How Education Pays Off for Older Americans

Heidi Hartmann, Ph.D.
Jeff Hayes, Ph.D.

Institute for Women's Policy Research

About this Report

This report presents findings from an Institute for Women's Policy Research (IWPR) analysis of the 2005-2009 American Community Survey data regarding the earnings of older men and women with different levels of education. The analysis was funded by the Alfred P. Sloan Foundation, and is part of IWPR's on-going research concerning the economic status and security of older women and men.

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Institute for Women's Policy Research
1200 18th Street NW, Suite 301
Washington, DC 20036
Tel: 202/785.5100 Fax: 202/833.4362
www.iwpr.org

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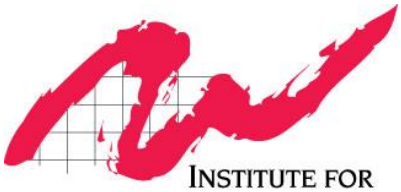

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Introduction

Retirement laws and practices historically led to a situation where men's hours of work smoothly increased through the prime working years then decreased with age, with a steep drop at the retirement point (Killingsworth 1983). That drop partly reflected the fact that full Social Security retirement benefits were not available until the age of 65 (currently age 66 and rising to 67 in 2027), and the legal requirement under the Employee Retirement Income Security Act that an employee must quit employment in order to receive pension benefits associated with that job (U.S. Department of Labor 2011). As well, women's employment was discouraged regardless of age, such that only 30 percent of payroll employees were women in 1964 (English, Hartmann, and Hayes 2010). Circumstances are dramatically different today.

Employment among older Americans has expanded in recent years. For individuals over the age of 65, the employment to population ratio rose steadily from 12.5 percent in the first quarter of 2002, to 15.0 percent in the first quarter of 2007, and through the recent recession, achieving a level of 18.5 percent in 2012 (Labor Force Statistics from the Current Population Survey 2012). Women's labor force participation increased substantially at all ages, including at older ages.

Labor economists note that, on average, having more education increases life-time earnings, that pension and Social Security benefits are related to earnings, and that the standard of living of older Americans is higher for those with more education (Blau, Winkler, Ferber 2014). Further, jobs held by employees with college degrees tend to be white collar, so less often involve either physical labor or working on one's feet, facilitating employment beyond the traditional retirement age (Jin Rho 2010). Indeed, among Americans who are at least 65 years of age, 32 percent of men and 22 percent of women with college degrees belonged to the labor force in 2009, while only 12 percent of men and 7 percent of women who did not complete high school were in the labor force that year (Shattuck 2010). The rapid increase in women's labor force participation since the 1960s has still not equalized participation by gender, and older women remain less likely to work or look for work than older men.

Employment and earnings past the traditional retirement age have become more important to the well-being of older Americans in part due to increased retirement income risk flowing from the shift away from defined benefit towards defined contribution pensions. There has also been a decade-long decline in asset income among older Americans (Hartmann, Hayes, and Drago 2011), an asset decline exacerbated by the recent recession (Hurd and Rohwedder 2010). Highly educated individuals may more effectively counter these negative trends with high earnings later in life. Preference, as well as need, may be a factor; some older women and men may prefer work to leisure or to other activities.

Simultaneous with the increased employment of older Americans is a significant change in college attendance, flowing from the increasing enrollment of older or returning students. According to the National Center for Education Statistics (2010a), the percentage of students under age 25 enrolled in degree-granting institutions of higher education[1] rose by 27 percent between 2000 and 2009, while the enrollment of students aged 25 and older increased by 43 percent across the same period, a trend that is expected to continue. For individuals in middle-age, or even for younger people with a long time horizon, knowing the value of education past the traditional retirement age could be useful for making educational and occupational choices.

The purpose of this study is to identify the role that higher education plays in employment, earnings, and occupations held by women and men beyond the traditional retirement age of 65 years. The major value of the study lies in its ability to inform policymakers about the working lives of older Americans and about any needed policy changes. Women and men considering occupational changes and college entry or re-entry later in life, and educational and vocational counselors, may also find the results of interest.

Research Questions and Data

The study addresses four research questions:

1. ***How do employment and work hours among employed older Americans vary by gender as men and women age into the traditional retirement years, and how do these patterns differ at different levels of educational attainment?*** As expected from the labor force participation rates cited above, those older Americans with more education likely work more than those with less education, but do those differences shrink or grow with age? Are work patterns similar for women and men?
2. ***Among those employed, does the hourly earnings premium for higher education rise or fall beyond the traditional retirement age of 65 and do the premiums differ by gender?*** The direction of the relationship between the wage premium for education and age is uncertain a priori. On the one hand, highly educated men and/or women may retain their value to employers in ways that employees in physically demanding jobs associated with lower educational attainment often cannot, raising the earnings premium for education. On the other hand, highly educated individuals may have assets allowing them to take less demanding or more interesting

[1] Degree-granting institutions grant associate's or higher degrees and participate in Title IV federal financial aid programs.

but lower-wage jobs past the traditional retirement age, effectively reducing their earnings premium. The wage premium to highly educated older workers could also be reduced relatively more or less by factors such as age discrimination or the need to care for oneself or other family members.

3. ***How do projected total earnings at and beyond the age of 65 years vary for men and women according to levels of educational attainment?*** The total earnings advantage, past the traditional retirement age, for higher education might be substantial, given that individuals with degrees may hold jobs that lend themselves to delayed retirement, or to full-time employment with a minimal physical toll, and that pay high wages. Or, as above, highly-educated older workers may have the resources to take lower paid jobs reducing their total earnings. Are there substantial gender differences in total earnings, based on wages or hours of work specific to women and men? Do women take lower paying jobs more often? Might they be more likely to reduce hours to care for family members?
4. ***How do occupations differ for men and women across age and education?*** Highly educated individuals may work in less physically demanding occupations that are conducive to later retirement or they may be in a financial position to retire early or switch occupations as they age, while individuals with less education may work in physically difficult occupations that they cannot afford to leave and may remain employed in them later in the life course, or they may change occupations in an effort to find something less physically demanding. Occupations may also differ by gender since they reflect established patterns of sex segregation or different options and choices of men and women as they age.

To examine these questions the study analyzes data from the 2005–2009 American Community Survey (US Census Bureau 2010). The survey provides information on age, sex, educational attainment, employment status, occupation, earnings, and weeks and hours of work (information on hours worked was supplemented by use of the Current Population Survey – see Technical Appendix).

The 2005-2009 ACS includes data for 35.4 million workers aged 50–64 years and 5.4 million workers aged 65 and older (Table 1). Within the group of older workers (65 years and older), 56 percent (3.1 million) are men and 44 percent (2.4 million) are women. In this older age group, women are less likely than men to have a Bachelor's degree or more, but high school or less is the largest educational level for both men and women: 41 percent of all older working men have a high school diploma or less and 49 percent of older working women have that level of education. While 36 percent of working men aged 65 years and older (the same as for ages 50 to 64 years) have a Bachelor's degree or higher, only 23 percent of working women aged 65 years and older have a Bachelor's degree or higher (compared with 32 percent of women

Table 1. Number of Employed Men and Women Aged 50 Years and Older by Educational Attainment, 2009 (In Thousands)

	High School Diploma/GED or Less		Some College or Associate's Degree		Bachelor's Degree		Postgraduate Degree		Total	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
50-64 Years	6,636	6,066	5,240	5,438	3,689	3,026	2,900	2,342	18,465	16,872
65-69 Years	665	640	401	404	285	181	333	162	1,683	1,386
70-74 Years	338	300	176	160	130	66	148	58	793	584
75-79 Years	168	149	82	73	64	28	70	24	383	273
80 Years and Older	86	73	40	34	33	15	37	12	196	133
65 Years and Older	1,256	1,162	700	669	512	291	588	255	3,056	2,376

Source: IWPR analysis of 2005-2009 American Community Survey (Ruggles, et al. 2010).

aged 50 to 64 years). As noted above, the research literature indicates a higher propensity to work at higher education levels for both women and men, and the women and men in this study, as will be shown below, follow that pattern. Nevertheless, Table 1 shows that among all older workers, those with high school or less make up the largest share of the post-50 workforce. For both women and men with a high school diploma or less, the share of the work force aged 50 years and older that is aged 65 and older is 16 percent. For women, this share of the post-65 group relative to the post-50 workforce declines across increasing levels of education to 9 percent among women with a Bachelor's degree or higher. However, among men the share of workers aged 50 years and older that is aged 65 and older declines for those with some college or a Bachelor's degree (12 percent for both) and then increases to 17 percent for men with postgraduate degrees. This suggests that, for women, the least educated may be working longer, while for men it is both the least and most educated who seem to work longer.

To shed light on research question 1, how much are older men and women with different levels of education working, total employment and the subset of those employed part-time, ranging from ages 50 to 80, are shown separately for men and women, and then those analyses are replicated for the four education levels delineated in this study: high school or less, an Associate's degree or some college, a four-year college degree, and postgraduate education.

To answer research question 2, how does the earnings premium for higher levels of education differ by gender at different age ranges, requires undertaking a standard statistical regression analysis. Details are shown in the Technical Appendix.

To answer research question 3 requires estimates of the total expected earnings for individuals from employment at or beyond age 65, and appropriate discounting to generate a present discounted value at age 65 for earnings then and later in life (see Technical Appendix). These estimates are replicated across the eight education and gender groups to ascertain the total earnings advantage for older individuals associated with education for women and men at each of the four levels of education considered in the study.

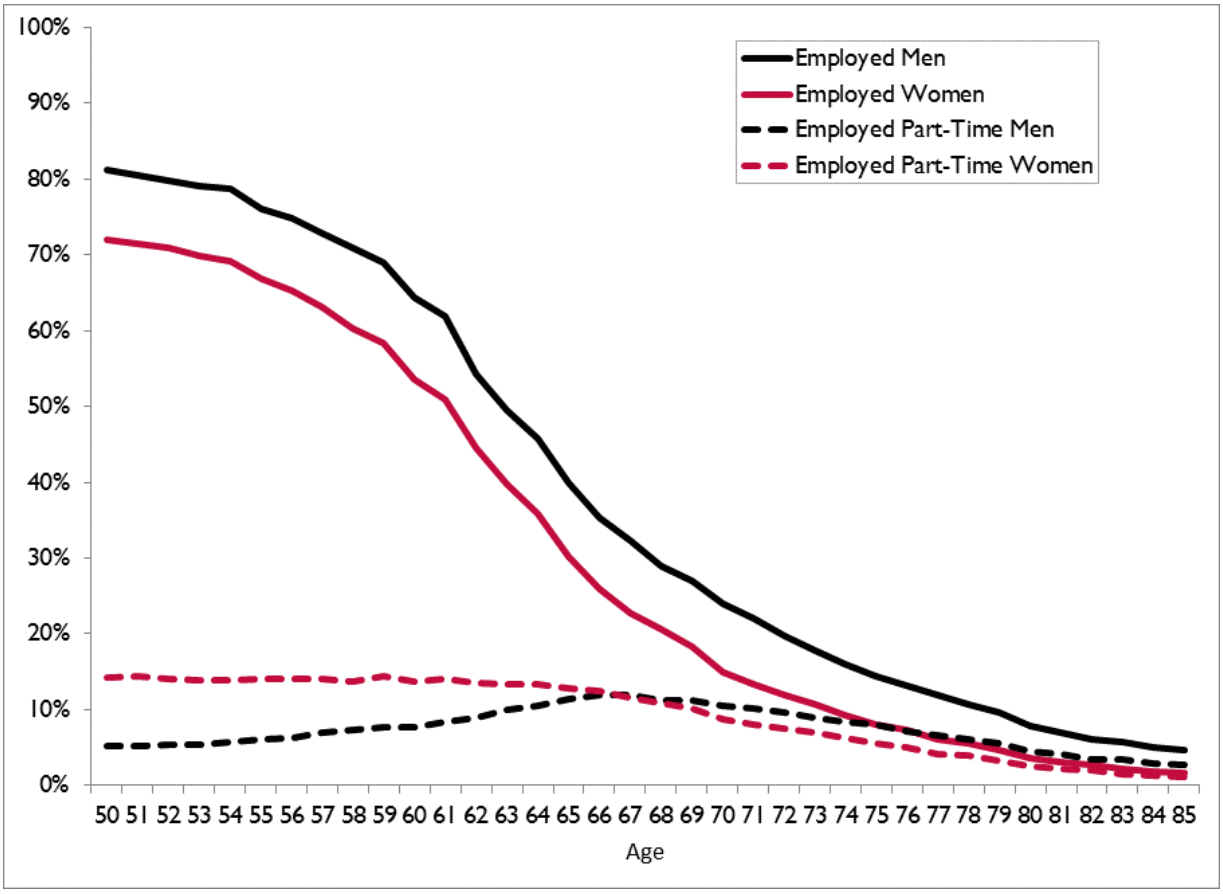
To answer research question 4, regarding differences in occupations by age, gender, and education, the ACS provides information on 509 specific occupational categories. To utilize this rich source of information while preserving sample size, employed individuals are analyzed in six age ranges: 50-55, 56-61, 62-64, 65-69, 70-74, and 75 years and above. For each age range, the number of men and women employed in each occupation is estimated, and the ten most common occupations are listed, separately for men and for women, along with the percentages working part-time, the percentage with at least a Bachelor's degree, and the mean hourly wage.

Findings

How is Education Related to Employment and Work Hours among Older Women and Men?

Figure 1 shows the overall employment and the part-time employment rates by age for women and men between ages 50 and 85 (the employment rate is the percent of the population working). The difference between the lines for part-time employment and total employment represents the rate of full-time employment. As suspected, the share employed is lower at higher ages and is lower for women at every age. Among those age 50, more than 80 percent of men and 70 percent of women are employed. Employment is lower for men (64 percent) and women (53 percent) at age 60. Among those age 70, one in four men (24 percent) and one in seven women (15 percent) are employed. For women, the part-time employment rate is higher among those at younger ages compared with women at older ages. Among men, the part-time employment rate is highest (12 percent) among men age 66–67 and lower among both those younger and older.

