The Gender Gap in Wage Returns on Job Tenure and Experience*

Lalith Munasinghe† Tania Reif‡

July 2004

*We thank Satyajit Bose, Joyce Jacobsen, Audrey Light, Jacob Mincer, Brendan O'Flaherty, Steffen Reichold, Rena Rosenberg, Rajiv Sethi, and Nachum Sicherman for many helpful comments and suggestions.

†Corresponding author. Department of Economics, Barnard College, Columbia University, 3009 Broadway, New York, NY 10027. E-mail: lm25@columbia.edu. Telephone: 212-854-5652.

‡Economist, International Monetary Fund. E-mail: TREIF@imf.org. Telephone: 202-623-8996.

Abstract

We present empirical evidence on gender differences in wage returns on firm-specific experience (job tenure) and general experience. We find that overall returns on an extra year of labor market experience are lower for women than men. However, a decomposition analysis shows that the return on job tenure is substantially lower for women than it is for men, and that the return on general experience is higher for women than it is for men. These findings are consistent with the hypothesis that despite their growing attachment to the labor market, women are less likely to invest in job-specific skills or to self-select into jobs with backloaded compensation because women are more prone to job separations than their male counterparts. The lower estimated returns on tenure for women could also be due to employer discrimination in hiring, and the provision of training and promotion opportunities within firms.

Key words: Gender Wage Gap, Tenure, Experience

JEL Classification: J16, J24, J31, J41

1 Introduction

The changing role of women in the labor market is an unparalleled transformation of the twentieth century. The dramatic increase in labor force participation, catch up in educational attainment, legal battles of equal pay for equal work, and the narrowing, but still persistent, gender wage gap are some of the key issues that continue to occupy research agendas across many disciplines. A major focus in the economics literature is the earnings disparity across women and men. Various empirical studies (Blau and Kahn 1997; O'Neill and Polachek 1993; Wellington 1993) attribute an important part of the recent narrowing of the gender wage gap to the marked increase in both women's labor force participation rates and accumulation of labor market experience.[1] In this paper we contribute to this large and growing empirical literature on the gender wage gap by presenting an analysis of gender differences in the wage returns on an extra year of job tenure and general labor market experience. This decomposition of wage returns into a firm-specific and general component allows us to locate more precisely apotenitally important source of the gender wage disparity.

We estimate differential returns on tenure and experience across women and men in the first decade and half of their careers within the framework of a standard human capital earnings model. The National Longitudinal Surveys of Youth (NLSY) are ideally suited for our purposes. The NLSY tracks a panel of 12,686 young women and men, first interviewed in 1979. The availability of work histories of early careers, including detailed information on job duration, labor market experience, earnings, and other individual and job characteristics, facilitate a rigorous analysis of returns on tenure and experience. To anticipate our results: total wage returns on an extra year of labor market experience are lower for women than men. However, the decomposition analysis shows that the return on job tenure is substantially lower for women than it is for men, and that the return on general labor market experience is higher for women than it is for men.

The estimation of wage returns on tenure and experience raises a number of difficulties

[1] A striking illustration of rapidly changing work expectations of women is documented in two surveys of young women aged 14 to 21 conducted a decade apart. In a 1969 survey less than 30% of the respondents expected to work at age 35, and just ten years later in 1979 over 70% of a similarly aged cohort of young women expected to work at age 35. No doubt, these dramatic changes in expectations are likely to have important implications for human capital investments of women (O'Neill, 1990).

that are extensively documented in the literature (Abraham and Farber 1987; Altonji and Shakotko 1987; Topel 1991). The current consensus is that OLS estimates are not only biased, but that the direction of bias is ambiguous. Although there is no consensus about the correct procedure to estimate these returns, two recently developed estimators are widely used. The first is Topel's two-step estimation procedure (1991) that yields a supposedly unbiased lower bound for tenure and an unbiased upper bound for experience. The second is Altonji and Shakotko's (1987) instrumental variables procedure that corrects for tenure bias resulting from individual and job match heterogeneity.[2] We present estimates of wage returns on tenure and experience using both procedures, and the gender disparities in these estimates are qualitatively similar across the two procedures.

Despite the growing attachment to the labor market mentioned earlier, women are likely to be relatively less attached to their respective *employers and jobs* compared to their male counterparts, especially during the early part of their careers. Women in their twenties and thirties experience life cycle events such as marriage, childbirth, and family care responsibilities that make them more prone to employment interruptions and gaps (Mincer and Ofek, 1982). A likely consequence is that expected job duration will be shorter for women than men. Different expectations about job duration and overall commitment to the labor market will have important ramifications for gender differences in strategic aspects of on-the-job training and job selection. If women are relatively less attached to firms because life cycle events lead to less durable employment relationships then women are likely to invest less in firm-specific skills and more in general labor market skills that are portable across employers. Since investments in specific/general skills typically lead to higher future earnings with tenure/experience, women are likely to experience relatively flatter wage-tenure profiles and higher wage-experience profiles compared to their male counterparts, a prediction that is consistent with our findings.

Our findings on gender disparities in wage returns on tenure are consistent not only with the theory of firm-specific human capital but also with implications of other models of compensation and turnover. For example, bonding models (Lazear, 1981) and selection models (Salop and Salop, 1976) predict positively sloped wage-tenure profiles. Unlike the

[2] In Section 2.2 we briefly outline these procedures.

theory of specific human capital, wage increases with tenure in these models are not due to productivity increases on the job, but are instead wage policies designed to elicit appropriate levels of work effort and to self select less mobile workers, respectively. Note, if these theories accurately describe the workings of labor market then our hypothesis about gender differences in returns on tenure remain valid.[3] The common feature among compensation models that imply positive returns on tenure is the growing attachment between the worker and the firm as the employment relationship ages. The important corollary is that workers who anticipate more frequent job changes in the future will have less incentives to select into jobs where compensation is backloaded. In fact, the increasing wage-tenure profile of selection models is explicitly designed to self select less mobile workers.[4]

We have thus far attempted to explain gender differences in wage returns on tenure as a "supply" side effect because we interpret this "difference" as a consequence of either strategic human capital choice or of self-selection into jobs with less backloaded compensation. However, it is indeed possible that the observed gender differences in returns on tenure need not necessarily be the result of strategic choice on the part of women. The observed lower returns on tenure for women may include a component that is due to employer discrimination – i.e., discrimination based on rational expectations about women's attachment to jobs.[5] For example, if employers engage in statistical discrimination then the perception of women as "less" stable workers could lead employers to systematically not hire women into jobs with opportunities of specific training or learning.[6] Although it is clearly important to distinguish

[3]Note however, that Hersch and Reagan (1997), citing evidence that returns to tenure tend to be greater for female than for male workers, develop an agency model of wage contracts that shows efficient wage-tenure profiles are steeper for women than men as a direct result of their shorter working life.

[4]Loewenstein and Sicherman (1991) provide a psychological explanation for increasing wage profiles: workers like to see their wages increase over time. Interestingly, they find, in a survey setting, that women are more likely to choose steeper profiles than men when the payments are rental payments, but there are no significant gender differences in preferences for wage payments. The authors do not provide an explanation of this finding.

[5]Discrimination based on employer prejudice could also prevent women from receiving the requisite training and promotion opportunities within the internal labor markets of firms. However, our finding that women have a higher wage return on general labor market experience does not square well with this interpretation of discrimination.

