CONVERGENCES IN MEN'S AND WOMEN'S LIFE PATTERNS: LIFETIME WORK, LIFETIME EARNINGS, AND HUMAN CAPITAL INVESTMENT ☆

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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

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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 consider the effects of sample selection over time for both women and men and show the rising effect of selection for women in recent years. Returns to education 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 synthetic lifetime labor force participation, hours, and earnings that indicate convergence by gender in worklife patterns, but less convergence in recent years in lifetime earnings. Thus, while some convergence has indeed occurred, the underlying mechanisms causing convergence differ for women and men, reflecting continued fundamental differences in women's and men's life experiences.

Keywords: Gender earnings gap; lifetime work; lifetime earnings; human capital investment

JEL classifications: J3; J16; J24; N3

1. 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, 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

For our main left-hand side, variables in the hourly earnings regressions, for our calculation of the wage we use the log hourly earnings 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 (thus the latest year for the earnings data is 2012, and the earliest 1963, but we will refer to earnings by the year of the sampling). We then convert this wage and salary income 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 annual wage and salary income variable by the annual hours worked before converting it into the logarithm of hourly earnings.[6]

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 by weeks worked in the last year, available in intervals. This particular change causes a one-time jump in the data series at 1976.[7]

To analyze convergence and divergence of earnings over time, we estimate separate hourly earnings regressions for each year t and for each gender j:

$$w_{ijt} = \alpha_{jt} + \beta_{jt} X_{ijt} + \varepsilon_{ijt} \quad \text{for } t = 1964,\ 1965,\ \ldots\ 2013,\ \text{and } j = 1 \text{ and } 2 \qquad (1)$$

Thus we estimate the hourly earnings (Eq. (1)) as a yearly cross-sectional regression with individual data, where data are available for a sample of individuals i of gender j (men or women) in year t. This yields, for our sample, 100 different equations (50 years times two genders). 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 Eq. (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 and show those results in the appendix.

6. We code the observations that have less than 1 and greater than 1,000 US$ hourly earnings as missing. Annual earnings greater than 9,999,997 US$ we also code as missing.

7. We choose to let this variable definition change causes a one-time level reset in the data rather than include a dummy in the hourly earnings equation for this so as to keep the regression specification identical across the years.

In the first stage, we estimate the participation (Eq. (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 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 an exclusion restriction in the results we present here.[8] 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.[9]

$$P_{ijt}(\text{LFP} = 1 | Z = 1) = \Phi(Z\delta) \tag{2}$$

From Eq. (2), we compute the inverse Mills ratio $\widehat{\lambda_{ijt}} = \lambda\left(Z_{ijt}\widehat{\delta_{jt}}\right)$.

Then we estimate the 100 hourly earnings regressions with the selection correction term included:

$$w_{ijt} = \alpha_{jt} + \beta_{jt}X_{ijt} + \rho_{jt}\widehat{\lambda_{ijt}} + \varepsilon_{ijt} \tag{3}$$

The inverse Mills ratio obtained from a probit regression then corrects our hourly earnings regressions for the selection into labor force participation. It measures the degree of selection bias of persons in our sample.

In addition to degree of selection over time and earnings over time based on the Heckman regression models, we calculate the synthetic worklife measures of years in the labor force, total hours worked, and total earnings

8. Heckman (1980) in his original paper includes linear and squared terms for children less than six, 1967 assets, husband's age, husband's education, husband's hourly earnings, wife's education, and interactions of all linear terms (p. 226, Table 5.1). He uses the cross-section data of the 1967 National Longitudinal Survey of Work Experience of Women Aged 30−44 and has other variables available that the CPS does not include for our project over a 50 year horizon.

9. Full regression results, including all coefficients, as well as results from these alternative specifications, are available upon request from the authors.

