The Fall in Men's Return to Marriage

Declining Productivity Effects or Changing Selection?

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ABSTRACT

Historically, one of the most robust findings from human capital wage equations has been that married men earn more than men who never marry. However, the earnings premium paid to married compared with never-married men declined by more than 40 percent during the 1980s. Data from the National Longitudinal Surveys (young men and youth cohorts) are used to explore two competing explanations for this decline: changes in the selection of high-wage men into marriage and changes in the productivity effects of marriage due to declining specialization within households. The results suggest that the drop in the marriage wage premium was due largely to a decline in the productivity effects associated with marriage. Instrumental variables estimation suggests that these declining productivity effects can be explained by a reduction in the average degree of specialization across households coupled with an increase in the wage penalty associated with wives' labor market hours.

I. Introduction

The determinants of wages are of central importance in understanding the roots of income inequality. The theoretical framework commonly

The author is an assistant professor at the University of Illinois at Urbana-Champaign. *This research was supported by a grant from the U.S. Department of Agriculture, under Project No. 1-6-53846. Any opinions, findings, conclusions, or recommendations expressed herein are those of the author and do not necessarily reflect the view of the U.S. Department of Agriculture. An earlier draft of this paper was presented at the 1995 Population Association of America Meetings in San Francisco. The author thanks Andrea Beller, Martin Browning, Kermit Daniel, Shoshana Grossbard-Shechtman, Kevin Hallock, H. Elizabeth Peters, two anonymous referees, and particularly David Neumark for useful comments and discussions. The data used in this article can be obtained beginning in November 1997 through December 2000 from the author, Department of Agricultural and Consumer Economics, University of Illinois at Urbana-Champaign, 1301 W. Gregory Drive, Urbana, IL 61801.*
[Submitted June 1995; accepted December 1996]

followed is to postulate that current earnings are a function of previous human capital investments. Following this framework, various variables such as schooling and work experience are included in wage regressions to control for an individual's stock of human capital. Also used as a control variable, particularly when studying the determinants of male wages, is a worker's current marital status. The primary rationale for including marital status variables in wage equations is to control for unmeasured skill or human capital effects. Marital status variables are also included in wage regressions to test socioeconomic theories of the household. Previous studies suggest that, on average, married men earn between 10 and 40 percent more than comparable men who have never been married. This marriage premium persists after controlling for the higher educational attainment and greater work experience of married men, as well as after controlling for systematic differences in job attributes and in the industry and occupational choices of married versus never-married men (Duncan and Holmund 1983; Bartlett and Callahan 1984; Korenman and Neumark 1991).

The wage premium paid to married male workers over unmarried male workers has been fairly constant over time (Goldin 1990). Using time-series data, however, Blackburn and Korenman (1994) find that this marital wage premium decreased by ten percentage points between 1967 and 1988. On the surface this large change in the return to marriage is not surprising, given the dramatic changes in the wage structure in the United States over the past quarter century. The increase in the black-white wage differential has been ascribed to an increase in the wage premium paid for both observable and unobservable skills (Juhn, Murphy, and Pierce 1993; Card and Lemieux 1994). Changes in women's relative skill levels have been offered as an explanation for the reduction of the male-female wage gap during the 1980s (Katz and Murphy 1992). If the marriage wage premium captures unmeasured human capital effects, however, it is curious that these premiums have been falling at precisely the same time as the returns to other forms of human capital investments have accelerated.

This paper explores the causes of the fall in the return to marriage for white men. Two alternative explanations for the existence of a marriage wage premium, the specialization and the selection hypotheses, are examined. The specialization hypothesis argues that marriage actually makes men more productive by enabling them to focus their time or effort on their labor market activities. If the marriage wage premium results from household specialization, then the recent rise in married women's labor force participation could dampen the return to marriage for many men, if they respond to their wives' increased labor supply by focusing more of their energies on home production activities.

The selection argument suggests that men possessing attributes that are ultimately rewarded in the labor market are also valued in the marriage market. The argument is not that marriage increases unobservable skills, but that men with higher unobservable skills are selected into marriage. The recent trend of marriages being delayed or foregone could affect the "type" of individuals who are more likely to marry. In particular, if this trend reflects a general decrease in men's willingness to marry, perhaps due to a lowering social stigma associated with not being married, then men would be an increasingly binding constraint in the marriage market and women might be forced to be less selective in their

marriage decisions. Such behavior would be associated with a decrease in the average unobserved ability of married men relative to that of unmarried men, and a fall in the marriage wage premium.[1]

This paper empirically tests the relative merits of the specialization and selection arguments in explaining both the existence of the marriage wage premium and its recent decline. Samples are drawn from the National Longitudinal Survey (NLS) of Young Men and the National Longitudinal Survey of Youth (NLSY) to evaluate these competing hypotheses. The longitudinal surveys allow fixed-effects estimation procedures to control for individual heterogeneity that can affect marriage and labor market outcomes. The two different time periods covered by the surveys enable the investigation of whether changing returns to specialization or changing selection into marriage can explain the recent fall in the marriage wage premium. Changes in fixed-effects estimates between the two samples identify the change in the productivity effects of marriage. Changes in the difference between cross-sectional and fixed-effects estimates isolate the change in the selection effect of marriage.

The following section provides a brief review of the literature concerned with the marriage wage premium and its recent decline. Section III describes the two data sets used in this paper in greater detail, and presents summary statistics. Section IV discusses the empirical methods and presents the results. Concluding remarks are contained in Section V.

II. Explanations for the Marriage Wage Differential and Its Decline

The empirical observation that married men earn higher wages than unmarried men is a robust finding in labor economics dating back to the nineteenth century (Goldin 1990). While many studies examining the determinants of men's wages include marital status controls, recently a small literature has developed focusing on the causes of marital pay differentials. The existence of compensating wage differentials or employer discrimination in favor of married workers could explain the marriage wage premium even if married men were no more productive than comparable unmarried men. Simple discrimination is inconsistent with the nature of the wage premium paid to married men, however, as research using several data sources suggests that married men experience faster wage growth than unmarried men (Duncan and Holmund 1983; Kenny 1983; Bartlett and Callahan 1984; Korenman and Neumark 1991). Daniel (1995) also finds that the marriage wage premium declines as a husband approaches divorce, casting further doubt that discrimination can explain the entire differential. Moreover, Hersch (1991) and Duncan and Holmund (1983) find little support for the theory that the marriage wage premium might reflect married men's will-

1. Under different assumptions regarding the distribution of ability, Blackburn and Neumark (1993) show that if marriage sorts people by ability, then an increase in the probability of marriage, from any level above 50 percent, will cause an increase in the marriage wage premium.

ingness to trade favorable job amenities such as flexible hours for greater monetary compensation.