Whether the gender wage gap is due to lower investments by women because of anticipated career interruptions, or whether career interruptions are due to lower wages (say due to discrimination), is of course the chicken or the egg question addressed in Gronau (1988).

[6]We do not provide a summary of the extensive literature on gender discrimination here. For an excellent survey of the literature see the recent article by Altonji and Blank in the Handbook of Labor Economics

between this demand side versus supply side interpretations, note that both explanations hinge on the presumed gender difference in attachment to a job or employer. The key point, however, is that our estimates of gender disparities in wage returns to tenure and experience shed light on where improvement might be needed to equalize wages between women and men, irrespective of the precise reasons for why such disparities exist.

The remainder of the paper is organized as follows. In Section 2 we present the empirical analysis of gender differences in wage returns on tenure and experience. This section is presented in various parts. First, we describe the NLSY data and present summary statistics of some of the key variables. Second, we outline our estimation framework by briefly discussing Topel's (1991) two-step estimator and Altonji and Shakotko's (1987) instrumental variables estimator. Third, we present and discuss our estimates of within-job wage growth and returns on tenure and experience across women and men. Fourth, we address some potential biases in the estimation of gender wage returns, and present some related evidence on mobility wage gains and serial correlation of wage increases. Finally, we present summary statistics of incidence and intensity of formal training, including company provided training, across a subsample of our NLSY respondents. In Section 3, entitled "Related Literature," we discuss a variety of related findings in order to place our contribution in the context of the large empirical literature on the gender wage gap. Section 4 concludes with a brief summary and discussion of further extensions.

2 Empirical Application

2.1 Data, Sample Restrictions, and Summary Statistics

We use panel data from the NLSY (1979-1994) to estimate the returns to experience and tenure across women and men. Starting in 1979, 12,686 male and female youths, aged 14 to 21, were interviewed annually till 1994, the last year of our panel.[7] Although the NLSY records information about multiple jobs, we only consider CPS designated job both because it is the main (or more recent) job, and because more information is available about the

(1999).

[7]Since 1994 the NLSY data are collected only every two years, and as a result some inconsistencies arise in annual earnings in the off years. To avoid such problems we restrict our analysis to the years 1979-1994 of the NLSY.

CPS job. Annual wages are deflated by the consumer price index from the Report of the President, where the base year is 1987. Our sample is restricted to white males and females who are neither self-employed nor employed in the agricultural or government sector. In addition we attempt to "clean" our data as follows. Observations with reported hourly wages in excess of $100 and less than $1.00 were deleted. We also drop observations with a real wage loss in excess of 30% or a real wage increase in excess of 300% from the previous interview (on the same job). Further, we drop observations if nominal wages increase by over 200% and is immediately followed by a nominal wage decrease of 50% or higher, and vice versa. Finally we restrict our sample to those with completed years of schooling between nine and sixteen. These selection criteria are of course arbitrary. However, the qualitative results of the paper are robust to various changes in these deletion criteria. One noteworthy point is that excluding observations with negative nominal within-job wage growth increases our estimates of within-job wage growth to levels comparable to Topel's (1991) estimates.

The construction of the experience and tenure variables is based on actual weeks worked and the start and stopping dates of work with a specific employer, respectively. Due to employment breaks, it is possible that the tenure variable overstates the actual weeks worked. We implement a simple correction by ensuring that the change in tenure from the previous interview year does not exceed the actual weeks worked between the current and previous interview dates.[8]

Table 1 shows the means for a key set of variables across four classifications by gender and education groups. The low education group (LHS) is restricted to those between 9 and 12 years of completed schooling, including high school graduates. The high education group (MHS) is restricted to those between 13 and 16 years of schooling including college graduates.[9] The mean ages are about the same across women and men within each of these two education groups. The most striking difference is in the mean hourly wages across women and men. Among the more educated workers, the mean wage for men is about $11 and for women it is about $8.50. That translates into an almost 30% wage premium for men.

[8] We thank Audrey Light for alerting us to this issue.

[9] Our wage analyses are presented for these two education groups separately. This classification follows Royalty (1998) who presents her mobility analyses along the same classification of low and high education groups. Alternative specifications yield qualitatively similar results.

Among the less educated workers, the premium is almost 35%. This gender wage discrepancy is particularly striking given that the means of some standard human capital measures such as completed years of schooling and AFQT scores are very similar across women and men within each education group. Men have slightly higher mean tenure and mean experience. Women work in jobs that are less likely to be union represented, they work fewer hours, and they have a slightly higher quit rate.

2.2 Estimation Framework

Consider a standard model of wage determination:

$$y_{ijt} = X_{ijt}\beta_1 + T_{ijt}\beta_2 + F_{ijt}\gamma + e_{ijt}, \tag{1}$$

where y_{ijt} is the log wage for individual i on job j at time t, X is total labor market experience, T is tenure (current job seniority) and F_{ijt} is a vector of other determinants of wages including higher order terms of experience and tenure. Henceforth we will drop $F_{ijt}\gamma$ for expository convenience. Parameters β_1 and β_2 represent the returns to an additional year of experience and tenure, respectively. The common interpretation of these coefficients is that β_1 represents the return on general human capital and β_2 represents the return on accumulated job-specific capital.

The error term is decomposed as:

$$e_{ijt} = \mu_i + \phi_{ij} + \eta_{ijt} + \nu_{it},$$

where μ_i is a fixed individual specific error component, ϕ_{ij} is a fixed job match specific error component, η_{ijt} is a time varying job match specific component, and ν_{it} is noise. Various hypothetical correlations between these error components and the two key independent variables – tenure and experience – give rise to bias in estimating returns on tenure and experience using OLS. These correlations are systematic because they are the outcome of optimizing search behavior, i.e., workers searching for, finding and maintaining good (high wage) employment matches and on account of individual heterogeneity. The OLS results are further confounded because the bias on tenure and experience coefficients cannot be signed.[10]

[10] The nature of these biases are explained in much greater detail in Topel (1991), and Altonji and Williams (1997).

Two well known estimators – Altonji and Shakotko (1987) and Topel (1991) – are explicitly designed to address these potential biases, and thus provide tenure and experience coefficients that are more reflective of the "true" returns. Although the size of the point estimates differ depending on which estimator is implemented (see Altonji and Williams 1997 for a more recent evaluation of these methods), we present estimates from both procedures and show that the differential returns to tenure and experience across gender remain robust across them especially among more educated workers.

Since these procedures are well known in the literature, we only briefly outline them here. Topel (1991) claims that his so-called two-step estimator provides an unbiased estimate of the overall returns to an extra year of labor market experience, a lower bound of the returns on tenure, and an upper bound of the returns on general labor market experience. Although the second step estimates of returns on experience and tenure are themselves not unbiased, the direction of bias is implied by theory and is symmetrical across the two estimates. (In Section 2.4 below we also tests for other potential sources of bias that might impact women and men differently.)

