Convergences in Men's and Women's Life Patterns:

Lifetime Work, Lifetime Earnings, and Human Capital Investment

Joyce Jacobsen, Melanie Khamis, and Mutlu Yuksel·

2nd Version –Do not cite without permission: March 2014

Abstract

The changes in women's and men's work lives have been considerable in recent decades. Yet much of the recent research on gender differences in employment and earnings has been of a more snapshot nature rather than taking a longer comparative look at evolving patterns. In this paper, we use 50 years (1964-2013) of US Census Annual Demographic Files (March Current Population Survey) to track the changing returns to human capital (measured as both educational attainment and potential work experience), estimating comparable earnings equations by gender at each point in time. We also consider the effects of sample selection over time for both women and men and show the rising effect of selection for women over this period. Returns to education appear to diverge for women and men over this period in the selection-adjusted results but converge in the OLS results, while returns to potential experience converge in both sets of results. We also create annual calculations of expected lifetime labor atttachment and earnings that indicate convergence by gender in work life patterns, but less convergence in recent years in lifetime earnings.

I. Introduction

The changes in women's and men's work lives since the mid-twentieth century have been considerable. The best known of such changes include women's rising labor force participation,

· Jacobsen: Wesleyan University, contact author email: jjacobsen@wesleyan.edu; Khamis: Wesleyan University and IZA email: mkhamis@wesleyan.edu; Yuksel: Dalhousie University and IZA email: mutlu@dal.ca

with some leveling off in more recent years; the narrowing of the gender wage gap, again with periods of leveling; and men's falling labor force participation, exacerbated in part by the most recent economic downturn. These changes are true for most societies, although our specific statements in this paper will refer for the most part to the US experience.

These changes have also made it harder for researchers to generalize about the experience of the typical woman or man. Workforce experiences, measured in terms of labor force attachment, hours worked, and returns per hour, have increasingly diverged for those with higher levels of human capital and lower levels of human capital. In addition, the current focus of much labor economics research on economic inequality within gender and within the labor force as a whole has reinforced this movement away from generalization regarding economy-wide patterns.

In addition, much of the most recent research on gender differences in employment and earnings has been of a more snapshot nature rather than taking a longer comparative look at evolving patterns. In contrast, in this paper we use 50 years (1964-2013) of US Census Annual Demographic Files (March Current Population Survey) to track the changing levels of and returns to human capital (both education and potential work experience) by gender through estimation of comparable earnings equations at each point in time. We are also able to track changes in self-selection into the labor market for both women and men and the effects of selection on earnings. While our paper confirms many of the trends that papers examining subsets of the data also find, it also attempts to refocus on the general trends by gender rather than on divergence within gender. This has the effect in part of refocusing attention on the fact that women's and men's labor market experiences, while more similar now than in the past, are also still quite different in terms of both year-to-year and total lifetime outcomes.

This time-series comparative methodology also allows us to see the very clear effects of both the longer upward trend in US workforce participation and returns to participation for women (and the slight downward trend for men in participation) along with the recent changes in the labor market driven by the long recession. These effects include a narrowing of the gender differentials in expected lifetime labor force attachment, lifetime hours worked, and lifetime

earnings. These lifetime calculations provide another way of considering the full effect on women and men of the labor market changes over their work lifetime rather than focusing on yearly variations in earnings and participation.

The paper is structured as follows: Section II contains discussion of previous related work. This is followed by a discussion of how we set up our analytical structure to be consistent across this fifty-year time span (Section III). Section IV provides our graphical results and discussion of those results. Section V concludes and indicates directions for follow-up work.

II. Literature Review

Recent research on male and female labor force participation, hours worked and returns to human capital investment finds some clear trends over time (Goldin 2014). Labor force participation rates of men and women have converged over time and there has been narrowing of the gender earnings gap. This convergence of labor force participation, earnings and the educational attainment of men and women over time can probably be explained by a combination of structural changes in the economy, technology advances in workplace and in home production, child care provision and policies addressing discrimination, divorce, marriage and labor markets (Fernández 2013). Fernández (2013) argues that social transformation and a revolution in social attitudes towards married women in the labor market can also explain increases in the labor force participation of women.

However, in explaining the gender gap in earnings social changes in and of themselves may not be sufficient. Investment in human capital and time allocation towards the labor market, thus increasing the total work experience of women, are important determinants to understand female earnings (Mincer and Polachek 1974). Without this human capital investment, social change would likely not have led to substantial measured effects on gender differences. Looking at the evolution of the gender earnings gap and human capital investments over the time period 1970 to 2010, Goldin (2014) indeed finds that underlying differences in human capital between men and women have decreased and thereby the portion of the gender earnings gap attributed due to these differences has been reduced.

These trends of convergence in wages for men and women have been documented and explained for particular recent time periods . For example, O'Neill and Polachek (1993) document earnings from 1890 to 1990 and find that since 1976 the gender earnings gap declined until 1990 by about 1 percent a year. They attribute much of this convergence in acquired characteristics such as education and work, experience, while additional factors accounting for part of the narrowing include the returns to experience for women and declines in wages in blue-collar work, which is clearly a more male-dominated sector.

However, for the 1990s, a slowing convergence in the gender pay gap cannot be explained by changes in human capital as continued improvements for women were made over 1980s and 1990s (Blau and Kahn 2006). Underlying mechanisms that might explain the slowdown could be changes in the selection into the labor force and changes in unobservable gender characteristics (Blau and Kahn 2006). For the period 1979 to 2001 O'Neill (2003) finds a narrowing of the returns to potential experience for men and women, which is consistent with the earlier studies (Blau and Kahn 2006; O'Neill and Polachek 1993).

Overall, a convergence of earnings for men and women has been documented for the period from the 70s to the early late 90s (Blau and Kahn 2000). At the same time rising inequality and increases in the returns to skill might account for a potential opposing trend of widening the gap in turn. Author, Katz and Kearney (2008) analyze U.S. wage inequality over the 1980s and 1990s and attribute this to skill-biased technological change. The effect on the gender earnings gap is not entirely clear: one hand Blau and Kahn (2000) argue that the trend in wage inequality is similar for men and women over this period and on the other hand Bacolod and Blum (2010) find that a narrowing gender gap and increases in wage inequality are consistent with differential returns to skills, which favor women.

In explaining potential candidates for the residual gender wage gap, while observable attributes such as educational attainment cannot account for this, Goldin (2014) argues that increases in the earnings gap by age, and the increases in the earnings gaps and hours worked within and across occupations and sectors can explain large parts of the remaining earnings gap. Occupational characteristics as an explanation of the gender wage gap were already found to be an important determinant for the period up to 2001 (O' Neill 2003).

To understand gender convergence patterns over time, a number of factors, including the selection into the labor force, earnings, composition effects of the labor force, returns to education and experience, and hours worked need to be analyzed in further detail. The paper most closely related to our current research is by Mulligan and Rubenstein (2008), who investigate selection into the labor force and wages for women over time. In particular, they find that over time women's selection into labor force participation changed from negative

selection in the 1970s to positive selection in the 1990s. This indicates that the selection rule was changing over time for women and a different composition of women was selecting into the labor force. This can explain the narrowing of the gender wage gap at the same time that there are increases in within-gender wage gaps.

Building on the previous research in the area, we are able to extend the analysis over time, looking at returns to education and experience and expected lifetime labor force attachment, lifetime earnings and lifetime hours worked. We also account for self-selection into the labor force for men and women over the entire period. Thus we extend earlier basic research into the patterns of both returns to human capital investment and levels of human capital investment over this fifty-year time period to see whether our results, which utilize a consistent estimation methodology over the full time period, are both consistent with other researchers' results and internally consistent in terms of tracking both investments in human capital and returns to human capital from year to year.

III. Data and Regression Specification

For this paper we employ 50 years (1964-2013) of the US Census Annual Demographic Files (March Current Population Survey). The data for our projected were downloaded from the Integrated Public Use Microdata Series (IPUMS) CPS webpage at the University of Minnesota (http://cps.imps.org/cps/).

We restrict our sample to individuals aged 25 to 65 and obtain individual characteristics such as gender, age, race, marital status, years of education, educational attainment, urban-rural location and regions. These variables are all measured as consistently as possible over the full sample period, although changes in CPS sampling procedure and definitions can show up as jumps in the data.

All regressions are run separately by gender. From the data we create a dummy variable for race which covers whites, black and other races The marital status is variable that takes the value 1 for married with spouse present or absent and 0 for any other status.

To account for geographic effects of rural-urban location we include a dummy for not in the metro area, central city and outside the central city. For location within the United States we use the regional codes from the CPS for the Northeast, Midwest, South and West region.

For educational attainment we create three categories: high school attendance without high school diploma, high school diploma and some college attendance but no degree and bachelor degree and above.

For years of education we code 0 to 22 years of education from the CPS, which we employ to obtain potential experience. Potential experience for males and females is calculated by subtracting years of education minus 6 from individual age. In our OLS regressions and the two-step selection-corrected Heckman model we include experience as a quartic function, following Lemieux (2006).

For our main left-hand side variables in the wage regressions we use the log hourly wages in real terms and log annual earnings in real terms. To obtain this we use the wage and salary

income variable from the CPS that records individuals' total pre-tax wage and salary income from the previous calendar year. We then convert this wage variable to real terms, with the base year 2013. We obtain log annual earnings taking the logarithm from this. For the hourly numbers we divide the wage variable by the annual hours worked before converting it into the logarithm of wages.[1]

Annual hours worked are calculated from weeks worked last year multiplied by usual hours worked per week in the last year after 1976. Before 1976 annual hours worked are calculated from hours worked last week multiplied weeks worked in the last year, available in intervals.

To analyze convergence and divergence of earnings over time, we estimate wage regressions and calculate expected lifetime numbers from the CPS.

(1)$w_{it} = \alpha_{it} + \beta_{it} X_{it} + \varepsilon_{it}$

We estimate the wage equation (1) separately for each individual i by gender and year t. X is a vector that includes educational attainment dummies, potential work experience as a quartic, race dummies, a rural-urban dummy and regional dummies. The base categories for our regressions are high school dropout, race other than white or black, rural and the West region.

We estimate (1) as an OLS regression, without selection-correction and then also estimate a two-step Heckman selection model (Heckman 1979). We mainly discuss the Heckman results in the following sections, but ran OLS for comparison.

In the first stage we estimate the participation equation (2) that includes an exclusion restriction. As a determinant for selection into labor force participation, the vector Z includes marital status in addition to the variables included in X. Contrary to Mulligan and Rubinstein (2008), who assume no selection bias on the part of men, we include the marital status, hence being married, into the selection equation for both men and women. Mulligan and Rubinstein (2008) also interact the marital status with the number of children aged 0-6. However, the

[1] We code the observations that have less than 1 and greater than 1000 US$ hourly wages as missing.

number of own children under age 5 in the household is only available from 1968 onwards, thereby this would limit our sample by a few years.

For this reason we only use marital status in our selection equation as exclusion restriction in the results we present here. However, we have also estimated the Heckman selection models with marital status interacted with the number of children and found similar results over the period (1968 onwards) where both variables are available.[2]

(2) $P_{it}(LFP = 1|Z = 1) = \Phi(Z\delta)$

From (2) we compute the inverse Mills ratio $\widehat{\lambda_{it}} = \lambda(Z_{it}\hat{\delta}_{it})$ for each individual i.

Then we estimate the wage regression with the selection correction term included:

(3) $w_{it} = \alpha_{it} + \beta_{it}X_{it} + \rho_{it}\widehat{\lambda_{it}} + \varepsilon_{it}$

The inverse Mills ratio obtained from a probit regression fitted for each individual then corrects our wage regressions for the selection into labor force participation. It measures the degree of selection bias of individuals in our sample.

In addition to degree of selection over time and earnings over time based on the Heckman regression models, we measure individual life choices based on their expectations of lifetime years of work, hours and earnings by gender. We calculate the expectations:

(4) $E(LTY) = \sum_{i=1}^{40} p_k(w)$

where E(LTY) is the expected lifetime years in work, k is age and p(w) is the probability of working for that age group in a particular census year for each gender separately.