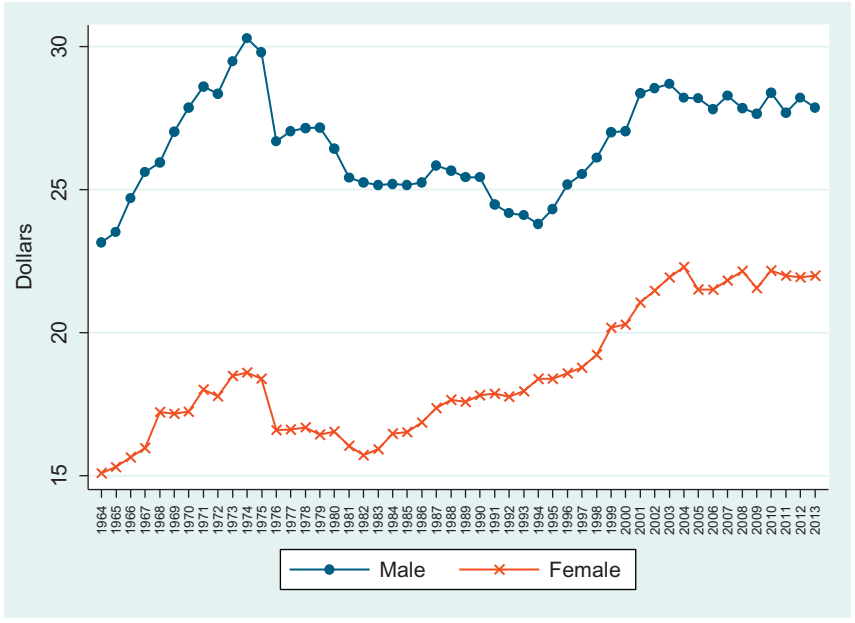

Fig. 3. Descriptive Results: Average Real Hourly Earnings by Gender, 1964–2013.

potential. For women the finding is more striking, but also consistent with the finding of Mulligan and Rubinstein (2008) for the real hourly earnings. Women initially have negative selection until about the late 1980s, thereafter the selection is positive. These results are not echoed identically in annual earnings where women also have negative selection into employment, albeit reducing over time, but only display positive selection at the very end of the period under investigation.

For the experience results, we find convergence in returns for increasing potential experience levels for both hourly earnings and annual earnings. For education, the results differ for hourly earnings and annual earnings: returns to High School and College are higher for women than for men for hourly earnings. For annual earnings, male and female returns to either education level tracked each other and only a higher return for females is found in the later years, after 2008.

Looking at the selection effects over time, Fig. 6 displays the degree of selection bias as percentage of log real hourly earnings. The coefficient

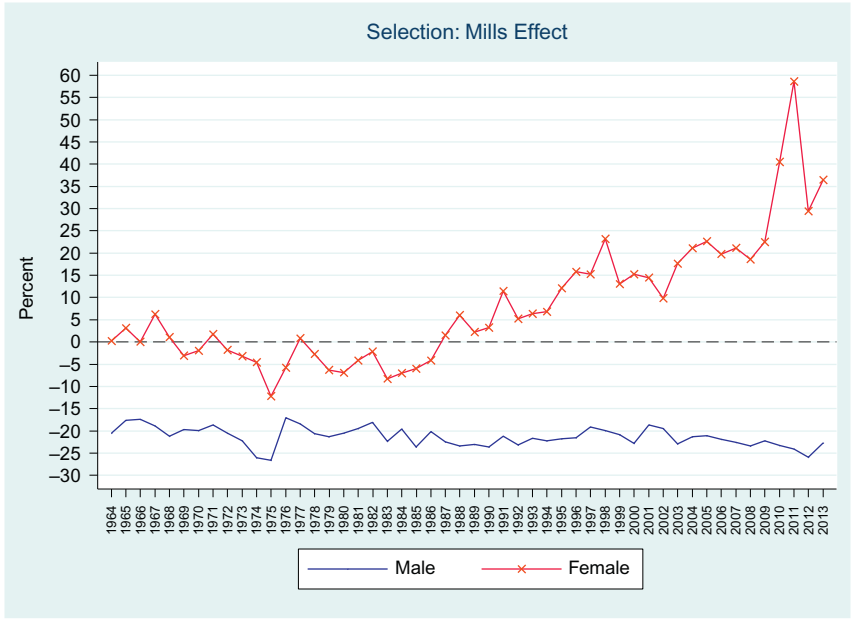

Fig. 6. Heckman Selection Corrected Graphs: Selection: Mills Effect in Percentage, Log Real Hourly Earnings.

selection. However, this peak declines about 40 percent in 2013. Demographic changes and the composition of women selecting into the labor force could partially account for these trends and changes in the selection. This is one of the most interesting findings from our research and is consistent with an increasing trend toward potential high earners among women being more likely to both marry and continue working.

We wanted also to see whether our models fit relatively better or worse over time. In particular, we were concerned that a regression specification that is fit to data available in 1964 might no longer be relevant by 2013. While a simple measure of fit would be the *R*-squared, this is not calculable for selection models (we do show the *R*-squared measure for our OLS models in Fig. A1 of the appendix). Hence in Fig. 7, to try to ascertain goodness of fit, we instead plot the year-to-year correlation of individual predictions from our Heckman model and the actual observed levels of outcomes for hourly earnings. We find a positive correlation that is slightly increasing over time, implying that our models fit no more poorly over time even though they are based on a stable specification, and if anything,

experience (and thus another grounds for preferring the selection-corrected estimates over the OLS estimates).