For simplicity, consider the following decomposition of the unobservables

$$e_{ijt} = \phi_{ijt} + \nu_{it}, \tag{2}$$

where ϕ_{ijt} represents the stochastic component of wages that is idiosyncratic to a specific employment relationship. A high value of ϕ would represent a "good match." Now consider the correlation of experience and tenure with this unobservable component

$$\phi_{ijt} = X_{ijt}b_1 + T_{ijt}b_2 + u_{ijt} \tag{3}$$

The job search process and increasing within-job wages imply that $b_1 > 0$; but the sign of b_2 is ambiguous if OLS is implemented. The advantage of Topel's two-step method is that this ambiguity is resolved because the estimate is derived from the consistent estimate of overall returns and the biased up estimate of the returns on experience. Hence the two-step procedure yields a lower bound estimate of the returns on tenure.

The first step of the two-step estimation procedure is to estimate within-job wage growth from the first differences of (1) for persons who do not change jobs, which eliminates fixed

job and individual effects:

$$y_{ijt} - y_{ijt-1} = \beta_1 + \beta_2 + e_{ijt} - e_{ijt-1} \tag{4}$$

If $e_{ijt} - e_{ijt-1}$ has zero mean and is serially independent then OLS applied to (4) will yield a consistent and efficient estimate of within job wage growth, $\beta_1 + \beta_2$.[11]

Note in particular that the sum of our estimates is a consistent estimate of the true returns on an additional year of labor market experience, unlike the one step OLS estimates where the sum would be biased, and thus we would be unable to assess the bounds for the returns on experience and tenure.

The second step entails the estimation of the returns on experience and tenure. Since $X = X_0 + T$ we can rewrite (1) as:

$$y = X_0\beta_1 + T(\beta_1 + \beta_2) + e \tag{5}$$

By subtracting within-job wage growth from either side of the above equation we get:

$$y - T(\widehat{\beta_1 + \beta_2}) = X_0\beta_1 + \epsilon, \tag{6}$$

where $\epsilon = e + T((\beta_1 + \beta_2) - T(\widehat{\beta_1 + \beta_2}))$, and $\widehat{\beta_1 + \beta_2}$ is the consistent first step estimator of the sum of the returns on experience and tenure. Equations (4) and (6) define the two-step model of estimating returns to tenure and experience.[12]

[11] We test whether wage innovations are serially correlated, and find no evidence of such correlation in either the female or male sample. See Subsections 2.4.1 and 2.4.3 for further discussion and empirical results, respectively.

[12] The OLS estimate $\widehat{\beta_1}$ (from 6) is an overestimate of the true returns to experience because X_0 is correlated with ϵ. Hence our estimate of returns on tenure, $\widehat{\beta_2} \equiv \widehat{\beta_1 + \beta_2} - \widehat{\beta_1}$, is a lower bound of the average return on seniority. These implications of the two step procedure can be explicitly derived by applying OLS to (4) and (6) and computing the expectations of $\widehat{\beta_1}$ and $\widehat{\beta_2}$ as follows:

$$E(\widehat{\beta_1}) = \beta_1 + b_1 + \gamma_{X_0T}(b_1 + b_2) \tag{7}$$

$$E(\widehat{\beta_2}) = \beta_2 - b_1 - \gamma_{X_0T}(b_1 + b_2), \tag{8}$$

where γ_{X_0T} is the least squares coefficient from a regression of tenure on initial experience, X_0. Note that the biases of our two step estimates of the returns on experience and tenure are equivalent but of opposite signs. Given $b_1 > 0$ (because of optimal job mobility), and $(b_1 + b_2) > 0$ (because productive employment relationships are located later in a workers career), we estimate an upper bound for experience and a lower bound for tenure. Since these are well settled properties of job search models, Topel's two step method leads to biased estimates where the direction of bias is well defined. Note, however, the result that Topel's two-step estimator yields an upper bound for experience and a lower bound for tenure must be tempered by the fact that individual heterogeneity – discussed in both Topel (1991) and Altonji and Williams (1997) – will bias tenure up and experience down. In our analysis of gender differences this will matter if heterogeneity is say greater among women than it is among men.

Altonji and Shakotko (1987) propose an instrumental variables estimator to address bias problems in estimating returns to tenure due to individual and job match heterogeneity in the wage equation. The main instrumental variables for the tenure variables T_{ijt} and T_{ijt}^2 are the deviations of the tenure variables around their means for the sample of observations on a given job match. By construction these instruments are uncorrelated with both the individual specific error component (μ_i) and the job match error component (ϕ_{ij}). Let $\overline{T_{ij}}$ be the mean of tenure for individual i over the sample observations in job j. Define $\widetilde{T}_{ijt}$ to be the deviation of T_{ijt} from the job mean, with $\widetilde{T}_{ijt} = T_{ijt} - \overline{T_{ij}}$. Let $(\widetilde{T}_{ijt})^2 = T_{ijt}^2 - \overline{(T_{ij})^2}$. The instrumental variables procedure is a 2SLS estimator in which $\widetilde{T}_{ijt}$ and $(\widetilde{T}_{ijt})^2$ serve as instrumental variables for T_{ijt} and T_{ijt}^2. If T_{ijt} is also uncorrelated with the transitory error component η_{ijt} then it is a valid instrumental variable.

In the results section below we present estimates from both these procedures, in addition to the OLS estimates.

2.3 Results

2.3.1 Within-job Wage Growth

Estimates of within-job wage growth are reported in Table 2. The first step of Topel's model allows for quadratic differentials for tenure and experience. The model is under-identified by one parameter because first differences imply the identical unit change for both experience and tenure. Thus the constant term represents the wage increase due to an additional year of labor market experience, i.e. the sum of returns on an additional year of both general and job-specific experience.

Note that the overall return to labor market experience is higher for men than women across both low and high education groups. An additional year of labor market experience leads to about a 17 to 15 percent higher wage increase for men compared to women across the high and low education groups, respectively. This finding of lower overall returns to labor market experience for women have been documented in many previous studies.[13] We now turn to our estimates of the differential returns to experience and tenure across women and men.

[13] For example, see Loprest (1992), and Light & Ureta (1995).

2.3.2 Returns to Experience and Tenure

Table 3 and Table 4 present the result from various log wage regressions – OLS, AS, and Topel estimators – across low and high education groups. The OLS results are largely for comparison purposes, but since the biases of the OLS estimates are obvious we will focus our discussion on the estimates from the AS and Topel estimators. Tables 3 and 4 present estimates for the low and high education groups, respectively. Given the significant effects of the higher order terms on wages, Tables 5 and 6 show the cumulative returns on tenure and experience for 5 and 10 year periods across the low and high education groups, respectively. These cumulative returns of course include the effects of the higher order terms of tenure and experience. The overall impression from the sample of less educated workers is that the return on tenure is higher for men and that the return on experience is higher for women. This pattern of returns is similar across both AS and Topel procedures especially over the longer 10 year horizon. Among more educated workers these patterns of cumulative returns are even more striking: across both the AS and Topel procedures, return on tenure is substantially smaller for women than it is for men, and return on experience is larger for women than it is for men.[14] In particular, the estimates from Topel's procedure imply that the cumulative wage return on tenure, over a 10 year period, is about 50% higher for men than it is for women;[15] and the cumulative return on experience is about 40% higher for women than it is for men. Note further that, on the basis of Topel's estimates, the true gender differential of the returns on experience is likely to be stronger than what our estimates suggest because these estimates are biased up more for men than for women since men experience higher mobility wage gains than women (see Section 2.4.2 below).