Rather than compensating wage differentials or employer discrimination explaining the wage premium, the general consensus in the literature is that, controlling for other observable characteristics, married men are simply more productive than unmarried men. This empirical consensus is consistent with predictions made by theoretical models of family formation and wage determination. However, these models argue that marriage is both a cause and consequence of higher male wages: men who earn high wages are more attractive partners and will therefore be more likely to marry, and men who do marry will be able to specialize in market work, become more productive, and earn higher wages (see Becker 1981). Grossbard-Shechtman (1986) and Daniel (1995) extend the specialization theory by arguing that wives play an integral role in the formation of their husband's human capital. The longer a man is married, the more opportunities his wife will have to augment his human capital and the higher should be his marriage wage premium.

Recent empirical work on the return to marriage has attempted to disentangle the direction of causality: does marriage make men more productive or do more productive men marry? Examining changes in wages controls for potential correlations between marital status and fixed unobservables such as ability that might reflect selection into marriage and therefore contaminate the estimated return to marriage. Using Swedish data from 1968 and 1974, Duncan and Holmund (1983) find that becoming married is positively correlated with changes in men's wages. Korenman and Neumark (1991) and Daniel (1995) use fixed-effects analyses to determine explicitly how much of the marriage wage premium can be attributed to selection of high-ability men into marriage. Using NLS data from 1976 to 1980, Korenman and Neumark conclude that less than half of the marriage wage premium is attributable to selection effects; the remainder of the marriage wage premium is due to productivity-enhancing effects of marriage. Daniel uses NLSY data from 1979 to 1987 and finds that a larger fraction of the marriage wage premium than that found by Korenman and Neumark is attributable to selection effects, though he still finds significant productivity effects associated with marriage.

Although several studies have investigated the causes of the marriage wage premium, the recent decrease in the magnitude of the premium has gone virtually ignored. One study that has examined the decrease is that by Blackburn and Korenman (1994) documenting a ten percentage point drop in the marriage wage premium between 1967 and 1988. Their data from the 1968–89 Current Population Surveys suggest that the decline in marriage wage differentials over the 1967–88 period was due to a declining difference for younger cohorts and not a uniform decrease across all age cohorts. They argue that such a pattern is unlikely to follow from declining employer discrimination. However, their ability to distinguish the impact of changing selection patterns into marriage from declining productivity effects associated with marriage is somewhat limited due to their data source.

Without longitudinal data they are unable to control for unobservable individual fixed effects, and instead must make assumptions regarding the relationship be-

tween the changing percentage of the population married and the changing relationship between marriage and ability to test the selection hypothesis. They find that the decrease in the probability of marriage arising from men increasingly postponing or foregoing marriage explains little of the marriage wage premium, and conclude that changing selection into marriage plays only a small role in the premium's decline. However, they admit that changing selection with respect to unobservables could explain the marriage premium decline.

Using the 1970 and 1980 censuses Blackburn and Korenman also find that the average years married for men at a given age declined during the 1970s, but that the return to years married (insignificantly) increased. Insofar as years married captures the productivity-enhancing characteristics of marriage, their findings suggest that any fall in the marriage wage premium that occurred during the 1970s cannot be ascribed to declining productivity effects of marriage. However, it is possible that the correlation between years married and unobservable characteristics changed over the 1970–80 period, causing their results to be biased.

Blackburn and Korenman thus provide an important description of the downward trend in marital status pay differentials, and explore plausible explanations for this trend. However, further analysis using data that enable the researcher to control for potential correlations between marital status and fixed unobservables is warranted. While Korenman and Neumark (1991) and Daniel (1995) each use longitudinal data to remove such fixed effects and therefore provide distinct estimates of the contribution of selection and productivity effects to the marriage wage premium at two different points in time, their different specifications and cohorts used make it impossible to determine whether the marriage wage premium decreased between the time periods covered by the two surveys and the causes of the decrease if it had.[2] The remainder of this paper is devoted to filling this void in the literature by using longitudinal data to explore whether the fall in the marriage wage premium is due to changing selection into marriage or falling productivity effects associated with marriage.

III. Data and Summary Statistics

Data for individuals over several periods are necessary to examine how a marital status change, as well as how an additional year of marriage, affects labor market earnings. Both the National Longitudinal Survey (NLS) of Young Men and the National Longitudinal Survey of Youth (NLSY) have the requisite repeated observations on individuals. Together the two data sets allow the investigation of whether the impact of marital status on wages has changed over time. Survey years and observations are selected to investigate the impact of marital

2. For example, in addition to examining a different age cohort, Daniel uses a specification that includes control variables for each respondent's living arrangements. As a result, though the reference group in the Korenman and Neumark study consists of men who never married, the reference group in the Daniel study consists of men who currently have never married, who currently are not cohabiting, and who will not marry over the ensuing four years. Daniel's estimates showing a premium to cohabitation and years until marriage reflect that his omitted group is more negatively select.

status on post-schooling labor market outcomes. In 1966, the NLS surveyed a cohort of men aged 14 to 24 and reinterviewed them periodically through 1981. Data from the 1976, 1978, and 1980 surveys are used in the analysis.[3] To be consistent with the NLSY, the sample was restricted to men aged 24–31 as of January 1, 1976. The NLS sample of white men in this cohort attrited from 2,836 in 1966 to 2,043 in 1980. Due to sample restrictions and incomplete data, the sample consists of 1,248 observations.[4]

The NLSY was originally designed to permit the replication of analyses using the NLS. The NLSY is a nationally representative sample of women and men who were 14 to 21 years old on January 1, 1979. The NLSY also contains subsamples that overrepresent blacks, Hispanics, and economically disadvantaged whites. This paper uses a sample of white men from the representative cross-sectional subsample of the NLSY. The NLSY sample is extracted to be as consistent as possible with the NLS sample. The representative cross-sectional sample consisted of 2,439 white men in 1979. Data from the 1989, 1991, and 1993 surveys are used in the empirical investigation. Attrition reduced the number of respondents to 2,171 by 1993. Due to data requirements, the sample decreased further to 1,611 young men.