Comparing the returns to high school and college for the Heckman selection-corrected estimates of annual earnings, we find that the patterns for annual earnings are consistent with the hourly earnings in later years (Fig. 13). Women achieve higher returns to high school and college than men starting from 2001. In the hourly earnings, 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 closely track each other and then diverge after the economic crisis in 2008, with women then receiving higher returns to high school and college completion. Thus partly the difference in these patterns is likely due to differential changes in the hours worked over time, with women steadily increasing their hours worked from the mid-1980s onward.

The OLS results for annual earnings follow the OLS patterns observed for the hourly earnings and are dissimilar to the Heckman results. This

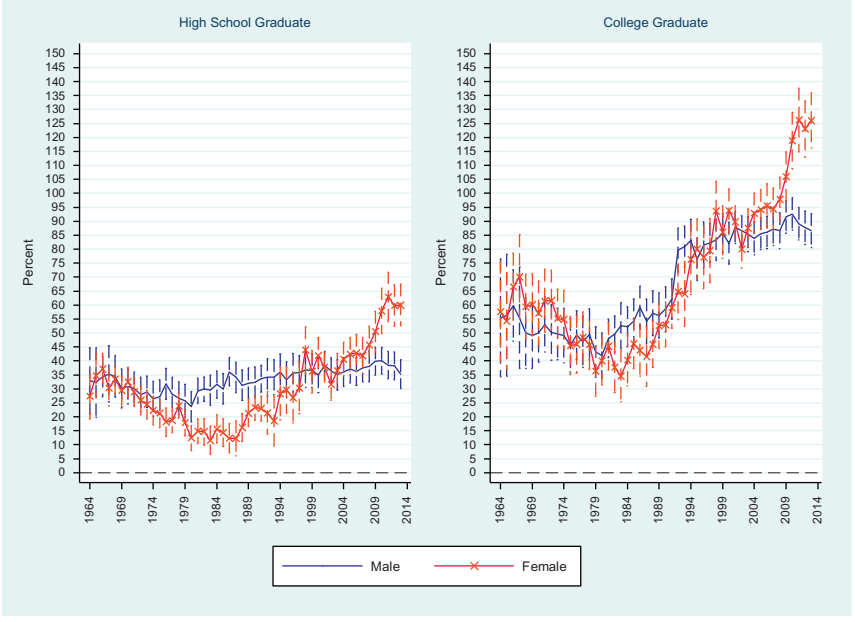

Fig. 13. Heckman Selection Corrected Graphs: Heckman, Education, Log Real Annual Earnings. *Note*: Marginal effect, Heckman.

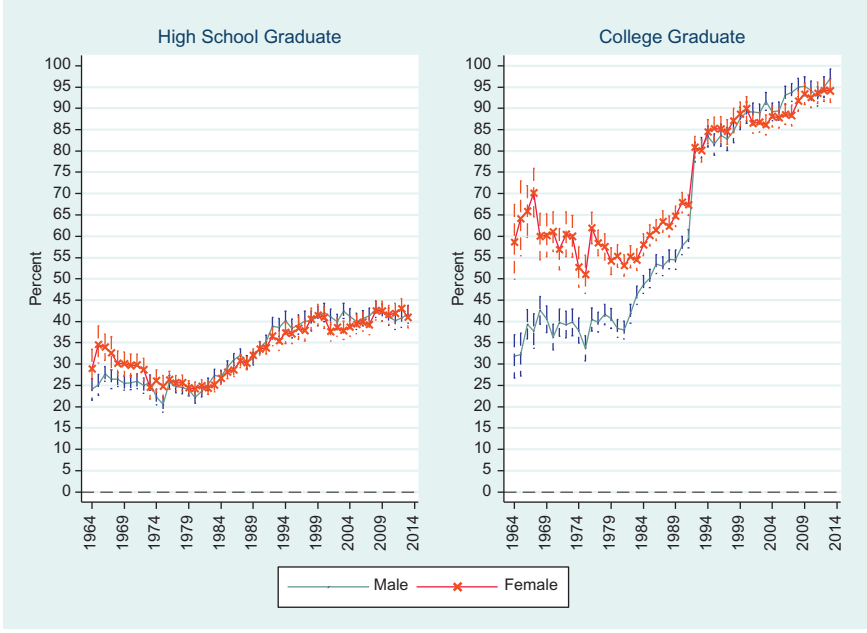

Fig. A3. OLS, Education, Log Real Hourly Earnings. *Note*: Marginal effect.