Adding to (4), we can calculate the expected lifetime hours worked in (5) and the expected lifetime earnings in (6).

(5) $E(LTHW) = \sum_{i=1}^{40} p_k(w)\left(\overline{hw}\right)(W)$

[2] Results are available upon request from the authors.

where E(LTHW) is the expected lifetime hours worked, $\overline{hw}$ is the average hours worked of individuals with age i and W the number of weeks worked.

(6) $E(LTE) = \sum_{i=1}^{40} p_k(w)(\overline{ae})$

where E(LTE) is the expected lifetime earnings, $\overline{ae}$ is the average annual earnings of individuals with age i.

For our sample of 25 to 65 years of age, we obtain 40 age groups and the estimations of expected lifetime work, hours worked and earnings are based on gender and age in a particular year of the CPS. The estimates are obtained for each CPS year separately.

IV. Results

1. Descriptive Graphs

Looking at general trends over the 50-year period under consideration, we plot graphs for both men and women that display the developments in terms of average demographics, individual and labor market patterns over time.[3]

In Figure 1.1 average education in terms of years of education completed for both men and women exhibits an increasing trend over time, rising from a little above 10 years in 1964 to 14 years of education in 2013. While both men and women saw increases in the average years of schooling over the entire time, initially women had lower levels of years of education until about the late 1990s and early 2000s, changing after 2001. From that point onwards women have obtained on average more years of education than men.

In terms of average potential experience while both genders follow a U-shaped pattern, women had more average potential experience than men over the entire period (Figure 1.2). This is driven by the age component as potential experience is derived from age and years of education as outlined in the previous section. Figure 1.3 shows the average age by gender. Here, also the average age of women in each year is higher than the average age for men. Both

[3] Weighted by the person-level weights provided by the CPS data. Our regressions are not weighted.

lines are also U-Shaped with a sharp increase in the average for both gender from the mid-90s onwards, rising to the average age of women to 45 years and the average age of men to around 44 years of age in the sample in 2013.

Labor market outcomes, real hourly wages, real annual wages and annual hours worked, do not exhibit average female outcomes above men or any gender reversal as seen in education. Across these outcomes and over the entire time period men earn higher average real hourly wages (Figure 1.4), higher real annual wages (Figure 1.5) and accumulate higher average annual hours worked (Figure 1.6). For women over time increases in terms of real hourly wages and real annual wages are visible and show some narrowing of the gap, but still a persistent gap, to the male wage outcomes (Figure 1.4 and Figure 1.5). In terms of annual hours worked women saw increases in their hours worked, in particular from late 70s and early 80s onwards, converging towards the male average hours worked. However, still women work less hours than men in 2013 (Figure 1.6).

2. OLS and Heckman wage regression results

Looking at the selection effects over time, Figure 2.1 displays the degree of selection bias as percentage of log real hourly wages. The coefficient of the Mills ratio from the wage regression multiplied by the average sample Mills ratio is calculated, $\exp\left(\widehat{\rho_{it}} * \overline{\widehat{\lambda_{it}}}\right) - 1) * 100$. The Mills ratio coefficient is always significant at the 1 percent level, indicating that selection is an important factor in our data. For both genders, we plot this number over time: For men we find negative selection bias over the entire period and the effect remains relatively stable in the 15 to 25 percent. This indicates that males in the labor force are negatively selected and they will receive lower wages than a randomly selected sample. This could potentially be driven by men who work due to not continuing with higher education or men who do not stop working at later ages, potentially due to low retirement savings.

For women the trend is very different, but always above the male levels of negative selection in any given year. In the few early years in the 1960s, up to 1968, there is slightly positive selection for women, then negative selection until the late 1980s and then positive selection which is increasing over time. These trends for women are similar to the results found by

Mulligan and Rubinstein (2008), who use the selection correction with marital status interacted with children under the age of 6. We also find similar results when we mirror these results.[4] In our case, only using marital status as exclusion restriction, we are able to extend our analysis to the early 1960s and up to 2013. Contrary to Mulligan and Rubinstein (2008), we find a positive selection in the early years of 1960s, where they do not have the data, and a strong increase in positive selection after 1999, which is their cut-off in their analysis. For women in the beginning of the 1990s 5 to 10 percent of the wages can be accounted for due to positive selection. In the late 2000s, particular around the economic recession, 20 to 60 percent of wages can be accounted for due to positive selection. However, this peak declines about 40 percent in 2013.

Demographic changes and the composition of women selecting into the labor force could be partially account for these trends and changes in the selection.

A closer look at the underlying trends in the returns to experience and education for men and women over the entire time period might explain some of these patterns.

Figure 2.2 to Figure 2.6 show the returns to different years of experience, 5, 10, 15, 20 and 25 years respectively for both genders. These are based on the Heckman selection corrected wage regression with the dependent variable in log real hourly wages. The lines display the average marginal effect of the years of potential experience in percent of hourly wages.

Across all the years of experience it is possible to see that the male average marginal effects are usually above the female marginal effect, indicating higher returns for men than women.

However, for the different years of experience different degrees of convergence and even coincidence at the same level for both male and female returns are visible.

In Figure 2.2 for average marginal returns to 5 years of experience for males are above the ones for females and no convergence is apparent. Also the variances of the results for both men and women are large. Over time, already for Figure 2.3 that shows the returns to 10 years of experience, a large decrease in the variance occurs. This variance continues to decrease with higher levels of years of experience (Figure 2.4 for 15 years of experience, Figure 2.5 for 20 years of experience, Figure 2.6 for 25 years of experience). For 10 years of experience one can see already a narrowing of the returns for men and women over time, the lines converging

[4] Results are available upon request from the authors.

towards each other but with a gender gap remaining in the returns (Figure 2.3). Men in 2012 increased their wages by 0.8 percent of hourly wages if they increased their experience from 9 to 10 years while average marginal return for women was only 0.4 percent of hourly wages.

The average marginal returns to 15 years of experience show a convergence of male and female return at the end of the period and in the 2000s coinciding even. Men and women have almost the same returns of 0.5 percent of hourly wages from moving from 14 to 15 years of potential experience (Figure 2.4).

The returns for 20 years of experience are almost identical in terms of patterns to the 15 years of experience figure and show a convergence and coincidence at the end of the period. The marginal returns for men and women are 0.2 percent of hourly wages (Figure 2.5).

For 25 years of potential experience male and female returns are narrowing in the 2000s, but contrary to the 15 and 20 years of experience the marginal returns do not exhibit complete convergence for this particular group and a gender gap remains (Figure 2.6).

For the results for hourly wages, we also looked at the OLS without selection correction. The goodness of fit, R-squared, exhibits for both men and women an increasing trend. Over time the OLS model seems to explain more of the variation in the data, instead of less as one might initially expect (Figure A.1.1).

Comparing the above Heckman selection-corrected results for returns to experience with the OLS results (Appendix Figure A.1.2 to A.1.6), it is possible to see that the two patterns remain: male returns being higher than female returns in general and the decreasing variance.

The figures showing higher than 5 years of experience and up to 20 years of experience exhibit convergence in the marginal returns for men and women. Contrary to the Heckman selection corrected graphs, the OLS graphs of the returns do not converge to close the gender gap entirely for 15 and 20 years of potential experience. For the OLS graphs for 25 years of potential experience a closing of the gender gap towards the end of the entire period under consideration is displayed, which is opposed to the Heckman selection corrected graph for 25 years of experience.

While OLS and Heckman selection corrected graphs are still very similar in general trends for the various levels of experience, the returns to education results differ substantially.

Looking at Heckman results for the returns to education of high school completion and some college in Figure 2.7 for both genders, the female marginal effect of high school completion is above that of the male returns and increasing since the late 1980s. The male returns are almost flat at about 20 to 25 percent higher wages for moving from no high school diploma to high school completion. For women these returns have increased from 25 percent to 55 to 60 percent higher wages in 2012 and 2013.

For college graduate (Figure 2.8) women had always higher marginal effect of college than men and from the late 1980s the gender gap in favor of women widened. While in 1964 women were able to increase their wages by 60 to 70 percent with the additional educational attainment of a bachelor degree or above, women at the end of the period during the years 2010 to 2013 almost increased their hourly wages by 115 to 125 percent. For men college education compared to high school increased their wages by 30 percent in 1964 and by 75 percent in 2013.

The OLS graphs (Appendix A.1.7 and A.1.8) for the returns to high school and college do not exhibit the diverging pattern of men and women as the Heckman results. In fact it seems that the marginal effects for both seem to coincide and evolve pretty similar.

This in turn points to the fact that selection seems to be an important in the wage regression for log real hourly wages, changing the returns of education significantly when accounting for selection into the labor force.

Using the log real annual earnings as the dependent variable in our wage analysis, we find results that are different for the selection effects over time than when using log hourly wages (Figure 2.9). For women, in particular, negative selection bias is present over almost the entire time period until 2009, with decreases starting in the late 1980s. From 2009 onwards a sharp increase occurred and the selection bias turns negative, coinciding with the economic crisis period. The selection effect for men is still negative as with the log hourly wages but decreases since the late 1980s and becoming less negative.

The average marginal effect for returns to experience for the various years of experience, 5 to 25 (in intervals of 5 years), exhibits almost an identical pattern to the hourly wage results: the variance decreases over time, male returns are above female returns in general but

convergence and even coincidence occurs for the 15-20 years of experience. For 25 years of experience the average marginal effect converged but still a slight difference between men and women remains. The magnitudes in terms of percentages tend to be somewhat smaller than for the hourly wages (Figure 2.10 to Figure 2.14).

For the log annual earnings we also estimated these OLS returns to experience for different years and found that albeit male returns are above female returns a convergence over time (Appendix A.2.1 to A.2.5). The results for 5 to 20 years of experience show a convergence. For 20 years of experience the returns for male and females in the later years of our time period even coincides. However for 25 years widens slightly as also seen in the Heckman results. A puzzling result are the negative returns for women at the 5 years of potential experience level, which indicate the need for correcting for selection into the labor force to obtain believable returns to work experience.

Comparing the returns to high school and college, we find that the patterns for annual earnings are consistent with the hourly wages (Figure 2.15 and Figure 2.16). Women achieve higher returns to high school and college than men starting from 2001. In the hourly wages they started to achieve this earlier in time and a larger gap between the genders was visible. For annual earnings the returns for men and women almost tracked each and then diverged after the economic crisis in 2008. Partly the difference in these patterns may be due to differential changes in the hours worked over time.

The OLS results for annual earnings follow the OLS patterns (Appendix A.2.6 and A.2.7) observed for the hourly wages and are dissimilar to the Heckman results. Again pointing towards the issue that selection is important in order to understand the actual returns of educational attainment for men and women over time.

3. Lifetime graphs

Overall, expectations of women in terms of years in work, their earnings and hours worked over their lifetime have converged towards men's expectations.

In Figure 3.1 female expectations of lifetime years in work are increasing over the 50-year period of our data while male expectations are slightly decreasing from above 35 years in work lifetime expectation in 1964 to 30 years in lifetime work in 2013. Contrary to this, female expectations rose steadily from 15 years of lifetime work expectation in 1964 to over 25 years of expected lifetime work in 2013, thereby narrowing the gap between genders.

In addition to increased expectations of lifetime years in work women expect to accumulate more hours worked over their lifetime while men have not seen a comparable increase, maybe even a slight decrease, in their expected lifetime hours worked. This leads to a narrowing of the gender gap in expected lifetime hours worked for men and women (Figure 3.2.).

Not only expectations of lifetime years in work and expected life hours worked have increased, in terms of expected lifetime earnings women have also increased over time their lifetime expectation, almost doubling from 1964 to 2013. Men over the same time period have also increased their expected life time earnings, but across the entire period have consistently had much higher expected lifetime earnings. While there is some convergence of the female and male expected lifetime earnings, the gap does not seem to have narrowed much (Figure 3.3).