Table 1 presents summary statistics for each sample. Sample means are reported by the respondent's marital status at the time of the first sample year (1976 for the NLS sample and 1989 for the NLSY sample). The differences between the sample means of the NLS sample and those of the NLSY sample largely reflect national trends in labor market activities and demographics. A smaller percentage of the NLSY sample lives in southern states, and far fewer men in the NLSY are employed in jobs covered by collective bargaining. On average, workers in the NLSY sample had accumulated more actual work experience and less education than their counterparts a decade earlier.[5,6]

Hourly wages for salaried workers are calculated from earnings, weeks worked, and usual hours worked responses. Comparing wages across surveys reveals a decrease in real wages irrespective of marital status. These decreases in real wages are larger than those found using other data sources (see, for example, Acs and Danziger 1993). In 1976 the average wage of never-married men was 12 percent lower than the average wage of divorced or separated men and 13 percent lower than the average wage of married men. By 1989 the differential between married and never-married men had dropped to 9 percent, while the mean wage

3. NLS surveys were not performed in 1977 and 1979.

4. Appendix Table A1 presents cross-tabulations of marital status by missing values.

5. Actual labor force experience is calculated from the number of weeks worked by the respondent during years in which school was not reported as his primary activity. The variable was created using both retrospective and contemporaneous survey questions.

6. While these differences are not statistically significant, other data sets such as the Current Population Survey have shown an increase in the average educational attainment of young men over this time period (Acs and Danziger 1993). The trend found using these data could result from the different attrition rates between the two surveys. Rhoton and Nagi (1991) find that nonwealthy respondents in the NLS displayed a greater tendency toward attrition than wealthy respondents. Given a positive correspondence between education and wealth, the lower retention rates in the NLS sample than in the NLSY sample could explain the observed decrease in average education between the two samples. Sample attrition will not pose a problem in our estimation so long as the earnings functions are correctly specified.

of divorced or separated men was 7 percent lower than the mean wage of never-married men. As shown in the empirical section below, the fall in the difference between the average wage of divorced or separated men and that of never-married men is considerably smaller after controlling for individual characteristics. The decline in the marriage wage premium, on the other hand, increases when adding these controls. The fall in the marriage wage premium coincides with the apparent decline in specialization within households, as the mean labor market hours worked by wives nearly doubled from 15 hours per week in 1976 to 28 hours per week in 1989.

The fraction of the sample married, with spouse present, is substantially higher for the NLS sample. This reflects primarily the younger cohort's postponing or foregoing marriage, as the proportion of the sample never married climbs from 17 percent in the NLS sample to 36 percent in the NLSY sample.[7] Because household specialization may contribute to the building of men's human capital that has a long-run effect on earnings, years married is defined as the cumulative number of years spent in the state of marriage.[8] The sample means show that those divorced or separated have spent a significant number of years married with their spouse present. Those currently married during the first sample year had, on average, married at an earlier age and had accumulated more years married in the NLS sample than in the NLSY sample. In each sample about a third of the respondents who were never married in the first year had been married at least once by the final sample year. A larger fraction of divorced men in the NLSY were still divorced in the final sample year than in the NLS. These summary statistics suggest that each sample contains a significant number of individuals whose marital status changed during the four-year sample period.

IV. Methodology and Results

A. Empirical Methodology

Wages are assumed to be determined by the following equation:

$$(1)\quad W_{it} = X_{it}\beta^{C} + MST_{it}\gamma^{C} + \alpha_i + \varepsilon_{it} \qquad \begin{matrix} i = 1,2,\ldots,N \\ t = 1,2,\ldots,T \end{matrix}$$

7. One simple explanation for the fall in the marriage wage differential is that people marry later and that the return to marriage is systematically related to this delay. Sample statistics reflect national trends in the postponing or foregoing of marriage, as only 11 percent of the NLS sample compared with 23 percent of the NLSY sample were never married by the end of the sample period. Regressions including an interaction term between the marriage dummy and age at marriage reveal a negative relationship that does not vary in a statistically significant manner between the two samples (results available upon request of the author). This negative relationship is consistent with either the selection hypothesis, if higher-ability husbands are the first to clear the marriage market, or the specialization hypothesis, if the earlier you marry the sooner you are able to concentrate on market work and begin a more rapid accumulation of human capital. These hypotheses are explored in more detail below as the marital status premium is allowed to vary by years married.

8. The years married and years divorced or separated variables were constructed using retrospective and current survey questions in each sample.

Table 1
Sample Means for White Men Aged 24–31, by Marital Status—1976 for NLS Sample and 1989 for NLSY Sample

Variable in 1976 or 1989	NLS Marital Status in 1976			NLSY Marital Status in 1989		
	Married	Divorced or Separated	Never Married	Married	Divorced or Separated	Never Married
Hourly wage ($1989)	12.86	12.77	11.20	11.33	9.61	10.38
	(4.77)	(6.20)	(4.71)	(6.25)	(6.72)	(6.27)
Age (years)	27.42	27.24	26.62	27.89	27.70	26.68
	(2.27)	(2.20)	(2.08)	(2.23)	(2.11)	(2.16)
Education (years)	13.55	13.59	14.51	13.06	11.95	13.75
	(2.46)	(2.57)	(2.31)	(2.22)	(1.85)	(2.36)
Work experience (years)	8.31	8.39	6.52	9.19	9.18	7.44
	(2.70)	(2.67)	(2.83)	(2.66)	(2.23)	(2.64)
Lives in SMSA	0.703	0.819	0.790	0.722	0.742	0.842
Lives in South	0.306	0.313	0.294	0.326	0.409	0.206
Wages covered by collective bargaining	0.331	0.410	0.187	0.172	0.136	0.144
Marital status in years $t + 2$, $t + 4$						

Married, $t + 2$	0.939	0.410	0.220	0.927	0.227	0.194
Married, $t + 4$	0.907	0.578	0.336	0.882	0.364	0.331
Divorced or separated, $t + 2$	0.061	0.590	0.005	0.073	0.773	0.009
Divorced or separated, $t + 4$	0.093	0.422	0.019	0.118	0.636	0.019
Age at current marriage	22.73	NA	NA	23.48	NA	NA
	(2.84)			(3.08)		
Wife's labor market hours (10s)	1.46	NA	NA	2.83	NA	NA
	(1.91)			(1.81)		
Years married	6.41	3.65	NA	5.29	4.30	NA
	(3.06)	(2.58)		(3.19)	(2.70)	
Years divorced or separated	0.15	2.03	NA	0.18	2.35	NA
	(0.69)	(2.19)	(0.73)	(2.04)		
Child, younger than 18	0.72	0.07	0.0	0.65	0.16	0.03
	(0.45)	(0.26)	(0.0)	(0.48)	(0.37)	(0.18)
Sample size	951	83	214	902	132	577
Percent of sample	76.2	6.7	17.1	56.0	8.2	35.8

