NBER Working Paper Series

MALE WAGE RATES AND MARITAL STATUS

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Working Paper No. 271

National Bureau of Economic Research, Inc.
204 Junipero Serra Boulevard, Stanford, CA 94305

July 1978

This work was supported by grants to NBER from the Alfred P. Sloan Foundation and The Lilly Endowment. The author wishes to thank James D. Adams, Gary Becker, James Heckman, Robert Michael, Jacob Mincer, Jon Pritchett, and T. W. Schultz for their valuable comments on an earlier draft. Jon Pritchett and Laura Reed were able research assistants. This investigation utilized the Project TALENT Data Bank, a cooperative effort of the U.S. Office of Education, the American Institutes for Research, and the University of Pittsburgh. The design and interpretation of the research reported herein, however, are solely the responsibility of the author.

NBER Working Paper 271 (W)
August 1978

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Abstract

Numerous studies have found that married men earn considerably more than single men of the same education, experience, etc. There are several possible explanations of this phenomenon. Recent theoretical developments in the economics of marriage predict that males with higher wage rates have a greater gain from marriage and are therefore more likely to marry. Alternatively, one of the benefits of marriage is specialization in the labor force; married men spend more hours in the labor force than single males and thus have a greater incentive to invest in human capital.

The empirical work in this paper suggests that a large fraction of the unexplained wage differential between married males and unmarried males may be attributable to the former explanation.

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I. INTRODUCTION

Numerous studies have found that married men earn considerably more than single men of the same education, experience, etc. There are several possible explanations of this phenomenon. Recent theoretical developments in the economics of marriage predict that males with higher wage rates have a greater gain from marriage and are therefore more likely to marry. Alternatively, one of the benefits of marriage is specialization in the labor force; married males spend more hours in the labor force than single males and thus have a greater incentive to invest in human capital.

This paper attempts to ascertain the relative importance of the selectivity and investment explanations which have been outlined above. The empirical work accordingly focuses on the determination of wage rates and on the determination of the number of hours worked.

II. THEORY

Let us briefly reconstruct the marriage model which was developed by Becker (1973) and Keeley (1974). It is assumed that both married and single persons produce some aggregate commodity Z. The total gain from marriage (G) is the difference between married real income and single real income,

$$G = Z_{mf} - Z_m - Z_f,$$

where

Z_{mf} = total real income of m and f when married,

Z_m = real income of the male (m) when single,

Z_f = real income of the female (f) when single.

Z_{mf} is maximized subject to the production function

$$Z_{mf} = f(t_m^m, t_f^m, X^m)$$

and subject to the full income budget constraint

$$W_m t_m^m + W_f t_f^m + PX^m = (W_m + W_f)T + V_m + V_f$$

where

t_m^m = time devoted to household production by married male,

t_f^m = time devoted to household production by married female,

X^m = market goods and services bought by married couple,

W_m = wage rate of male (or shadow wage if not working),

W_f = wage rate of female (or shadow wage if not working),

P = price of market goods and services,

T = total time available,

V_m = non-wage income of male,

V_f = non-wage income of female.

Similarly, Z_m is maximized subject to the production function

$$Z_m = g(t_m^s, X_m^s)$$

and subject to the full income budget constraint

$$W_m t_m^s + PX_m^s = W_m T + V_m$$

and Z_f is maximized subject to the production function

$$Z_f = h(t_f^s, X_f^s)$$

and subject to the budget constraint

$$W_f t_f^s + PX_f^s T + V_f,$$

where

t_m^s = time devoted to household production by single male,

t_f^s = time devoted to household production by single female,

X_f^s = market goods and services bought by single male,

X_f^s = market goods and services bought by single female.

If f, g, and h have constant returns to scale, commodity output may be expressed as

$$Z_{mf} = \frac{W_m T + W_f T + V_m + V_f}{C_{mf}(W_m, W_f, P)}$$

$$Z_m = \frac{W_m T + V_m}{C_m(W_m, P)}$$

$$Z_f = \frac{W_f T + V_f}{C_f(W_f, P)}$$

where C_{mf}, C_m, and C_f are the cost-minimizing average costs of production.

How are the gains from marriage related to the male wage rate? It can be shown that

$$\frac{\partial G}{\partial W_m} = \frac{\ell_m^m}{C_{mf}} - \frac{\ell_m^s}{C_m}$$

where

$\ell_m^i = T - t_m^i$ = time spent in market work by a male of marital status i.[1]

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[1] $$\frac{\partial G}{\partial W_m} = \frac{C_{mf}T - (W_m T + W_f T + V_m + V_f)\frac{\partial C_{mf}}{\partial W_m}}{C_{mf}^2} - \frac{C_m T - (W_m T + V_m)\frac{\partial C_m}{\partial W_m}}{C_m^2}$$

Two of the first order conditions for cost minimization are $\frac{\partial C_{mf}}{\partial W_m} = \frac{t_m^m}{Z_{mf}}$ and $\frac{\partial C_m}{\partial W_m} = \frac{t_m^s}{Z_m}$. Substituting these into the above equation,

$$\frac{\partial G}{\partial W_m} = \frac{T - t_m^m}{C_{mf}} - \frac{T - t_m^s}{C_m}.$$

If a man has a higher wage than his wife and if the two have equal home productivities when $t_m^m = t_f^m$, then the married male will specialize in the labor force (i.e., $\ell_m^m > \ell_f^m$) and will work more than he would if he were single. Therefore, since $\ell_m^m > \ell_m^s$ and $C_{mf} < C_m$, an increase in the male wage rate increases the gains from marriage. Basically, the benefits of specialization associated with the husband spending more hours in the labor market ($\ell_m^m > \ell_m^s$) or associated with the wife assuming a greater share in household production ($C_{mf} < C_m$) increase as the male wage rises.

The theory of marriage (Becker 1973) predicts that male wages will be negatively correlated with female wages; that is, *ceteris paribus*, high wage males will marry low wage females, and low wage males will marry high wage females. Low wage males then specialize in household production, and an increase in their wages will decrease their gains from marriage. The incidence of male specialization in household production appears to be quite low. Thus, there will be a predominately positive association between male wages and the gain from marriage; and married males will have higher wages than single males partly because those males with high wages have found it worthwhile to marry. The positive relation between marriage and the male wage rate therefore in part reflects a selectivity phenomenon.

As we have seen, married males will tend to work more hours, other things equal, than single males. The marginal revenue of an incremental unit of human capital investment increases as the number of hours spent working rises.[2] Married males accordingly have a greater incentive to invest in human capital, and marriage-associated investment will create part of the observed wage differential between married and single males.

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[2] See, for example, Polachek (1975).

A symmetrical argument relates female wages to marital status. Single females have higher wages than married females partly because single females spend more hours in the labor market than married females and also partly because high wage females have not found it worthwhile to marry. It is surprising to note that in the literature on the determination of female wages there are few, if any, references to marital selectivity.

In the empirical analysis that follows, we will try to ascertain what part of the male wage differential may be ascribed to selectivity and what part may be attributed to marriage-associated investment. The fact that some marriage-associated investment may occur prior to marriage and between marriages makes this a difficult, if not impossible, task. For, as the number of hours spent working over the life cycle increases (e.g., the benefits of specialization in marriage increase), the marginal revenue of investment in human capital increases in <u>each</u> period, whether the individual is married or single, leading to an increase in investment in human capital in each period.