V. Conclusion

The patterns that we show and discuss in this paper show that there has been significant convergence over this fifty-year period in the work lives of women and men, but that differences continue. We have emphasized the commonality of women's (and men's experiences) by focus on average returns. Perhaps the most notable change over this period is the rising effect of selection in the case of women, which does imply a continued bifurcation in women's experiences in terms of whether or not they participate substantially in paid work. This is also reflected in the differences between the OLS and sample selection-corrected results for returns to education.

Interestingly, returns to potential work experience do converge for women and men in both OLS and sample-selection-corrected results for those with more years of potential experience.

In our annual calculations of expected lifetime labor atttachment and earnings, these indicate again convergence by gender in work life patterns, but less convergence in recent years in lifetime earnings.

This line of research is meant to complement rather than supplant the more recent research focus on divergence in outcomes within women and within men taken as groups. Our research focuses more on commonality of outcomes for women and for men to consider how larger trends in gender differences can also be seen in these average results and to remind us of the primacy of gender as a factor of interest and in determining life's outcomes.

References

Autor, David H., Lawrence F. Katz, and Melissa S. Kearney. 2008. "Trends in U.S. Wage Inequality: Revising the Revisionists." The Review of Economics and Statistics, 90(2): 300–323.

Bacolod, Marigee P. and Bernardo S. Blum. 2010. "Two Sides of the Same Coin: U.S. "Residual" Inequality and the Gender Gap." The Journal of Human Resources, 45(1): 197-242.

Blau, Francine D. and Lawrence M. Kahn. 2000. "Gender Differences in Pay." Journal of Economic Perspectives, 14 (4): 75–99.

Blau, Francine D. and Lawrence M. Kahn. 2006. "The U.S. Gender Pay Gap in the 1990s: Slowing Convergence." Industrial and Labor Relations Review, 60(1): 45-66.

Fernández, Raquel. 2013. "Cultural Change as Learning: The Evolution of Female Labor Force Participation over a Century." American Economic Review, 103(1): 472-500.

Goldin, Claudia. 2014. "A Grand Gender Convergence: Its Last Chapter." American Economic Review, 104(4): 1–30.

Heckman, James J.. 1979. "Sample Selection Bias as a Specification Error." Econometrics, 47(1):153-161.

King, Miriam, Steven Ruggles, J. Trent Alexander, Sarah Flood, Katie Genadek, Matthew B. Schroeder, Brandon Trampe, and Rebecca Vick. 2010. Integrated Public Use Microdata Series, Current Population Survey: Version 3.0. [Machine-readable database]. Minneapolis: University of Minnesota.

Lemieux, Thomas. 2006. "The "Mincer Equation" Thirty Years After *Schooling, Experience and Earnings*." In S. Grossbard-Shechtman (ed.) Jacob Mincer, A Pioneer of Labor Economics, Springer Verlag.

Mincer, Jacob and Solomon Polachek. 1974. "Family Investments in Human Capital: Earnings of Women" Journal of Political Economy, 82(2): 76-108.

Mulligan, Casey B. and Yona Rubenstein. 2008. “Selection, Investment and Women’s Relative Wages over Time.” The Quarterly Journal of Economics, 123(3): 1061-1110.

O'Neill, June and Solomon Polachek. 1993. “Why the Gender Gap in Wages Narrowed in the 1980s.” Journal of Labor Economics, 11(1): 205-228.

O’Neill, June. 2003. “The Gender Gap in Wages, circa 2000.” American Economic Review, 93(2): 309-314.

Figures

1. Descriptive Results

Figure 1.1: Average Education by Gender, 1964-2013

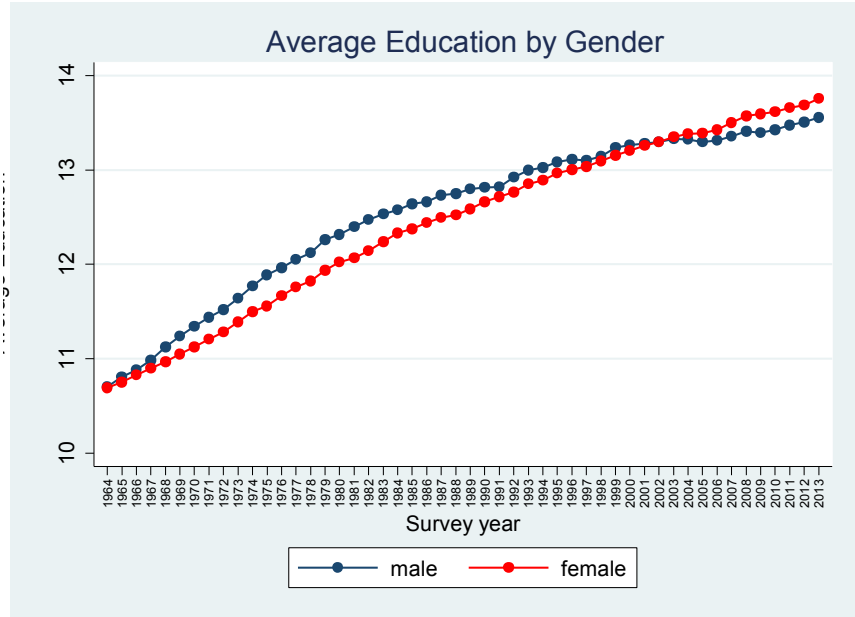


Figure 1.2: Average Potential Experience by Gender, 1964-2013

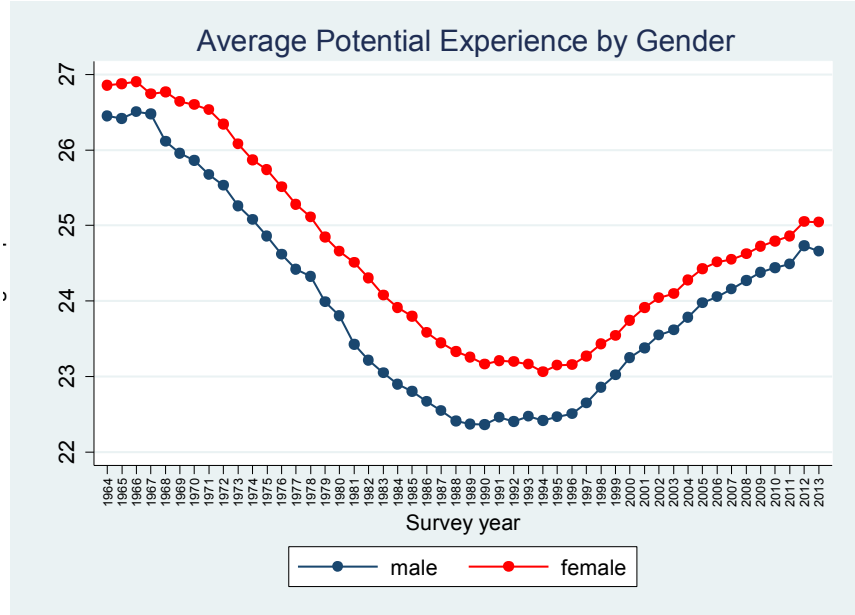


Figure 1.3: Average Age by Gender, 1964-2013

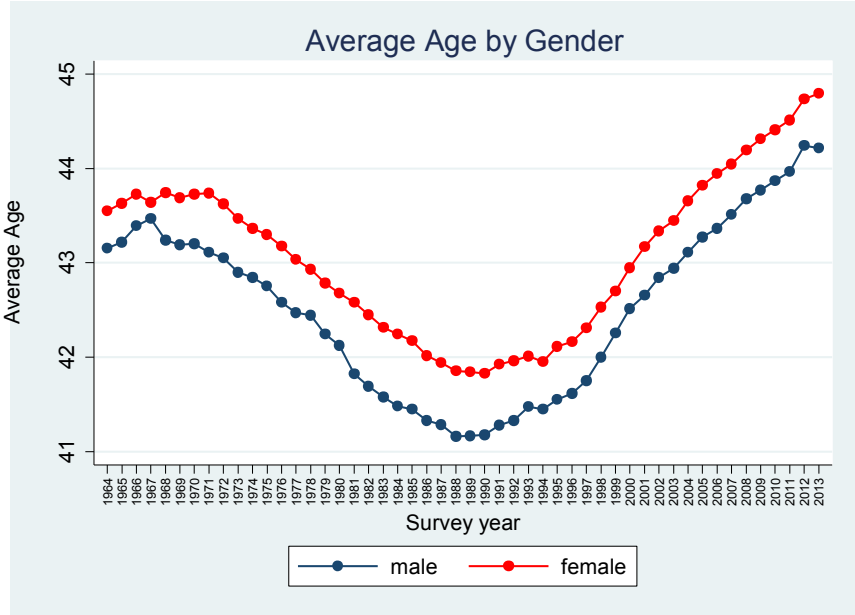


Figure 1.4: Average Real Hourly Wage by Gender, 1964-2013

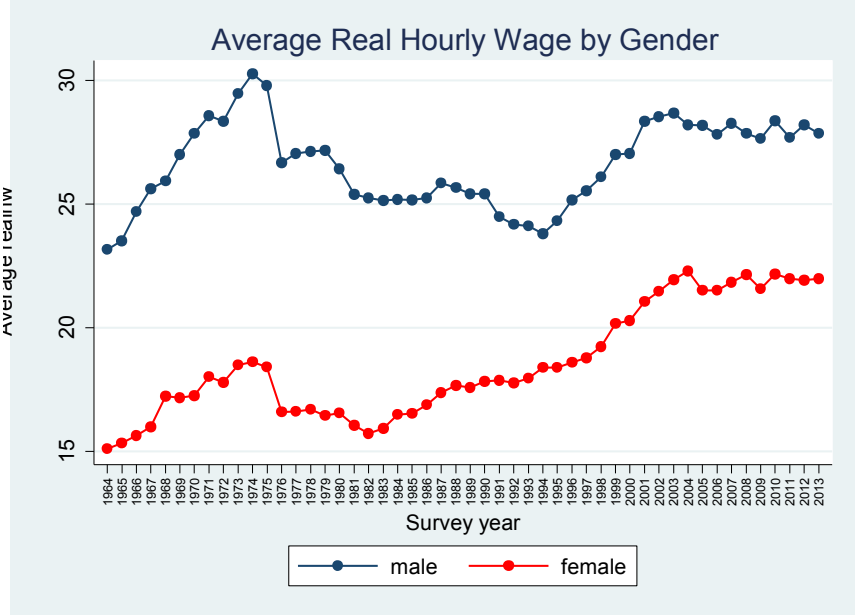


Figure 1.5: Average Real Annual Wage by Gender, 1964-2013

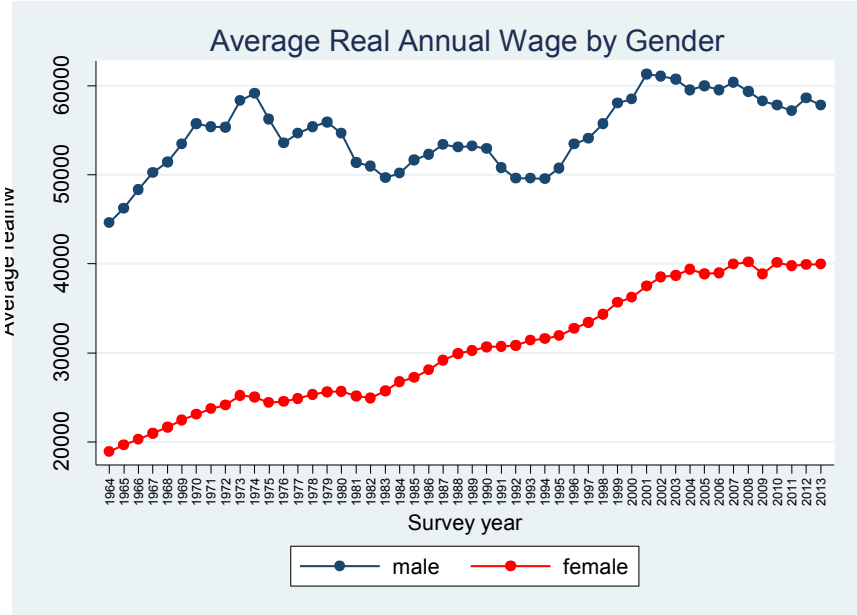
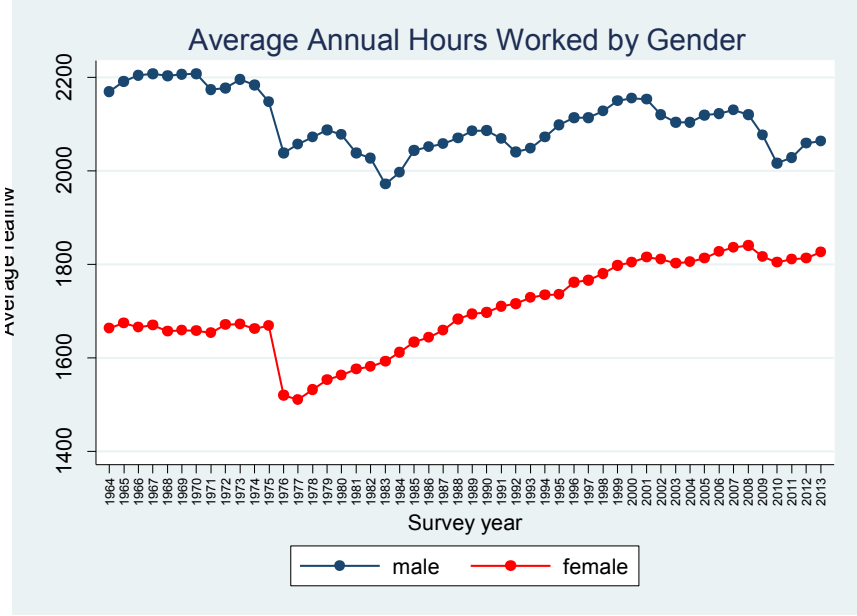