Sources: National Longitudinal Survey (NLS) of Young Men and National Longitudinal Survey of Youth (NLSY).

where I indexes individuals and t indexes years. W is the natural logarithm of the individual's wage, MST is a dummy variable reflecting marital status, and X is a vector of regressors that includes other human capital variables. Individual i's time-invariant unobserved characteristic is captured by the parameter α_i, whereas ε_{it} reflects unobserved characteristics varying over both time and individuals. This equation could be estimated using the NLS or the NLSY samples of young men. To test whether the marital status premium has been decreasing over time, both samples are pooled and a cohort dummy variable, D, is defined to equal 0 if the individual is in the NLS sample, and 1 if the individual is in the NLSY sample. The index t indexes the sample year (for example, $t = 0$ indexes 1976 for $D = 0$ and 1989 for $D = 1$). The pooled "cross-sectional" wage equation estimated is therefore

$$(2)\quad W_{it} = X_{it}\beta^C + MST_{it}\gamma^C + D_i{*}X_{it}\xi^C + D_i{*}MST_{it}\delta^C + \varphi^C D_i + D_i{*}\alpha_i + \alpha_i + \nu_{it}.$$

The coefficient γ^C measures the magnitude of the marital status premium over the NLS sample, and the parameter δ^C measures the change in the premium between the two sample periods; $\delta^C < 0$ would suggest a decrease in the cross-sectional marital status premium between the two sample periods. The cohort dummy variable is interacted with the other independent variables to allow for changes in the return to human capital and unobserved characteristics observed over time (see Juhn, Murphy, and Pierce 1993; Card and Lemieux 1994). Because it is likely that individual error terms are correlated over time, a GLS estimator is used to obtain consistent parameter and standard error estimates.[9]

A further methodological difficulty in estimating either Equation 1 or 2 is that α and MST may be positively correlated. This will occur if unobservable characteristics that are valued in the labor market are also valued in the marriage market. Ordinary least squares estimation of these equations would yield positively biased estimates of γ. Least squares estimation could also yield a biased estimate of δ, the direction of the bias depending on how the valuation of unobservable characteristics in the marriage and labor markets changed over time. A standard approach to address this unobservable variable bias is to use a within-group estimator that sweeps out the latent variable α and any potential correlations between α and the other independent variables. The fixed-effects equation estimated is

$$(3)\quad W_{it} - W_i = (X_{it} - X_i)\beta^{FE} + (MST_{it} - MST_i)\gamma^{FE} + D_i{*}(X_{it} - X_i)\xi^{FE} + D_i{*}(MST_{it} - MST_i)\delta^{FE} + \varphi^{FE}D_i + \nu_{it} - \nu_i$$

where W_i is individual's mean log wage over the t periods.

To allow for serial correlation among individual errors, the estimation of Equation 3 uses a GLS fixed-effects estimator developed by Keifer (1980). Because the variance-covariance matrix of the GLS estimator is singular if all years of

9. A disadvantage of the GLS estimator is that it restricts the correlations among residuals to be the same in each cohort. Some studies suggest that wages have become more variable over time (see, for example, Gottschalk and Moffitt 1994). Similar results are found if estimates are computed for the two samples separately.

data are used, it is necessary to drop data from one of the sample years when estimating the fixed-effects model with serial correlation. Because the variables are defined as deviations from their individual sample means, the results are not sensitive to which year is dropped from the analysis (Keifer 1980).

B. Empirical Results

1. Main Findings

The first three columns in Table 2 present estimates of the cross-sectional Equation 2, using the pooled NLS and NLSY samples. The results suggest that over the 1976–80 period a marriage wage premium did exist, as married men earned 11 percent more than never-married men in the same single-digit industry and occupation and with the same socioeconomic background.[10] Divorced or separated men earned about 10 percent more than comparable never-married men. By the 1989–93 period the marriage premium still existed, but the magnitude dropped to 6 percent. The third column shows that this drop, measured by δ^C, is statistically significant at the 10 percent level, suggesting that the return to marriage for men fell by 45 percent over the 1980s. The wage differential between never-married and divorced or separated men decreased by seven percentage points, becoming statistically insignificant by the 1989–93 period.

As discussed above, estimation of Equation 2 may yield biased results due to potential omitted variable bias. The second set of columns in Table 2 presents results from the longitudinal estimation of Equation 3. Over the 1976–80 period the marriage wage premium dropped from 11 to 9 percent after sweeping out fixed individual characteristics. Over the 1989–93 period the marriage wage premium disappeared after removing individual fixed effects. These lower estimates found in fixed-effects estimation suggest that wages and the probability of marriage are both positively correlated with an individual's fixed unobservable characteristics. The change in the fixed-effects estimates between the two periods, measured by δ^{FE}, identifies the change in the productivity effects of marriage. The results suggest that the decline in the productivity effects of marriage is actually larger than the observed decline in the marriage wage premium found in the cross-section. This could reflect the changing valuation of unobservable characteristics in the labor and marriage markets. In particular, $\delta^{FE} > \delta^C$ is consistent with the correlation between ability and marriage increasing over time. The disappearance of the marriage wage premium by the later period indicates that the premium observed in the cross-section over this time period resulted solely from the selection of high-wage men into marriage.

Differences between cross-sectional and longitudinal estimates can also arise

10. Socioeconomic background variables control for survey year, actual labor market experience and its square, education, southern and urban residence, union status, the presence of a child, and age at the beginning of the sample. Fertility decisions are potentially endogenous to a man's wages, and industry and occupational choices are potentially collinear with marital status. The empirical results are qualitatively similar when these variables are excluded as independent variables. Tables summarizing these findings are available from the author upon request.