For several reasons, married males face a lower marginal cost of investment in human capital than otherwise identical single males. A man is able to borrow at lower cost from a wife than from other sources to finance investment in human capital; this is partly because alimony reduces the risk faced by wives when they finance their husbands' investment in human capital. It is reasonable to assume that the marginal cost of hourly investment in human capital is an increasing function of the quantity of investment per hour. A given level of annual investment in training will then be cheaper to individuals when they are working many hours (e.g., married) than when they are working few hours (e.g., unmarried). Thus, although there is likely to be more annual investment in human capital when an individual is married, the difference between an individual's annual rate of investment in human capital while married and an individual's annual rate of investment in human capital while single, other things equal, provides only a lower bound on the quantity of marriage-associated investment.

Let us now more formally specify the relation between wage rates and marital status. The wage rate of individual i in year j ($W_{j,i}$) may be written as

$$W_{j,i} = W_{s,i} + \sum_{t=0}^{j-1} r\lambda_t I_{t,i} - I_{j,i} + D_j + E_j \qquad (1)$$

where

$W_{s,i}$ = the initial capacity wage rate,

λ_t = fraction of total available hours (T) which was spent working in year t,

$I_{t,i}$ = resources per hour at work devoted to acquiring job skills and information,

r = average "rate of return" to investment in human capital,

D_j = adjustment to wage rate in year j to compensate worker for distasteful job conditions or for living in an expensive or less desirable area,

E_j = stochastic disturbance in year j.

This specification allows individuals working 2000 hours per year to receive twice the total return to their investment as individuals who work 1000 hours per year and who invest at the same hourly rate.

The resources per hour which are devoted to the acquisition of human capital may be rewritten as

$$I_{t,i} = I_{t,s} + \delta_t (\Delta I)_{t,n,m} + \alpha_i \qquad (2)$$

where

$I_{t,s}$ = resources per hour at work devoted to acquiring job skills and information by single males in year t,

$\Delta I_{t,n,m}$ = "additional" resources per hour at work devoted by married males in year t and in their n^{th} year of marriage,

$$n = \sum_{i=0}^{t} \delta_i,$$

δ_t = 1 if married in year t; 0 if not married in year t,

α_i = individual-specific component of hourly investment which is unrelated to marital status.

Similarly annual investment may be rewritten as

$$\lambda_t I_{t,i} = (\lambda I)_{t,s} + \delta_t (\Delta\lambda I)_{t,n,m} + \lambda_t \alpha_i \qquad (3)$$

where

$(\lambda I)_{t,s}$ = annual investment by single males in year t,

$(\Delta\lambda I)_{t,n,m}$ = "additional" annual investment by married males in year t and in their n^{th} year of marriage.

The terms α_i and $\lambda_t \alpha_i$ pick up differences across individuals in their propensity to invest in human capital as well as some of the differences in investment due to marriage-associated investment. The rest of marriage-associated investment, that part due to the lower cost of investment during marriage, is captured by the terms $(\Delta I)_{t,n,m}$ and $(\Delta\lambda I)_{t,n,m}$. Married males are predicted to invest more resources annually in human capital accumulation than single males (i.e., $(\Delta\lambda I)_{t,n,m} > 0$) because wives help to finance this investment and because a given annual rate of investment is cheaper when spread over many hours. The latter argument predicts that the hourly rate of investment will be less for married males than for single males (i.e., $(\Delta I)_{t,n,m} < 0$). The increase in annual investment brought about by the wife's financing of her husband's human capital accumulation may, however, cause $(\Delta I)_{t,n,m}$ to be positive.

As men move through their life cycle, the marginal revenue of investment in human capital falls and assets accumulate. Moreover, as assets accumulate, the benefits of financing investment in human capital within the marriage decrease. It therefore follows that

$$\frac{\partial(\Delta\lambda I)_{t,n,m}}{\partial t} < 0 \qquad \frac{\partial(\Delta\lambda I)_{t,n,m}}{\partial n} < 0$$

$$\frac{\partial(\Delta I)_{t,n,m}}{\partial t} < 0 \qquad \frac{\partial(\Delta I)_{t,n,m}}{\partial n} < 0$$

Combining equations (1), (2), and (3),

$$W_{j,i} = W_{s,i} + \sum_{t=0}^{j-1} r(\lambda I)_{t,s} + \sum_{t=0}^{j-1} r\delta_t(\Delta\lambda I)_{t,n,m} + \alpha_i r \sum_{t=0}^{j-1} \lambda_t - I_{j,s} - \delta_j(\Delta I)_{j,n,m} - \alpha_i + D_j + E_j \qquad (4)$$

Equation (4) will be estimated in section III.

The growth in the wage rate in the k years following year j equals

$$\begin{aligned} W_{j,j+k,i} &= W_{j+k,i} - W_{j,i} \\ &= \sum_{t=j}^{j+k-1} r(\lambda I)_{t,s} + \sum_{t=j}^{j+k-1} r\delta_t(\Delta\lambda I)_{t,n,m} + \alpha_i r \sum_{t=j}^{j+k-1} \lambda_t \\ &\quad - (I_{j+k,s} - I_{j,s}) - \left(\delta_{j+k}(\Delta I)_{j+k,n,m} - \delta_j(\Delta I)_{j,n,m}\right) \\ &\quad + (D_{j+k} - D_j) + (E_{j+k} - E_j) \end{aligned} \qquad (5)$$

The growth in the wage rate over time therefore is positively related to the growth in previous investment over this period, is negatively related to the fall in current investment, and is positively related to the change in wage compensation $(D_{j+k} - D_j)$. In particular, if $(\Delta I)_{t,n,m}$ is negative, then wage growth is predicted to be negatively related to initial marital status (δ_j) and positively related to final marital status (δ_{j+k}). In the empirical work that follows this section, equation (5) will also be estimated.

We will now compare people to themselves. We will compare the growth in wage rates in adjacent married years to the growth in wage rates in adjacent unmarried years. Suppose that a person is married in years j+k and j+k+1 and is unmarried in years j and j+1. Equation (4) implies that the annual growth in wage rates in married years less the annual growth in wage rates in unmarried years equals

$$\begin{aligned} W_{j+k,j+k+1,i}\Big|_{\delta=1} - W_{j,j+1,i}\Big|_{\delta=0} = {} & r(\lambda I)_{j+k,s} + r(\Delta\lambda I)_{j+k,n,m} \\ & + \alpha_i r\lambda_{j+k} - (I_{j+k+1,s} - I_{j+k,s}) \\ & - \big((\Delta I)_{j+k+1,n,m} - (\Delta I)_{j+k,n,m}\big) \\ & - r(\lambda I)_{j,s} + (I_{j+1,s} - I_{j,s}) - \alpha_i r\lambda_j \\ & + (D_{j+k+1} - D_{j+k} - D_{j+1} + D_j) + \mu, \qquad (6) \end{aligned}$$

where

$$\mu = E_{j+k+1} - E_{j+k} - E_{j+1} + E_j.$$

If

$$(\lambda I)_{t,s} = a - bt$$

and

$$I_{j+k+1,s} - I_{j+k,s} = I_{j+1,s} - I_{j,s},$$

then (6) simplifies to

$$= -rbk + [r(\Delta\lambda I)_{j+k,n,m} - ((\Delta I)_{j+k+1,n,m} - (\Delta I)_{j+k,n,m})]$$
$$+ \alpha_i r(\lambda_{j+k} - \lambda_j) + (D_{j+k+1} - D_{j+k} - D_{j+1} + D_j) + \mu \qquad (7)$$

The term in brackets is predicted to be positive since $(\Delta I)_{t,n,m}$ is expected to fall over the life cycle. This specification has the advantage that the bias brought about by the presence of term individual-specific terms appears to be negligible, for the term $\alpha_i r(\lambda_{j+k} - \lambda_j)$ equals zero if labor supply in period j+k equals labor supply in period j. Moreover, the assumption, found in equations (2) and (3), that annual individual-specific investment in human capital varies with current labor supply, may be questioned. The predictions of equation (7) will be tested in section III.