These findings are consistent with the hypothesis that women, especially among educated workers where strategic human capital investments are likely to matter more, are less likely

[14] Somewhat surprisingly, under the AS method the cumulative return to tenure after 10 years is lower than the cumulative return after 5 years. This is clearly due to the negative coefficient on the square term of tenure. Note that in Bratsberg and Terrell (1999) the cumulative return to tenure turns negative after 5 years for their white sample. Our 10 year cumulative return to tenure is very similar to the return estimated in Altonji and Williams (1997) using the same AS procedure. As a precaution, it is important to note that given the young age of the NLSY sample, and hence relatively fewer observations around the 10 year tenure mark, the predicted cumulative returns after 10 years of job tenure are not particularly reliable.

[15] The true percentage differences should be calculated on the basis of $(e^{\beta} - 1)$ when β is higher.

to invest in job-specific skills and more likely to invest in general skills.[16] However, to the extent that these differences in wage returns on experience and tenure are not due to gender differences in job duration, they could very well reflect employer discrimination in terms of access to company training and promotion opportunities.

2.4 Other Potential Biases

2.4.1 Estimating Wage Returns across Women and Men

Here we discuss some of the biases of our estimation procedures and ask whether they are likely to be different across women and men. The discussion here focuses on the possible interpretive ramifications for our estimates of returns on experience and tenure across women and men on account of such biases.[17]

Since job mobility considerations lead to an upper bound estimate of returns on experience, an important concern is whether the job search process is likely to differ among women and men. Standard search theory says that workers search for, and move to better jobs. Our estimation framework defines "better" jobs one-dimensionally, i.e., in terms of wages only. This wage sensitivity of mobility, however, is likely to be different across women and men for precisely the same sorts of reasons that motivate differences in strategic human capital investments. If women care relatively more about other job characteristics such as hours and location of work than wages (Kahn and Griesinger, 1989) then mobility wage gains are likely to be smaller for women. In addition, since job search is also a job-specific investment, women might invest less in search than men.[18] Thus the bias in estimating returns to experience is likely to be less for women than men. This difference in mobility wage gains only strengthens our findings because it implies that our results over estimate the upper

[16] Sicherman (1996) finds that women are more likely to quit for a higher paying job, while men are more likely to quit for a job with better "career oppportunities."

[17] Bratsberg and Terrell (1999) have a more extensive discussion on the sensitivity of both the AS and Topel estimators to various considerations that could lead to bias in their estimators, including choice of metric of tenure and experience. Using the same NLSY data they argue that their key conclusion – black workers receive a comparable or even higher return to tenure than white workers, but earn a far lower return to general labor market experience – holds because these biases do not necessarily compromise the comparison across races. Our discussion here focuses on considerations we think might lead to biases that differ systematically across women and men.

[18] Sandell (1980) presents some evidence to suggest that unemployed married women invest too little in job search.

bound for men. If the mobility bias for women were as large as it is for men our estimates of returns on experience for women would be higher, and the returns on tenure would be correspondingly lower.

In fact, Loprest (1992) using the same NLSY data shows that mobility wage gains for women are about half of what they are for men, and attributes part of the discrepancy to choice of hours, location and occupation. In the empirical section below we provide some further evidence of differential mobility wage gains across gender.

Another potential hurdle in implementing Topel's is the assumption that jobs do not differ systematically in their permanent rates of wage growth. If high wage growth is due to firm-specific factors then high growth jobs are more likely to survive, and our first step estimate of within-job wage increases will over estimate the wage growth of the population. In turn, this would lead to an over estimate of the return on tenure. The issue is twofold. First, we need to ascertain whether there is evidence of heterogeneity of wage growth rates, and second whether this evidence differs across gender. In the empirical section we replicate a test outlined in Topel (1991) and conclude that this potential bias is empirically unimportant for both women and men.

A cautionary note here is that positive serial correlation of wage growth may be an inappropriate test of heterogeneity of wage growth rates among jobs (Munasinghe 2003), and thus Topel's first step may be an over estimate of the overall returns to an additional year of labor market experience. This conclusion needs to be tempered with the fact that it is the same wage setting considerations that show that the tenure-wage profile will be flatter than the tenure-productivity profile. Thus the over sampling of higher wage growth jobs is ameliorated by the fact that any estimate of the tenure effect on wages is likely to be an underestimate of the underlying increase in firm-specific productivity. The key point for our purposes is that the gender differential in returns to tenure is nevertheless informative of differences in firm-specific skill accumulation across women and men.

2.4.2 Mobility Wage Gains across Women and Men

We just argued that mobility wage gains are likely to be smaller for women than for men. Recent evidence seems to suggest that this is in fact the case (Loprest, 1992; Light & Ureta,

1995). We include some direct evidence of mobility wage gains across gender using our NLSY sample. The gross increase in wages across women and men conditional on a quit are about 30% more for men compared to women. Regression results of mobility wage gains are presented in Table 7. We confirm that men gain more from mobility, and that married women gain the least. This latter effect is stronger when we restrict our sample to ages between 20 and 30.

2.4.3 Heterogeneous Wage Growth Rates

In this section we consider whether wage innovations on the job are serially correlated. Recall from Section 2.2 that we assume serial independence to obtain consistent first step estimates for overall returns. If jobs differ in wage growth rates and the source of wage growth is due to firm-specific factors then high growth jobs are more likely to survive. As a consequence, our first step would over estimate the return on an extra year of labor market experience. In turn, the second step leads to an over estimate of β_1. Our concern here is to ask whether there is evidence of such bias, and especially, whether this bias is different across women and men. Here we follow Topel's exposition. Rewrite the wage growth model (4):

$$y_{ijt} - y_{ijt-1} = \beta_1 + \beta_2 + \eta_{ijt} + \nu_{ijt} - \nu_{ijt-1},$$

where $\eta_{ijt} = \phi_{ijt} - \phi_{ijt-1.}$ Note that if this permanent component of wage increase is specific to an employment relationship then high wage growth jobs are more likely to survive. So high (low) anticipated values of η_{ijt} are more (less) likely to survive in the future. In the observed sample of within-job wage growth $E\eta > 0$. A simple procedure to test for this source of bias is to ask whether the residual of current wage growth is positively correlated with the remaining life of the job (Topel, 1991). Denote R_t as the remaining life a job from time t. Then

$$0 \leq E(\eta_t | R_t \geq 0) < E(\eta_t | R_t \geq 1) < E(\eta_t | R_t \geq 2) < ....$$

We replicate this test across women and men in our sample and find no evidence of the above inequalities in either sample.[19] Table 8 presents evidence of current wage growth

[19] We regress current wage growth on the remaining life of a job with controls for other observables. We do not find evidence of a linear relationship between current wage growth and the remaining life of a job. We also allow for separate effects for jobs that end in period t+2, t+3, t+4. Because the omitted category

across jobs that end in the near and distant future. Current wage growth is not systematically higher for jobs that end further in the future across either the male or the female sample. Hence we do not find evidence in support of this bias.[20] However, these findings must be tempered with the possibility that under certain wage setting conditions lack of positive serial correlation in within-job wage growth is an inappropriate test to reject the hypothesis of heterogeneous wage growth rates among jobs.[21]

2.5 Training Incidence and Intensity

Starting in 1987, the NLSY contain detailed information on formal job training programs, including the incidence and hours of training on the job. More importantly for our purposes this training information is available for company provided training and other non-company provided training separately. Since company provided training is more likely to be firm specific than other non-company provided sources of training, it is relevant to ask whether women receive relatively less of the company provided training than men. Table 9 shows the incidence and mean hours of all training versus company provided training across women and men

The sample is restricted to white women and men who start a new job in 1987 or after, and continue on in the same job for two further periods. Hence the incidence rate represents the percent that receive any hours of training during the first three survey periods on a job. The mean hours include the sample of individuals that never receive any training.[22] Even these gross numbers are quite striking. The incidence rate for all training is slightly higher for men (37% versus 34%), but the disparity in the incidence rate for company provided is bigger (31% for men versus 26% for women).[23] The more dramatic finding is the relative

is of jobs with duration longer than 4 periols, these coefficients should be negative and decreasing in value. This pattern is clearly not supported by the evidence presented in Table 8.