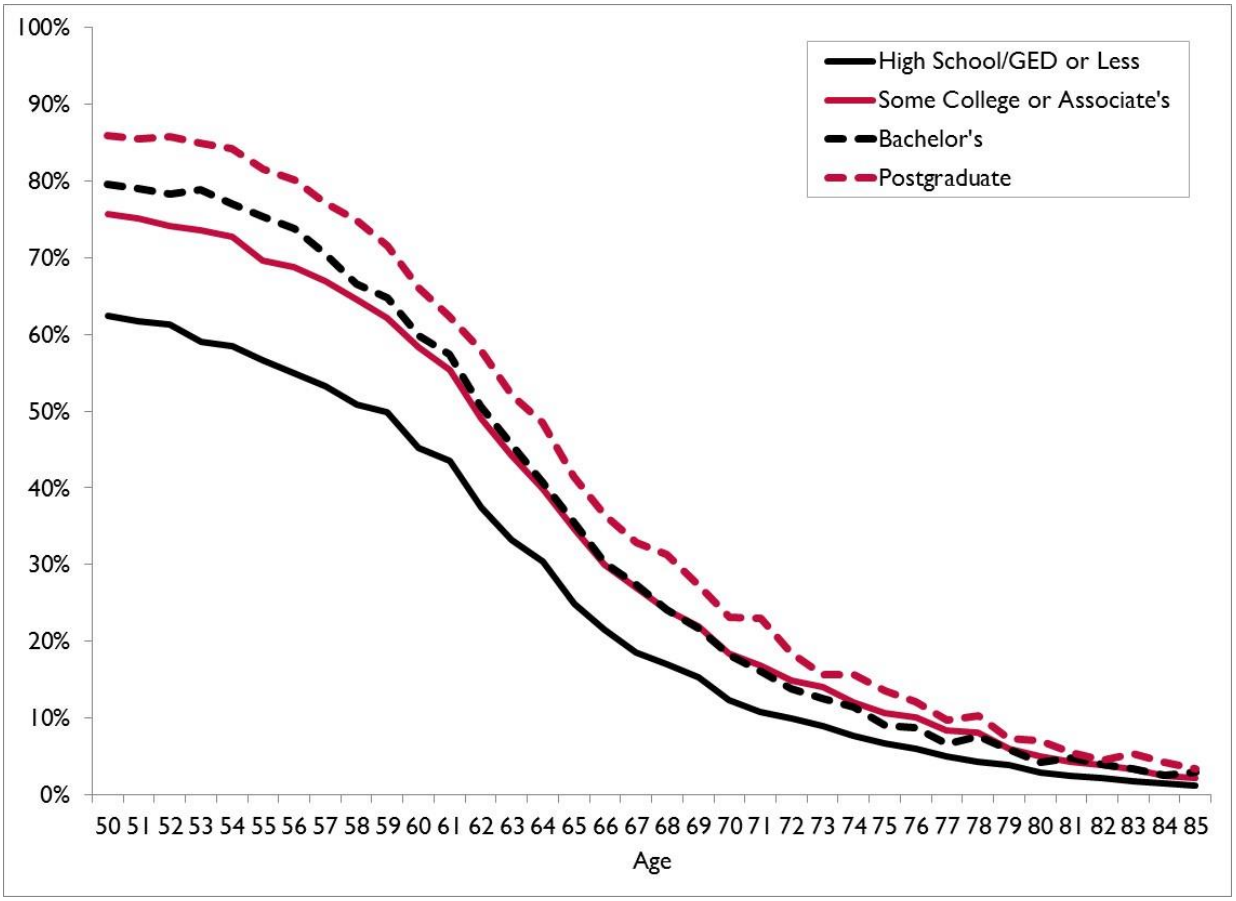
Figure 1. Employment Rates Overall and Part-Time for Women and Men by Age



Source: IWPR analysis of 2005-2009 American Community Survey (Ruggles, et al. 2010).

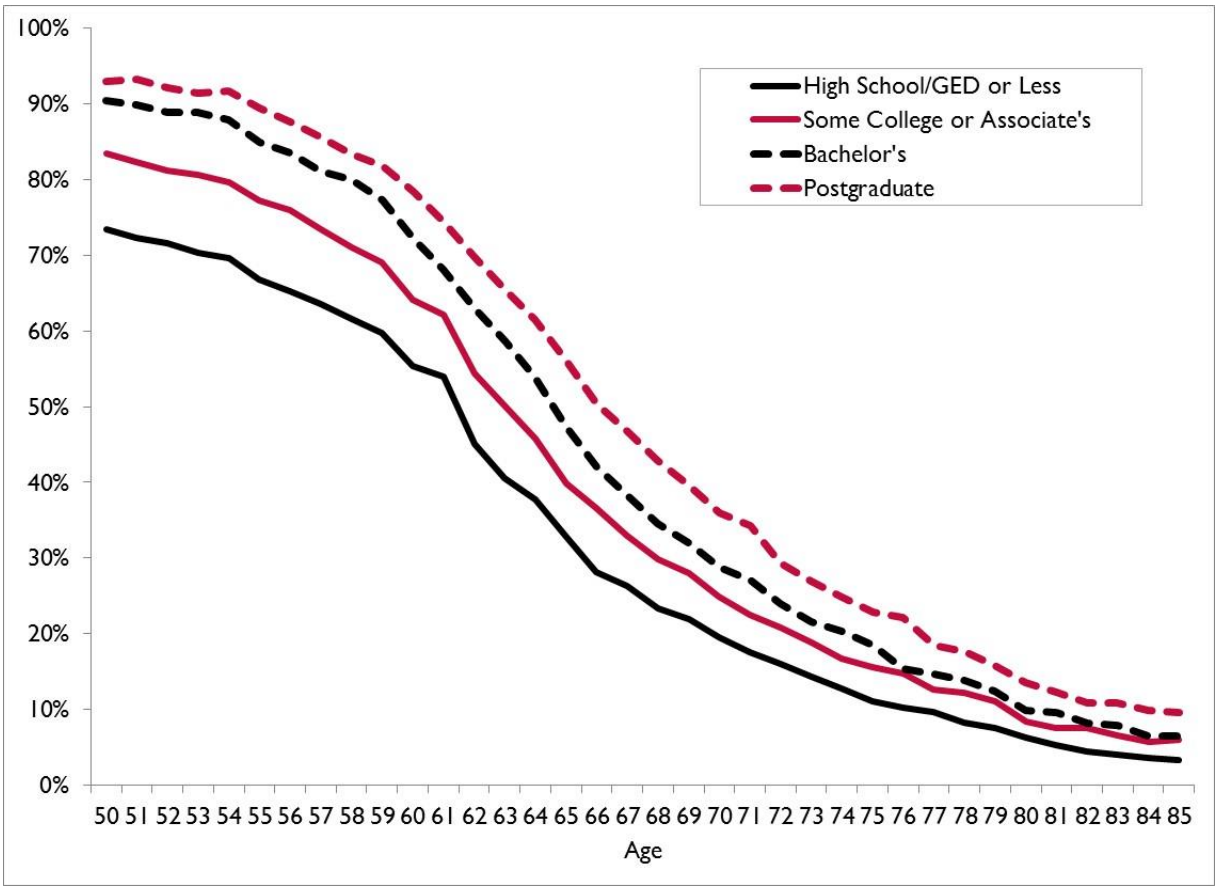
Figures 2 and 3 display the overall employment rates by age for women and men, respectively, by the four educational attainment categories used in this study. The general pattern of employment rates by age and gender is similar in each of the educational groups to those shown in Figure 1. In most cases larger proportions of women and men with higher educational attainment are working at each age compared with those with less schooling. One exception is that at older ages a larger proportion of women with some college is working than of women with Bachelor's degrees. While the ACS are cross-sectional data, if these age-specific employment rates persist, more educated men and women would have more years of employment and earnings after age 50, on average, than less educated men and women.

Figure 2. Women's Employment Rates by Education Level and Age



Source: IWPR analysis of 2005-2009 American Community Survey (Ruggles, et al. 2010).

Figure 3. Men's Employment Rates by Education Level and Age



Source: IWPR analysis of 2005-2009 American Community Survey (Ruggles, et al. 2010).

At all education levels a larger proportion of men are working at each age compared with women (Figures 2 and 3 or Table 2). Among individuals aged 50–59 years with a high school diploma or less, 57 percent of women and 68 percent of men are working. Among similarly educated individuals in their 70s, 7.6 percent of women and 13 percent of men are working. Employment is greater among the more educated. For individuals aged 50–59 years with postgraduate degrees, 81 percent of women and 89 percent of men are employed. Even among those in their 70s, 16 percent of women and 26 percent of men with postgraduate degrees are employed. As can be seen in Table 2, the gender gaps in the share employed across the age and education groups range from 2.3 percentage points for the oldest, least educated group to 11.9 percentage points for postgraduates in their 60s.

The shapes of the curves in Figures 2 and 3 are similar for women and men, suggesting that both women and men decrease their employment similarly as they age (here cross-sectional data are used to indicate

longitudinal trends, but change in education and work behavior, especially for women in the baby boomer generation, suggest future trends may look different for today's 50-year-olds).

Table 2. Employment Rates by Age, Education, and Gender (2005-2009)

	High School/GED or Less		Some College or Associate's		Bachelor's		Postgraduate	
Age	Men	Women	Men	Women	Men	Women	Men	Women
50-59 years	68.1%	57.1%	77.8%	70.8%	85.5%	75.0%	89.0%	81.3%
60-69 years	37.6%	29.4%	47.4%	41.1%	54.9%	42.8%	61.6%	49.7%
70-79 years	13.1%	7.6%	17.8%	12.4%	20.4%	11.5%	26.0%	15.8%
80 or more years	3.7%	1.4%	6.0%	2.8%	7.1%	2.7%	9.7%	4.0%

Source: IWPR analysis of 2005-2009 American Community Survey (Ruggles, et al. 2010).

Table 3 expresses the age- and education-specific employment rates for women and men as a percentage increase over the rate for the least educated, high school diploma or less, group of the same gender. At most ages and education levels women's postsecondary schooling increases their employment rates compared with women with secondary or less education more than postsecondary education increases men's employment rates. For example, the share of employed women aged 50–59 years with a Bachelor's degree is 31 percent larger than the share of women of the same ages with a high school diploma or less. Among similar men, the share of those employed with a Bachelor's degree is 26 percent greater than for the least educated category. At older ages, having a Bachelor's degree increases employment less for women than it does for men, but, in general, the older women and men are, the more having higher education increases their employment compared with those with less education.

Table 3. Increase in Employment Rates Relative to High School Diploma/GED or Less by Age, Education, and Gender (2005-2009)

	Some College or Associate's		Bachelor's		Postgraduate	
Age	Men	Women	Men	Women	Men	Women
50-59 years	14.3%	24.0%	25.6%	31.4%	30.6%	42.4%
60-69 years	25.8%	40.0%	45.8%	45.7%	63.7%	69.0%
70-79 years	36.4%	62.4%	56.1%	50.4%	98.7%	106.7%
80 or more years	63.2%	94.2%	92.8%	89.0%	162.4%	178.7%

Source: IWPR analysis of 2005-2009 American Community Survey (Ruggles, et al. 2010).

Women and men aged 70-79 years with postgraduate degrees are about twice as likely to be employed as their age peers with a secondary school education or less.

Reading down the columns within education categories and gender, the increasing proportion working for postsecondary schooling is larger in the older age ranges compared with the younger age ranges. Women and men aged 70–79 years with postgraduate degrees are about twice as likely to be employed as their age peers with a secondary school education or less (99 percent increase for men and 107 percent increase for women). The increase in share employed among those with a postgraduate degree aged 50-59 years is only 31 percent for men and 42 percent for women compared with their age peers in the lowest education category.

How does the Wage Premium for Education Change with Age and Differ by Gender?