It has been argued that marriage leads, through an increase in hours worked, to higher wages. Knowledge of the relation between the number of hours worked and wages, together with information about the effect of marriage on labor supply, will enable us to ascertain what part of the observed wage differential between married and never-married males is attributable to differential labor supply. First, some additional structure must be given to the investment profile.

If m_t is defined to equal the ratio of hourly investment costs $(I_{t,i})$ to the gross wage $(W_{t,i} + I_{t,i})$ and if $\lambda_t m_t$ is assumed to be small, then equation (1) can be rewritten to yield

$$\ln W_{j,i} \cong \ln W_{s,i} + r\sum_{t=0}^{j-1} \lambda_t m_t - m_j + d_j + v_j, \qquad (8)$$

where

d_j = amenity or cost of living adjustment.

Furthermore, assume that

$$m_t = m_o - \beta t.^3 \qquad (9)$$

Combining (8) and (9),

$$\ell n\, W_{j,i} \cong \ell n\, W_{s,i} + rm_o \sum_{t=0}^{j-1} \lambda_t - r\beta \sum_{t=0}^{j-1} \lambda_t t - (m_o - \beta j) + d_j + v_j \qquad (10)$$

Also,

$$\ell n\, W_{j+k,i} - \ell n\, W_{j,i} \cong rm_o \sum_{t=j}^{j+k-1} \lambda_t - r\beta \sum_{t=j}^{j+k-1} \lambda_t t + \beta k$$
$$+ (d_{j+k} - d_j) + (v_{j+k} - v_j) \qquad (11)$$

The predictions found in equation (11) will be put to a test in section III. Let us then turn to the empirical work.

III. EMPIRICAL RESULTS

The primary data set used in this preliminary investigation is the seven year Panel Study of Income Dynamics. Variables are defined in the appendix at the end of the paper. The sample consists of males who were in the sample for the entire seven year period (1968-1974), who had earnings in 1973, and whose estimated wage rate exceeded \$0.50. Unless otherwise specified, all empirical work will refer to this data set.

The Project TALENT data set has been used to supplement the results obtained from the Income Dynamics data set. Project TALENT is a stratified, random sample of all students in grades nine through 12 in 1960. I

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[3] The specification in equation (9) assumes that the rate of investment per hour is unrelated to the number of annual hours spent working. In future work, this assumption will be relaxed.

have selected a subsample of the twelfth grade males; observations where information was missing were deleted. There were follow-up surveys in 1961, 1965, and 1971; the response rate to the 1965 and 1971 surveys was in the vicinity of 30 percent. It will soon be seen that the intermittence of the follow-up surveys severely limits the usefulness of this data set for probing the relation between wages and marital status. Again, all variable definitions are given in the appendix.

A. Labor Supply

It has been predicted that married men will work more hours than unmarried men. If married males work many more hours than single males, then married males have a much greater incentive to invest in human capital, and marriage-associated investment in human capital is likely to be an important component of the difference between the wage rate of married males and the wage rate of single males. With this in mind, let us turn to the regressions in Tables 1 and 2, which explain variation in the total number of hours worked in 1973 among those aged 64 or less.

Most of the variables have a significant impact on labor supply. A 10 percent increase in the wage rate leads to a 34 hour reduction in the number of hours worked per year. The number of years of schooling (EH) is significantly positive only when the log of the wage rate (LW4) is one of the regressors.[4] The positive sign of age (AGEH4) and the negative sign

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[4] It is puzzling to find that LW4 and EH take on opposite signs. If an increase in education generates a neutral increase in household productivity, then labor supply will be unaltered. Under this neutrality assumption, educational attainment and wages both measure human capital. Borjas (1978) offers an explanation of the then inconsistent signs. He shows that the often observed negative relationship between the wage rate and labor supply may be spuriously induced by estimating the wage rate as the ratio of earnings to hours worked.

TABLE 1

LABOR SUPPLY: HOURS

	HOURH4	HOURH4	HOURH4	HOURH4
CONSTANT	1466.254[a]	1312.290[a]	1444.883[a]	1289.731[a]
	(275.794)	(265.962)	(275.979)	(266.107)
EH	7.483	29.930[a]	7.461	29.929[a]
	(4.224)	(4.482)	(4.222)	(4.480)
AGEH4	35.930[a]	51.860[a]	35.491[a]	51.416[a]
	(12.597)	(12.207)	(12.594)	(12.202)
AGE2	-.515[a]	-.691[a]	-.513[a]	-.689[a]
	(.140)	(.136)	(.140)	(.136)
STU4	-1784.559[a]	-1790.499[a]	-1775.127[a]	-1780.617[a]
	(280.933)	(270.599)	(280.864)	(270.496)
EXPCU4	10.074[a]	12.840[a]	10.059[a]	12.827[a]
	(2.054)	(1.992)	(2.053)	(1.991)
UN4	-118.260[a]	-28.021	-121.317[a]	-31.134
	(32.518)	(32.221)	(32.557)	(32.249)
RACE1	-101.801[a]	-152.493[a]	-102.492[a]	-153.269[a]
	(34.712)	(33.704)	(34.699)	(33.686)
SICK	-.122[a]	-.129[a]	-.122[a]	-.129[a]
	(.017)	(.016)	(.017)	(.016)
MARR4	224.967[a]	260.255[a]	262.786[a]	299.935[a]
	(54.647)	(52.720)	(59.334)	(57.228)
WID4			232.239	243.449
			(142.300)	(137.050)
LW4		-336.224[a]		-336.566[a]
		(28.164)		(28.148)
R^2	.123	.187	.124	.188
No. Obs's.	1828	1828	1828	1828

TABLE 2

LABOR SUPPLY: HOURS

	HOURH4	HOURH4	HOURH4	HOURH4
CONSTANT	1461.384[a]	1338.806[a]	1431.766[a]	1309.441[a]
	(279.245)	(269.055)	(279.685)	(269.464)
EH	8.033	27.481[a]	8.147	27.591[a]
	(4.846)	(4.939)	(4.844)	(4.937)
AGEH4	35.953[a]	51.694[a]	35.924[a]	51.633[a]
	(12.879)	(12.469)	(12.872)	(12.462)
AGE2	-.516[a]	-.686[a]	-.519[a]	-.689[a]
	(.145)	(.140)	(.145)	(.140)
STU4	-1782.667[a]	-1799.762[a]	-1772.989[a]	-1790.158[a]
	(281.233)	(270.778)	(281.159)	(270.694)
EYPCU4	10.091[a]	12.792[a]	10.075[a]	12.775[a]
	(2.057)	(1.994)	(2.056)	(1.993)
UN4	-118.582[a]	-25.286	-121.682[a]	-28.376
	(32.577)	(32.315	(32.616)	(32.349)
RACE1	-102.033[a]	-152.897[a]	-101.397[a]	-152.258[a]
	(35.949)	(34.871)	(35.934)	(34.854)
SICK	-.122[a]	-.128[a]	-.122[a]	-.128[a]
	(.017)	(.016)	(.017)	(.016)
MARRY4	241.987[a]	173.388[a]	288.412[a]	219.459[a]
	(90.254)	(87.085)	(94.472)	(91.136)
WID4			237.038	235.171
			(143.237)	(137.904)
EW4	-1.455	7.344	-1.930	6.871
	(6.157)	(5.973)	(6.161)	(5.977)
CHIL4	-.418	3.032	-2.001	1.461
	(9.272)	(8.932)	(9.317)	(8.974)
LW4		-340.665[a]		-340.610[a]
		(28.390)		(28.375)
R^2	.123	.187	.124	.189
No. Obs's.	1828	1828	1828	1828

of age squared (AGE2) imply that the life cycle profile of labor supply resembles an inverted U; labor supply is estimated to peak around age 36. Students (STU4=1) are estimated to work nearly 1800 fewer hours per year than non-students. An additional year of seniority on a given job (EXPCU4) is associated with approximately 11 more hours of work per year. When LW4 is not one of the regressors, union members (UN4) work significantly fewer hours than non-union members. Nonwhites (RACE1=1) work between 101 and 153 fewer hours per year than whites, and individuals who were sick 10 hours over the 1967-1973 period (SICK) are estimated to work one less hour in 1973.