[20] We find, like Topel and Ward (1992), that the evolution of within-job wages follows a random walk. Moreover, we also find that there is no evidence of positive serial correlation of within-job wage innovations for either women or men.

[21] See the earlier discussion in Section 2.4.1.

[22] Table 9 is clearly not a substitute for a rigorous analysis of gender disparities in training. The objective is simply to present some summary statistics about gender disparities in company provided training that is consistent with the differential wage returns to tenure across gender. Other studies (see below) have provided a more thorough analysis of training disparities across gender.

[23] See Lynch (1992) for a more careful analysis of incidence of different types of training programs. Her study confirms that men are more likely to receive on-the-job training, and that women (controlling for

mean hours of training between all training and company provided training across gender. Men receive substantially more hours of all training combined – over 50% more in mean training hours – than women. But this gender disparity in combined training is entirely due to the fact that men receive more than double the hours of company provided training than women – mean of 42 hours for men versus 19 hours for women. These findings are consistent with our earlier findings on the differential wage returns on tenure and experience across gender.

A relevant question here is whether these large gender disparities in company provided training could be due to differences in expected job duration. Royalty (1996) not only finds that predicted turnover is significantly related to the likelihood of receiving company provided training, but that the positive effect of being male on the probability of receiving company training is reduced by about 25% when estimated turnover rates are included in the estimation. However, as also noted by Royalty, there remains some advantage to men in the receipt of company training that is not explained by observables, including the turnover probabilities. Hence these training disparities could indeed be a consequence of employer discrimination.

3 Related Literature

Previous empirical studies have documented the effects of experience and tenure on the gender wage gap. The primary focus in this literature has been to explore the contribution of gender differences in actual experience and labor force interruptions on the gender wage gap (Light and Ureta 1990; Kim and Polachek 1994; Wellington 1993; Filer 1993). The conclusion here is that gender differences in participation rates, timing of work experience, and accumulated experience are not only key determinants of earnings, but the convergence of these work history characteristics across women and men is an important source of the recent narrowing of the gender wage gap. Although these studies are not focussed on estimating differential gender returns on experience and tenure as we are in this paper, some results from these studies stand in sharp contrast to our findings. For example, Light and Ureta (1995)

other factors) are more likely to receive off-the-job training. Note, however, that her sample is restricted to non-college-graduates and only looks at training incidence during the period 1980-83.

find that returns on tenure are higher for women than men (though these estimated returns are very small for both women and men and use a different – work history – specification);[24] Becker and Lindsay (1994), using the Panel Study of Income Dynamics from 1968 to 1987, find that wage-tenure profiles are steeper for women than men among a sample of stayers (those who stay with the same employer for more than 5 years).[25] By contrast we find strong evidence that the returns on tenure is substantially higher for men than it is for women.

Here we address several other related issues. First, although some of the evidence on gender differences in job mobility seems to be consistent with our conjecture that women have weaker attachment to jobs, the overall evidence is mixed. Light and Ureta (1995) find that women have longer and more frequent non-working spells than men in their early careers, and that women tend to require relatively more time to accumulate a given amount of work experience. Other studies, including Becker and Lindsay (1994) and Sicherman (1996), also find that women quit jobs at a higher rate than men. These studies support the view that women are relatively less attached to jobs. To the extent that women expect, and do experience, shorter job durations, the lower estimated rate of return on tenure for women is consistent with the strategic choice hypothesis.

However, a more recent empirical analysis by Royalty (1998) shows, using the same NLSY data that we use in our wage analyses, that the average probability of staying on the job is not significantly different for men and women.[26] More interestingly, Royalty uncovers some interesting gender differences in mobility patterns by looking at finer categories of mobility across different education levels: less educated women have lower job-to-job (and higher job-to-unemployment) transitions compared to their male counterparts, and more educated women have higher job-to-job (and also higher job-to-unemployment) transitions compared to their male counterparts. This study highlights the importance of distinguishing the type of

[24] These findings are discussed in greater detail in Section 3.3.

[25] Becker and Linsay (1994) present an extension of Hashimoto's (1981) model of financing firm-specific investments to show that women will bear a higher cost of these investments because they are more likely to turn over. As a consequence, they argue that women will have steeper wage-tenure profiles than men. This result is sensitive to the implicit assumption that all workers receive the same amount of specific investment. In a less restrictive framework where the investments are endogenous, this result is unlikely to hold. As we have stressed in this paper, if women are more likely to separate from their employers then they are less likely to invest in specific skills and in jobs with backloaded compensation.

[26] Other studies of young women and men (e.g. Farber 1994) have also not found significant differences in separation probabilities by gender.

departure from a firm and its interaction with education in the analysis of gender differences in job mobility. However, to the extent that women and men have similar firm-specific tenure, the reason why women experience lower returns to tenure favors the demand side explanation based on employer discrimination.

Light & Ureta (1995), emphasizing a work history specification for experience, obtain estimates of returns on experience and tenure across gender that are somewhat at variance with our results. They find, like we do, that the overall returns to labor market experience are higher for men than women. With the more detailed experience variable they find that the returns to experience are substantially higher than with more conventional measures of experience such as cumulative experience and potential experience. The more striking finding is that their estimates of returns on tenure across both women and men are extremely low, and even more surprising is the fact that the returns on tenure (for women are almost three times the returns for men. Five years of tenure increases the wages of women by about 14%, while for men it increases by a mere 5%. This result stands in sharp contrast to our findings on gender differentials in returns on tenure. One potential reason for the relatively low estimates of returns on tenure could be due to the IV approach where returns to experience and tenure are likely to be over and under estimated, respectively.[27]

Perhaps more importantly, Light and Ureta's estimates of returns on tenure across gender is somewhat perplexing in light of their own findings (mentioned earlier) that women experience a smaller drop in wages when they re-enter the labor market after a nonworking spell compared to their male counterparts, and further that women rebound to their previous wages quicker than men. These latter findings suggest that women invest more in portable skills and less in firm-specific skills compared to their male counterparts. This interpretation, however, is difficult to reconcile with the fact that returns on tenure are higher for women than men.

Second, the type and quantity of training women and men receive have important ramifications for returns on tenure and experience. The observed gender differences in returns to tenure and experience could indeed be the result of gender differences in training.[28] The

[27] See Topel (1991) for a careful discussion of the reasons, including the IV approach, why returns on tenure are consistently under estimated. Also see Altonji and Williams (1997) for a rebuttal.