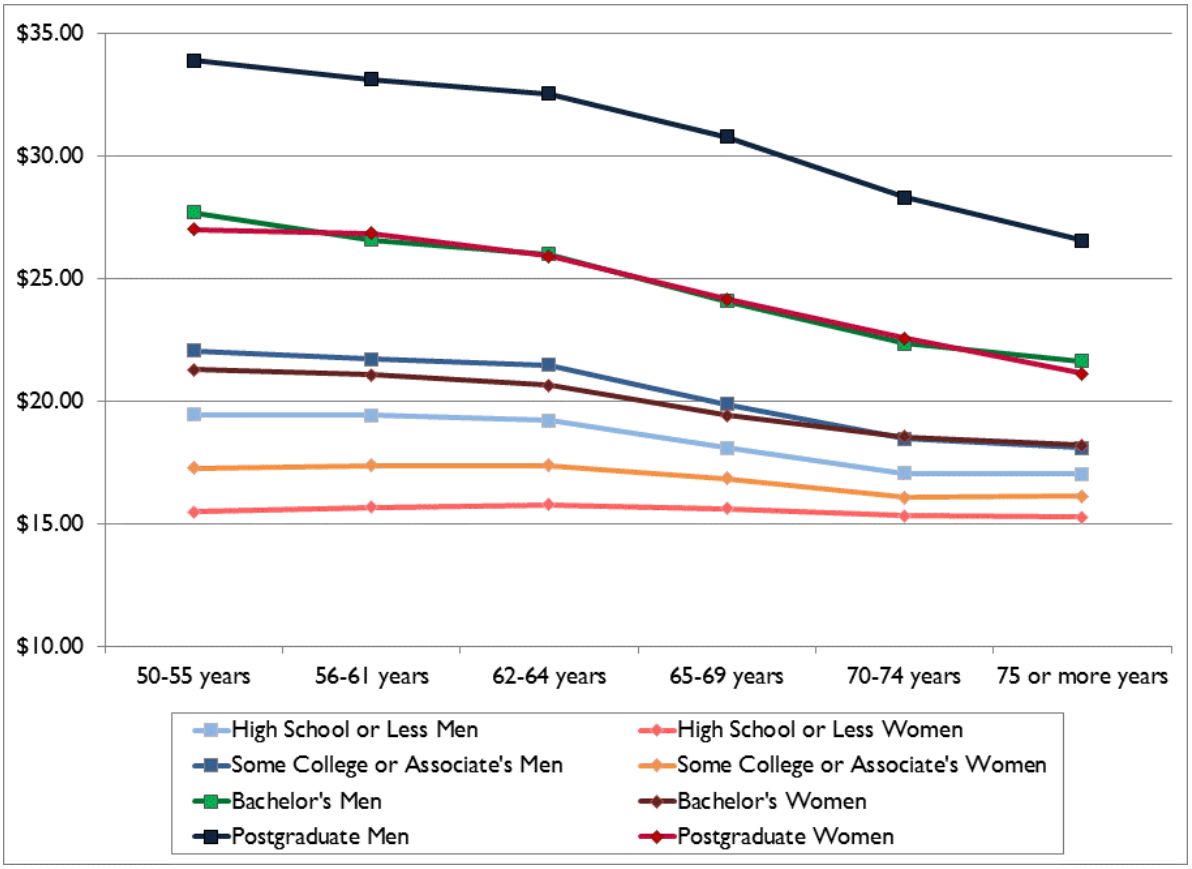
Figures 4 and 5 summarize the results of the regression analysis of hourly wages to estimate the returns to education by gender and age, controlling for occupation, industry, sector, part-year and part-time employment, and several personal characteristics such as race/ethnicity and marital status. Figure 4 shows the marginal effects of gender, age, and education when the other statistical control variables are evaluated at their means. (See Appendix Table 2 for the full regression model.) Older women receive lower wages than men at each level of education and at every age. Women in the lowest two educational groups (those with high school or less and some college or an Associate's degree) average substantially lower earnings than men completing high school or less ($2 to $4 less per hour at younger ages). Women in the two highest education groups earn about the same as men one group lower. That is, women with a Bachelor's degree earn about what men with some college or an Associate's degree earn, and women with a postgraduate (Master's, PhD, or professional degree) earn wages similar to men with a Bachelor's degree. Women in these two educational groups are averaging $5 or more less per hour than men at similar education levels.

Workers in the younger age ranges receive higher hourly wages, on average, compared with workers in the older age ranges within gender and education categories. Wages for men decline across age ranges more than women's wages, and the decline for both women and men is greater for workers in higher education categories. Among workers with a high school diploma or less men aged 75 or more earn 88 percent of the wage earned by men aged 50-55 years compared with 99 percent for women. Among workers with a high school diploma or less men aged 75 or more earn 88 percent of the wage earned by men aged 50-55 years compared

Workers in the younger age ranges receive higher hourly wages, on average, compared with workers in the older age ranges within gender and education categories.

with 99 percent for women. Among men with Bachelor's degrees, those aged 75 or more earn 78 percent as much as men aged 50-55 years. Women aged 75 or more in this education category earn wages 86 percent as large as those aged 50-55 years. Women's lower wages hold up better with age within educational categories.

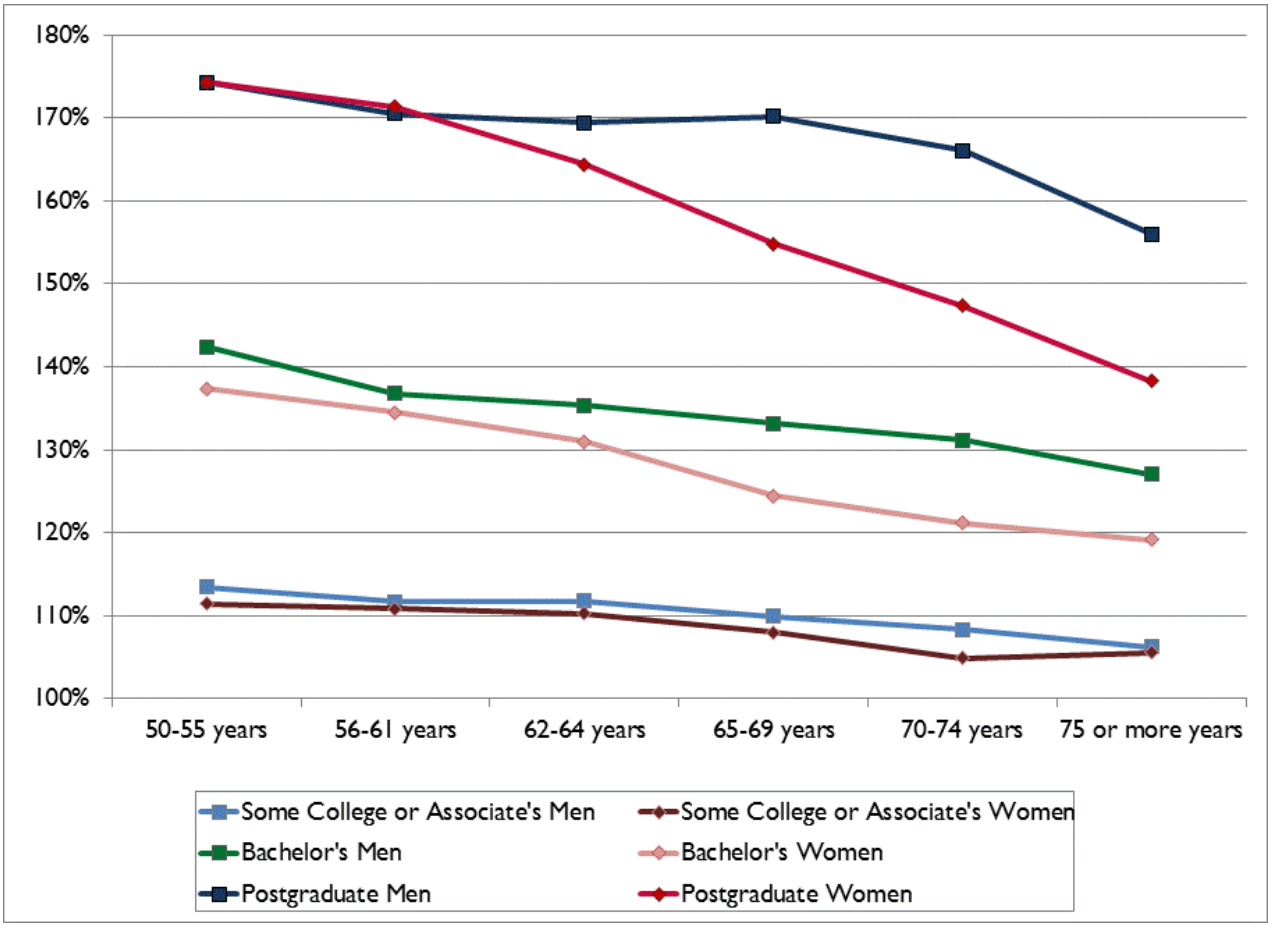
Figure 4. Average Hourly Wage Level for Women and Men by Age and Educational Attainment



Source: IWPR analysis of 2005–2009 American Community Survey (Ruggles, et al. 2010). See Appendix Table 3.

Figure 5 displays the same model's results to illustrate the returns to postsecondary schooling. Hourly wage levels are shown for the higher three educational groups relative to the hourly wage of those with high school completion or less within gender; for example, a percentage of 150 indicates that workers with more education earn 150 percent or 1.5 times what the same gender/age workers with high school completion or less earn. This indicates a 50 percent wage premium for the higher degree.

Figure 5. Average Premia for Postsecondary Education for Women and Men by Age and Highest Degree Level (Relative to those without Postsecondary Education)



Source: IWPR analysis of 2005-2009 American Community Survey (Ruggles, et al. 2010).

At most ages men receive higher wage premia at each level of education compared with same aged women.

At most ages men receive higher wage premia at each level of education compared with same aged women, but the gender differences in the premia range from small for those at the some college or associate's degree level to quite large at the post-graduate level. The gender differences in wage premia are greater among those with a Bachelor's degree or more at age ranges 65-69 years and older than either the some college or Associate's education category or age ranges before the traditional retirement age. Both women and men with some college or an Associate's degree earn about 10 percent more than those with high school completion or less. Women and men with postgraduate degrees earn between 64 and 74 percent more than those with high school completion or less in age ranges between 50 and 64 years. But at older age ranges, as can be seen in Table 4, women's premia relative to high school or less

range from 8 percentage points to 22 points lower than men's depending on the specific age range and whether the higher education is a Bachelor's or postgraduate degree.

Table 4. Average Premia for Postsecondary Degrees Relative to High School Diploma or Less by Age and Gender

	50-55 years		56-61 years		62-64 years		65-69 years		70-74 years		75 or more years	
	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women
High School or Less	100	100	100	100	100	100	100	100	100	100	100	100
Some College or Associate's	113	111	112	111	112	110	110	108	108	105	106	106
Bachelor's	142	137	137	135	135	131	133	124	131	121	127	119
Postgraduate	174	174	170	171	169	164	170	155	166	147	156	138

Source: IWPR analysis of 2005-2009 American Community Survey (Ruggles, et al. 2010).

Younger workers earn a slightly larger wage premium for higher education compared with workers in the older groups (Figure 5 and Table 4). Among men with a Bachelor's degree, the wage premium for those aged 75 or more is 11 percent less than for similar men in the 50-55 years age range. The decline in the wage premium between these age ranges for women with a Bachelor's degree is 13 percent. The gender difference in the decline in wage premia between workers in the 50-55 years age range and those aged 75 or more is larger among individuals with a postgraduate degree at 11 percentage points (21 percent for women compared with 10 percent for men). Women with advanced degrees lose more earnings with age than men do (relative to high school completion or less). Women's lesser earnings premia at older ages may reflect employment preferences, such as shifting to work that is lower paying but more rewarding (community service, the arts), a shift those with more education, especially those who are married, may be better able to afford due to higher family income. They may also reflect less voluntary choices such as seeking less demanding work to allow for taking care of an ill spouse or greater gender discrimination at older ages or age discrimination that affects women more than men.

Women with advanced degrees lose more earnings with age than men do.

Table 5. Percentage Change in Relative Wage Premia for Educational Attainment Relative to High School Diploma/GED or Less Between Ages 50-55 Years and 75 or more Years for Men and Women

	Percent Change: 50-55 years to 75 or more years	
	Men	Women
High School or Less	0	0
Some College or Associate's	-6	-5
Bachelor's	-11	-13
Postgraduate	-10	-21

Source: IWPR analysis of 2005-2009 American Community Survey (Ruggles, et al. 2010).

Surprisingly, this analysis finds that women and men with high school or less lose much less in hourly earnings as they age from 50 to 75 and older than do the more educated groups of workers (Figure 4), perhaps because their wages, not being very high, have less to fall. All the more educated groups of workers, who earn considerably more than the least educated group in this analysis, all lose hourly earnings as they age (Figures 4 and 5 and Tables 4 and 5). Losses with age for women and men are comparable in percentage terms (relative to those with the least education) with the exception of women with postgraduate degrees: their hourly earnings fall substantially more than men's. Without additional analysis beyond the scope of this study, it is difficult to attribute this loss in hourly earnings for postgraduate women as they age to preferences, constraints (such as the need to provide caregiving for an older husband), or factors such as discrimination.

How Much is an Education Worth for Women and Men Looking Forward from Age 65?

Table 6 shows the estimated total earnings (in 2009 dollars) that men and women might earn across 31 years, from age 65 years to 95 years, in four education categories, based on a simulation using 2005-2009 American Community Survey data for different years to predict future earnings, and taking into account age-specific survival (see Technical Appendix for additional details).

Men are estimated to earn two or three times more than women after age 65 within each educational level.

The results of the simulation estimate that men earn two or three times more than women after age 65 within each educational level. The largest gender gap is among women and men with postgraduate degrees where men earn $252,400 and women earn $74,886 or 30 percent as much (using a discount rate = 0.98). The smallest gender difference is among women ($41,438) and men ($85,374) with some college or an Associate's degree; women in this category earn 49 percent of what men earn.

Table 6. Estimated Total Earnings Between Ages 65 and 95 by Education and Gender

	Men		**Women**		**Female-to-Male Ratio**	
	Discount= 0.96	Discount= 0.98	Discount= 0.96	Discount= 0.98	Discount= 0.96	Discount= 0.98
High School or Less	$49, 748	$54, 338	$22, 845	$24, 842	.46	.46
Some College or Associate's	$78, 789	$85, 374	$38, 639	$41, 538	.49	.49
Bachelor's	$140, 830	$152, 833	$46, 474	$49, 786	.33	.33
Postgraduate	$233, 664	$252, 400	$70, 168	$74, 886	.30	.30

Source: IWPR analysis of 2005-2009 American Community Survey (Ruggles, et al. 2010).

For both women and men, the returns to education are substantial.

Table 7 shows that the returns to education persist in the simulated earnings of workers after the traditional retirement age (65 years). For both women and men, the returns to education are substantial. Women with a Bachelor's degree are projected to earn twice as much as women with a high school diploma or less education. Men with a Bachelor's degree do even better earning 2.8 times their age peers in the lowest education category. Women with a postgraduate degree are predicted to earn three times women in the lowest education category, while men with postgraduate degrees are estimated to earn 4.7 times as much compared with men in the lowest education category.

Comparing Table 7 with Table 4, the returns to education are much greater in terms of total earnings after age 65 than the premia on hourly wages for both men and women. The differences reflect the greater

employment rates of more educated people later in the life course (Figures 2 and 3) as well as greater survivorship among those with more education. The total earnings premia women receive from Bachelor's and postgraduate degrees relative to the total earnings for women with a high school diploma or less are also smaller compared with those of men (301 percent for women compared with 465 percent for men, as shown in Table 7 for those with postgraduate degrees). This large gender gap, especially at the highest education level, raises the question of whether marital status may be associated with the gap.