Let us now examine the relationship between marital status and labor supply. Variables measuring the wife's education and the presence of children are found in Table 2 but not in Table 1. Consider first the regressions in Table 1. As predicted, married males (MARR4=1) work significantly more hours than unmarried males. Married males are estimated to supply approximately 250 more hours per year to the labor force than unmarried males; this estimate is quite close to Parson's (1977) estimate, which was obtained from another sample. In the third and fourth regressions, widowers are estimated to work nearly as many hours as married males. However, the coefficient of WID4 is estimated very imprecisely; widowers do not work significantly more hours than the group of divorced, separated, or never-married males. The MARR4 coefficient is again significantly positive in Table 2. If education increases market productivity more than household productivity, then men married to more educated women will have smaller gains from marriage and will work fewer hours than men married to less educated women. On the other hand, men married to highly educated women may have more human capital and may therefore work more hours than men married to women with little education.[5] Neither the education of the wife (EW4) nor the number of children in the family unit under 18 years of age (CHIL4) significantly affect the husband's labor supply.

The marriage coefficient in Tables 1 and 2 may be biased. Married males may work more hours than single males because they have more human capital than single males rather than because of the specialization that accompanies marriage.[6] Some insight into the importance of this bias is gained by explaining changes over the life cycle in the number of hours worked.

The regressions in Tables 3 and 4 explain part of the variation across individuals in the change in the number of annual hours worked between 1967 and 1973 (HOUR84). Most of the variables are significant only in the full sample and in the subsample of those who were married in 1968; variables which are significant in the subsample of those who were not married in 1968 will be noted. The growth in hours between 1967 and 1973 falls with age; moreover, the coefficient of AGEH4 in Tables 3 and 4 is close to the coefficient that would have been predicted on the basis of the regressions in Tables 1 and 2 (i.e., 12 times the coefficient of AGE2 in Tables 1 and 2). The signs and magnitudes of the coefficients of change in the number of hours sick (SICK84), change in the wage rate (W84), and change in job tenure (EXPC84) are also consistent with Tables 1 and 2. In every sample, the change in student status (STU84) is significantly and negatively related to the change in labor supply. Married students have a much greater increase in labor supply when they leave school than do

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[5]Note that this argument assumes a positively sloped labor supply curve.

[6]Again, a positively sloped labor supply curve must be assumed.

TABLE 3

LABOR SUPPLY: CHANGE IN HOURS

	Not Married in 1968		Married in 1968		Full Sample	
	HOUR84	HOUR84	HOUR84	HOUR84	HOUR84	HOUR84
CONSTANT	423.988	537.090	319.931[a]	519.102[a]	304.008[a]	497.557[a]
	(320.678)	(325.499)	(77.483)	(76.459)	(73.880)	(73.222)
AGEH4	-10.704	-11.799	-8.729[a]	-9.987[a]	-8.479[a]	-9.738[a]
	(6.754)	(6.737)	(1.693)	(1.632)	(1.621)	(1.568)
SICK84	-.421	-.410	-.669[a]	-.637[a]	-.649[a]	-.619[a]
	(.229)	(.227)	(.057)	(.054)	(.055)	(.053)
EXPC84	18.924	19.904	7.409[a]	8.130[a]	8.318[a]	9.033[a]
	(10.337)	(10.279)	(2.122)	(2.042)	(2.081)	(2.008)
DUN84	337.355	336.425	81.027	89.171[a]	97.646[a]	105.435[a]
	(211.318)	(209.783)	(41.440)	(39.860)	(40.661)	(39.236
STU84	-877.485[a]	-877.328[a]	-1530.438[a]	-1560.803[a]	-1301.634	-1319.060[a]
	(223.742)	(222.116)	(137.636)	(132.396)	(110.501)	(106.624)
MARR84	28.711	61.075	167.870	196.064[a]	63.988	90.558
	(140.842)	(141.161)	(94.429)	(90.848)	(64.984)	(62.740)
WID84	262.761	255.504	225.070	239.593	133.058	143.309
	(333.593)	(331.197)	(189.434)	(182.190)	(155.073)	(149.621)
W84		-40.100		-69.197[a]		-66.919[a]
		(24.058)		(5.947)		(5.791)
R^2	.275	.291	.165	.228	.172	.229
No. Obs's.	129	129	1664	1664	1793	1793

[a]Significant at .05 level

LABOR SUPPLY: CHANGE IN HOURS

	Not Married in 1968		Married in 1968		Full Sample	
	HOUR84	HOUR84	HOUR84	HOUR84	HOUR84	HOUR84
CONSTANT	377.042 (321.078)	511.805 (324.691)	299.896[a] (83.869)	508.786[a] (82.636)	277.273[a] (79.030)	479.222[a] (78.260)
AGEH4	-9.082 (6.833)	-10.392 (6.786)	-8.142[a] (1.883)	-9.655[a] (1.816)	-7.730[a] (1.779)	-9.227[a] (1.722)
SICK84	-.417 (.227)	-.407 (.225)	-.672[a] (.056)	-.640[a] (.054)	-.651[a] (.055)	-.620[a] (.053)
EXPC84	16.487 (10.314)	17.385 (10.204)	7.646[a] (2.123)	8.333[a] (2.043)	8.525[a] (2.082)	9.201[a] (2.010)
DUN84	349.782 (209.530)	350.716 (207.077)	79.817 (41.399)	87.817[a] (39.821)	96.659[a] (40.644)	104.470[a] (39.229)
STU84	-773.776[a] (230.396)	-754.940[a] (227.902)	-1545.226[a] (137.723)	-1576.523[a] (132.486)	-1322.465[a] (110.983)	-1337.374[a] (107.112)
MARR84	-716.043 (389.091)	-763.979[a] (385.313)	364.770[a] (133.987)	398.237[a] (128.893)	197.270 (112.428)	216.451[a] (108.512)
WID84	211.625 (332.891)	191.697 (329.151)	238.954 (190.643)	259.368 (183.358)	146.188 (155.611)	156.925 (150.176)
DKID	35.161 (57.768)	28.844 (57.183)	9.662 (12.715)	5.704 (12.233)	13.330 (12.318)	9.184 (11.893)
EW84	58.904[a] (29.173)	66.540[a] (29.093)	-18.282[a] (7.941)	-18.174[a] (7.637)	-12.684 (7.667)	-11.643 (7.400)
W84		-47.040 (24.015)		-69.097[a] (5.942)		-66.664[a] (5.792)
R^2	.300	.322	.168	.231	.174	.231
No. Obs's	129	129	1664	1664	1793	1793

unmarried students. Part of this difference may be attributed to the role that wives play in the financing of their husband's investment in human capital. The positive sign of change in union status (UN84) is puzzling, for in the hours regressions, union members are estimated to work fewer hours than individuals who do not belong to unions.