Figure 1.6: Average Real Annual Hours Worked by Gender, 1964-2013



2. Heckman selection corrected Graphs

Figure 2.1: Selection: Mills effect in percentage, log real hourly wage

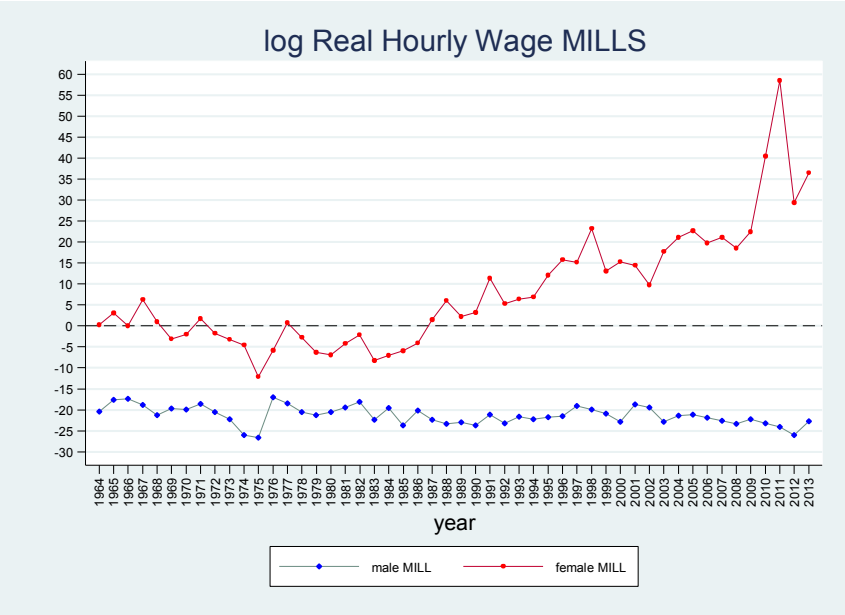


Figure 2.2: Heckman: 5 years experience, log real hourly wage

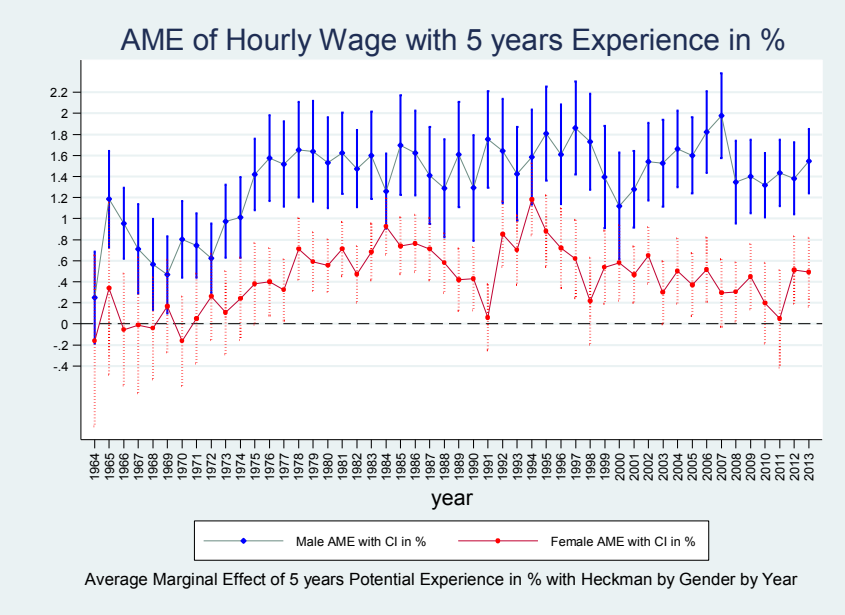


Figure 2.3: Heckman: 10 years experience, log real hourly wage

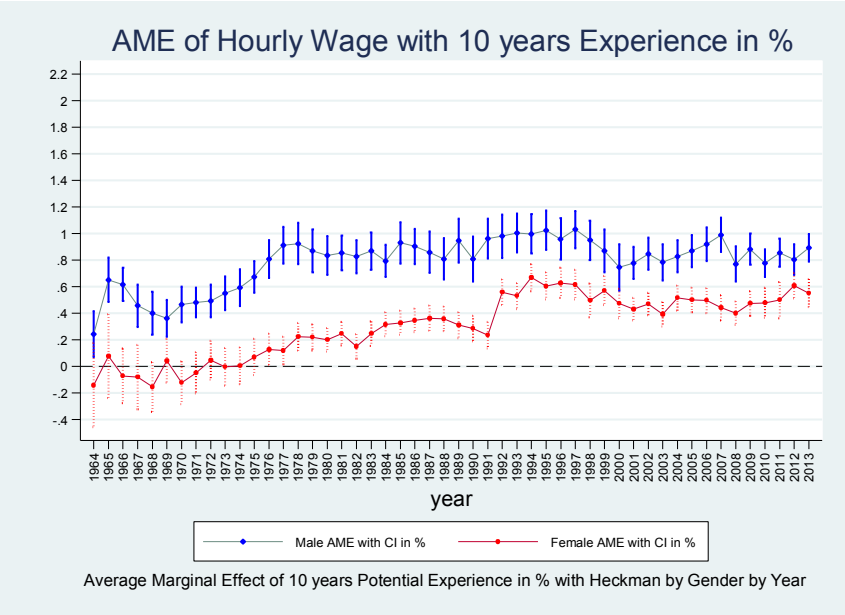


Figure 2.4: Heckman: 15 years experience, log real hourly wage

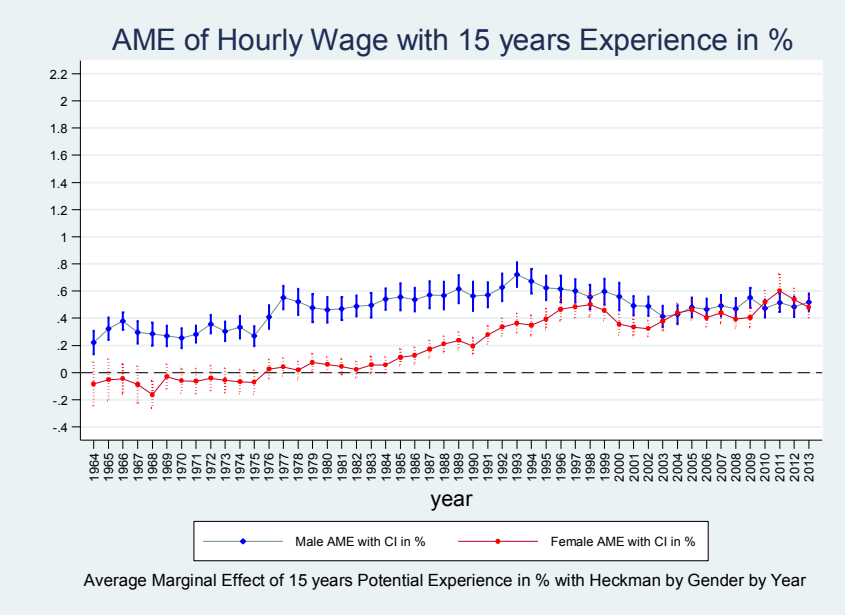


Figure 2.5: Heckman: 20 years experience, log real hourly wage

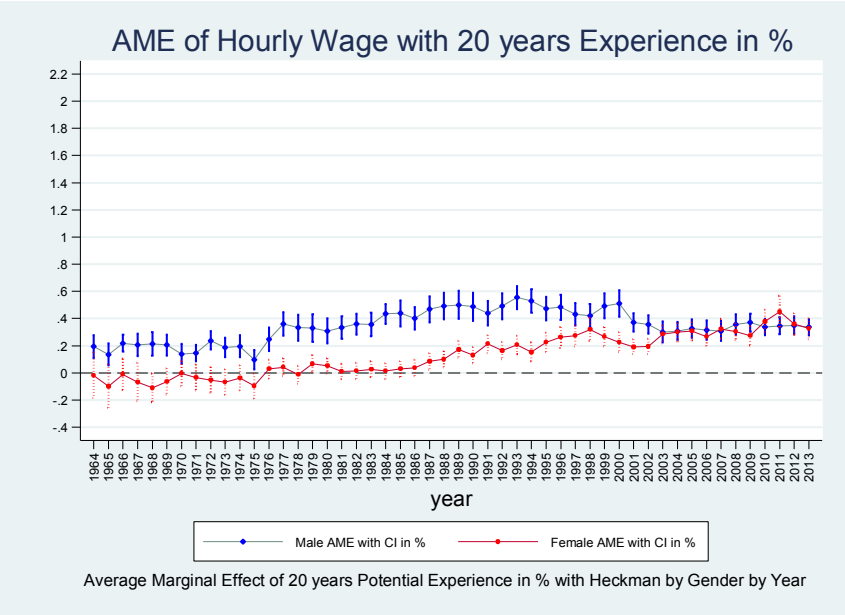


Figure 2.6: Heckman: 25 years experience, log real hourly wage