[28] Indeed, weaker job attachment implies that women are less likely to invest in on-the-job training. See

direct evidence on gender differences in training suggest that women receive less training then men (Royalty 1996; Olsen and Sexton 1996; Hill 1995; Lynch 1992; Altonji and Spletzer 1991). We also provide some direct, albeit preliminary, evidence on training incidence and intensity across women and men that is consistent with the observed gender differentials in the returns on tenure and experience.[29] Using information in the NLSY on formal job training programs, we reported in Section 2.5 that men not only spend more hours training but that this gender disparity in hours of training is entirely due to the disparity in hours of *company provided* training.[30] There are of course major limitations to using data from formal training programs, especially given how little of such training is received. However, if reported training is just a small (but proportional) component of actual training then these reported differences in training may also reflect gender disparities in actual training levels. More importantly, note that our primary concern is on the general issue of differential wage returns on tenure and experience since wage returns reflect not only returns on formal training programs (as identified in the NLSY and in many of the training studies cited above), but also returns on informal training, learning by doing, and other incentive-based compensation policies. As a consequence the major focus of our empirical work is on gender differences in wage returns on tenure and experience.

Third, the findings in this paper may have a direct link to the recent literature on the "family gap" in earnings for women with children.[31] Differential returns to marital and parental status explain a large fraction (in the order of 40%-50%) of the gender wage gap (Waldfogel 1998a). One explanation is that employers may discriminate against women with children in terms of company provided training and promotions. A second noteworthy reason could be the lack of access to job-protected maternity leave that impedes progress of mothers in labor markets that value experience, tenure, and a good match between employer and

Barron *et al* (1993). Of course, gender differences in company provided training could be due to strategic investment decisions on the part of the employee or due to employer discrimination.

[29] As mentioned earlier, gender disparities in wage returns on tenure could be due to factors other than just company provided training differentials such as back-loaded pay structures designed to elicit work effort or to incent self selection of less mobile workers. Information on wage contracts and employment practices are, however, extremely rare, except perhaps in firm level data that includes personnel records.

[30] Further evidence from the NLSY is provided by Lynch (1992), who looks at a sample of non-college-graduates and finds that males are more likely to receive on-the-job training and to be in apprenticeships while women are more likely to receive off-the-job training.

[31] See Waldfogel (1998b) for an excellent review of this literature.

employee (Waldfogel, 1998a and 1998b). Our finding that women experience substantially lower returns to tenure is entirely consistent with this family penalty literature. An important policy issue, stressed in this literature, is the ramification of legislation such as the Family and Medical Leave Act (FMLA) on the family penalty.[32] A potentially interesting question for future research would be to ask whether the returns to tenure for women increase in the post 1993 period after the enactment of FMLA.

Finally, it is important to emphasize that we are less concerned with "unbiased" point estimates of returns on tenure and experience than we are with gender differentials of these returns that may signify important differences in the types of human capital or wage-tenure profiles experienced by women and men. As a consequence, the finer points of the debate on estimating wage returns on tenure and experience concern us only to the extent that the potential biases might be systematically different across women and men.[33]

4 Conclusion

We estimate returns to experience and tenure across a sample of women and men in their early careers. We confirm that the overall wage return to an additional year of labor market

[32] Waldfogel (1998a) presents evidence showing that women who are allowed maternity leave are more likely to return to their previous employers. Clearly such mandates will increase expected job duration and thus increase the likelihood of women receiving job specific investment opportunities. These effects will not only pertain to mothers but more generally to women since expectations about motherhood especially from the employers perspective is the more likely determinant of job specific investment opportunities.

[33] The controversy about estimating returns on tenure has much to do with the current consensus among empirical labor economists that the estimated tenure effect is either small or absent (Altonji and Williams, 1997), while the negative effect of tenure on job turnover remains one of the most robust and widely documented findings in empirical labor. Since the size of the tenure effect on wages is typically interpreted as an indicator of the importance of firm-specific skills or of back-loaded compensation schemes, the small estimated coefficient appears to cast doubt on the workhorse theories of compensation and turnover. However, it is important to keep in mind that in the presence of firm-specific rents, Becker-type sharing models and dynamically consistent wage policies (Munasinghe 2002) imply flatter wage-tenure profiles compared to the underlying productivity-tenure profiles. Hence small tenure effects on wages are consistent with high levels of firm-specific skill accumulation. These considerations suggest that even if the estimated gender differentials in returns on tenure are small, it may nevertheless represent much larger differences in firm-specific skill accumulation across women and men.

A further complication arises due to heterogeneity of firm-specific wage growth rates among jobs. If high wage growth jobs are oversampled because they are more likely to survive, then the estimates of wage returns on tenure are likely to be overestimated. Topel (1991) argues that heterogeneity of wage growth rates is empirically unimportant because there is no evidence of serial correlation of within-job wage increases. However, serial correlation of wage growth rates is an inappropriate test of wage growth differences among jobs under dynamically consistent compensation policies. The interested reader can find a more complete discussion of these issues in Munasinghe (2003).

experience is higher for men than women. However, a decomposition of this overall return shows that especially among more educated workers, the return on tenure is substantially lower for women than for men, but that the return on experience is higher for women than men. These findings are consistent with the hypothesis that women in comparison to men might be less attached to jobs due to life cycle events such as marriage and child birth. Our interpretation is also compatible with some of the findings in Light and Ureta (1995), namely that for women the drop in earnings upon returning to work after a career interruption is smaller than it is for men, and the "catch up" to their continuously employed counterparts is quicker. Further we show that the gender disparity in job training intensity is due to the fact that men receive substantially more company provided training than women. These findings support our conjecture that women invest (or receive) relatively less in job or firm specific skills because on average they expect to have shorter job durations.

Our empirical analysis can be extended by explicitly introducing instruments for women's commitment to the labor market and to specific jobs. For example, worker's expectations about job duration, future labor force participation, care for parent, and the timing of marriage and children can be utilized to refine the analysis presented in this paper. How do the returns to experience differ across women who anticipate working in the labor market versus those who do not? Do women who expect to marry and have children later in life experience greater returns to labor market experience? Do women who expect long job durations experience higher returns to tenure? Answers to these questions could potentially help to clarify whether the observed differential returns on experience and tenure for women are a consequence of investment choice or discrimination on the part of employers.

Given the dramatic changes in women's commitment to the labor market, it would be interesting to replicate our analysis of returns on experience and tenure for women not only in the post 1994 period but also in an earlier time period. It is a well documented fact that women have caught up in terms of educational attainment (Light and Ureta, 1990). Estimating the changing returns to different types of labor market experiences can attest to the growing importance of human capital formation on the job for women.

References

[1] Abraham, Katherine and Henry Farber (1987), "Job Duration, Seniority, and Earnings," *American Economic Review*, Vol. 77, June 1987: 278-297.

[2] Altonji, Joseph and Rebecca Blank (1999), "Race and Gender in the Labor Market" Chapter 48 in the *Handbook of Labor Economics*, Volume 3, Edited by O. Ashenfelter and D. Card, Elsevier Science, 1999.

[3] Altonji, Joseph and Nicolas Williams (1997), "Do Wages Rise With Job Seniority? A Reassessment," NBER, Working Paper # 6010, Cambridge, MA.