Table 2
Estimates of Changes in Marital Status Wage Premiums: Dummy Variable Specifications

	Cross-Sectional Analysis			Longitudinal Analysis		
	1976–80 (γ^C)	1989–93 ($\gamma^C + \delta^C$)	Change (δ^C)	1976–80 (γ^{FE})	1989–93 ($\gamma^{FE} + \delta^{FE}$)	Change (δ^{FE})
Married spouse present	0.106	0.058	−0.049	0.086	0.014	−0.072
	(0.024)	(0.016)	(0.029)	(0.037)	(0.023)	(0.044)
Divorced or separated	0.095	0.029	−0.066	0.085	0.002	−0.083
	(0.030)	(0.023)	(0.037)	(0.044)	(0.032)	(0.055)
Degrees of freedom	8,513			5,660		

Notes: Also included in the cross-sectional regression, but not reported, are actual experience and its square, education, age at first survey, south, urban, union, child, year (3), single-digit industry (11) and occupation (8) dummy variables, a constant, and each variable interacted with the cohort dummy variable. The longitudinal regression includes the same regressors as above with the exception of the education and age variables which do not vary over time. Standard errors are reported in parentheses.

from a misspecification of the earnings equation.[11] Kenny (1983) argues that the marital wage premium is a function of the number of years of marriage. This will result if there are productivity effects associated with marriage that are realized over time. If so, then lower longitudinal estimates could instead be due to shorter marital tenure of those who married between 1976 and 1980 and between 1989 and 1993 than the marital tenure of all married men in the NLS and NLSY sample periods, respectively. Korenman and Neumark (1991) test this hypothesis using a specification where marital status premiums can vary by the number of years married. They find that the marriage wage premium is quadratic in the total number of years a man has been married. This steepening wage profile in the early years of marriage is consistent with productivity-enhancing effects of marriage.

Table 3 reports results from the test of whether this productivity effect of marriage has changed over time. The first three columns in Table 3 report cross-sectional estimates of the economic return to marriage when marital status premiums can vary by marital tenure. Over the 1976–80 period, the divorced/separated and married coefficients become smaller and statistically insignificant at the usual confidence intervals when using this specification. Rather than an intercept shift associated with marriage, cross-sectional wages increase by 2.4 percent per year during the first few years of marriage, and by 1 percent at the sample mean years of marriage. These results are similar to those found by Korenman and Neumark, who use a slightly older sample from the NLS. These findings are consistent with the finding that much of the marriage wage premium in the 1976–80 period was attributable to the productivity effects of marriage.

The second column shows that the inclusion of marital tenure variables also eliminates the intercept shift associated with marriage over the 1989–93 period. The return to years married is smaller than that found during the earlier period, as wages increased 1.7 percent during the first few years of marriage and 0.5 percent at the sample mean years of marriage. While the return to years married in the cross-section is consistent with productivity effects of marriage, it is possible that the number of years a man is married is also correlated with his ability. In particular, it is possible that unobserved attributes valued in both the labor market and the marriage market are revealed over time to market participants. If so, then the number of years a man is married would be positively correlated with these unobserved attributes, and ascribing the positive coefficient on years married to productivity-enhancing effects of marriage would be inappropriate. Columns 4–6 report the fixed-effects estimates, which eliminate potential unobserved variable biases. The results suggest that whereas wages increased by

11. Differences between cross-sectional and longitudinal estimates could also arise from measurement error in the marital status variables, causing the fixed-effects estimates to be downward biased. We would expect that measurement error would be less serious in the context of marital status than in other contexts (for a general discussion see Bound and Krueger 1991). First, the marital status categories used are broad and clearly distinct, lowering the risk of measurement error due to respondent uncertainty. Second, each survey began when respondents were young and marriages were of short duration so that recall bias is minimized. Examining the data unveils few inconsistencies when comparing responses to contemporaneous survey questions with responses to retrospective questions on marital history. The longitudinal structure of the data allows us to discover these few inconsistencies and correct the reporting (such as men who report being never married when they have a history of marriage).

Table 3
Estimates of Changes in Marital Status Wage Premiums: Years Married Specifications

	Cross-Sectional Analysis			Longitudinal Analysis		
	1976–80 (γ^C)	1989–93 ($\gamma^C + \delta^C$)	Change (δ^C)	1976–80 (γ^{FE})	1989–93 ($\gamma^{FE} + \delta^{FE}$)	Change (δ^{FE})
Married spouse present	0.041	0.024	−0.016	0.063	0.0004	−0.063
	(0.031)	(0.020)	(0.037)	(0.039)	(0.024)	(0.046)
Divorced or separated	0.048	0.020	−0.028	0.076	−0.005	−0.081
	(0.039)	(0.028)	(0.048)	(0.047)	(0.033)	(0.057)
Years married	0.024	0.017	−0.007	0.028	0.006	−0.022
	(0.007)	(0.006)	(0.010)	(0.012)	(0.009)	(0.015)
Years married squared/100	−0.092	−0.103	−0.011	−0.144	−0.060	0.084
	(0.045)	(0.041)	(0.061)	(0.055)	(0.050)	(0.074)
Years divorced or separated	−0.010	−0.016	−0.006	−0.020	−0.017	0.003
	(0.007)	(0.006)	(0.009)	(0.013)	(0.010)	(0.016)
Degrees of freedom	8,507			5,654		

Note: See notes to Table 2 for regression details.

nearly 3 percent per year during the early years of marriage during the late 1970s, wages were relatively constant during the first few years of marriage in the early 1990s. The observed return to years married in the cross-section in the NLSY only reflects a positive correlation between years married and the error term in the wage equation.

Both cross-sectional and longitudinal estimates reveal a negative relationship between wages and years divorced or separated over both time periods. The relative fall in wages as men remain divorced is consistent with both the depreciation of human capital acquired while married and the selection of higher-ability divorced men back into marriage. Much of the wage premium experienced by divorced or separated men during the 1976–80 period appears consistent with productivity gains occurred while married, gains that were slowly lost as men remained divorced. Longitudinal estimates suggest that wages of divorced or separated men decreased by 2 percent per year more than those of never-married men. The earlier wage premium paid to divorced or separated men or never-married men became insignificantly different from 0 by the late 1980s. Therefore the slower wage growth of divorced men over the 1989–93 period compared to never-married men may only reflect differences in ability, although the longitudinal estimates do not reduce the observed penalty associated with years divorced or separated.

The marriage premium has therefore changed in origins, from reflecting primarily productivity-enhancing effects of marriage to being exclusively a result of selection into and out of marriage. The changes in the selection associated with marriage appear complex. While the data suggest an increasing correlation between marriage and unobserved ability, there is also evidence that the correlation between years married and ability has increased. Although this is consistent with the hypothesis that, over the years, men who have exited marriage have had less and less ability on average, the results in Table 2 do not support this hypothesis. The results, however, are consistent with the selection of high-ability men into marriage increasing during the mid-1980s, and this selection leveling off by the early 1990s.