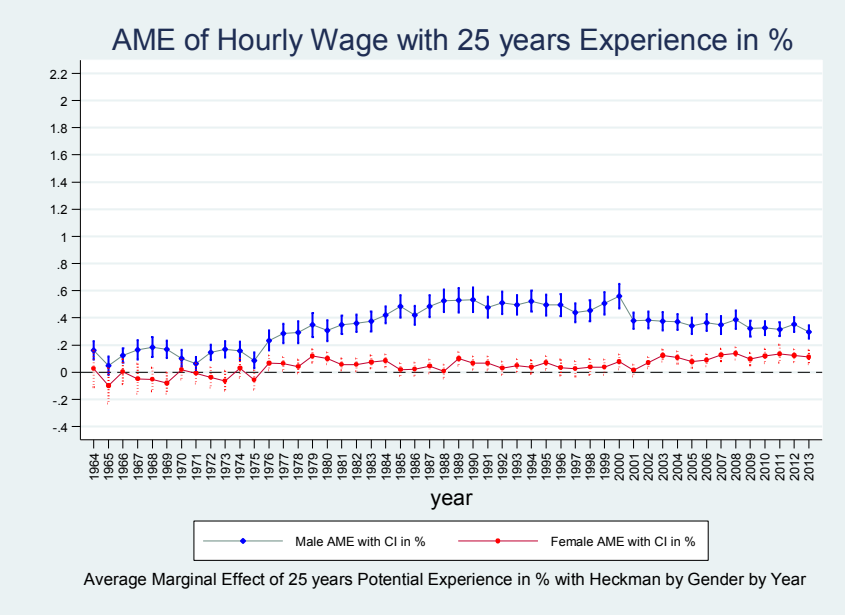


Figure 2.7: Heckman: High School , log real hourly wage

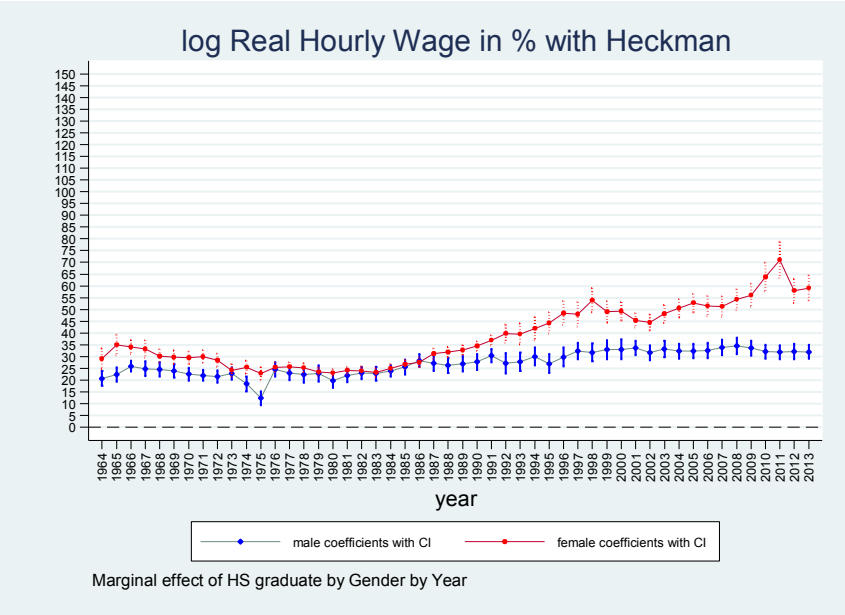


Figure 2.8: Heckman: College, log real hourly wage

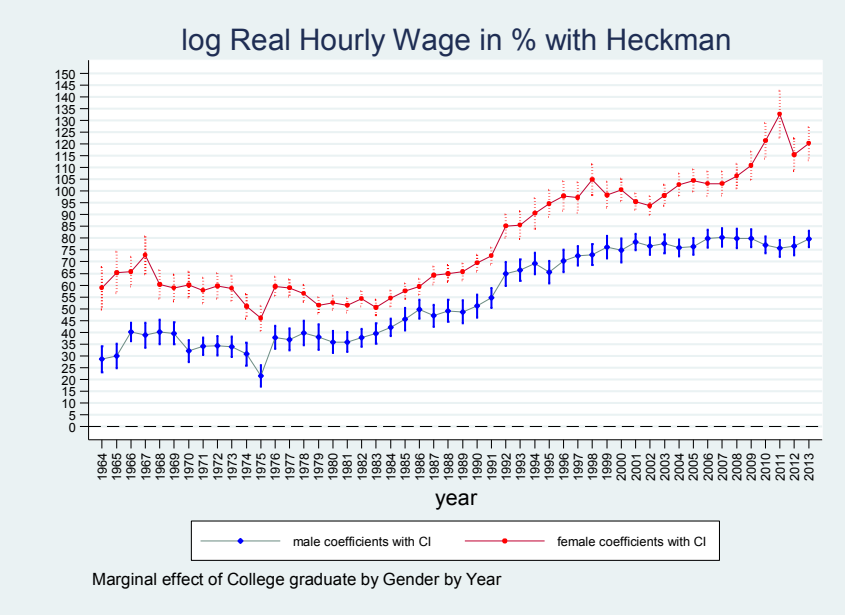


Figure 2.9: Selection: Mills effect in percentage, log real annual earnings

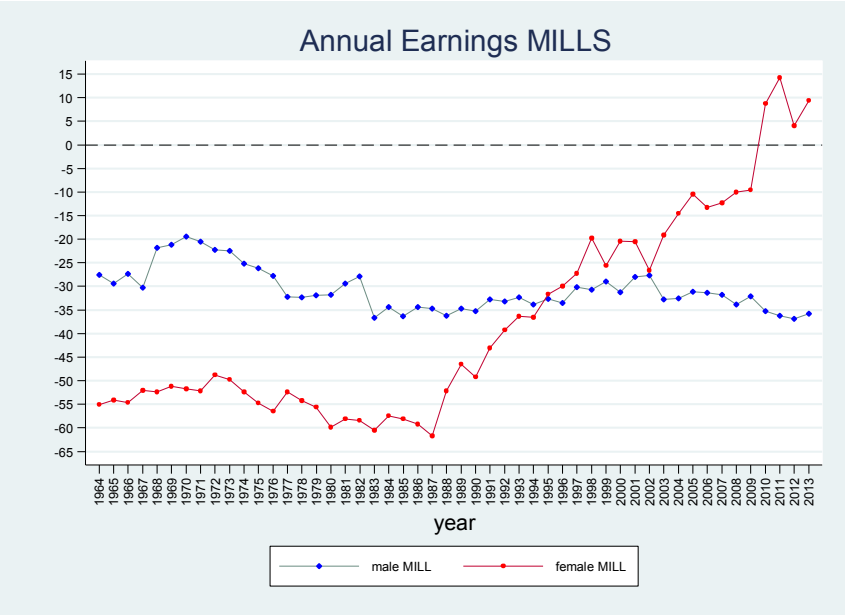


Figure 2.10: Heckman: 5 years experience, log real annual earnings

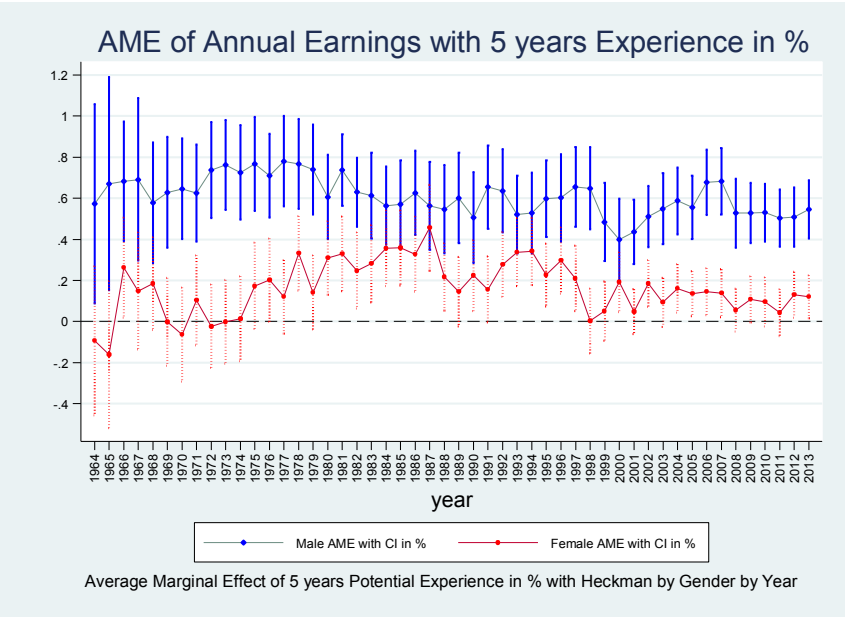


Figure 2.11: Heckman: 10 years experience, log real annual earnings

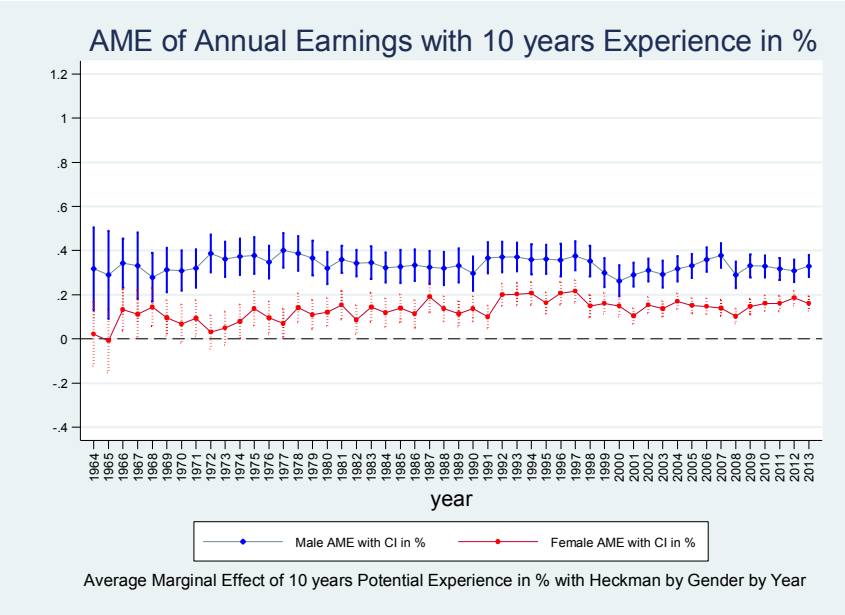


Figure 2.12: Heckman: 15 years experience, log real annual earnings

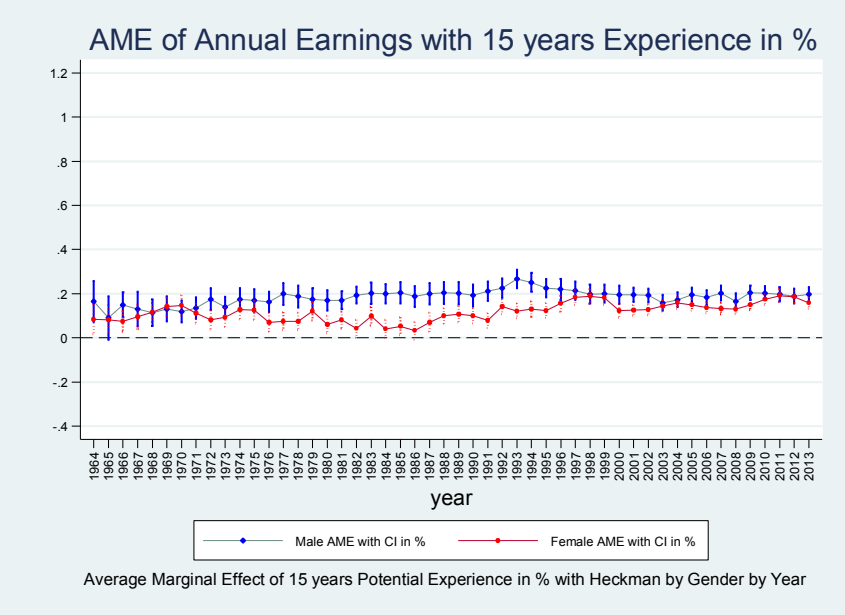