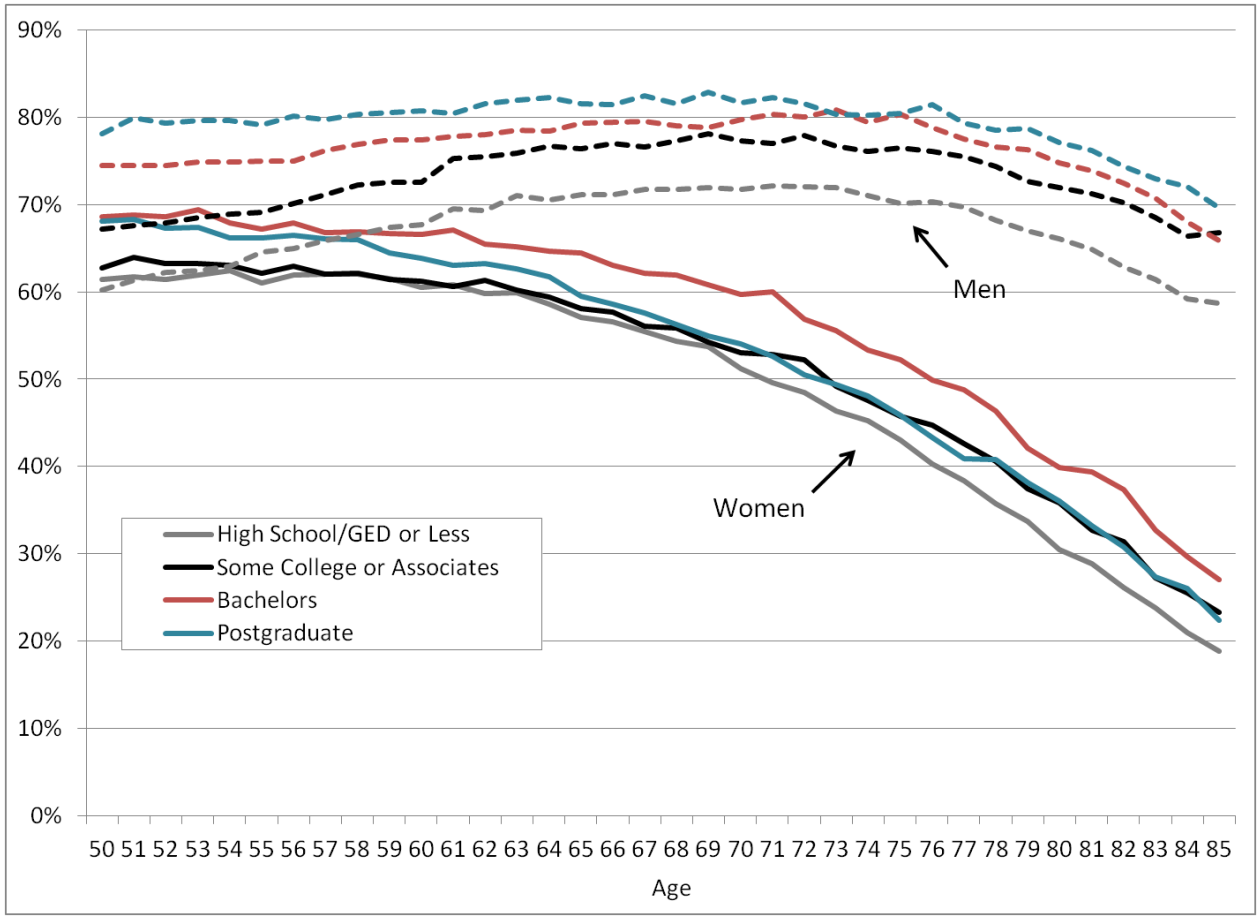
Table 7. Relative Returns to Education for Total Earnings Between Ages 65 and 95 by Education and Gender

	Men		Women	
	Discount = 0.96	Discount = 0.98	Discount = 0.96	Discount = 0.98
High School or Less	100%	100%	100%	100%
Some College or Associate's	158%	157%	169%	167%
Bachelor's	283%	281%	203%	200%
Postgraduate	470%	465%	307%	301%

Source: IWPR analysis of 2005-2009 American Community Survey (Ruggles, et al. 2010).

Figure 6 shows that a declining proportion of women are married at each year of age after the early fifties. Women with a Bachelor's degree are the most likely to be married and women without any postsecondary schooling are least likely to be married at older ages. Women with some college or an Associate's degree or a postgraduate degree converge in between those with more and less education. Beyond the early fifties, men at every age are more likely to be married than women with comparable levels of education, and, for men, the share married peaks in the early seventies for all education levels. For men, the rank order of share married at each age varies more at each educational level than it does for women, with men with postgraduate degrees most likely to be married and men with a high school diploma or less least likely to be married. Women aged 65 and older are more likely than men to live in poverty, and women living without a spouse have higher poverty than women living with a spouse (Fischer and Hayes 2013).

Figure 6. Marital Status of Women and Men by Age and Education



Source: IWPR analysis of 2005-2009 American Community Survey (Ruggles, et al. 2010).

Among both married and unmarried individuals, the gender gap in total earnings after age 65 is larger among the more educated than among those in the lower education categories.

Tables 8 and 9 repeat the simulation of total earnings for workers between ages 65 and 95 separately by current marital status measured at the time of the ACS survey. In these results married men earn more than unmarried men, but unmarried women earn more than married women. This marital status effect results in a much larger gender gap between married men and women than between those who are unmarried. For example, in Table 8, for individuals with a Bachelor's degree, married women ($36,933) are predicted to earn 23 percent of what married men ($162,602) earn after age 65 compared with unmarried women ($73,377) earning 64 percent as much as unmarried men ($115,349). Among both married and unmarried individuals, the gender gap in total earnings after age 65 is larger among the more educated than among those in the lower education categories. These differences suggest that married women may decrease their

hours of work or earnings in response to high family income, preferences for alternative types of paid work, need or desire to spend time on household/family activities (such as caring for other family members), or differential health conditions.

Table 8. Estimated Total Earnings Between Ages 65 and 95 by Marital Status, Education, and Gender

	Men		Women		Female-to-Male Ratio	
	Discount = 0.96	Discount = 0.98	Discount = 0.96	Discount = 0.98	Discount =0.96	Discount =0.98
Married						
High School or Less	$56,047	$61,044	$17,554	$18,799	.31	.31
Some College or Associate's	$85,358	$92,239	$29,350	$31,184	.34	.34
Bachelor's	$150,078	$162,602	$34,791	$36,933	.23	.23
Postgraduate	$245,830	$265,058	$58,134	$61,489	.24	.23
Unmarried						
High School or Less	$34,309	$37,901	$29,897	$32,894	.87	.87
Some College or Associate's	$57,794	$63,426	$51,538	$55,915	.89	.88
Bachelor's	$105,326	$115,349	$67,927	$73,377	.64	.64
Postgraduate	$179,968	$196,540	$87,861	$94,595	.49	.48

Source: IWPR analysis of 2005–2009 American Community Survey (Ruggles, et al. 2010).

When calculated separately by marital status, men's earnings premia for higher education are larger than women's among both married and unmarried individuals, relative to those in the lowest educational category (high school diploma or less). Within gender, unmarried individuals receive higher returns to education than married individuals (Table 9). There is one exception—among women with postgraduate degrees, married women do better than unmarried women relative to those in the lowest educational category.

Table 9. Relative Returns to Education for Total Earnings Between Ages 65 and 95 by Marital Status, Education, and Gender

	Men		Women	
	Discount = 0.96	Discount = 0.98	Discount = 0.96	Discount = 0.98
Married				
High School or Less	100%	100%	100%	100%
Some College or Associate's	152%	151%	167%	166%
Bachelor's	268%	266%	198%	196%
Postgraduate	439%	434%	331%	327%
Unmarried				
High School or Less	100%	100%	100%	100%
Some College or Associate's	168%	167%	172%	170%
Bachelor's	307%	304%	227%	223%
Postgraduate	525%	519%	294%	288%

Source: IWPR analysis of 2005-2009 American Community Survey (Ruggles, et al. 2010).

Which Occupations are done by Older Women and Men and How are they Linked to Education?

Table 10 shows the ten most common occupations for women and men aged 50 and older along with selected characteristics. They are sorted in descending order by the number of older women or men working in them. There are two measures of the wage level for each: the average (mean) hourly wage and the percentage with wages below $15 per hour. The age composition is shown by the percentage aged 65 and older. The most striking feature of the two lists shown in Table 10 is that the ten largest occupations for women and men among workers aged 50 and older have only one occupation in common, retail salesperson. All the other occupations differ, reflecting the overall labor market tendency for women and men to work in different occupations, often those in which most of the incumbents are of the same gender. Generally, women tend to be more segregated in the labor market than men are, and this age group follows that general pattern. Thirty-four percent of women aged 50 and older who are working are in the ten most common occupations for women. For men, 24 percent of those aged 50 and older are working in the ten most common occupations for men.

Table 10. Ten Largest Occupations for Women and Men Aged 50 and Older

WOMEN: Occupational Title	Number of Women	Average Wage	% with Hourly Wage < $15	% Age 65 and older
Secretaries and Administrative Assistants	1,481,495	$18.45	43.8%	14.3%
Elementary and Middle School Teachers	1,016,524	$29.08	18.6%	9.2%
Registered Nurses	919,015	$32.58	8.5%	9.4%
Nursing, Psychiatric, & Home Health Aides	508,003	$14.45	70.3%	14.3%
Retail Salespersons	503,947	$17.30	62.2%	23.2%
Bookkeeping, Accounting, and Auditing Clerks	499,868	$19.11	43.7%	16.5%
Cashiers	442,436	$12.86	79.2%	22.1%
First-Line Supervisors/Managers of Office and Administrative Support Workers	368,181	$25.45	25.0%	8.7%
Receptionists And Information Clerks	348,506	$14.67	67.6%	23.3%
Customer Service Representatives	338,437	$18.52	48.8%	11.7%
Total of 10 Largest Occupations for Women Aged 50 and Older	6,426,412			
Percent of Women Aged 50 and Older in the Workforce in 10 Largest Occupations for Women	34%			
Percent of Older Women in Low-Wage Occupations (Highlighted) among 10 Largest Occupations	28%			
MEN: Occupational Title	**Number of Men**	**Average Wage**	**% with Hourly Wage < $15**	**% Age 65 and Older**
Driver/Sales Workers And Truck Drivers	979,764	$18.00	49.1%	16.8%
Janitors And Building Cleaners	667,199	$14.44	67.8%	19.4%
Miscellaneous Managers, Including Postmasters And Mail Superintendents	588,978	$41.63	11.1%	9.1%
Retail Salespersons	415,076	$17.30	62.2%	23.2%
Laborers And Freight, Stock, And Material Movers, Hand	362,279	$16.48	59.0%	13.3%
Sales Representatives, Wholesale And Manufacturing	334,096	$32.60	20.2%	12.3%
First-Line Supervisors/Managers Of Retail Sales Workers	323,009	$21.70	43.8%	8.6%
Chief Executives And Legislators	307,095	$65.34	7.6%	15.6%
Postsecondary Teachers	306,750	$37.84	12.0%	21.2%
Security Guards And Gaming Surveillance Officers	293,910	$16.51	62.4%	28.0%
Total of Ten Largest Occupations for Men Aged 50 and Older	4,578,156			
Percent of Men Aged 50 and Older in the Workforce in Ten Largest Occupations for Men	24%			
Percent of Older Men in Low-Wage Occupations (Highlighted) among the Ten Largest Occupations	38%			

Note: Shaded occupations are those in which more than half the workers earn less than $15.00 per hour, called "low wage."
Source: IWPR analysis of 2005-2009 American Community Survey.

For women, the average hourly wage in these common occupations ranges from $12.86 (cashiers) to $32.58 (registered nurses). The range is much broader for men: from $14.44 (janitors and building cleaners) to $65.34 (chief executives and legislators). The top ten occupations for both women and men each include four occupations where more than half of the workers earn less than $15 per hour (these are highlighted as low-wage occupations). These low-wage occupations also have large proportions of older women and men, those aged 65 and older, working in them. Among women aged 50 and older working in the ten most common occupations, 28 percent are in the four low-wage occupations. Among men aged 50 and older working in the ten most common occupations, 38 percent are in the four low-wage occupations. The findings suggest that many of those working at age 65 and older work out of necessity and likely have low levels of educational attainment.

Tables 11 and 12 disaggregate data on the most common occupations by age (above age 50) as well as gender and indicate the percent working part-time and the percent with a Bachelor's degree or more, as well as the average hourly wage.

As shown in Table 11, among older women the most common occupations are frequently those in traditionally female dominated fields such as nursing, teaching, and skilled administrative roles. In addition, typically female-dominated, lower wage occupations also appear on the list, for example, 'maids and housekeeping cleaners' and 'nursing, psychiatric, and home health aides.' Among the youngest age groups, aged 50-64, there are some supervisory occupations in the ten most common, but not for the age groups older than age 65.

In terms of education levels, two differences appear across age groups for women. First, even in occupations that appear among the ten most common across the age groups, fewer women in the older groups have Bachelor's or higher degrees compared with women in the younger age groups. For example, 21 percent of women in retail sales aged 50-55 years have a Bachelor's degree or higher compared with 12 percent of women aged 75 or older. Second, the composition of occupations in the top ten changes across the age groups, with fewer occupations with more educated workers and higher wages among the older age groups and more occupations with less educated workers and lower wages. For example, more than 90 percent of elementary and middle school teachers hold a Bachelor's degree or more. While elementary and middle school teachers are ranked second or third largest among women's occupations for workers under age 65, however, this occupation drops in rank to seventh in size among workers aged 65-69 and does not appear among the top ten occupations for women aged 70 and older. The occupations that appear in the ten most common among older age groups for women include cashiers, child care workers, and personal and home care aides in which fewer than ten percent of workers have a Bachelor's degree or more and in which the average wage is quite low.