Only in one regression in Table 3 does change in marital status (MARR84) have a significant impact on HOUR84. Males who get married experience approximately 40 hours greater growth in hours worked than males who remain single; this difference, however, is insignificant. If the sample of those who were not married in 1968 is divided into two subsamples--those who in 1968 had never been married and those who in 1968 were divorced, widowed, or separated--then the MARR84 coefficients in comparable but unreported regressions approximately equal 20 and 210 in the two respective samples; in these small samples, neither coefficient is significant. Those who marry for the first time appear to experience virtually no increase in time spent working. The coefficients in the third and fourth regressions in Table 3 imply that males who become separated or divorced experience significantly less (180 hours) growth in hours worked than males who remain married. Change in widower status (WID84) is not significantly related to the change in labor supply over the life cycle.

Why does male labor supply change so little at first marriage when the response to other changes in marital status is so great? There are several possible explanations. A large expenditure is associated with getting married; this goes to acquiring furniture, taking a honeymoon, having a wedding reception, perhaps buying a house, etc. If capital markets are imperfect, then one way to acquire the desired funds is to increase labor supply prior to marriage. The observations that wedding-related expenditures tend to be smaller in subsequent marriages and that males are older when they remarry and therefore have assets upon which to borrow may help to explain the observed asymmetry in labor supply.

It could be argued that the coefficients in Table 3 result from the tax on earnings associated with alimony and child support payments; however, this argument is inconsistent with the large (although insignificant) increase in labor supply with remarriage and is inconsistent with evidence (from unreported regressions) that males who become separated decrease their time spent in the labor market by nearly 160 more hours than males who become divorced.[7]

It could also be argued that differences in human capital rather than specialization generate the differences in labor supply between married males and single males which are found in Table 1. The change in hours worked would then be unrelated to the change in marital status. This line of reasoning would not explain the fall in labor supply that accompanies divorce or separation.

Consider now the marriage and family structure variables in Table 4. The change in the number of children under 18 in the household (DKID) and the change in widower status have positive but insignificant coefficients. MARR84 is significantly negative in the sample of males who were not married in 1968 and is significantly positive in the sample of males who were married in 1968. The change in the wife's education (EW84) is significant and positive in the former sample and is significant and negative in the latter sample. Because the wife's education takes on a value of 0 when the male is not married, EW84 and MARR84 are highly positively correlated; the correlation coefficient equals 0.88 and 0.45 in the unmarried and

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[7]The latter difference is not significant.

married subsamples, respectively. The flip-flopping of coefficients across samples may thus be caused by multicollinearity and may not reflect a behavioral relationship. The pattern of coefficients would be difficult to explain if multicollinearity were not a problem.

Additional evidence on the relation between marital status and labor supply is found in Table 5. Since the regressions in this table are similar to regressions which have already been discussed, let us turn immediately to the marriage coefficients. In the subsample of those who are not married in 1968, those who are married in 1974 work over 250 more hours in 1967 than those who are not married in 1974. In the subsample of those who are married in 1968, future marital status does not have a significant impact on current labor supply. These results are consistent with the imperfect capital markets argument which was put forward earlier in this paper. Moreover, the regressions in Table 5 are not explained by the tax on wages which is brought about by alimony payments. Why would single males who anticipate getting married work additional hours?

The evidence which has been presented on the relation between labor supply and marital status suggests the following scenario: prior to marriage, single males increase the number of hours supplied to the market in order to accumulate savings. Because of the specialization that accompanies marriage, this high labor supply continues through the marriage. With divorce or separation, there is less specialization in the labor market, and male labor supply falls. An alternative scenario that appears to be less supported by the data would explain the observed differences in labor supply with differences in human capital and with the tax on wages that accompanies divorce.

TABLE 5

LABOR SUPPLY: THE EFFECT OF FUTURE MARITAL STATUS

	Not Married in 1968		Married in 1968	
	HOURH8	HOURH8	HOURH8	HOURH8
CONSTANT	1224.847 (1339.669)	882.651 (1128.090)	1812.665[a] (268.158)	1115.462[a] (262.185)
EH	1.495 (18.605)	17.327 (19.432)	10.315[a] (4.317)	37.515[a] (4.645)
AGEH4	25.954 (49.254)	43.803 (48.933)	24.866[a] (11.406)	56.486[a] (11.185)
AGE2	-.257 (.527)	-.427 (.522)	-.240[a] (.121)	-.560[a] (.118)
STU8	-1134.227[a] (234.224)	-1171.721[a] (230.503)	-1701.341[a] (132.132)	-1830.031[a] (126.761)
EXPCU8	24.089[a] (12.026)	29.268[a] (12.005)	-7.008[a] (2.259)	-1.683 (2.200)
UN8	-235.320 (168.922)	-163.133 (168.583)	-65.864 (33.881)	31.718 (33.289)
RACE1	-92.161 (160.443)	-169.621 (160.830)	-130.535[a] (35.814)	-226.669[a] (35.066)
SICK	.025 (.080)	-.002 (.080)	-.112[a] (.018)	-.114[a] (.017)
MARR4	279.864[a] (132.378)	263.592[a] (130.151)	-39.177 (75.398)	.234 (72.170)
LW8		-288.662[a] (120.831)		-409.678[a] (32.066)
R^2	.329	.358	.131	.206
No. Obs's.	136	136	1746	1746

B. Wage Rates

Much of the work in section II was devoted to showing how marital history and marital status may affect wages. Let us first explain some of the variation across individuals in the level of wage rates. The regressions in Table 6 test the specification implied by equation (4). MARR4 measures current marital status (δ_j), and MARRYR and SEC together measure the number of years married prior to the current year $\left(\sum_{t=0}^{j-1} \delta_t\right)$. We do not know exactly how many years these respondents have been married prior to 1968. All that is known is the age of first marriage, how many years the respondent has been separated, widowed, or divorced by 1968 if separated, widowed, or divorced at the time of the survey in 1968 (a bracketed answer), and whether or not the marriage in 1968 (if married in 1968) is the respondent's first marriage. MARRYR incorporates the first two pieces of information, and SEC, a dummy variable which equals one if the 1968 marriage is not the first marriage, incorporates the third piece of information. The error in the measurement of MARRYR is thus expected to increase with age. In the full sample, the correlation between the number of years married (MARRYR) and experience (EXP) is quite high. Because of this high correlation, it is difficult to separate the impact of marriage from the effect of experience. In younger samples, the correlation between MARRYR and EXP is lower. Younger samples are used in Table 6 to take advantage of the smaller correlation between MARRYR and EXP and to take advantage of the reduced error in the measurement of MARRYR.