Figure 2.13: Heckman: 20 years experience, log real annual earnings

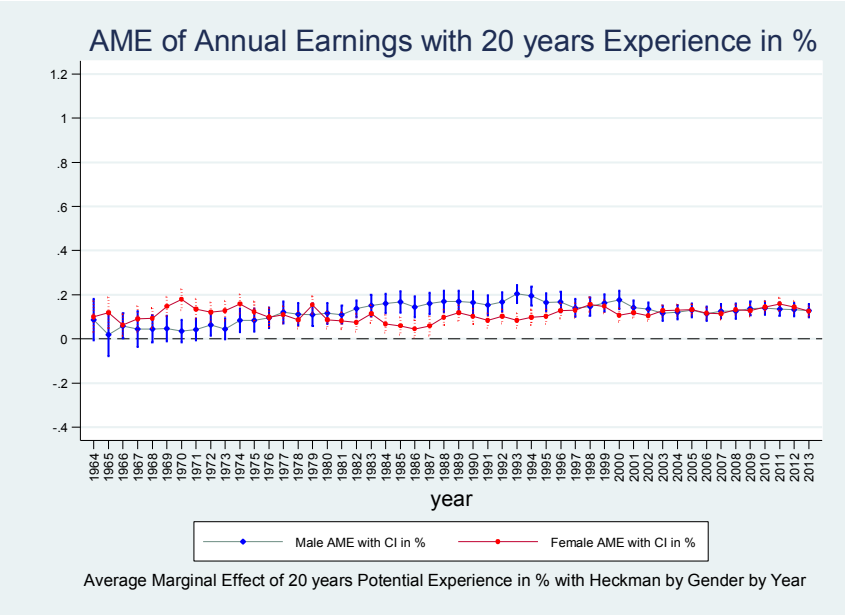


Figure 2.14: Heckman: 25 years experience, log real annual earnings

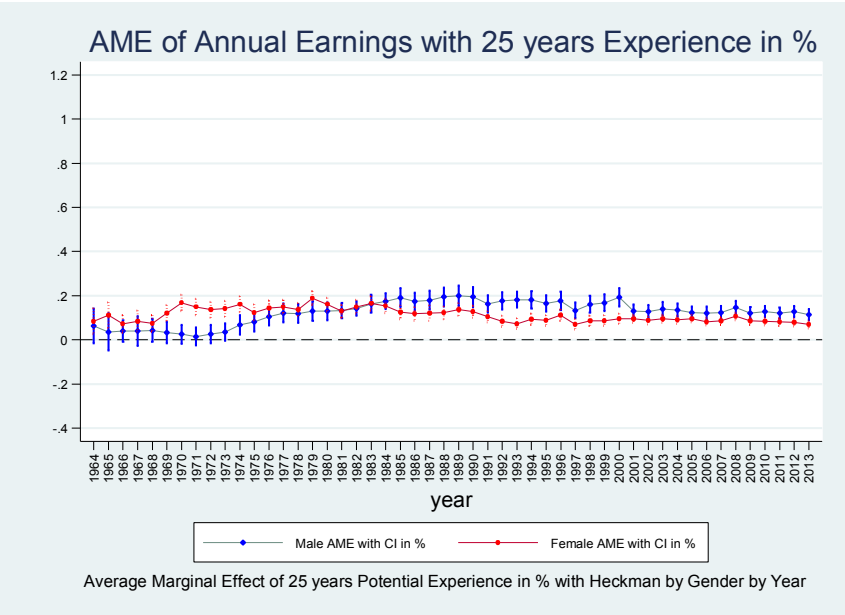


Figure 2.15: Heckman: High School , log real annual earnings

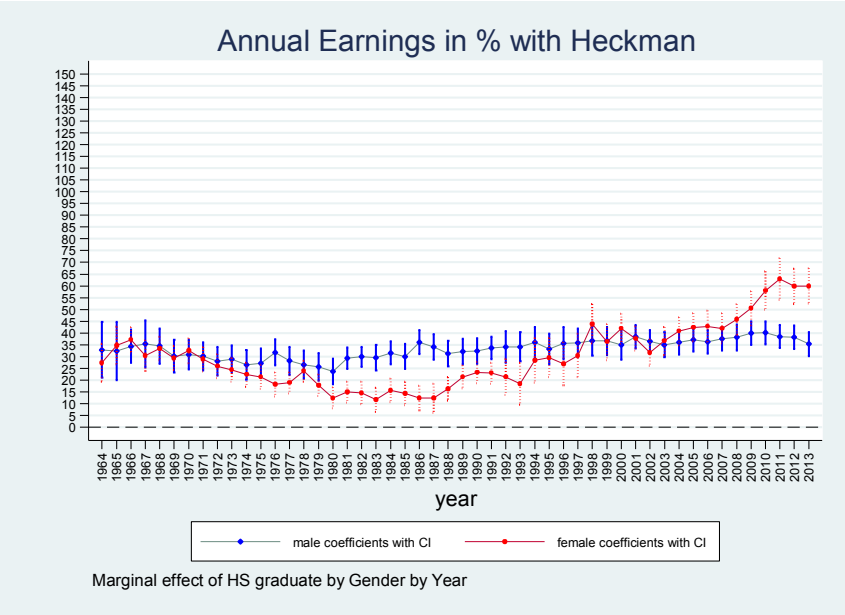
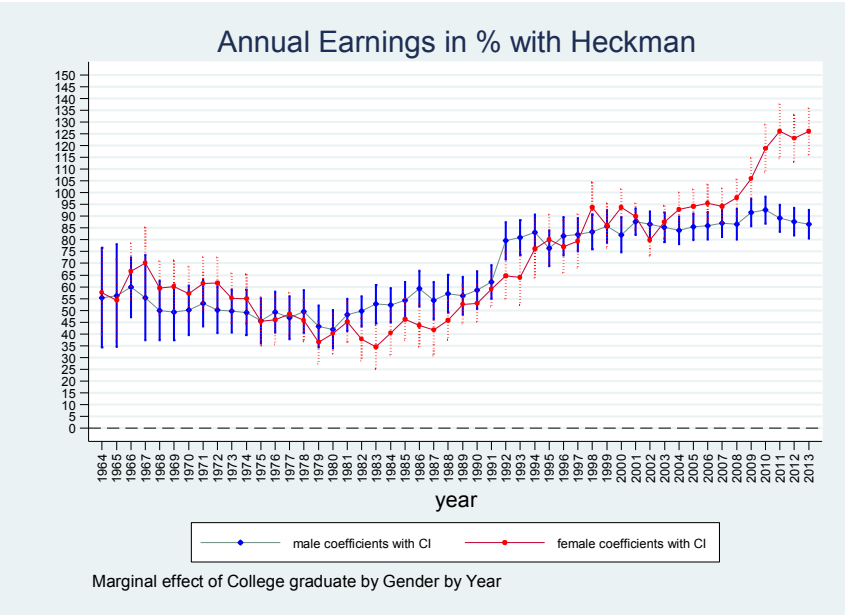


Figure 2.16: Heckman: College, log real annual earnings



3. Lifetime Graphs

Figure 3.1: Expected Lifetime Years in Work by Gender, 1964-2013

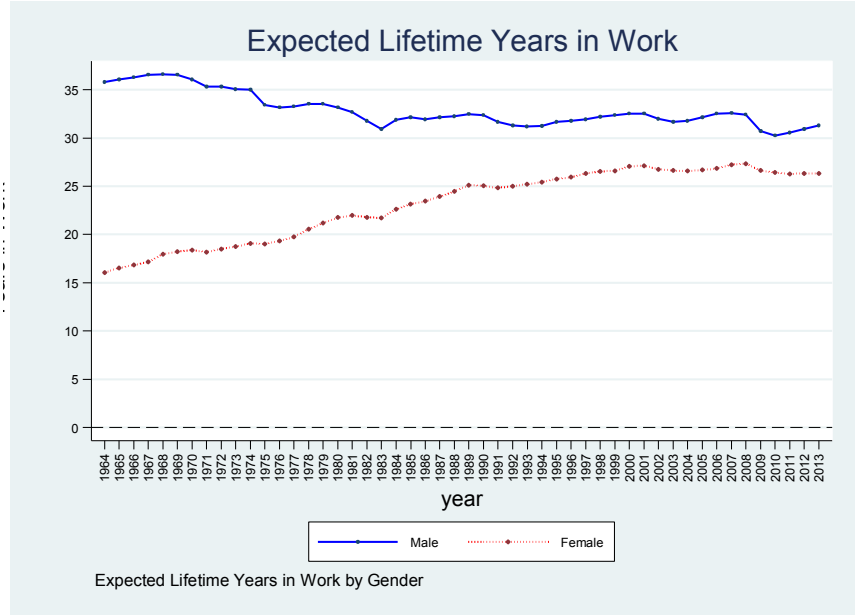


Figure 3.2: Expected Lifetime Hours worked by Gender, 1964-2013

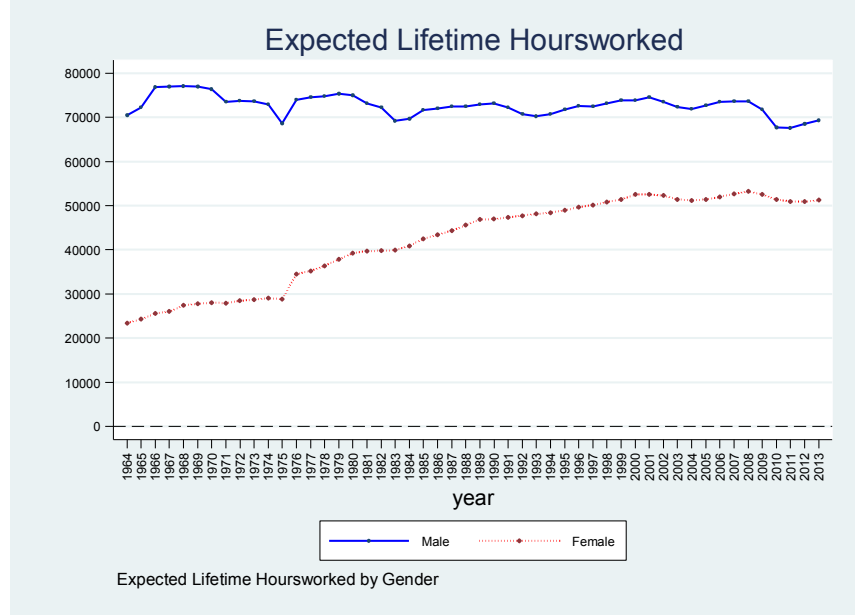
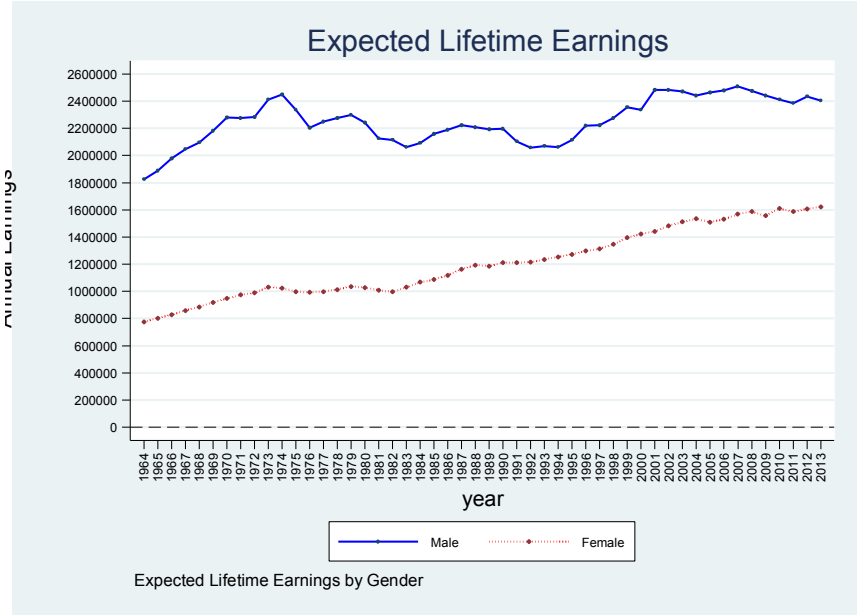
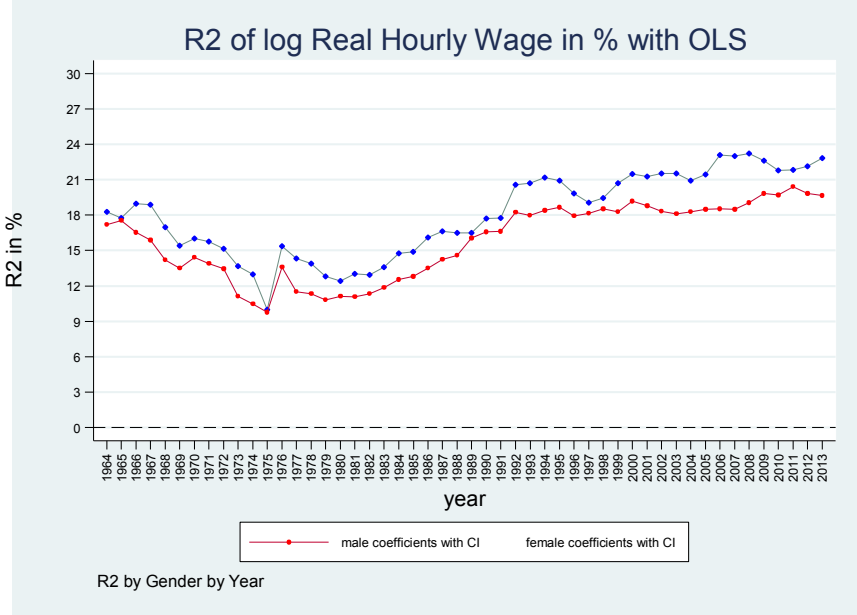