Despite the higher propensity of those with higher education to work at older ages, it appears that women who work in the most common occupations for their age group, especially at the oldest ages, are those with lower education.

The composition of occupations across women's age groups also shifts, not surprisingly, towards fewer full-time workers in older groups compared with younger groups. For example, while 17 percent of secretaries and administrative assistants aged 50-55 years work part-time, 62 percent in this occupation work part-time in the group aged 75 and older. The occupations that are more common among the older workers compared with the younger workers, such as cashiers and child care workers, are more likely to be part-time than the most common occupations among younger workers. Seeing lower shares of full-time and highly educated (Bachelor's degree or higher) workers in the older age groups compared with the younger age groups, it is not then very surprising that the hourly wages earned by older women are lower than those of younger women. The increase of the low-education, low-wage jobs with age suggests that, for women, remaining in the labor force is much more a matter of economic necessity than of enrichment. The wages of some of these occupations are close to the federal minimum (e.g., retail sales and cashiers) and such low wages are likely to make it difficult for older women in these occupations to support themselves or their families.[2]

The increase of the low-education, low-wage jobs with age suggests that, for women, remaining in the labor force is much more a matter of economic necessity than of enrichment.

[2] In July 2007, the federal minimum wage was raised from $5.15 to $5.85. It was raised to $6.55 in July 2008 and $7.25 in July 2009.

Table 11. Most Common Occupations for Women by Age, Part-Time Status, College Degree, and Wage

50-55 years	Number	Part-time	Bachelor's or higher	Average Wage
Secretaries And Administrative Assistants	600,764	17%	14%	$17.41
Registered Nurses	445,962	22%	55%	$29.05
Elementary And Middle School Teachers	428,849	11%	94%	$22.48
Bookkeeping, Accounting, And Auditing Clerks	217,424	20%	12%	$16.87
Nursing, Psychiatric, And Home Health Aides	216,759	24%	8%	$12.26
First-Line Supervisors/Managers Of Office And Administrative Support Workers	181,246	9%	23%	$15.26
First-Line Supervisors/Managers Of Retail Sales Workers	175,855	12%	19%	$7.88
Miscellaneous Managers, Including Postmasters And Mail Superintendents	173,398	8%	48%	$11.92
Retail Salespersons	171,070	39%	21%	$7.77
Maids And Housekeeping Cleaners	169,661	39%	4%	$9.20
56-61 years	**Number**	**Part-time**	**Bachelor's or higher**	**Average Wage**
Secretaries And Administrative Assistants	492,757	20%	14%	$17.86
Elementary And Middle School Teachers	324,434	16%	95%	$22.95
Registered Nurses	283,059	25%	53%	$29.86
Bookkeeping, Accounting, And Auditing Clerks	173,660	25%	11%	$16.67
Nursing, Psychiatric, And Home Health Aides	151,697	27%	7%	$12.06
Retail Salespersons	148,484	44%	21%	$7.42
Maids And Housekeeping Cleaners	123,330	40%	4%	$9.77
First-Line Supervisors/Managers Of Office And Administrative Support Workers	121,899	11%	24%	$14.83
Cashiers	118,222	44%	8%	$9.70
First-Line Supervisors/Managers Of Retail Sales Workers	112,818	14%	19%	$7.55
62-64 years	**Number**	**Part-time**	**Bachelor's or higher**	**Average Wage**
Secretaries And Administrative Assistants	148,523	28%	13%	$17.70
Registered Nurses	73,010	30%	52%	$30.78
Elementary And Middle School Teachers	64,597	25%	93%	$21.71
Retail Salespersons	56,129	54%	16%	$7.72
Bookkeeping, Accounting, And Auditing Clerks	53,910	36%	10%	$16.92
Nursing, Psychiatric, And Home Health Aides	44,751	36%	7%	$12.60
Cashiers	41,085	58%	7%	$9.70
Maids And Housekeeping Cleaners	39,236	49%	3%	$9.88
Receptionists And Information Clerks	34,275	44%	12%	$13.56

First-Line Supervisors/Managers Of Retail Sales Workers	29,502	20%	18%	$7.86
65-69 years	**Number**	**Part-time**	**Bachelor's or higher**	**Average Wage**
Secretaries And Administrative Assistants	112,406	42%	13%	$17.05
Retail Salespersons	56,311	67%	15%	$7.21
Registered Nurses	49,980	50%	51%	$31.33
Bookkeeping, Accounting, And Auditing Clerks	45,742	51%	9%	$16.29
Cashiers	43,756	66%	6%	$8.85
Nursing, Psychiatric, And Home Health Aides	39,715	49%	6%	$12.68
Elementary And Middle School Teachers	37,502	42%	91%	$19.89
Receptionists And Information Clerks	34,698	58%	10%	$13.23
Maids And Housekeeping Cleaners	34,257	60%	3%	$10.16
Child Care Workers	31,339	53%	8%	$10.28
70-74 years	**Number**	**Part-time**	**Bachelor's or higher**	**Average Wage**
Secretaries And Administrative Assistants	45,387	56%	13%	$16.09
Retail Salespersons	30,093	74%	13%	$6.75
Cashiers	21,084	73%	5%	$8.69
Bookkeeping, Accounting, And Auditing Clerks	20,897	64%	11%	$15.87
Receptionists And Information Clerks	16,562	71%	10%	$11.80
Registered Nurses	16,042	62%	47%	$30.10
Nursing, Psychiatric, And Home Health Aides	15,856	58%	5%	$12.04
Maids And Housekeeping Cleaners	15,606	69%	3%	$10.34
Child Care Workers	15,115	64%	8%	$10.12
Personal And Home Care Aides	15,000	68%	9%	$10.08
75+ years	**Number**	**Part-time**	**Bachelor's or higher**	**Average Wage**
Secretaries And Administrative Assistants	29,424	62%	12%	$15.37
Retail Salespersons	22,138	77%	12%	$7.45
Bookkeeping, Accounting, And Auditing Clerks	15,722	72%	12%	$13.60
Cashiers	14,549	74%	5%	$8.48
Receptionists And Information Clerks	13,157	75%	10%	$11.79
Child Care Workers	11,543	72%	5%	$12.03
Maids And Housekeeping Cleaners	10,694	78%	3%	$10.02
Personal And Home Care Aides	10,460	67%	7%	$9.86
Nursing, Psychiatric, And Home Health Aides	9,873	62%	7%	$11.22
Office Clerks, General	9,653	74%	10%	$11.56

Source: IWPR analysis of 2005-2009 American Community Survey (Ruggles, et al. 2010).

As Table 12 shows, the most common occupations for men do not reveal as much difference across age groups as observed among women. Also, the occupations that appear among the top ten most common

Overall, the men's occupations have higher wages on average and there are fewer low wage occupations.

among older male workers compared with younger male workers do not have lower shares of more highly educated workers as seen for women. The proportion of men working part-time in the most common occupations is higher in the older groups than in the younger groups, but the differences between age groups are slightly smaller than shown in the occupations most common for women. For men the wages received in the most common occupations across age groups do not decline for older workers compared with younger workers as much as women's wages vary across the age groups examined. Overall, the men's occupations have higher wages on average and there are fewer low wage occupations. Quite a few of the common occupations pursued by older men are very high wage occupations: 'chief executives and legislators,' $58.38-$48.00; 'lawyers, judges, and magistrates,' $61.03-$51.84; and 'physicians and surgeons,' $65.54. Men's most common occupations, more than women's, appear to reflect the preferences of many highly skilled workers to remain employed at older ages.

Table 12: Most Common Occupations for Men by Age, Part-Time Status, College Degree, and Wage

50-55 years	Number	Part-time	Bachelor's or higher	Average Wage
Driver/Sales Workers And Truck Drivers	446,239	6%	5%	$17.42
Miscellaneous Managers, Including Postmasters And Mail Superintendents	353,772	3%	54%	$29.31
Janitors And Building Cleaners	250,144	13%	6%	$10.93
First-Line Supervisors/Managers Of Retail Sales Workers	229,743	3%	29%	$13.68
Chief Executives And Legislators	175,922	3%	64%	$53.39
Carpenters	173,121	13%	9%	$20.60
Sales Representatives, Wholesale And Manufacturing	168,847	3%	44%	$27.24
Retail Salespersons	161,420	9%	29%	$10.72
First-Line Supervisors/Managers Of Construction Trades And Extraction Workers	160,454	5%	11%	$28.32
Laborers And Freight, Stock, And Material Movers, Hand	156,644	11%	6%	$13.75
56-61 years	**Number**	**Part-time**	**Bachelor's or higher**	**Average Wage**
Driver/Sales Workers And Truck Drivers	310,285	10%	7%	$17.69
Miscellaneous Managers, Including Postmasters And Mail Superintendents	246,381	6%	58%	$30.96
Janitors And Building Cleaners	199,625	17%	8%	$11.05
First-Line Supervisors/Managers Of Retail Sales Workers	156,003	6%	34%	$13.80

Retail Salespersons	145,577	16%	32%	$10.02
Chief Executives And Legislators	143,556	6%	69%	$56.08
Sales Representatives, Wholesale And Manufacturing	129,480	5%	47%	$27.96
Lawyers, And Judges, Magistrates, And Other Judicial Workers	106,083	7%	99%	$51.84
Laborers And Freight, Stock, And Material Movers, Hand	99,562	14%	7%	$13.57
First-Line Supervisors/Managers Of Non-Retail Sales Workers	97,896	6%	42%	$27.53
62-64 years	**Number**	**Part-time**	**Bachelor's or higher**	**Average Wage**
Driver/Sales Workers And Truck Drivers	92,744	20%	6%	$16.98
Miscellaneous Managers, Including Postmasters And Mail Superintendents	66,368	11%	55%	$32.79
Janitors And Building Cleaners	60,698	26%	8%	$10.45
Retail Salespersons	48,770	28%	30%	$8.67
Chief Executives And Legislators	48,381	10%	65%	$58.38
First-Line Supervisors/Managers Of Retail Sales Workers	43,498	12%	31%	$14.20
Sales Representatives, Wholesale And Manufacturing	39,670	12%	40%	$26.59
Postsecondary Teachers	37,827	26%	97%	$28.10
Lawyers, And Judges, Magistrates, And Other Judicial Workers	36,978	12%	99%	$60.72
Accountants And Auditors	30,622	18%	86%	$19.07
65-69 years	**Number**	**Part-time**	**Bachelor's or higher**	**Average Wage**
Driver/Sales Workers And Truck Drivers	86,020	38%	7%	$15.68
Janitors And Building Cleaners	63,306	46%	7%	$9.99
Retail Salespersons	50,811	42%	26%	$8.29
Miscellaneous Managers, Including Postmasters And Mail Superintendents	49,455	23%	49%	$31.18
Chief Executives And Legislators	43,628	20%	60%	$53.20
Postsecondary Teachers	37,956	33%	97%	$30.51
First-Line Supervisors/Managers Of Retail Sales Workers	37,629	23%	25%	$15.30
Security Guards And Gaming Surveillance Officers	37,510	41%	18%	$13.30
Lawyers, And Judges, Magistrates, And Other Judicial Workers	32,945	25%	98%	$61.03
Farmers And Ranchers	32,495	28%	20%	$18.65
70-74 years	**Number**	**Part-time**	**Bachelor's or higher**	**Average Wage**
Driver/Sales Workers And Truck Drivers	42,049	52%	8%	$14.15
Janitors And Building Cleaners	33,722	57%	7%	$9.73
Retail Salespersons	27,219	51%	24%	$8.20

Security Guards And Gaming Surveillance Officers	22,340	49%	13%	$11.61
Chief Executives And Legislators	20,335	29%	59%	$49.24
Miscellaneous Managers, Including Postmasters And Mail Superintendents	20,322	34%	48%	$31.33
Postsecondary Teachers	16,482	47%	96%	$31.67
Lawyers, And Judges, Magistrates, And Other Judicial Workers	16,058	37%	98%	$60.29
First-Line Supervisors/Managers Of Retail Sales Workers	15,867	31%	29%	$13.94
Clergy	15,234	46%	71%	$19.37
75+ years	**Number**	**Part-time**	**Bachelor's or higher**	**Average Wage**
Janitors And Building Cleaners	24,243	68%	7%	$9.22
Driver/Sales Workers And Truck Drivers	22,790	60%	5%	$13.20
Retail Salespersons	19,288	60%	24%	$7.38
Chief Executives And Legislators	16,676	45%	53%	$48.00
Security Guards And Gaming Surveillance Officers	16,022	53%	14%	$11.74
Miscellaneous Managers, Including Postmasters And Mail Superintendents	15,268	43%	48%	$30.53
Lawyers, And Judges, Magistrates, And Other Judicial Workers	14,823	48%	97%	$59.13
Clergy	13,185	57%	72%	$18.86
First-Line Supervisors/Managers Of Retail Sales Workers	12,224	34%	22%	$16.36
Physicians And Surgeons	11,025	52%	98%	$64.54

Source: IWPR analysis of 2005-2009 American Community Survey (Ruggles, et al. 2010).

Conclusion

Societal trends, such as increased educational attainment and improvements in health; policy changes, such as increases in the age at which unreduced Social Security benefits can be received; and recent economic changes in wealth and the value of assets in the recent recessions have changed the work behaviors and economic security of older Americans. This report has examined differences in work and wages among women and men aged 50 and older at different levels of educational attainment across the years 2005-2009.

Almost 41 million women and men aged 50 and older are employed, including 5.4 million aged 65 and older. A larger share of women and men with postsecondary education work at age 50 and older compared with similar women and men with a high school diploma or less. The relative gain in employment to additional schooling is greater at older ages and increases with higher education levels.