These regressions explain variation in the log of the wage rate (LW4). The coefficients are both more plausible and more significant in the older subsample, which has more than twice as many observations as the subsample of those 29 or younger. In fact, the only two significant variables in

TABLE 6

EARNINGS FUNCTIONS

	29 or Younger			34 or Younger		
	LW4	LW4	LW4	LW4	LW4	LW4
CONSTANT	7.8278 (8.6531)	8.7233 (8.7647)	8.9473 (8.7887)	4.6825 (5.2681)	5.4145 (5.2831)	6.1871 (5.2961)
EH	.0190 (.0197)	.0211 (.0199)	.0211 (.0200)	.0568[a] (.0091)	.0583[a] (.0092)	.0572[a] (.0092)
EXP	-.0346 (.1216)	-.0667 (.1256)	-.0589 (.1259)	.0340 (.0335)	.0225 (.0345)	.0259 (.0346)
EXP2	.0033 (.0077)	.0044 (.0079)	.0038 (.0079)	-.0012 (.0015)	-.0010 (.0015)	-.0012 (.0015)
EXPCU4	.0184 (.0016)	.0172 (.0118)	.0181 (.0118)	.0163[a] (.0056)	.0160[a] (.0056)	.0162[a] (.0056)
UN4	.0775 (.0929)	.0632 (.0940)	.0652 (.0943)	.1081[a] (.0513)	.1021[a] (.0514)	.1047[a] (.0516)
RACE1	-.1808 (.1159)	-.1708 (.1167)	-.1856 (.1165)	-.1621[a] (.0612)	-.1605[a] (.0614)	-.1732[a] (.0614)
SICK	$-.635\times10^{-4}$ $(.875\times10^{-4})$	$-.793\times10^{-4}$ $(.891\times10^{-4})$	$-.825\times10^{-4}$ $(.894\times10^{-4})$	$-.264\times10^{-4}$ $(.362\times10^{-4})$	$-.316\times10^{-4}$ $(.363\times10^{-4})$	$-.365\times10^{-4}$ $(.364\times10^{-4})$
MARRYR		.0264 (.0244)	.0411 (.0220)		.0118 (.0097)	.0188[a] (.0092)
MARR4	.2621[a] (.1286)	.1943 (.1441)		.1938[a] (.0721)	.1646[a] (.0764)	
SEC		-.1260 (.2920)	-.1367 (.2927)		.1070 (.1243)	.0839 (.1244)
CITY4	$.11\times10^{-6}$ $(.10\times10^{-6})$	$.9\times10^{-7}$ $(.10\times10^{-6})$	$.8\times10^{-7}$ $(.10\times10^{-6})$	$.10\times10^{-6}$ $(.6\times10^{-7})$	$.10\times10^{-6}$ $(.6\times10^{-7})$	$.10\times10^{-6}$ $(.6\times10^{-7})$
AGND4	-.0001 (.0003)	-.0002 (.0003)	-.0003 (.0003)	$.30\times10^{-6}$ $(.141\times10^{-3})$	$.116\times10^{-4}$ $(.141\times10^{-3})$	$.160\times10^{-4}$ $(.141\times10^{-3})$
DIST4	-.0026[a] (.0012)	-.0030[a] (.0013)	-.0031[a] (.0013)	-.0022[a] (.0007)	-.0022[a] (.0007)	-.0022[a] (.0007)
DENS4	$-.470\times10^{-5}$ $(.633\times10^{-5})$	$-.464\times10^{-5}$ $(.635\times10^{-5})$	$-.568\times10^{-5}$ $(.632\times10^{-5})$	$-.203\times10^{-5}$ $(.357\times10^{-5})$	$.224\times10^{-5}$ $(.357\times10^{-5})$	$.201\times10^{-5}$ $(.359\times10^{-5})$
PREC4	.0039 (.0051)	.0034 (.0051)	.0042 (.0051)	.0038 (.0030)	.0040 (.0030)	.0045 (.0030)
JAN4	-.0022 (.0034)	-.0028 (.0035)	-.0036 (.0034)	-.0004 (.0021)	-.0001 (.0022)	-.0007 (.0022)
JULY4	-.1663 (.2253)	-.1849 (.2279)	-.1872 (.2286)	-.1081 (.1368)	-.1269 (.1372)	-.1447 (.1376)
JULY42	.0010 (.0014)	.0011 (.0015)	.0011 (.0015)	.0006 (.0009)	.0008 (.0009)	.0009 (.0009)
R^2	.1662	.1735	.1627	.2533	.2587	.2496
No Obs's.	159	159	159	397	397	397

[a]Significant at .05 level

the subsample of males 29 or younger are marital status (MARR4) and distance from the nearest standard metropolitan statistical area (DIST4), which takes on a negative sign. In the subsample of males aged 34 or younger, educational attainment (LH), years of experience on the current job (EXPCU4), union membership (UN4), MARRYR, and MARR4 have significant positive signs and race (RACE1) and DIST4 have significant negative signs. The number of years of full-time-equivalent job experience (EXP), experience squared (EXP2), SICK, SEC, size of the largest city in the sampling unit (CITY4), state value of land and buildings per acre in agriculture (AGND4), county population density (DENS4), the state's average yearly rainfall (PREC4), the state's average January temperature (JAN4), the state's average July temperature (JULY4), and JULY4 squared (JULY42) do not significantly affect wage rates.

Since the significant results for the most part replicate the results of earlier earnings functions studies, we will proceed to a discussion of the coefficients of the three marriage variables. Those who are currently married (MARR4=1) have significantly higher wages than those who are not currently married. This may reflect either a positive correlation between MARR4 and $\alpha_i r \sum_{t=0}^{j-1} \lambda_t - \alpha_i$, the unobserved individual-specific component of investment which is independent of current marital status, or a lower rate of <u>hourly</u> investment among married males than among single males (i.e., $(\Delta I)_{j,n,m} < 0$).[8] Controlling for years married results in only a 20 per cent drop in the MARR4 coefficients. The number of years of previous marriage experience (MARRYR) is correctly positive but is significant only when MARR4 is omitted from the regression in the sample of those 34 or

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[8]A positive correlation between MARRYR and $\alpha_i r \sum_{t=0}^{j-1} \lambda_i - \alpha_i$ is also anticipated.

younger. Using the coefficients from the second and fifth regressions, it is estimated to take between 1.4 and 5.3 years of previous marriage experience to generate the unexplained 98 cent wage differential between married males and never-married males found in similar regressions using the full sample.

There is also weak evidence supporting the expectation that the additional annual investment that occurs within marriage falls as the number of years of marriage increases. In the sample of those 29 or younger (where the mean value of MARRYR equals 5.99), one year of marriage increases the wage rate by 2.6 percent, while in the sample of those 34 or younger (where the mean of MARRYR equals 8.02), one year of marriage increases the wage rate by only 1.2 percent. However, regressions using the natural logarithm of MARRYR instead of MARRYR were less successful in explaining variation in LW4 than were the regressions reported in Table 6.

Similar regressions, estimated from the Project TALENT data, are found in Table 7. The dependent variable is the natural logarithm of the wage rate in 1971 (WYEAR11). Years of schooling (EH) is significant and positive. Recall that this sample comprises but one cohort; therefore, one additional year of schooling is obtained at the expense of one year of on-the-job experience. The number of jobs held between 1965 and 1971 (JOBS), the fraction of the year spent sick in 1961 (SICK1), and race (RACE) do not significantly affect wages. Those who grew up in rural-farm or small town areas (RURAL) are more likely than others to be living in 1971 in these areas, where the cost of living is low. It can therefore be plausibly argued that the significant negative coefficient of RURAL captures a compensating wage differential associated with differences in the cost of living.