2. *Role of Specialization*

The results suggest that the recent fall in the marital status premium is attributable to a fall in the productivity effects of marriage. Given that the productivity-enhancing effects of marriage are generally believed to result from the specialization within marriage (Becker 1981), this fall in the productivity of marriage could result either from less specialization taking place in marriages or from a decrease in the return to specialization. Table 4 presents results from a test of the extent to which the rewards to specialization have decreased. If the marriage wage premium is due to specialization within marriage, then the wage premium should be particularly large for those men whose wives work less in the paid labor force.[12] This is evidenced in the cross-sectional data for the 1976–80 period; the

12. This assumes that a wife's hours of labor market work come primarily at the expense of her home production hours, and only secondarily at the expense of her leisure hours. Data that contain information

Table 4
GLS and IV Estimates of the Impact of an Employed Spouse on Marriage Wage Premium

	GLS			IV		
	1976–80 (γ^{FE})	1989–93 ($\gamma^{FE} + \delta^{FE}$)	Change (δ^{FE})	1976–80 ($\gamma_{IV}{}^{FE}$)	1989–93 ($\gamma_{IV}{}^{FE} + \delta_{IV}{}^{FE}$)	Change ($\delta_{IV}{}^{FE}$)
Cross-sectional analysis						
Married spouse present	0.166	0.099	−0.067	0.199	0.219	0.019
	(0.028)	(0.021)	(0.035)	(0.039)	(0.045)	(0.059)
Wife's market hours/10	−0.018	−0.012	0.006	−0.028	−0.047	−0.019
	(0.004)	(0.004)	(0.006)	(0.009)	(0.012)	(0.015)
Divorced or separated	0.092	0.033	−0.059	0.091	0.044	−0.046
	(0.030)	(0.023)	(0.037)	(0.030)	(0.023)	(0.038)
Degrees of freedom	8,509			8,509		
Longitudinal analysis						
Married spouse present	0.128	0.016	−0.113	0.115	0.131	0.016
	(0.028)	(0.028)	(0.049)	(0.070)	(0.074)	(0.101)
Wife's market hours/10	−0.013	0.0002	0.013	−0.009	−0.032	−0.023
	(0.005)	(0.004)	(0.006)	(0.018)	(0.019)	(0.026)
Divorced or separated	0.081	0.003	−0.078	0.082	0.023	−0.059
	(0.044)	(0.028)	(0.055)	(0.045)	(0.035)	(0.057)
Degrees of freedom	5,656			5,656		

Notes: Also included in the cross-sectional regression, but not reported, are actual experience and its square, education, age at first survey, south, urban, union, child, wife's hours missing, year (3), single-digit industry (11) and occupation (8) dummy variables, a constant, and each variable interacted with the cohort dummy variable; in the IV regression, men's attitude towards gender roles in household production together with child under 3 dummy variable is used as an instrument. The longitudinal regression includes the same regressors as above with the exception of the education, age, and attitude variables which do not vary over time. Standard errors are reported in parentheses.

marriage wage differential was 1.8 percentage points lower for each additional ten hours per week a wife worked in the labor market. The marriage wage premium was nearly 17 percent for husbands whose wives specialized in home production, and 9 percent for husbands whose wives worked 40 hours per week in the labor force. The NLS longitudinal data suggest that men who marry women employed full-time (40 hours per week), or whose wives enter full-time employment, earn 5 percent less than married men whose wives specialize in home production.

Both the cross-sectional and the longitudinal estimates suggest that these gains from specialization within marriage decreased by the 1989–93 period. Between the two sample periods the premium paid to husbands whose wives specialized in home production decreased by nearly 7 percentage points. The penalty associated with a wife's labor supply also decreased from 1.8 percent to 1.2 percent for each ten hours she worked outside the home, although the third column reveals that this change was not statistically significant. Longitudinal estimates suggest that each additional hour worked by a married woman in the labor market had no effect on her husband's marriage premium over the 1989–93 period.

During the 1976–80 period, the decrease in wages due to divorce was greater for those husbands whose wives specialized in home production activities. Divorcing men whose partners had been specializing in home production experienced a 4.7 percent decrease in wages ($0.081 - 0.128$), whereas divorcing men whose spouses worked full-time in the labor market experienced a 0.5 percent increase in labor market earnings ($0.081 - (0.128 + 4 \cdot -0.013)$). These findings are consistent with much of the marriage wage premium resulting from specialization within some marriages. The greater the degree of specialization, where the wife specializes in home production activities, the greater will be the economic return to marriage via higher male wages. Consequently, a greater percentage of marital surplus in the form of male wages is lost when such a marriage dissolves.

By the 1989–93 period, the wage cost to a husband associated with marital dissolution had became less dependent on whether his wife specialized in home production. Longitudinal estimates suggest that following divorce, a man's wages drop by about 1.4 percent if his wife was employed full-time in the labor market or if she worked only at home. Thus, the wage decrease incurred by husbands following divorce during this later period cannot be attributed to lost gains from specialization.

While both cross-sectional and longitudinal estimates reveal an apparent return to specialization within households, as well as a decrease in these returns over time, two econometric problems suggest caution should be exercised in interpreting these results. First, a wife's labor supply is arguably endogenous to her husband's earnings. An increase in the wages of a married man may lead to a reduction in his wife's market work, if leisure is a normal good and his earnings enter her labor supply equation as nonlabor income. Least squares estimation of the impact of her labor market hours on his wages would reveal a negative coefficient,

on hours worked at home would allow a more direct test of the impact specialization has on marital status premiums.

even if her labor market activity had no actual effect on his wages. Second, economic theory of the household maintains that traditional specialization within a household will lead to higher husband's wages, all else equal. However, a wife's labor market hours is at best a crude measure of the degree of specialization within the household. If husbands are devoting more time and energy to home production activities independent of the time their wives spend in paid employment, then decreased specialization could explain the fall in the productivity-enhancing effects of marriage.

Measurement error and endogeneity will each cause the wife's labor market hours variable to be contemporaneously correlated with the disturbance. Measurement error would lead to the coefficient estimate of the impact of a wife's labor market hours on her husband's wages to be biased toward 0, whereas endogeneity bias would lead to an overly negative estimate. Instrumental variables techniques can be used to obtain consistent estimates of the impact of specialization on husband's wages. The major challenge with this approach is to find an instrument that is highly correlated with the degree of household specialization yet independent of the disturbance term in the husband's wage equation. Ideal instruments might capture a woman's taste for home production, perhaps measured by her mother's or sibling's career choices; or they might represent the varying risk associated with the career of a homemaker such as whether state laws governing divorce settlements give courts the authority to weigh the contributions of a wife to household production. Unfortunately, the NLS and NLSY collect limited information concerning the wives of male respondents, and the NLS does not contain state-level geographic data.