Figure 3.3: Expected Lifetime Earnings by Gender, 1964-2013

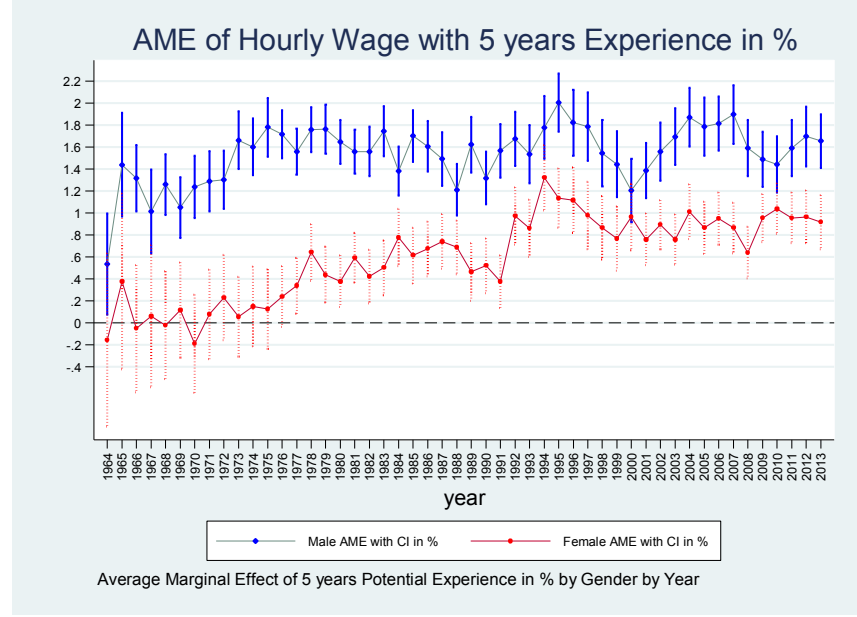


Annex 1: OLS Results, log real hourly wage

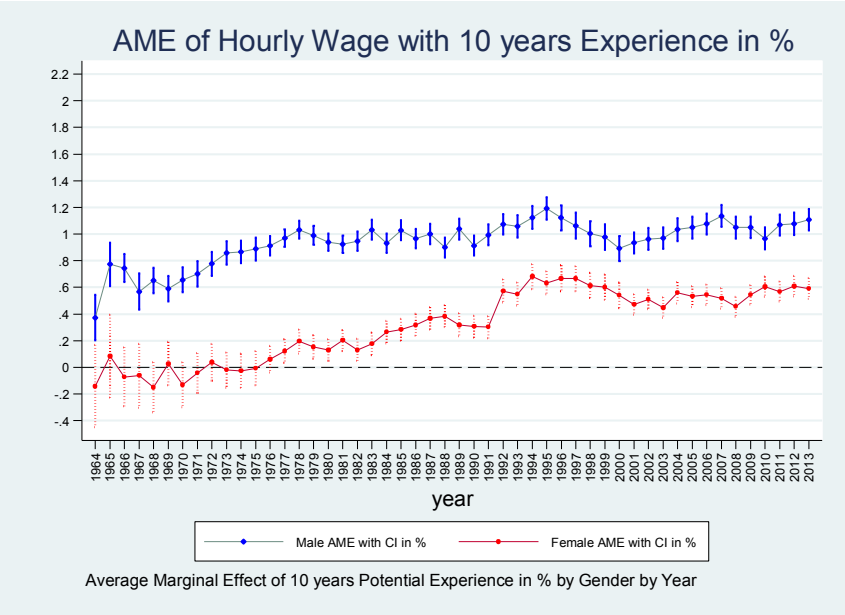
A.1.1: OLS 5 years experience, log real hourly wage



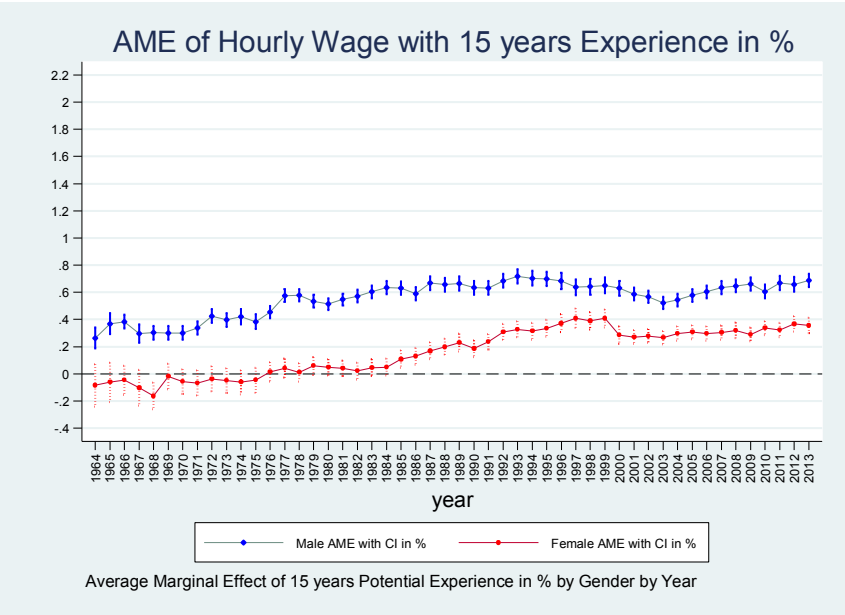
A.1.2: OLS 5 years experience, log real hourly wage



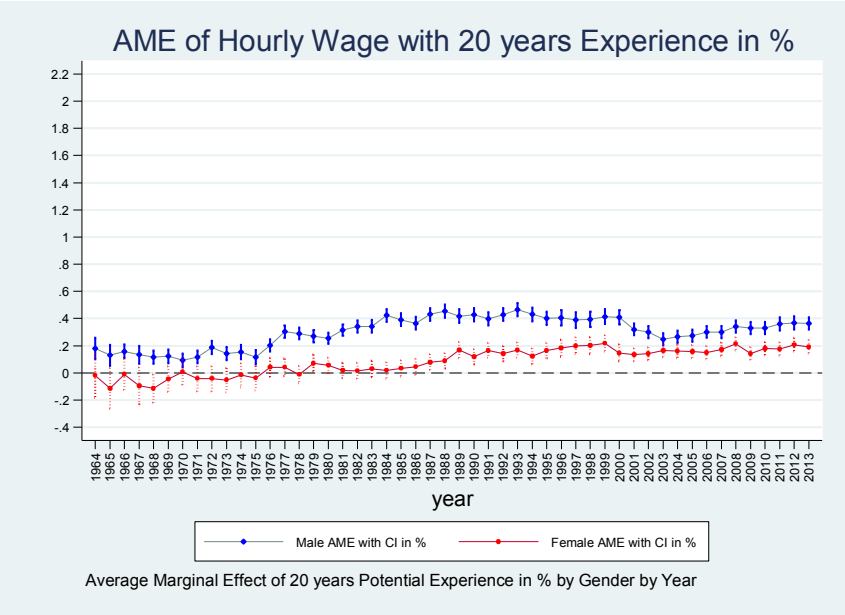
A.1.3: OLS 10 years experience, log real hourly wage



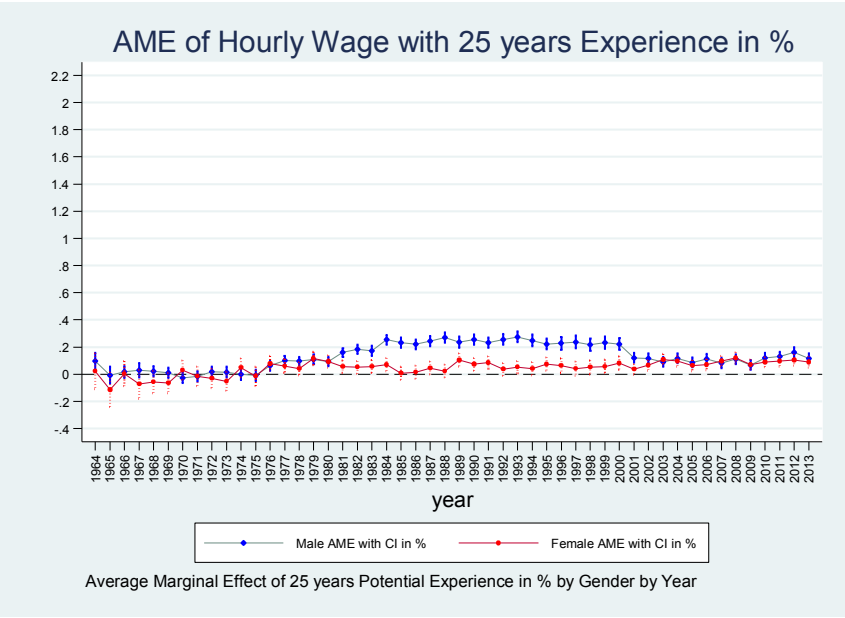
A.1.4: OLS 15 years experience, log real hourly wage



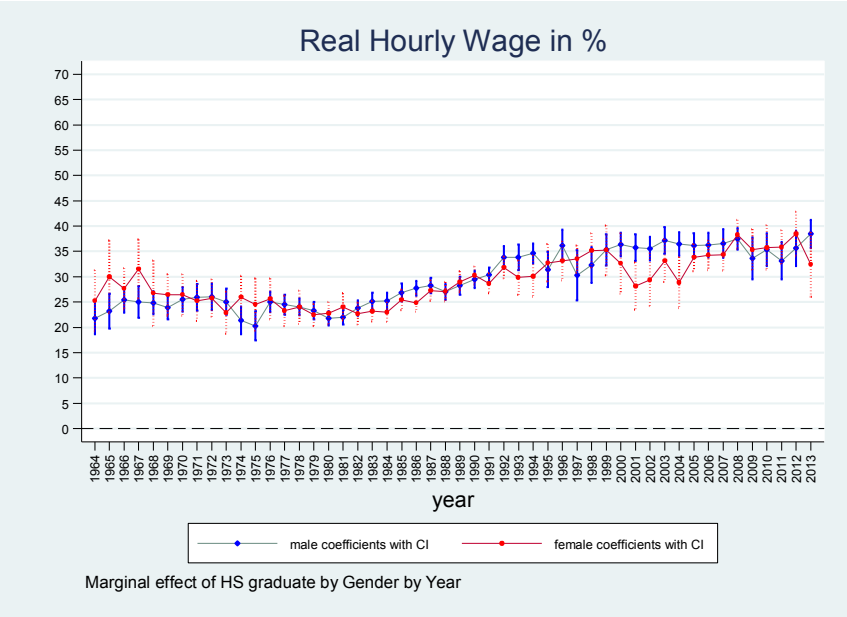
A.1.5: OLS 20 years experience, log real hourly wage