TABLE 7

PROJECT TALENT

EARNINGS FUNCTIONS

	FULL SAMPLE			One marriage, currently married
	WYEAR11	WYEAR11	WYEAR11	WYEAR11
CONSTANT	1.329[a] (.032)	1.300[a] (.033)	1.337[a] (.029)	1.383[a] (.037)
EH	.046[a] (.005)	.049[a] (.005)	.050[a] (.005)	.046[a] (.005)
JOBS	-.007 (.008)	-.007 (.008)	-.007 (.008)	-.011 (.009)
SICK1	-.003 (.004)	-.003 (.004)	-.003 (.004)	-.003 (.004)
RACE	.079 (.106)	.080 (.106)	.077 (.106)	.076 (.123)
RURAL	-.067[a] (.029)	-.071[a] (.029)	-.071[a] (.029)	-.080[a] (.033)
MARR	.139[a] (.029)	.076[a] (.034)		
MARRYR		.018[a] (.005)	.023[a] (.004)	.020[a] (.005)
NOMARR1		-.109 (.056)	-.116[a] (.056)	
R^2	.105	.118	.114	.097
No Obs's.	1098	1098	1098	830

[a]Significant at .05 level

In this sample, a sizable part of the wage differential associated with marital status appears to be attributable to differences in investment. Married males (MARR=1) are estimated to earn 14 percent more per hour than unmarried males. However, when variables measuring the number of years married prior to 1971 enter the regression, this coefficient drops by nearly 50 percent. MARR is significant in both regressions. Our knowledge of the respondent's marital history is extremely limited; we know his age at first marriage, his marital status in 1965, his marital status in 1971, and the number of marriages in 1971. MARRYR measures the number of years of previous marriage experience $\left(\sum_{t=0}^{j-1} \delta_t\right)$; it equals 28 less the age at first marriage and is constrained to be nonnegative. NOMARR1 is also used to measure the number of years of marital experience. NOMARR1 equals the number of marriages in excess of one. As predicted, MARRYR is significantly positive and NOMARR1 is significantly negative. One year of previous marriage experience increases the wage rate by 1.8 percent. Using the coefficients from the second regression, it is estimated to take nearly four years of previous marriage experience to produce the observed unexplained marital wage differential. Being married twice is estimated to be equivalent to losing five to six years of marriage experience; these estimates are quite close to the actual median time between separation and remarriage.[9] Finally, the fourth regression is estimated using a sample in which our knowledge of marital experience is fairly precise: the sample of once married, currently married individuals. This regression is quite similar to the others. Finally, note that unreported regressions using the log of MARRYR are less successful in explaining variations in WYEAR11 than the regressions reported in Table 7.

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[9] See Becker, Landes, and Michael (1977), p. 1172.

Returning to the Income Dynamics data, regressions are presented in Table 8 which attempt to explain differences across individuals in the increase in wage rates between 1967 and 1973 (W84). The regressions are based on equation (5) in section II. Wage growth is estimated as a function of educational attainment (EH), change in union membership (DUN84), the number of hours sick between 1967 and 1973 (SICK), race (RACE1), change in city size (DCITY84), change in average state January temperatures (DJAN84), a dummy variable indicating whether or not the individual changed states (DSTATE), experience (EXP), the number of years married between 1968 and 1973 (MARRYR2), marital status in 1968 (MARR8), marital status in 1974 (MARR4), and dummy variables measuring changes in marital status over this period.

In order to hold marital status in 1968 (δ_j) constant, the sample has been split into two groups: those who were not married in 1968 and those who were married in 1968. Let us first examine the first three regressions, which are based on the former subsample. Surprisingly, a move to a warmer climate is associated with a significant <u>increase</u> in the wage rate; DJAN84 is significantly positive.[10] The cross sectional evidence, however, shows that workers are willing to work for lower wages in warmer climates. The positive coefficient of DJAN84 may be reflecting the migration of predominantly skilled workers to the sunbelt. Changing states (DSTATE) leads to a significant increase in wages in the first regression. The marriage variables support the predictions of equation (5). Those who marry between 1968 and 1974 (NMARR=1) are estimated to experience nearly a $1.00 greater increase in the wage rate than those who do not marry in this period; the

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[10]In unreported regressions, the significance of the positive coefficient of DJAN84 persists even after the distance of the move has been held constant.

TABLE 8

WAGE GROWTH 1967 to 1973

	Not Married in 1968			Married in 1968			Full Sample
	W84	W84	W84	W84	W84	W84	
\NT	-.060 (1.112)	.302 (1.094)	.155 (1.078)	.897[a] (.359)	-.202 (.815)	-.233 (.794)	.330 (.437)
EH	.082 (.064)	.073 (.064)	.072 (.064)	.130[a] (.021)	.131[a] (.021)	.131[a] (.021)	.126[a] (.020)
\84	-.120 (.629)	-.225 (.625)	-.180 (.622)	.151 (.177)	.143 (.177)	.144 (.177)	.136 (.170)
ICK	$.187 \times 10^{-3}$ $(.283 \times 10^{-3})$	$.179 \times 10^{-3}$ $(.281 \times 10^{-3})$	$.192 \times 10^{-3}$ $(.280 \times 10^{-3})$	$-.144 \times 10^{-3}$ $(.855 \times 10^{-4})$	$-.142 \times 10^{-3}$ $(.855 \times 10^{-4})$	$-.142 \times 10^{-3}$ $(.854 \times 10^{-4})$	$-.116 \times 10^{-3}$ $(.819 \times 10^{-4})$
:E1	.160 (.572)	.073 (.569)	.075 (.568)	.240 (.171)	.239 (.171)	.236 (.171)	.219 (.164)
/84	$.75 \times 10^{-6}$ $(.54 \times 10^{-6})$	$.70 \times 10^{-6}$ $(.54 \times 10^{-6})$	$.67 \times 10^{-6}$ $(.54 \times 10^{-6})$	$-.31 \times 10^{-6}$ $(.33 \times 10^{-6})$	$-.33 \times 10^{-6}$ $(.33 \times 10^{-6})$	$-.33 \times 10^{-6}$ $(.33 \times 10^{-6})$	$-.10 \times 10^{-6}$ $(.29 \times 10^{-6}$
\84	.076[a] (.030)	.069[a] (.029)	.070[a] (.029)	.013 (.015)	.013 (.015)	.012 (.015)	.023 (.013)
\TE	1.360[a] (.659)	1.228 (.658)	1.257 (.656)	.395 (.306)	.410 (.306)	.408 (.306)	.551[a] (.278)
:XP	.009 (.020)	.003 (.019)	.005 (.019)	-.011 (.007)	-.011 (.007)	-.011 (.007)	-.010 (.006)
\RR	.975[a] (.475)						
)SS				-.292 (.290)			
/R2		.431[a] (.189)	.307[a] (.118)		.169 (.160)	.187 (.120)	.266[a] (.123)
RR4		-.627 (.748)			.079 (.466)		-.112 (.404)
RR8							-.897 (.486)
R^2	.177	.197	.193	.040	.041	.040	.045
s's.	143	143	143	1774	1774	1774	1917

ificant at .05 level

average value of W84 is $2.00. The number of years married between 1968 and 1973 (MARRYR2) also has a significant and positive impact on wage growth. When final marital status (MARR4) is held constant, an additional year of marriage is estimated to increase the wage rate by 43 cents. It should be noted that the significant positive coefficients of NMARR and MARRYR2 may result from a positive correlation between these variables and α_i. MARR4 has a negative but insignificant coefficient; currently married males experience a wage growth which is 63 cents less than the wage growth of males who are not currently married. It therefore would take nearly four years of previous marriage experience to build the unexplained 98 cent wage differential that is observed between married males and never-married males. None of the remaining variables are significant.