[4] Altonji, Joseph and James Spletzer (1991), "Worker Characteristics, Job Characteristics and the Receipt of On-the-Job Training," *Industrial and Labor Relations Review*, 45 (1): 58-79.

[5] Altonji, Joseph and Robert Shakotko (1987), "Do Wages Rise with Job Seniority," *Review of Economic Studies*, Volume 54, July 1987, pp. 437-459.

[6] Barron, John, Dan Black, and Mark Loewenstein (1993), "Gender Differences in Training, Capital and Wages," *Journal of Human Resources*, 28 (2): 343-64.

[7] Becker, Elizabeth and Cotton Lindsay (1994), "Sex Differences in Tenure Profiles: Effects of Shared Firm-Specific Investments," *Journal of Labor Economics*, 12 (1): 98-118.

[8] Blau, Francine and Lawrence Kahn (1997), "Swimming Upstream: Trends in the Gender Wage Differential in the 1980s," *Journal of Labor Economics*, Volume 15 (1, part 1): 1-42.

[9] Bratsberg, Bernt and Dek Terrell (1998), "Experience, Tenure, and Wage Growth of Young Black and White Men," *Journal of Human Resources*, Volume 33, pp. 658-682.

[10] Burdett, Kenneth (1978), "Theory of Employee Search: Quit rates," *American Economic Review*, Vol. 68, March 1978: 212-220.

[11] Farber, Henry S. (1994), "The Analysis of Interfirm Mobility," *Journal of Labor Economics*, 12 (October 1994): 554-93.

[12] Filer, Randall (1993), "The Usefulness of Predicted Values for Prior Work Experience in Analyzing Labor Market Outcomes for Women," *Journal of Human Resources*, 28 (3): 658-682.

[13] Gronau, Reuben (1988), "Sex-related Wage Differentials and Women's Interrupted Labor Careers – the Chicken or the Egg," *Journal of Labor Economics*, 6 (3): 277-301.

[14] Hashimoto, Masanori (1981), "Firm-Specific Human Capital as a Shared Investment," *American Economic Review*, Vol. 71, No. 3, June 1981: 475-482.

[15] Hersch, Joni and Abagail Reagan (1997), "Worker Effort Decisions and Efficient Gender-Specific Wage-Tenure Profiles," Economic Inquiry, vol. 35, issue 1, 1997: 193-207.

[16] Hill, Elizabeth (1995), "Labor Market Effects of Women's Post-School-Age Training," *Industrial and Labor Relations Review*, 49 (1): 138-149.

[17] Kahn, Shulamit and Harriet Griesinger (1989), "Female Mobility and the Returns to Seniority: Should EEO Policy be Concerned with Promotion?," *American Economic Review*, Volume 79, No. 2, Papers and Proceedings, May 1989, pp. 300-304.

[18] Kim, Moon Kak, and Solomon Polachek (1994), "Panel Estimates of Male-Female Earnings Functions," *Journal of Human Resources*, 29 (2): 406-428.

[19] Lazear, Edward P. "Agency, Earnings Profile, Productivity, and Hours Restrictions," *American Economic Review*, Volume 71 (September 1981), pp. 606-20.

[20] Light, Audrey and Manuelita Ureta (1995), "Early-Career Work Experience and Gender Wage Differentials," *Journal of Labor Economics*, Volume 13 (1), January 1995.

[21] Light, Audrey and Manuelita Ureta (1990), "Gender Differences in Wages and Job Turnover Among Continuously Employed Workers," *American Economic Review*, Volume 80, No. 2, Papers and Proceedings, May 1990, pp. 293-297.

[22] Loewenstein, George and Nachum Sicherman (1991), "Do Workers Prefer Increasing Wage Profiles?" *Journal of Labor Economics*, 9 (1): 67-84.

[23] Loprest, Pamela (1992), "Gender Differences in Wage Growth and Job Mobility," *American Economic Review*, Volume 82, May 1992.

[24] Lynch, Lisa (1992), "Private Sector Training and the Earnings of Young Workers," *American Economic Review*, Volume 82, March 1992, 299-312.

[25] Mincer, Jacob and Hiam Ofek (1982), "Interrupted Work Careers: Depreciation and Restoration of Human Capital," *Industrial and Labor Relations Review*, 17 (1): 3-24.

[26] Munasinghe, Lalith (2003), "A Theory of Wage and Turnover Dynamics," Working Paper. New York: Barnard College, Department of Economics, 2003.

[27] Olsen, Reed Neil, and Edwin Sexton (1996), "Gender Differences in the Returns to and the Acquisition of on-the-job Training," *Industrial Relations*, 35 (1): 59-77.

[28] O'Neill, June and Solomon Polachek (1993), "Why the Gender Gap in Wages Narrowed in the 1980's," *Journal of Labor Economics*, Volume 11. January 1992, Part I: 205-228.

[29] O'Neill, June (1990), "Women and Wages," *The American Enterprise*, 1.6 (Nov.-Dec.): 25-33.

[30] Royalty, Anne Beeson (1998), "Job-to-Job and Job-to-Nonemployment Turnover by Gender and Education Level," *Journal of Labor Economics*, Volume 16, no. 2, pp. 392-443.

[31] Royalty, Anne Beeson (1996), "The Effects of Job Turnover on the Training of Men and Women," *Industrial and Labor Relations Review*, Volume 49, Issue 3, 1996: pp. 506-521.

[32] Salop, Joanne and Steven Salop (1976), "Self-Selection and Turnover in the Labor Market" *Quarterly Journal of Economics* 90. November. 1976

[33] Sandell, Steven H. (1980), "Is the Unemployment Rate of Women Too Low? A Direct Test of the Economic Theory of Job Search," *Review of Economics and Statistics*, Volume 62, Issue 4, November 1980: 634-638.

[34] Sicherman, Nachum (1996), "Gender Differences in Departure from a Large Firm," *Industrial and Labor Relations Review*, vol. 49, no. 3, April 1996.

[35] Topel, Robert (1991), "Specific Capital, Mobility, and Wages: Wages Rise with Job Seniority," *Journal of Political Economy*, Volume 9, No. 1, 1991: 145-176.

[36] Topel, Robert and Michael P. Ward (1992), "Job Mobility and the Careers of Young Men," *Quarterly Journal of Economics*, May 1992: 145-176.

[37] Waldfogel, Jane (1998a), "The Family Gap for Young Women in the United States and Britain: Can Maternity Leave Make a Difference?", *Journal of Labor Economics*, 16(3), 505-545.

[38] Waldfogel, Jane (1998b), "Understanding the 'Family Gap' in Pay for Women with Children," *Journal of Economic Perspectives*, 12(1), 137-156.

[39] Wellington, Alison (1993), "Changes in the Male Female Wage Gap (1976-95)," *Journal of Human Resources*, 28 (2): 383-411.