Defensible instruments contained in these data include the respondent's attitude toward gender roles in household production and the presence of an infant in the household. The attitude variable measures the relative agreement to the statement that men should share housework responsibilities with women.[13] This variable is unusual to most nationally representative data sets and is particularly compelling as an instrument, as it is likely to be correlated with the degree of traditional specialization taking place in households. The presence of an infant corresponds with the demand for home production time, and is also used as an instrument identifying wives' labor market hours. The shortcoming of this instrument is that the presence of a child may induce a married man to increase his work effort to meet greater household demands, thereby increasing his wages irrespective of any specialization effects. A dummy variable indicating the presence of a child less than age 18 is included as an exogenous variable in the system, controlling for the direct influence of children on wages. The excluded infant dummy variable therefore captures the additional effect of a young child on the demand for home production time.

The last three columns in Table 4 present instrumental variables estimates of the effect of household specialization on the marriage wage premium using the

13. The attitude variable is a four-point categorical response ranging from "strongly agree" to "strongly disagree." A dummy variable is included as an instrument to control for approximately 5 percent of the sample containing missing values. The results are nearly identical if observations with missing values are removed from the analysis.

attitude variable and the presence of a child younger than 3 to address the endogeneity and measurement error of specialization. The cross-sectional IV estimates of the impact of household specialization on the marriage wage premium are more negative than the GLS estimates, suggesting that measurement error is a more severe source of bias than endogeneity. When instrumenting for the potentially endogenous and mismeasured effect of household specialization, the data suggest that the relative return to specialization has actually increased over the 1980s. The marriage wage premium of a husband whose wife specialized in home production increased from 20 percent during the late 1970s to 22 percent during the early 1990s. The marriage wage premium paid to husbands of wives working full-time in the labor market decreased from 9 percent to 3 percent over the two time periods.

This observed increase in the return to specialization found in the cross-section may simply reflect the changes in the selection of different types of men into and out of marriage documented in Tables 2 and 3. In particular, not only may high-wage men be more likely to marry, but they may be more likely to marry women who specialize in home production. Fixed-effects estimation can isolate the changing contribution of specialization to the marriage wage premium. The last three columns in the bottom half of Table 4 present fixed-effects IV estimates of the impact of household specialization on the marriage wage premium. The attitude variable is asked only once in the NLS survey, so only the presence of an infant is used as an instrument in the longitudinal analysis. Strikingly, the estimated impact of a wife's time spent in the labor market on her husband's wages is more positive over the 1976–80 period and more negative over the 1989–93 period compared to the GLS estimates. This suggests that the GLS estimate in the earlier period may have suffered more from endogeneity bias, whereas measurement error bias appears to dominate in the later period.[14] As with the cross-sectional IV estimates, the fixed-effects IV estimates suggest an increase in the return to specialization within households, although the final column shows that this change is statistically insignificant. The fall in the marriage premium over the 1980s therefore reflects the decreasing productivity effects associated with marriage due to a fall in the average degree of specialization across households coupled with an increasing return to specialization within households.

A decomposition of the fall in the marriage wage premium into changes attributable to declining average labor market hours of wives as opposed to changes in the price of this variable reveals that more than half of the reduction in the marriage wage premium is explained by changing returns to specialization.[15,16]

14. The increasing severity of measurement error bias is consistent with studies suggesting that a wife's labor supply is less perfectly correlated with her home production hours (Fuchs 1988). The decreasing importance of endogeneity bias is consistent with Murphy and Welch's (1993) finding that during the 1970s the probability that a wife was employed outside the home was negatively correlated with her husband's earnings, and that the correspondence between husband's wage and wife's participation disappeared by 1990. However, they do not make an attempt to address causality.

15. If the marriage wage premium were solely a function of wives' labor market hours, then the observed change in the premium could be decomposed into the change due to the increase in the average labor market hours of wives and a change due to the increasing "price" of these hours. The percentage of the entire fall explained by a decline in the average labor market hours of wives ranges from 10 percent,

IV estimations therefore yield substantially different conclusions than those obtained not correcting for the endogenous and mismeasured home production activity of wives. However, the consistency of the IV estimates depends crucially on the quality of the instruments. The use of multiple instruments in the cross-sectional regressions allows identification tests of the appropriateness of the instruments used. Performing a test of the overidentifying restrictions (proposed by Hausman 1983) rejects the null hypothesis that the instruments belong directly in the cross-sectional wage equation.[17] Despite the results of the overidentification test, it is possible that changes in the quality of the instruments over time might be driving the IV results. One approach to gauge the changing appropriateness of the instruments is to run IV regressions on each sample separately, performing independent overidentification tests. While the null hypothesis is not rejected in either sample, the test statistic is nearly twice as large in the NLS regression than in the NLSY regression. This suggests modest concern that the appropriateness of the instruments is changing over time. Nonetheless, the results are suggestive that measurement error and endogeneity may lead to inconsistent least squares estimates of the impact of a wife's degree of household specialization on her husband's marital wage premium.

3. *Other Forms of Selection*

The decrease in husband's return to marital tenure over the past decade is consistent with decreasing productivity effects associated with marriage rather than changing selection into marriage based on wage levels. It is possible that other forms of selection into marriage during the 1976–80 period were responsible for the observed return to marital tenure, however, and that this type of selection decreased over the 1980s. In particular, if men with persistently higher wage growth select into marriage, then our empirical specification would erroneously suggest productivity effects associated with marriage. However, results based on samples restricted to those men unmarried in the year prior to the primary sample periods are inconsistent with selection based on wage growth; higher wage growth between 1975 and 1976 insignificantly lowered the probability a man married between 1976 and 1980, whereas higher wage growth between 1988 and 1989 had

using the fixed-effects estimates and average hours worked during 1976 and 1980 as the base, to 47 percent, using the cross-sectional estimates and average hours worked during 1989 and 1993 as the base.