While men earn more per hour than women at every age and educational level, the wages of both women and men rise with educational level within each age group. Both the average hourly wage and the relative wage premium for postsecondary education are lower among older workers, however, compared with younger workers. The decline in hourly wages across age groups is greater for men than for women, but for both women and men the difference between younger and older workers is larger at the higher educational levels. The wage premia for the three levels of postsecondary schooling included in this study are also lower among older groups compared with younger groups. The largest wage premium is for women with postgraduate degrees where the educational wage premium relative to women with a high school diploma or less is 74 percent among those aged 50-55 years compared with 38 percent among women aged 75 and older. The decline in the educational wage premium is only about half as large for men with postgraduate degrees (74 percent among men aged 50-55 and 56 percent among men aged 75 and older).

Potential total earnings for workers between ages 65 and 95 were estimated for women and men at each educational level. The gender gap in estimated total earnings is substantially larger for those with a Bachelor's or higher degree (female-to-male total earnings ratios between 0.30 and 0.33) than among those with less education (female-to-male total earnings ratios between 0.46 and 0.49). The large gender gap at high education levels led to an examination of marital status as a potential explanatory variable. This examination shows that the gender gap in total earnings is much larger for married women compared with married men than for unmarried women compared with unmarried men. Estimated earnings are higher at each education level for unmarried women compared with married women while they are lower for unmarried men compared with married men. This suggests that for married women, high family income may enable them to work less, or at lower earning pursuits, or that household and family care activities, such as taking care of an older spouse, claim their time. Moreover, if older women face lower hourly earnings in the field they have trained for than men do at all ages, then those low wages also provide less incentive for highly-educated women to remain in the labor market as they age.

The largest occupations for older women and men reveal considerable gender differences. Not only is there little overlap in the largest occupations for men and women aged 50 and older (only retail salespersons appear in the women's and men's lists of their ten largest occupations), but the occupations in which older men work tend to pay more. Many of the highest paying occupations for men remain in the list for the oldest men in the study, those 75 years old and older, whereas for older women, all their high wage occupations no longer appear in the most common occupations by age 70. Older men appear to pursue the high wage occupations for which they have trained, whereas older women do not. Among older women, most of those still working at older ages are those with less education who earn low

wages. Many low-wage men also work into the oldest age studied; for the group aged 75 and older, there are four low-wage occupations for men(with an average hourly wage of less than $15.00 per hour). For women aged 75 and older, only one occupation pays more than $15.00 per hour, secretaries and receptionists.

In conclusion, higher education pays off for both older women and men for all ages 50 and older, including for the oldest group studied, those 75 and older. Those with higher levels of education than high school or less work more as they age and earn more per hour as they age, relative to those with less education. Their estimated total earnings relative to those with high school or less at ages 65 and older looking forward to the end of their work lives are 3.0 times more for women with postgraduate education and 4.7 times more for men with postgraduate education.

But the gender differences that characterize younger workers' outcomes also characterize older workers' outcomes. Men earn more than women at every educational level at every age group, and their total estimated earnings at ages 65 and older range from 2.2 times to 3.4 times that of women, depending on educational level. The most common occupations for older women and men reveal a great deal of sex segregation in the labor market, since for workers 50 and older only one occupation is found in the top ten for both women and men, that of retail salesperson. At older ages (75 years and older) men's top occupations include both those that are highly paid, such as physicians and surgeons ($64.54 per hour), and those that are low-paid, such as janitors. For women in that age range, only relatively low-wage occupations remain, with secretaries being the highest paid at $15.37 per hour.

Moreover, both genders experience declining wage premia for their higher education as they age. Whether because of gender- or age-based discrimination, preferences of older workers to work and earn less by choosing different jobs, for example, or constraints that aging workers face because of their own or a family member's illness, these declines mean that older workers do not gain as much from higher education as they might. Policymakers interested in assuring fair and robust returns to older workers in the labor market and in encouraging older workers to work more need to be aware of the disadvantages that are revealed in this study and consider policy options for improving the labor market for older workers, including for highly educated older workers.

Technical Appendix

The 2005-2009 American Community Survey (ACS) data (U.S. Census Bureau 2010) provides information on age, educational attainment, employment status, and sex. Educational attainment is described by four categories: individuals with a high school diploma or less, some college or an Associate's degree, a Bachelor's degree, or an advanced degree (post-baccalaureate).

As shown in Appendix Table 1, there are a sufficient number of observations on older employees, by levels of educational attainment and gender, to make fairly detailed analyses possible. Even the smallest subsample – employed women with postgraduate degrees at 65 years or older – includes more than 15,000 observations.

Appendix Table 1. Number of Observations on Older Men and Women by Educational Attainment, Employees Only, in the Five-Year ACS Sample

	50-64 years		65 years or more	
Educational Attainment	Men	Women	Men	Women
HS or less	360,584	337,923	78,259	70,705
Some college/Associate's	296,995	312,868	43,370	40,882
Bachelor's	206,644	171,803	31,160	17,260
Postgraduate degrees	164,836	136,118	35,713	15,354

Source: IWPR estimates from the 2005-2009 ACS, (U.S. Census Bureau 2010).

The survey also provides data on usual work hours, earnings, and occupation. Hourly wages are estimated by dividing earnings from wages, salaries, bonuses and tips on all jobs in the last 12 months by the product of annual weeks worked during that same time period and usual hours worked per week. The ACS collects weeks worked during the past 12 months in ranges. Data from the 2005-2009 Current Population Survey Annual Social and Economic Supplement were used to estimate the mean hours within the range and imputed to the ACS. The hourly wage estimate is statistically noisy and observations with extreme values (below $1 or $250 and over per hour) were dropped; this affected less than one percent of observations.[3]

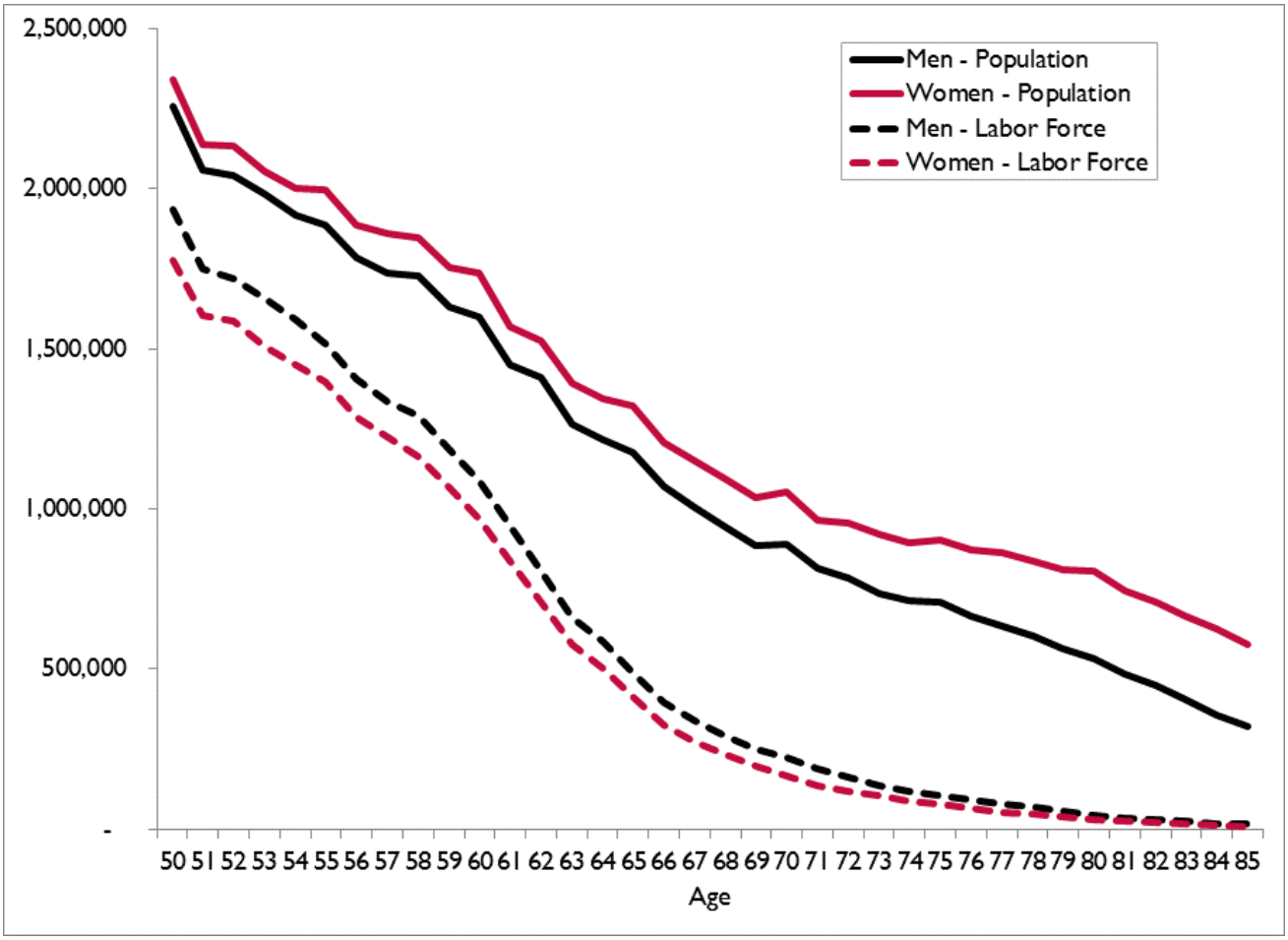
[3] The ACS is administered most days of the year, and asks about the previous 12 months, instead of the last calendar year. The predecessor PUMS data were part of the U.S. Census, and were administered around the time of

Because the data are cross-sectional, different individuals are interviewed each year. Therefore, comparisons across age groups in fact involve comparisons of different people. A more comprehensive analysis using longitudinal data (interviewing the same people at different points in time) would provide more accuracy as to whether the differences observed here across age actually occur for individuals over time and would allow for greater confidence in direction of causation.

Relatedly, mortality needs to be accounted for in the analysis. Appendix Figure 1 (below) provides population estimates for the number of women and men between the ages of 50 and 80. The results are consistent with women having greater longevity than men in the United States (Murphy et al. 2012). At age 50, the ratio of the number of women to men in the population is 1.04. By age 80, this rati o has increased to 1.5 and at age 85 it is 1.8. The numbers of both men and women decline throughout this age range, but more sharply for those in their mid-60s and then more slowly again after age 69. Fewer women than men aged 50 and older are in the labor force.

IRS tax filing, and asked about the previous calendar year. That approach likely generated fewer errors. See Posey, Welniak, and Nelson (2003).

Appendix Figure 1. Estimated Size of Population and Labor Force by Gender and Age

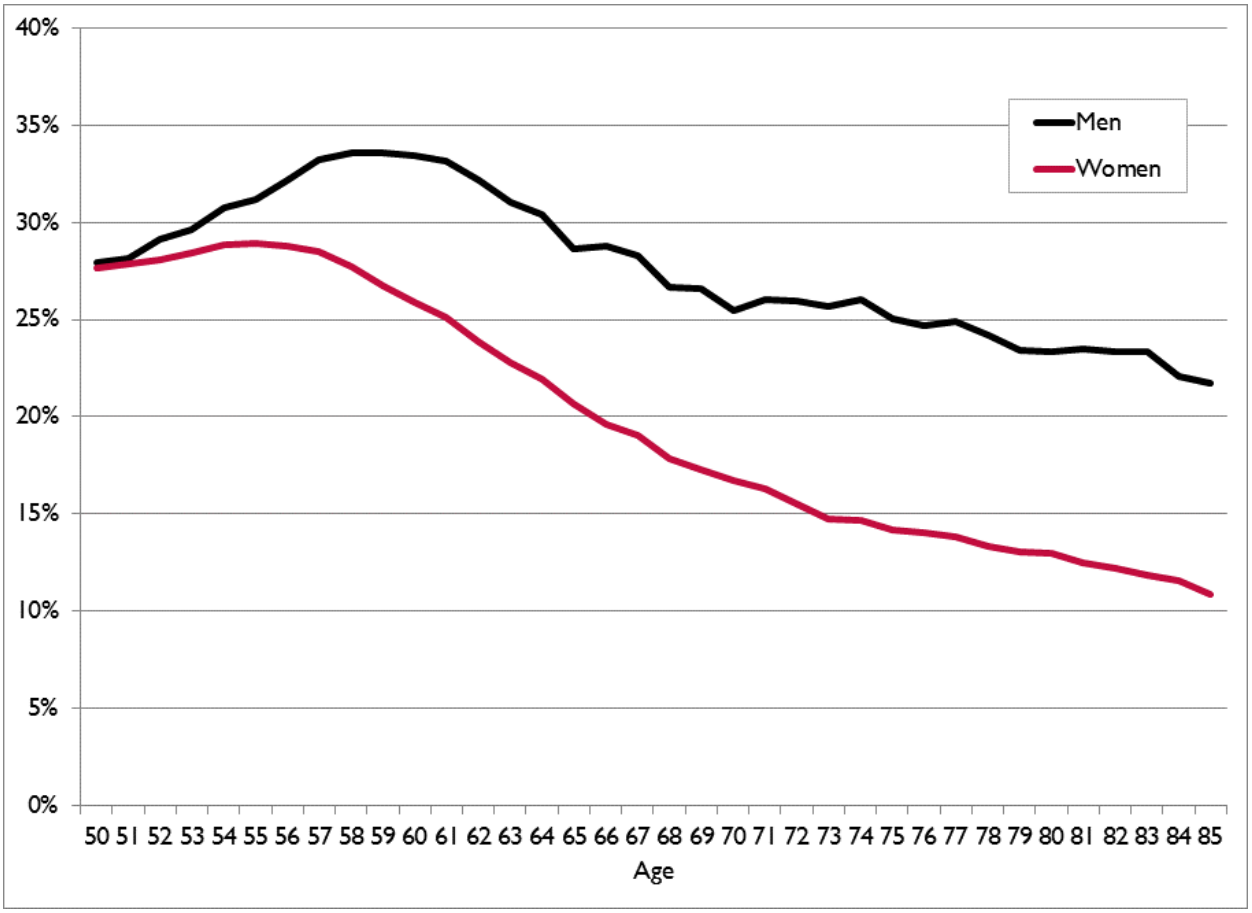


Source: IWPR analysis of 2005-2009 American Community Survey (Ruggles, et al. 2010).