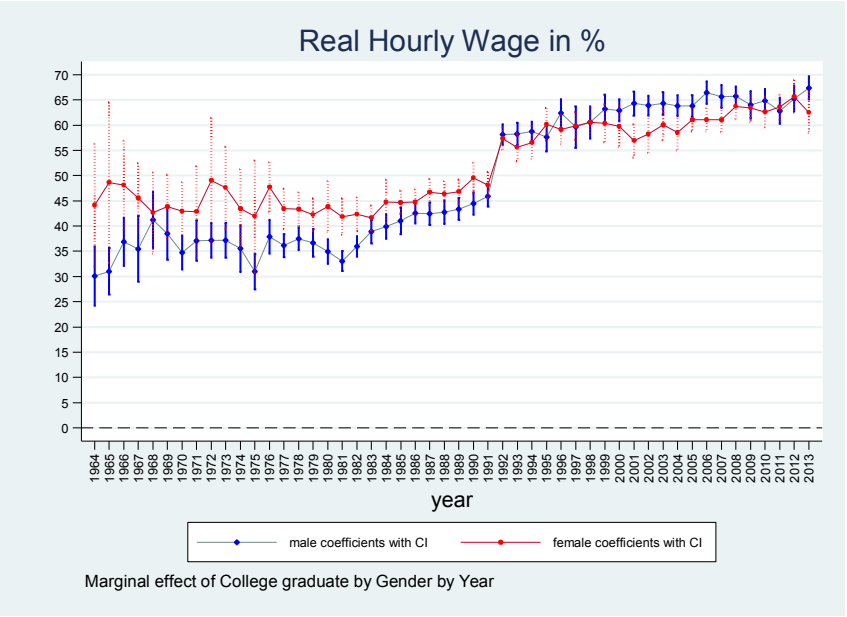
A.1.6: OLS 25 years experience, log real hourly wage



A.1.7: OLS: High School, log real hourly wage

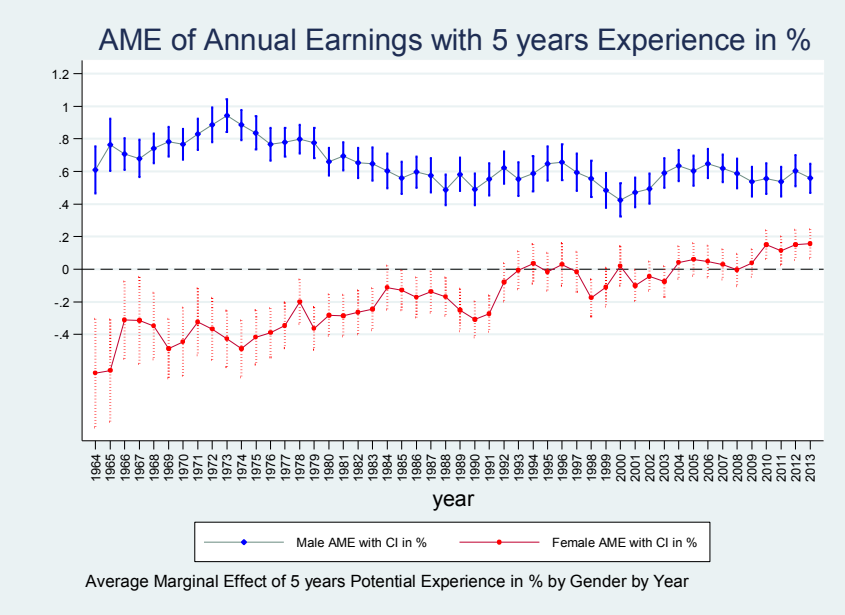


A.1.8: OLS: College, log real hourly wage

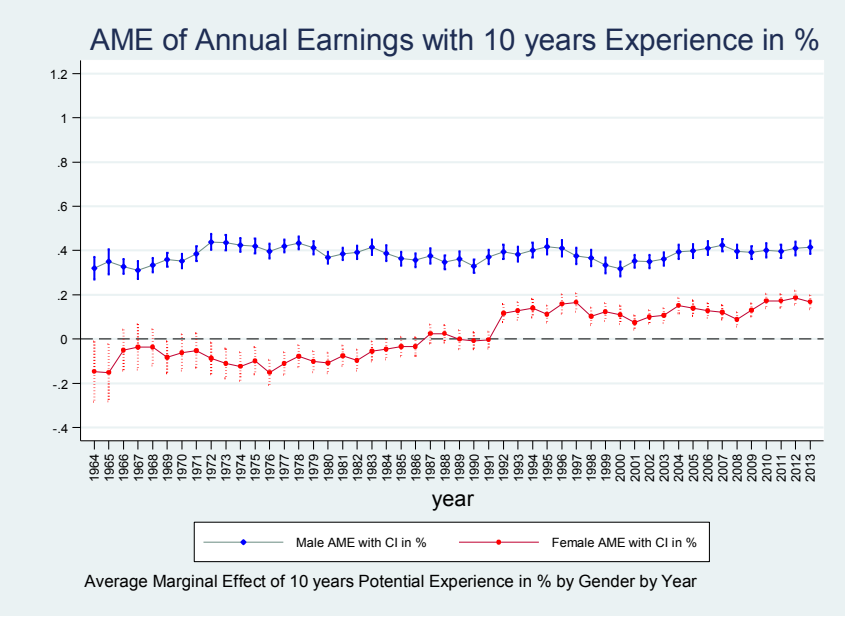


Annex 2: OLS Results, log real annual earnings

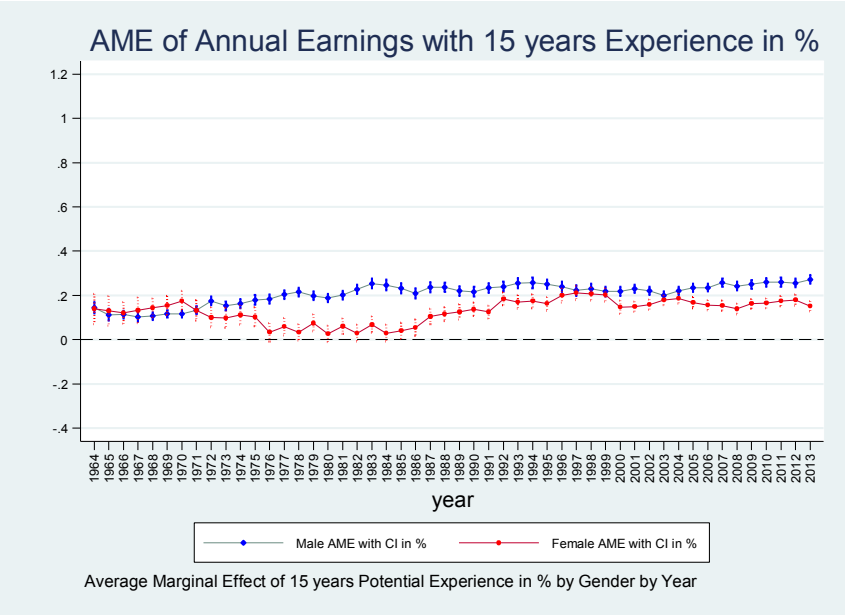
A.2.1: OLS 5 years experience, log real annual earnings



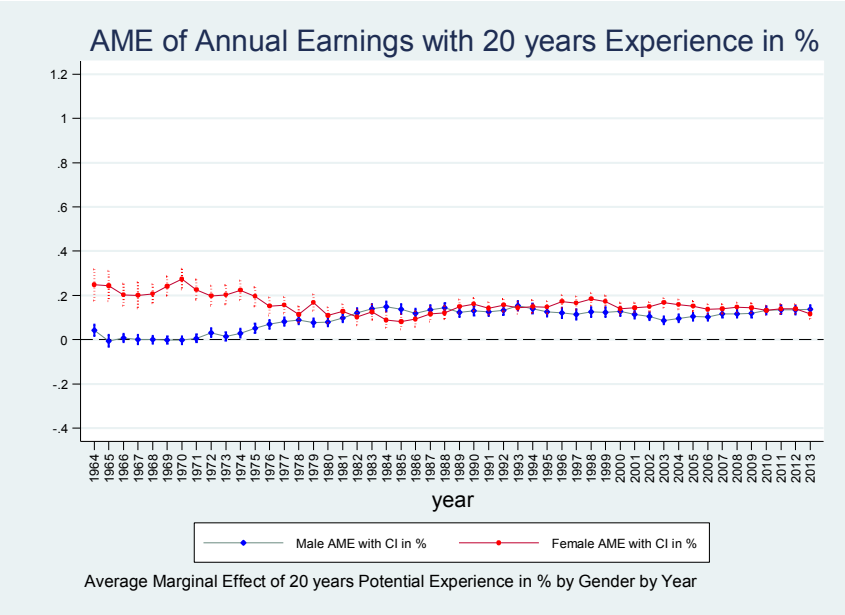
A.2.2: OLS 10 years experience, log real annual earnings



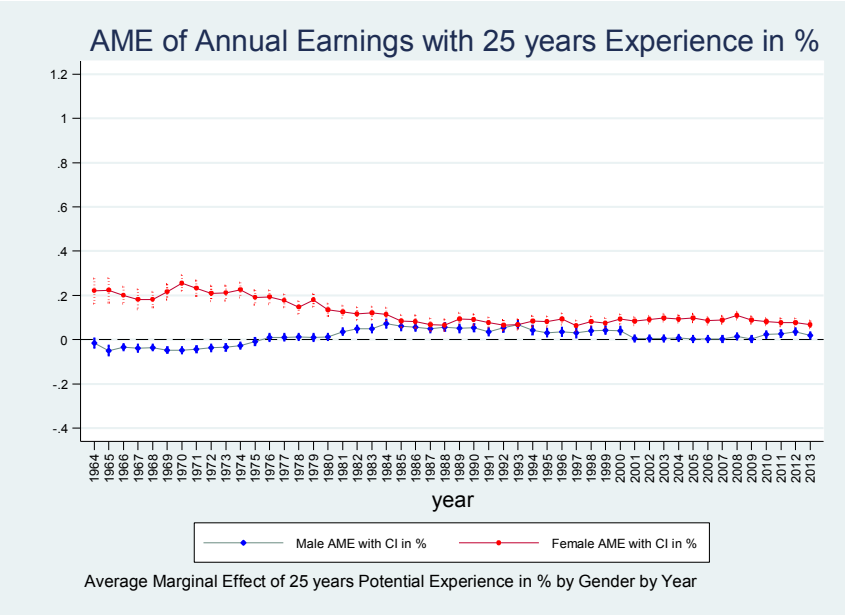
A.2.3: OLS 15 years experience, log real annual earnings



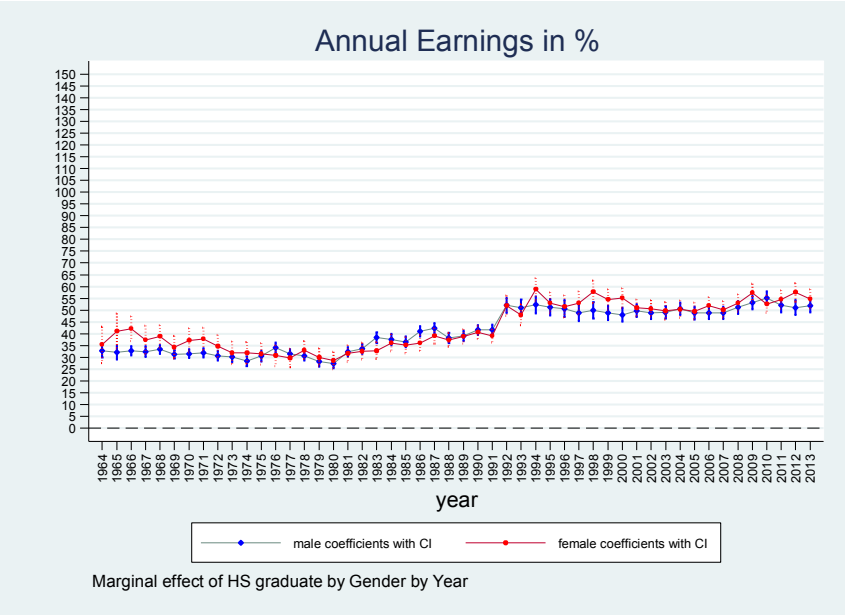
A.2.4: OLS 20 years experience, log real annual earnings



A.2.5: OLS 25 years experience, log real annual earnings



A.2.6: OLS: High School, log real annual earnings



A.2.7: OLS: College, log real annual earnings