16. The relative importance of the increase in the returns to specialization in explaining the fall in the marriage wage premium warrants further research. The unreported reduced-form estimates suggest that this structural coefficient is increasing in magnitude due largely to the changing influence of the presence of an infant on wife's hours worked. An infant in the household decreased the number of hours a wife worked in the labor market by 4.2 hours per week during the 1976–80 period and by only 3.0 hours per week during the 1989–93 period. The direct impact of an infant on husband's wages increased from −0.015 to 0.015 between the two sample periods, but this change was not statistically significant. Tables summarizing these results are available from the author upon request.

17. The test requires the calculation of NTR^2, where the R^2 is from the regression of the IV residuals on all of the predetermined variables in the model. In both the cross-sectional and fixed-effects estimation we cannot reject the null hypothesis at the 10 percent level that this regression has no predictive power. Results from the overidentification tests are presented in Appendix Table A2.

a positive impact on the likelihood a man married between 1989 and 1993.[18] The increasing impact of wage growth on marriage probabilities between the two time periods, although insignificant, is consistent with earlier findings that unobserved ability and years married are now increasingly positively correlated.

Therefore, changes in the selection of high-wage-growth men into marriage only served to increase the marriage wage premium and cannot explain the premium's recent decline. However, it is possible that the earlier wage premium was due to the selection of men with higher expected wage growth into marriage, and that this expected wage growth is not strongly correlated with wage levels or previous wage growth. If such a selection mechanism is the source of the observed return to marital tenure, then a decrease in this type of selection into marriage could explain the recent fall in the marriage premium. It is not possible to test for the existence and trend in this type of selection using standard data sources. In the absence of this form of selection, the fall in the marriage wage premium over the 1980s can only be explained by a decrease in the productivity effects of marriage.

V. Conclusion

Historically, cross-sectional data have suggested that married men are paid more than unmarried men, controlling for socioeconomic variables believed to affect worker productivity. Studies attempting to explain the existence of a marriage wage premium argue that the state of marriage is associated with higher levels of unobservable skills. These higher levels of unobservable skills are hypothesized to arise from either selection into marriage along these unobservable characteristics or from productivity-enhancing effects of marriage. The results in this paper suggest that this observed marriage premium paid to young male workers decreased dramatically between the late 1970s and the early 1990s. The wage premium that existed over the 1976–80 period primarily reflected a steepening of the wage profile of men while married rather than an intercept shift at the time of marriage. This finding that the marriage wage premium was a result of positive returns to marital tenure rather than simply the state of marriage is consistent with productivity-enhancing effects of marriage, and inconsistent with the selection of high-wage men into marriage. Longitudinal analysis controlling for fixed unobserved ability suggests that by the 1989–93 period the return to years married had disappeared, reflecting a fall in the productivity-enhancing attributes of marriage. The data suggest that the remaining wage premium resulted only from the selection of high-wage men into marriage. The nature and patterns of selection into and out of marriage have changed such that unobserved ability now appears correlated with men's accumulated years of marriage. These changes in the process selecting men into and out of marriage only served to mitigate the observed fall in the marriage wage premium.

18. A table summarizing these findings is available upon request from the author. Korenman and Neumark (1991) report similar results over the earlier period.

The finding that the fall in the marriage wage premium is attributable to declining productivity effects of marriage stands in contrast to Blackburn and Korenman's (1994) conclusion that the falling marriage premium in part reflects declining selectivity while the return to marriage has not declined. The different conclusions may follow from Blackburn and Korenman's inability to control for person-specific fixed effects. Our results suggest that years married has become positively correlated with unobserved characteristics affecting men's wages. Therefore, cross-sectional estimates will provide upwardly biased estimates of the impact of years married on wages. Moreover, due to data limitations Blackburn and Korenman only examine the change in the return to years married during the 1970s. While they do look at the relationship between age and the marriage wage premium during the 1980s, our data suggest that age is an increasingly poor proxy for years married. The results presented in this paper suggest a significant decline in productivity effects of marriage, measured by the return to years married, during the 1980s.

Least squares estimation suggests that the fall in the marriage wage premium occurred for married men irrespective of the degree to which their wives specialized in home production activities. These estimates imply that the greater return to marriage for those men whose wives work only at home now appears to result only from assortative mating rather than greater returns from specialized marriages. However, when instrumenting for the likely endogenous and mismeasured specialization variable, the data suggest that the observed fall in the marriage wage premium is very sensitive to the degree of household specialization taking place. Insofar as the instruments used are appropriate, these results suggest that the decline in the productivity effects of marriage results from less specialization taking place in marriages rather than any decrease in the return to specialization. Moreover, the IV results suggest that the returns to specialization actually increased slightly over the 1980s, as a wife's labor market activity had an increasingly negative impact on her husband's marriage wage premium.

Further research is warranted to explore the relationship between changing household specialization and the marriage wage premium. Although it is likely that married women's labor supply provides an inadequate measure of the degree of specialization within households, the instruments used in this paper to correct for this source of bias are not perfect. Data containing more compelling instruments or information on actual home production hours would better establish that the fall in the productivity-enhancing effects of marriage is attributable to husbands devoting more time and energy to home production activities. This paper provides an introduction to that line of research.

Table A1
Missing Observations by Marital Status in First Survey Year

	Total Observations	Observations with Missing Values	Sample Observations
NLS (marital status 1976)			
Never married	465	251	214
Married spouse present	1,428	477	951
Divorced or separated	150	67	83
Total	2,043	795	1,248
NLSY (marital status 1989)			
Never married	856	279	577
Married spouse present	1,124	222	902
Divorced or separated	191	59	132
Total	2,171	560	1,611

Sources: National Longitudinal Survey Young Men's Cohort (NLS) and the National Longitudinal Survey of Youth (NLSY).
Note: Respondents who had not completed their schooling by the first sample survey are removed from the sample and included among those with missing values. "Divorced or separated" includes several observations reporting widowed or married, spouse absent.

Table A2
Overidentification Tests of the Validity of the Instruments (cross-sectional regressions)

Test Statistic	Pooled Samples	NLS Sample	NLSY Sample
NTR^2	2.57	1.87	0.97
10 percent critical value	7.78	4.61	4.61

Note: The test statistic stems from an overidentification test proposed by Hausman (1983). N equals the number of observations (2,859 pooled, 1,248 in the NLS, and 1,611 in the NLSY); T equals the number of sample years (3); and R^2 is from the regression of the IV residuals on all of the predetermined variables in the model.

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[Footnotes]

[1] **Omitted-Ability Bias and the Increase in the Return to Schooling**

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[6] **Educational Attainment, Industrial Structure, and Male Earnings through the 1980s**

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