Further, education may be related to longevity, whether due to highly educated individuals having better health or greater access to health care while young, or healthier individuals selecting into higher education and less dangerous occupations, or individuals with higher levels of education ending up with more assets to devote to health in retirement. For a rough gauge of this phenomenon, Appendix Figure 2 shows the proportions of men and women with at least a Bachelor's degree across the 50 to 80 year age range. Among the individuals in the sample, 28 percent of both women and men in their early 50s have a bachelor's degree or higher. The largest proportion with higher levels of educational attainment for men is 34 percent at age 58 while for women it is 29 percent at age 55. Note that in a longitudinal panel, these measured effects would be even larger if education levels were rising when these individuals were of a traditional age for college attendance. Calling that age 20 years, individuals between 50 and 80 years of age

in the 2005–2009 ACS sample were 20 years old between 1955 and 1979, a period when enrollment in colleges and universities rose from 2.7 million to 11.6 million (National Center for Education Statistics 2010b). Women's expanded enrollment accounted for much of this increase, given they represented 34.7 percent of enrollees in 1955, but 50.9 percent in 1979 (National Center for Education Statistics 2010b). This differential increase in college attendance and completion in the second half of the twentieth century can be seen in the greater educational gender gap for women and men in their 70s and 80s compared with younger individuals. At age 50 the proportions of men and women with a Bachelor's degree or higher are the same, 28 percent. Among individuals age 60 one in three men and one in four women have at least a Bachelor's degree. The gender difference is wider— ten percentage points—among women (13 percent) and men (23 percent) at age 80.

Appendix Figure 2. Percent of Women and Men With a Bachelor's Degree or Higher by Age



Source: IWPR analysis of 2005-2009 American Community Survey (Ruggles, et al. 2010).

To answer research question 2, how does the earnings premium for higher levels of education change with age, requires estimating a standard log-wage equation for hourly earnings. Using the subsample of employed individuals aged 50 and older (excluding the self-employed),[4] independent variables include an age quadratic, dummy variables for three of the four educational attainment categories (excluding high school graduation and below), and a dummy variable for women, with a complete set of interactions between the six variables used to gauge differences in the education premium across older and younger men and women in the subsample. We also test for any potential wage discontinuity around and just past the age of 65, and use age range dummies instead of the age quadratic when appropriate. Additional controls available in the ACS include marital status, race/ethnicity, English as second language, public sector employment, part-time employment (less than 35 hours), part-year employment (less than 27 weeks), 12 industry dummy variables (for 13 civilian industries), and 21 occupational dummy variables (for 22 civilian occupations). The regression results are used to estimate simulated hourly wages and hourly wage premia for educational attainment as men and women age. The model and results for hourly wages are shown in Appendix Table 2 and Appendix Table 3.

Appendix Table 2. Regression Model of Hourly Wages

ln(Wages)	Coef.	Std. Err.	z	P>|z|
Gender*Education*Age (Men, HS or Less, 50-55 years omitted)				
Men, HS or Less, 56-61 years	-0.0007	0.0016	-0.46	0.642
Men, HS or Less, 62-64 years	-0.0084	0.0027	-3.10	0.002
Men, HS or Less, 65-69 years	-0.0474	0.0026	-18.49	0.000
Men, HS or Less, 70-74 years	-0.0850	0.0041	-20.86	0.000
Men, HS or Less, 75+ years	-0.0860	0.0049	-17.44	0.000
Men, Some College or Associates, 50-55 years	0.0850	0.0015	56.89	0.000
Men, Some College or Associates, 56-61 years	0.0737	0.0019	39.28	0.000
Men, Some College or Associates, 62-64 years	0.0659	0.0033	20.19	0.000
Men, Some College or Associates, 65-69 years	0.0142	0.0037	3.88	0.000
Men, Some College or Associates, 70-74 years	-0.0341	0.0058	-5.83	0.000
Men, Some College or Associates, 75+ years	-0.0475	0.0070	-6.76	0.000
Men, Bachelors, 50-55 years	0.2468	0.0020	124.89	0.000
Men, Bachelors, 56-61 years	0.2166	0.0021	100.94	0.000
Men, Bachelors, 62-64 years	0.2005	0.0043	46.95	0.000
Men, Bachelors, 65-69 years	0.1459	0.0050	29.14	0.000
Men, Bachelors, 70-74 years	0.0941	0.0078	11.98	0.000

[4] For a more comprehensive analysis, a sample selection model would be estimated, with selection into employment prior to estimation of wages. The exclusion of the self-employed is not carried through to the earnings analysis below. It is excluded here because models of wage determination typically do not cover the self-employed. See, e.g., Blau and Kahn (2006).

ln(Wages)	Coef.	Std. Err.	z	P>|z|
Men, Bachelors, 75+ years	0.0713	0.0097	7.33	0.000
Men, Postgraduate, 50-55 years	0.3992	0.0025	158.13	0.000
Men, Postgraduate, 56-61 years	0.3812	0.0025	151.13	0.000
Men, Postgraduate, 62-64 years	0.3676	0.0038	97.38	0.000
Men, Postgraduate, 65-69 years	0.3253	0.0051	63.97	0.000
Men, Postgraduate, 70-74 years	0.2630	0.0060	44.18	0.000
Men, Postgraduate, 75+ years	0.2162	0.0114	19.03	0.000
Women, HS or Less, 50-55 years	-0.1444	0.0016	-90.64	0.000
Women, HS or Less, 56-61 years	-0.1375	0.0016	-87.99	0.000
Women, HS or Less, 62-64 years	-0.1338	0.0025	-54.11	0.000
Women, HS or Less, 65-69 years	-0.1401	0.0019	-72.62	0.000
Women, HS or Less, 70-74 years	-0.1516	0.0033	-45.48	0.000
Women, HS or Less, 75+ years	-0.1532	0.0040	-38.19	0.000
Women, Some College or Associates, 50-55 years	-0.0773	0.0016	-49.11	0.000
Women, Some College or Associates, 56-61 years	-0.0735	0.0016	-46.41	0.000
Women, Some College or Associates, 62-64 years	-0.0729	0.0028	-26.16	0.000
Women, Some College or Associates, 65-69 years	-0.0925	0.0030	-30.66	0.000
Women, Some College or Associates, 70-74 years	-0.1224	0.0050	-24.58	0.000
Women, Some College or Associates, 75+ years	-0.1201	0.0066	-18.29	0.000
Women, Bachelors, 50-55 years	0.0600	0.0020	29.88	0.000
Women, Bachelors, 56-61 years	0.0538	0.0024	22.33	0.000
Women, Bachelors, 62-64 years	0.0395	0.0037	10.78	0.000
Women, Bachelors, 65-69 years	-0.0016	0.0044	-0.36	0.722
Women, Bachelors, 70-74 years	-0.0310	0.0075	-4.15	0.000
Women, Bachelors, 75+ years	-0.0438	0.0092	-4.76	0.000
Women, Postgraduate, 50-55 years	0.2281	0.0030	77.10	0.000
Women, Postgraduate, 56-61 years	0.2240	0.0025	89.28	0.000
Women, Postgraduate, 62-64 years	0.1981	0.0047	42.28	0.000
Women, Postgraduate, 65-69 years	0.1478	0.0060	24.58	0.000
Women, Postgraduate, 70-74 years	0.1002	0.0100	10.00	0.000
Women, Postgraduate, 75+ years	0.0549	0.0139	3.96	0.000
Currently Married	0.0418	0.0006	67.63	0.000
Race & Ethnicitiy (White, not Hispanic omitted)				
Black, not Hispanic	-0.0430	0.0012	-36.37	0.000
Asian, Not Hispanic	-0.0148	0.0016	-9.17	0.000
Hispanic	-0.0446	0.0013	-35.43	0.000
Other/Mixed, not Hispanic	-0.0538	0.0018	-29.13	0.000
Part-time Worker	-0.0893	0.0010	-87.49	0.000
Part-year Worker	0.0868	0.0016	54.41	0.000
Non-Citizen	-0.0613	0.0019	-32.90	0.000
Speaks English Well	0.0871	0.0022	39.25	0.000
Occupation (Management omitted)				

ln(Wages)	Coef.	Std. Err.	z	P>|z|
Business and financial operations	-0.1146	0.0018	-62.44	0.000
Computer and mathematical science	-0.0051	0.0024	-2.17	0.030
Architecture and engineering	-0.0569	0.0023	-24.58	0.000
Life, physical, and social science	-0.0956	0.0034	-28.31	0.000
Community and social service	-0.3314	0.0023	-144.28	0.000
Legal	0.0490	0.0039	12.41	0.000
Education, training, and library	-0.2275	0.0018	-129.19	0.000
Arts, design, entertainment, sports, and media	-0.1623	0.0040	-40.94	0.000
Healthcare practitioner and technical	0.0366	0.0018	20.64	0.000
Healthcare support	-0.3239	0.0021	-155.95	0.000
Protective service	-0.3267	0.0026	-124.36	0.000
Food preparation and serving related	-0.3911	0.0023	-172.33	0.000
Building and grounds cleaning and maintenance	-0.4160	0.0022	-188.41	0.000
Personal care and service	-0.3922	0.0025	-158.73	0.000
Sales and related	-0.2352	0.0018	-131.00	0.000
Office and administrative support	-0.2928	0.0015	-199.99	0.000
Farming, fishing, and forestry	-0.3957	0.0046	-85.41	0.000
Construction and extraction	-0.2723	0.0022	-121.38	0.000
Installation, maintenance, and repair	-0.2396	0.0018	-131.45	0.000
Production	-0.3476	0.0019	-185.98	0.000
Transportation and material moving	-0.3910	0.0018	-221.25	0.000
Industry (Agriculture, forestry, fishing, and hunting omitted)				
Mining	0.2650	0.0056	47.27	0.000
Construction	0.1554	0.0046	33.99	0.000
Manufacturing	0.1865	0.0043	43.11	0.000
Wholesale and retail trade	0.0363	0.0043	8.42	0.000
Transportation and utilities	0.2124	0.0044	47.87	0.000
Information	0.1787	0.0045	39.85	0.000
Financial activities	0.1900	0.0043	44.46	0.000
Professional and business services	0.1430	0.0043	33.50	0.000
Educational and health services	0.0860	0.0042	20.50	0.000
Leisure and hospitality	0.0143	0.0045	3.14	0.002
Other services	0.0383	0.0046	8.24	0.000
Public administration	0.1521	0.0045	33.47	0.000
Public Sector	0.0253	0.0011	23.12	0.000
Intercept	3.4020	0.0054	630.01	0.000

Source: IWPR analysis of 2005-2009 American Community Survey (Ruggles, et al. 2010).

Appendix Table 3. OLS Predicted Values of Wage Levels for Women and Men by Education and Age

	High School or Less		Some College or Associate's		Bachelor's		Postgraduate	
	Men	Women	Men	Women	Men	Women	Men	Women
50-55 years	$19.44	$15.48	$22.05	$17.25	$27.68	$21.26	$33.89	$26.99
56-61 years	$19.42	$15.66	$21.69	$17.36	$26.56	$21.07	$33.10	$26.83
62-64 years	$19.20	$15.75	$21.44	$17.37	$25.98	$20.63	$32.52	$25.89
65-69 years	$18.08	$15.59	$19.86	$16.84	$24.06	$19.39	$30.76	$24.13
70-74 years	$17.04	$15.30	$18.45	$16.05	$22.34	$18.54	$28.30	$22.54
75 or more years	$17.02	$15.26	$18.07	$16.11	$21.61	$18.18	$26.55	$21.10

Source: IWPR analysis of 2005-2009 American Community Survey (Ruggles, et al. 2010).

Wage equations are susceptible to sample selection bias: only individuals who choose employment receive wages, and many of the factors affecting wages also affect the employment decision (Heckman 1979). This problem is potentially acute in this sample, given a majority of respondents will not be employed at older ages. A sample selection model is shown in Appendix Table 4. The model is identified by including the percentage of workers in the respondent's state who work jobs with physical demands in the selection equation for work status and occupation, industry, part-time status, part-year work status, and a public sector indicator in the wage equation.

A separate issue concerns the potential endogeneity of educational attainment, or the possibility that individuals choose education levels in part due to expectations regarding superior employment opportunities and higher wages following from higher levels of educational attainment (e.g., see Burger 2011). For younger individuals, wage and employment estimates that do not account for the endogeneity of schooling decisions would likely bias the coefficients. However, for an older sample, as is used here, it is plausible to believe that educational attainment can safely be treated as exogeneous. For example, recent survey results regarding retirement planning found only around one-third of respondents ages 18 to 44 years had engaged in *any* form of retirement planning (Hess, Hayes, and Hartmann 2011, Figure 5.2), and that is the age range when educational attainment decisions were traditionally made.

The results of the sample selection analysis (Appendix Table 4) show that there is a small, negative correlation between the residuals for the equation predicting being in the workforce and the equation predicting hourly wage (rho = -0.11). In other words, one or more unobserved factors influence both work status and wages and the negative correlation indicates that the unobserved factors are simultaneously associated with a higher probability of working and a lower average wage. One possible example of what such a factor might be is wealth where those with careers that afforded them earnings

sufficient for accumulating retirement savings can afford to retire, while lower earners are faced with the need to remain in the workforce. The predicted values from the uncorrected ordinary least squares (OLS) model and the corrected Heckman sample selection model are correlated very highly (0.99).