Table 1

Key Variables and Descriptive Statistics
National Longitudinal Surveys of Youth, 1979-1994

Variable	LHS		MHS	
	Women	Men	Women	Men
# of Observations	7,747	9,579	4,720	4,237
Log of Real Wages	1.74	2.02	2.06	2.29
Age	26.4	26.6	27.9	28.2
Completed Years of Schooling	11.6	11.5	14.7	14.7
Tenure	2.80	3.13	2.83	3.06
Net Years of Experience	6.77	7.50	8.07	8.54
If Married, with Spouse	.52	.50	.51	.50
If Reside in SMSA	.70	.70	.82	.81
Health Limits Amount of Work	.024	.015	.02	.01
Union Status	.12	.21	.07	.10
Real Wage (1987 dollars)	6.13	8.20	8.6	10.91
Average Hours Worked	38.6	44.4	37.1	43.2
AFQT Score	42.24	42.5	66.7	70.7
Quit Rate	.22	.20	.22	.20

Table 2

Within-Job Wage Growth, NLSY 1979-94
Estimates from Topel's First Step

	LHS		MHS	
	Women	Men	Women	Men
	.079	.091	.100	.117
	(.0048)	(.0049)	(.0074)	(.0088)
# Observations	5,019	6,515	2,967	2,879

Note: Standard Errors in parentheses.

Table 3

Log Wage Regressions by Gender, NLSY 1979-94
High School or Less

	I. OLS		II. Altonji and Shakotko		III. Topel	
Variable	Women	Men	Women	Men	Women	Men
Tenure	.070	.057	.036	.036	.052	.056
	(.004)	(.003)	(.006)	(.006)	(.005)*	(.005)*
Tenure^2	-.004	-.003	-.003	-.003	-.0030	-.0023
	(.0003)	(.0003)	(.0005)	(.0004)	(.0005)	(.0004)
Experience	.024	.026	.040	.037	.030	.039
	(.005)	(.004)	(.005)	(.005)	(.0012)	(.0012)
Experience^2	-.0001	-.0005	-.0003	-.0006	-.0000	-.0011
	(.0003)	(.0003)	(.0003)	(.0003)	(.0004)	(.0004)
Union	.126	.257	.146	.270	.123	.246
	(.011)	(.009)	(.012)	(.009)	(.011)	(.009)
SMSA	.154	.103	.143	.100	.155	.102
	(.008)	(.008)	(.009)	(.008)	(.008)	(.008)
Health	-.064	-.064	-.074	-.057	-.060	-.079
	(.024)	(.028)	(.025)	(.029)	(.024)	(.029)
Hours Work	.0046	.0014	.005	.0012	.004	.0013
	(.0004)	(.0004)	(.0005)	(.0004)	(.0004)	(.0004)
AFQT	.0033	.0026	.0034	.0028	.003	.0026
	(.0002)	(.0002)	(.0002)	(.0002)	(.0002)	(.0002)
Constant	1.12	1.51	1.10	1.52	1.12	1.44
	(.025)	(.025)	(.026)	(.026)	(.023)	(.022)
# of Obs.	7,747	9,579	7,747	9,579	2,699	3,153
Adjusted R^2	.293	.311	.253	.280	.181	.227

Notes:

1. Estimates in Topel column are from Topel's second step.

2. Marital status, region dummies, and a dummy variable for less than high school are also included as independent variables.

3. Standard errors are in parentheses. *Estimated upper bound for standard errors.

Table 4

Log Wage Regressions by Gender, NLSY 1979-94
Sample: More than High School

	I. OLS		II. Altonji and Shakotko		III. Topel	
Variable	Women	Men	Women	Men	Women	Men
Tenure	.080	.068	.034	.043	.039	.067
	(.005)	(.006)	(.009)	(.010)	(.0077)*	(.0087)*
Tenure^2	-.005	-.004	-.0028	-.0023	-.0012	-.0021
	(.0005)	(.0006)	(.0007)	(.0008)	(.0006)	(.0006)
Experience	.034	.023	.040	.027	.065	.051
	(.008)	(.009)	(.008)	(.009)	(.002)	(.0021)
Experience^2	-.0000	-.0000	.0000	-.0001	-.0016	-.0017
	(.0005)	(.0004)	(.0005)	(.0005)	(.0005)	(.0005)
Union	.139	.100	.154	.105	.126	.084
	(.022)	(.02)	(.023)	(.020)	(.023)	(.021)
SMSA	.177	.200	.173	.195	.179	.198
	(.014)	(.015)	(.015)	(.016)	(.015)	(.016)
Health	-.127	-.184	-.114	-.195	-.121	-.160
	(.037)	(.057)	(.038)	(.058)	(.039)	(.060)
Hours Work	.0027	.0026	.003	-.003	.003	-.003
	(.0006)	(.0007)	(.0006)	(.0007)	(.0006)	(.0007)
AFQT	.0032	.0019	.0035	.0021	.003	.0015
	(.0003)	(.0003)	(.0003)	(.0003)	(.0003)	(.0003)
Constant	1.29	1.86	1.28	1.86	1.19	1.72
	(.048)	(.054)	(.050)	(.056)	(.042)	(.047)
# of Obs.	4,720	4,237	4,720	4,237	1,415	1,164
Adjusted R^2	.294	.294	.255	.260	.279	.278

Notes:

1. Estimates in Topel column are from Topel's second step.

2. Marital status, region dummies, and a dummy variable for less than college are also included as independent variables.

3. Standard errors are in parentheses. *Estimated upper bound for standard errors.

Table 5

Cumulative Returns to Tenure and Experience
Sample: High School or Less

		Women		Men	
		5 years	10 years	5 years	10 years
OLS	Tenure	.25	.30	.21	.27
	Experience	.12	.23	.12	.21
AS	Tenure	.11	.06	.11	.20
	Experience	.20	.40	.17	.26
Topel	Tenure	.19	.22	.22	.33
	Experience	.15	.30	.17	.28

Note: Computations are based on estimates from Table 3.

Table 6

Cumulative Returns to Tenure and Experience
Sample: More than High School

		Women		Men	
		5 years	10 years	5 years	10 years
OLS	Tenure	.28	.30	.24	.28
	Experience	.17	.34	.12	.23
AS	Tenure	.10	.06	.16	.33
	Experience	.20	.37	.13	.31
Topel	Tenure	.17	.27	.26	.41
	Experience	.29	.49	.21	.34

Note: Computations are based on estimates from Table 4.

Table 7

Mobility Wage Gains across Gender & Marital Status
NLSY 1979-1994

Variable	All	20≤Age≤30
Female	-.0133	-.0116
	(.0107)	(.0124)
Married*Female	-.0554	-.0641
	(.0175)	(.0205)
Married	.0138	.0217
	(.01206)	(.0142)
Education	.0114	.0127
	(.0023)	(.0028)
AFQT	-.0001	-.0001
	(.0002)	(.8002)
Constant	-.0332	-.0460
	(.0263)	(.0314)
Number of Observations	10,279	7,691
R-squared	0.0051	0.0059
Adjusted R-Squared	0.0046	0.0052

Note: Standard Errors in parentheses.

Table 8

Current Wage Growth & Remaining Job Duration
NLSY 1979-94

	Remaining job duration	Job ends in period t+2	t+3	t+4
Female	-.00007	.00015	.00338	-.01414
	(.00029)	(.00673)	(.00809)	(.00958)
Male	.00013	-.0109	.00395	-.01366
	(.00021)	(.00695)	(.00809)	(.00931)

Note: Standard Errors in parentheses.

Table 9

Training Incidence and Intensity across Gender
NLSY 1987-1994

	# of Obs.	All Training		Company Training	
		Incidence	Mean Hours	Incidence	Mean Hours
Female	601	33.8%	38.0	26.0%	19.3
Male	649	36.7%	59.2	31.3%	41.8