.0305)		0.0189 (0.0287)
PhD, MD, JD, etc.		0.109* (0.0456)		0.0751 (0.0454)		0.0517 (0.0446)
Lifecycle LFP 35-44			0.302*** (0.0315)	0.0818 (0.0565)	0.280*** (0.0297)	0.0430 (0.0674)
Never in LF 35-44			-0.0711* (0.0321)	-0.258** (0.0802)	-0.0721* (0.0303)	-0.275*** (0.0820)
Currently married					-0.104* (0.0525)	-0.276*** (0.0696)
Divorced					0.0796 (0.0531)	0.0120 (0.0457)
Widow					0.0313 (0.0540)	-0.0132 (0.0592)
Spouse in LF					0.168*** (0.0207)	0.200*** (0.0578)
Health status	no	no	no	no	yes	yes
Age dummies	yes	yes	yes	yes	yes	yes
Race dummies	yes	yes	yes	yes	yes	yes

Constant	0.341*** (0.0449)	0.662*** (0.123)	0.302*** (0.0484)	0.672*** (0.124)	0.149* (0.0663)	0.612*** (0.124)
N	7354	1649	7354	1649	7354	1649
R-squared	0.049	0.022	0.123	0.060	0.199	0.130

Sources: Health and Retirement Study (HRS) 1992 to 2012, RAND version with added variables from original HRS files. Social Security Administration earnings (and W-2) data are used to calculate life cycle labor force participation (Lifecycle LFP <ages>).

Notes: The dependent variable is 1 if the woman is in the labor force and 0 otherwise. The HRS asks respondents their labor force status and a woman is in the labor force if she reported being employed or unemployed and searching for work.

Health status is self-reported and is coded as 1 if “good” or better and 0 otherwise.

Marital status variables refer to current status.

“Lifecycle LFP <ages>” is the fraction of the interval the woman was in the labor force as determined by a combination of the data sources described in the Appendix. “Never in LF” is 1 if the individual was recorded as having no years in the labor force during those years. All columns use the “linked sample.”

Omitted base group variables are: 1934-36 birth cohort; below high school graduate (overall or for the less than college graduate group); BA only for the college graduate group; never married; other race and age 56. Omitted from the table are dummy variables for missing variables regarding spouse in labor force and health status.

Regressions are estimated separately for college graduates and those who did not graduate from college. For the college graduate degrees beyond a bachelors are added (MA, PhD, etc.), where MA includes all masters and PhD, MD, JD, etc. includes all graduate and professional degrees. For non-college graduates dummy variables are added for those with a high school diploma and some college.

The regressions are weighted by the HRS person weights adjusted for sample selection into the linked sample.

Standard errors in parentheses have been clustered at the individual level.

* p<0.05, ** p<0.01, *** p<0.001