Appendix Table 4. Sample Selection Model

ln(Wages)	Coefficient	S.E.	z	P>|z|
Gender*Education*Age (Men, HS or Less, 50-55 years omitted)				
Men, HS or Less, 56-61 years	0.0047	0.0015	3.07	0.002
Men, HS or Less, 62-64 years	0.0060	0.0023	2.57	0.010
Men, HS or Less, 65-69 years	-0.0226	0.0026	-8.74	0.000
Men, HS or Less, 70-74 years	-0.0469	0.0035	-13.45	0.000
Men, HS or Less, 75+ years	-0.0227	0.0043	-5.33	0.000
Men, Some College or Associates, 50-55 years	0.0808	0.0015	54.48	0.000
Men, Some College or Associates, 56-61 years	0.0757	0.0016	46.74	0.000
Men, Some College or Associates, 62-64 years	0.0766	0.0027	28.29	0.000
Men, Some College or Associates, 65-69 years	0.0413	0.0031	13.53	0.000
Men, Some College or Associates, 70-74 years	0.0052	0.0045	1.17	0.241
Men, Some College or Associates, 75+ years	0.0114	0.0056	2.03	0.042
Men, Bachelors, 50-55 years	0.2454	0.0018	139.13	0.000
Men, Bachelors, 56-61 years	0.2201	0.0019	116.90	0.000
Men, Bachelors, 62-64 years	0.2115	0.0032	66.04	0.000
Men, Bachelors, 65-69 years	0.1682	0.0037	45.79	0.000
Men, Bachelors, 70-74 years	0.1254	0.0054	23.34	0.000
Men, Bachelors, 75+ years	0.1334	0.0065	20.57	0.000
Men, Postgraduate, 50-55 years	0.4008	0.0020	196.32	0.000
Men, Postgraduate, 56-61 years	0.3832	0.0021	184.55	0.000
Men, Postgraduate, 62-64 years	0.3738	0.0032	117.12	0.000
Men, Postgraduate, 65-69 years	0.3465	0.0035	99.99	0.000
Men, Postgraduate, 70-74 years	0.2986	0.0051	58.57	0.000
Men, Postgraduate, 75+ years	0.2620	0.0063	41.87	0.000
Women, HS or Less, 50-55 years	-0.1502	0.0015	-102.07	0.000
Women, HS or Less, 56-61 years	-0.1383	0.0016	-86.15	0.000
Women, HS or Less, 62-64 years	-0.1232	0.0024	-52.30	0.000
Women, HS or Less, 65-69 years	-0.1154	0.0027	-43.46	0.000
Women, HS or Less, 70-74 years	-0.1123	0.0036	-31.05	0.000
Women, HS or Less, 75+ years	-0.0836	0.0045	-18.72	0.000
Women, Some College or Associates, 50-55 years	-0.0885	0.0015	-58.31	0.000
Women, Some College or Associates, 56-61 years	-0.0786	0.0017	-47.50	0.000
Women, Some College or Associates, 62-64 years	-0.0674	0.0026	-25.98	0.000
Women, Some College or Associates, 65-69 years	-0.0748	0.0029	-25.52	0.000
Women, Some College or Associates, 70-74 years	-0.0873	0.0044	-19.70	0.000
Women, Some College or Associates, 75+ years	-0.0624	0.0056	-11.23	0.000
Women, Bachelors, 50-55 years	0.0515	0.0018	28.73	0.000
Women, Bachelors, 56-61 years	0.0529	0.0020	26.14	0.000
Women, Bachelors, 62-64 years	0.0489	0.0035	13.81	0.000

Women, Bachelors, 65-69 years	0.0205	0.0041	4.97	0.000
Women, Bachelors, 70-74 years	0.0133	0.0066	2.01	0.045
Women, Bachelors, 75+ years	0.0175	0.0083	2.11	0.035
Women, Postgraduate, 50-55 years	0.2216	0.0021	107.80	0.000
Women, Postgraduate, 56-61 years	0.2213	0.0022	101.79	0.000
Women, Postgraduate, 62-64 years	0.2085	0.0037	56.47	0.000
Women, Postgraduate, 65-69 years	0.1676	0.0043	38.86	0.000
Women, Postgraduate, 70-74 years	0.1295	0.0070	18.50	0.000
Women, Postgraduate, 75+ years	0.1096	0.0091	11.98	0.000
Currently Married	0.0354	0.0006	57.46	0.000
Race & Ethnicitiy (White, not Hispanic omitted)				
Black, not Hispanic	-0.0380	0.0010	-37.57	0.000
Asian, Not Hispanic	-0.0018	0.0015	-1.19	0.233
Hispanic	-0.0362	0.0012	-29.76	0.000
Other/Mixed, not Hispanic	-0.0466	0.0023	-20.63	0.000
Part-time Worker	-0.0886	0.0008	-117.74	0.000
Part-year Worker	0.0945	0.0009	101.29	0.000
Non-Citizen	-0.0545	0.0017	-31.33	0.000
Speaks English Well	0.0858	0.0020	43.94	0.000
Occupation (Management omitted)				
Business and financial operations	-0.1149	0.0016	-73.20	0.000
Computer and mathematical science	-0.0049	0.0022	-2.20	0.028
Architecture and engineering	-0.0578	0.0021	-27.26	0.000
Life, physical, and social science	-0.0978	0.0030	-32.12	0.000
Community and social service	-0.3350	0.0021	-159.21	0.000
Legal	0.0481	0.0030	16.16	0.000
Education, training, and library	-0.2303	0.0015	-156.26	0.000
Arts, design, entertainment, sports, and media	-0.1660	0.0026	-63.94	0.000
Healthcare practitioner and technical	0.0350	0.0016	22.31	0.000
Healthcare support	-0.3277	0.0023	-144.99	0.000
Protective service	-0.3269	0.0022	-151.90	0.000
Food preparation and serving related	-0.3899	0.0021	-190.06	0.000
Building and grounds cleaning and maintenance	-0.4151	0.0017	-242.17	0.000
Personal care and service	-0.3909	0.0020	-190.76	0.000
Sales and related	-0.2335	0.0014	-168.46	0.000
Office and administrative support	-0.2913	0.0011	-253.68	0.000
Farming, fishing, and forestry	-0.3921	0.0046	-85.11	0.000
Construction and extraction	-0.2718	0.0020	-133.71	0.000
Installation, maintenance, and repair	-0.2413	0.0018	-133.00	0.000
Production	-0.3449	0.0015	-228.40	0.000
Transportation and material moving	-0.3906	0.0015	-261.97	0.000
Industry (Agriculture, forestry, fishing, and hunting omitted)				

Mining	0.2660	0.0052	50.71	0.000
Construction	0.1631	0.0041	40.25	0.000
Manufacturing	0.1933	0.0038	50.56	0.000
Wholesale and retail trade	0.0393	0.0038	10.28	0.000
Transportation and utilities	0.2222	0.0039	57.02	0.000
Information	0.1811	0.0042	43.50	0.000
Financial activities	0.1991	0.0039	51.12	0.000
Professional and business services	0.1527	0.0039	39.53	0.000
Educational and health services	0.0931	0.0038	24.36	0.000
Leisure and hospitality	0.0162	0.0040	4.05	0.000
Other services	0.0431	0.0040	10.84	0.000
Public administration	0.1559	0.0040	39.34	0.000
Public Sector	0.0206	0.0009	22.37	0.000
Intercept	3.4270	0.0045	755.42	0.000
Wage & Salary Work	**Coefficient**	**S.E.**	**z**	**P>|z|**
Gender*Education*Age (Men, HS or Less, 50-55 years omitted)				
Men, HS or Less, 56-61 years	-0.2578	0.0037	-69.16	0.000
Men, HS or Less, 62-64 years	-0.6679	0.0048	-139.83	0.000
Men, HS or Less, 65-69 years	-1.0871	0.0043	-250.93	0.000
Men, HS or Less, 70-74 years	-1.4517	0.0050	-292.41	0.000
Men, HS or Less, 75+ years	-1.9955	0.0048	-417.76	0.000
Men, Some College or Associates, 50-55 years	0.1815	0.0040	45.41	0.000
Men, Some College or Associates, 56-61 years	-0.1083	0.0041	-26.62	0.000
Men, Some College or Associates, 62-64 years	-0.5207	0.0058	-89.76	0.000
Men, Some College or Associates, 65-69 years	-0.9395	0.0055	-171.22	0.000
Men, Some College or Associates, 70-74 years	-1.3203	0.0068	-193.37	0.000
Men, Some College or Associates, 75+ years	-1.8289	0.0070	-261.27	0.000
Men, Bachelors, 50-55 years	0.2881	0.0048	60.06	0.000
Men, Bachelors, 56-61 years	-0.0290	0.0047	-6.14	0.000
Men, Bachelors, 62-64 years	-0.4317	0.0070	-61.29	0.000
Men, Bachelors, 65-69 years	-0.8822	0.0067	-130.83	0.000
Men, Bachelors, 70-74 years	-1.2900	0.0084	-153.90	0.000
Men, Bachelors, 75+ years	-1.8103	0.0082	-220.25	0.000
Men, Postgraduate, 50-55 years	0.2679	0.0055	48.53	0.000
Men, Postgraduate, 56-61 years	0.0177	0.0052	3.41	0.001
Men, Postgraduate, 62-64 years	-0.3409	0.0072	-47.28	0.000
Men, Postgraduate, 65-69 years	-0.7308	0.0067	-108.80	0.000
Men, Postgraduate, 70-74 years	-1.1552	0.0084	-137.82	0.000
Men, Postgraduate, 75+ years	-1.6742	0.0084	-200.22	0.000
Women, HS or Less, 50-55 years	-0.1396	0.0035	-39.75	0.000
Women, HS or Less, 56-61 years	-0.4079	0.0035	-115.83	0.000
Women, HS or Less, 62-64 years	-0.7877	0.0044	-177.56	0.000
Women, HS or Less, 65-69 years	-1.2213	0.0041	-299.52	0.000
Women, HS or Less, 70-74 years	-1.6396	0.0047	-351.67	0.000

Women, HS or Less, 75+ years	-2.2539	0.0044	-506.87	0.000
Women, Some College or Associates, 50-55 years	0.1672	0.0038	44.06	0.000
Women, Some College or Associates, 56-61 years	-0.1205	0.0039	-30.85	0.000
Women, Some College or Associates, 62-64 years	-0.5374	0.0054	-99.58	0.000
Women, Some College or Associates, 65-69 years	-0.9602	0.0051	-187.76	0.000
Women, Some College or Associates, 70-74 years	-1.4141	0.0065	-218.85	0.000
Women, Some College or Associates, 75+ years	-1.9980	0.0064	-311.57	0.000
Women, Bachelors, 50-55 years	0.2463	0.0047	52.66	0.000
Women, Bachelors, 56-61 years	-0.0638	0.0049	-13.02	0.000
Women, Bachelors, 62-64 years	-0.5277	0.0074	-71.08	0.000
Women, Bachelors, 65-69 years	-0.9828	0.0072	-135.78	0.000
Women, Bachelors, 70-74 years	-1.4676	0.0096	-152.28	0.000
Women, Bachelors, 75+ years	-2.0645	0.0095	-216.34	0.000
Women, Postgraduate, 50-55 years	0.4167	0.0057	73.49	0.000
Women, Postgraduate, 56-61 years	0.0979	0.0055	17.92	0.000
Women, Postgraduate, 62-64 years	-0.3680	0.0082	-44.83	0.000
Women, Postgraduate, 65-69 years	-0.8135	0.0081	-100.83	0.000
Women, Postgraduate, 70-74 years	-1.2789	0.0110	-116.44	0.000
Women, Postgraduate, 75+ years	-1.8879	0.0114	-166.14	0.000
Currently Married	0.0161	0.0014	11.72	0.000
Race & Ethnicitiy (White, not Hispanic omitted)				
Black, not Hispanic	0.0022	0.0023	0.94	0.347
Asian, Not Hispanic	0.0162	0.0036	4.50	0.000
Hispanic	0.0710	0.0028	25.39	0.000
Other/Mixed, not Hispanic	-0.1039	0.0050	-20.67	0.000
Non-Citizen	-0.0163	0.0039	-4.16	0.000
Speaks English Well	0.2080	0.0041	50.93	0.000
Percent of Workers in Physically Demanding Jobs	-0.0145	0.0002	-58.94	0.000
Constant	0.8311	0.0115	72.16	0.000
/athrho	-0.1140	0.0041	-27.68	0.000
/lnsigma	-0.9084	0.0006	-1642.62	0.000
rho	-0.1135	0.0041		
sigma	0.4032	0.0002		
lambda	-0.0457	0.0017		

Source: IWPR analysis of 2005-2009 American Community Survey (Ruggles, et al. 2010).

To answer research question 3, a simulation is performed using the cross-sectional ACS data to calculate total earnings between ages 65 and 95 for an individual if he or she experienced the age-specific survival, employment, and earnings levels reported by ACS respondents between 2005 and 2009. In the absence of

longitudinal data, it is assumed that the probability of survival is proxied by the age-specific population divided by the population at age 65.[5] The probability of employment at any age is proxied by the proportion of employees (Emp_{age}) divided by the population (Pop_{age}) of that same age. Mean[6] annual earnings ($Earn_{age}$) for each age (conditional on positive earnings) are multiplied by the probability of employment and an appropriately weighted discount rate (*discount*), then summed. Setting the variable *age* equal to zero for age 65, and estimating up to the age of 95, yields a present expected earnings value of:

$$PDV \text{ earnings 65 and beyond} = \sum_{age=0}^{30}(discount)^{age}(Pop_{age}/Pop_0)(Empage/Pop_{age})Earn_{age} \quad (1)$$

There is no obvious single value for the *discount* variable, so a range from .96 to .98 is used for the estimates (i.e., a 4 percent or 2 percent internal rate of interest).[7]

[5] The survival probability will be estimated separately for men and women but for combined educational groups. Otherwise, women's increasing levels of educational attainment over the last half-century would bias the survival probability downward for highly educated women.

[6] This analysis is akin to the synthetic work-life earnings estimates of Julian and Kominski (2011), but diverges in some important ways. The present analysis uses mean rather than median earnings, explicitly accounts for expected future employment and mortality due to the focus on older individuals, and discounts future earnings back to the present.

[7] Estimates of the *Earn* value will be noisy for older individuals, but will also carry little weight in the estimates because discounting increases, the population decreases, and employment declines with age.

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