The only variable that is significantly associated with wage growth in the subsample of those who were married in 1968 is educational attainment. Wage growth between 1968 and 1974 increases by 13 cents with every additional year of schooling. The marital variables often have a plausible, although insignificant, impact on wage growth.[11] Males who were not married for at least one year in the 1969-1974 period (LOSS=1) are estimated to have a 29 cent smaller increase in their wage rate than males who were married continuously in the period. When MARR4 is held constant, an additional year of marriage leads to a 17 cent larger increase in wage growth. The MARRYR2 coefficient in regression (5) is approximately 40 percent of the size of the MARRYR2 coefficient in regression (2). Since the mean number of years married is 13 years greater in the latter sample, this finding is consistent with the additional annual investment that occurs

[11]In the subsample of individuals who were not married for at least one year in the 1969-1974 period, MARRYR2 is significant at the 10 per cent level; its coefficient equals 0.20.

within marriage $\left((\Delta\lambda I)_{t,n,m}\right)$ falling as the number of years married (n) increases. MARR4 has a positive but insignificant coefficient.

Additional evidence on wage growth during marriage comes from unreported regressions. If widowhood is not as anticipated as marital dissolution, then males who become widowed will experience a greater rate of wage growth during their married years than males who become separated or divorced. This prediction receives weak confirmation. In the subsample of individuals who become separated or divorced in the 1969-1974 period, the coefficient of MARRYR2 approximately equalled 0.17. In the subsample of males who became widowed during this period, an additional year of marriage led to more than a 30 cent larger wage growth. However, in these small samples, neither coefficient is significant.

The final regression in Table 8 utilizes the full sample. As before, EH and DSTATE are significantly positive. MARRYR2 is correctly positive and is significant. Final marital status (MARR4) is negative and is again insignificant. The coefficient of initial marital status (MARR8) is negative and is significant at the seven percent level; this finding lends some support to the hypothesis that married males invest less per hour in the accumulation of human capital than single males (i.e., $(\Delta I)_{t,n,m} < 0$).

Additional evidence on the determinants of wage growth comes from the Project TALENT data. Table 9 presents regressions estimating the growth in wage rates between 1965 and 1971. The average growth in wage rates over these six years in this young and highly educated sample is close to \$3. Educational attainment is the only variable that has a significant impact on wage growth. Those with a B.A. are estimated to have approximately \$1.00 greater wage growth than high school graduates. The first three regressions examine the sample of males who were never married in

TABLE 9

PROJECT TALENT

WAGE GROWTH 1965 TO 1971

	Never Married in 1965				Not married in 1965	Married in 1965
	W511	W511	W511	W511[b]	W511	W511
CONSTANT	1.806[a] (.284)	1.766[a] (.278)	1.782[a] (.242)	1.678[a] (.321)	1.792[a] (.268)	2.641[a] (.348)
EH	.261[a] (.049)	.261[a] (.049)	.261[a] (.049)	.260[a] (.058)	.258[a] (.048)	.103 (.104)
RACE	.850 (.945)	.778 (.948)	.769 (.944)	.860 (1.444)	.837 (.936)	1.406 (2.841)
SICK1	.033 (.052)	.040 (.053)	.040 (.053)	.079 (.068)	.038 (.052)	-.014 (.050)
NMARR	.155 (.256)					
LOSS						-.708 (1.063)
MARR		.034 (.295)				
MARRYR		.070 (.077)	.075 (.065)	.109 (.086)		
NOMARR1		-.062 (1.032)	-.061 (1.030)			
NMARR1					.182 (.242)	
R^2	.087	.091	.091	.105	.088	.006
No Obs's.	310	310	310	206	321	312

[a]Significant at .05 level

[b]Married once in 1971; married in 1971

1965. In this sample, those who marry by 1971 experience a 16 cent greater wage growth than those who do not marry. As predicted, wage growth is positively related to MARRYR and is negatively related to NOMARR1. One year of previous marriage experience is estimated to increase wages by seven cents. Current marital status (MARR) has a positive but insignificant coefficient. The coefficients of regression (2) imply that 10 years of previous marriage experience would be required to increase wages by 72 cents (14 percent of the 1971 wage rate). In the fourth regression, the subsample of never-married males in 1965 who were married once in 1971 and married in 1971 is used. With MARRYR more accurately measured, its coefficient jumps by more than 50 percent; one year of marriage is now estimated to raise wage growth by 11 cents. MARRYR is, however, still insignificant. In the fifth regression those who are unmarried in 1965 and married in 1971 experience 18 cents greater wage growth than those who were unmarried in both years. In the sixth regression, males who were married in 1965 and unmarried in 1971 are estimated to have 71 cents smaller wage growth than those who were married in both years.

Let us now compare individuals to themselves. A subsample has been formed from the Income Dynamics data set to test the specification found in equation (7). Males were included in this data set if in the 1968-1974 period they spent at least two adjacent years married and two adjacent years unmarried. DIFF equals the average annual wage growth between adjacent married years less the average annual wage growth between adjacent unmarried years.

If in this sample, married males are approximately the same age as unmarried males (i.e., $k \doteq 0$) and $D_{j+k+1} - D_{j+k} - D_{j+1} + D_j \doteq 0$, then the mean value of DIFF provides an estimate of

$r(\Delta\lambda I)_{j+k,n,m} - \left[(\Delta I)_{j+k+1,n,m} - (\Delta I)_{j+k,n,m}\right]$, which is predicted to be positive.

TABLE 10

	Sample		
	Full	k ≥ 0	k < 0
Mean of DIFF	.176	.054	.276
Standard Error of Mean of DIFF	.137	.254	.138
Mean of k	-.38	3.33	-3.41
Number of Observations	98	44	54

Males are estimated to experience an 18 cent greater annual increase in wage rates when married than when not married; that is, the mean of DIFF = 0.18. This difference is, however, not significant. The mean of DIFF is significantly positive at the six percent level in the subsample of males who become unmarried with age (i.e., $k < 0$). It should be noted that since in this subsample the married years precede the unmarried years, the significant sign of DIFF may reflect nothing more than the concavity of the age-wage profile.

The following regression further tests the specification of equation (7):

$$\underset{}{\text{DIFF}} = \underset{(.446)}{1.020^*} - \underset{(.040)}{.028}\ k - \underset{(.00000061)}{.00000040}\ \text{DCITY} + \underset{(.047)}{.068}\ \text{DJAN}$$

$$-\underset{(.011)}{.022^*}\ \text{MAGED} \qquad R^2 = .075 \qquad \text{No. Obs.} = 96$$

The average change in city size in married years less the average change in city size in unmarried years (DCITY), a similar variable for January temperatures (DJAN), and k do not significantly affect wage growth. The negative sign of k is predicted by equation (7), but the signs of DCITY and of DJAN are inconsistent with cross sectional results. As retirement approaches, the benefits of the additional investment in human capital associated with marriage fall, causing $(\Delta\lambda I)_{t,n,m}$ to fall. The significant and negative sign of the average age in the married years (MAGED) is consistent with this expectation.

TABLE 11

ESTIMATED VALUES OF DIFF[a]

MAGED	DIFF
20	.58
30	.36
40	.14

[a]k, DCITY, and DJAN evaluated at zero. Source: regression on p. 35.

The decline over the life cycle in the additional investment that occurs in marriage can be seen in Table 11. The regression estimates that at age 20, the annual growth in wage rates is 58 cents greater if an individual is married than if that same individual is not married. By age 40, the difference has fallen to 14 cents. Neither of these differences, however, is significant.[12]

How much of the unexplained wage differential between married males and never-married males is attributable to differences in labor supply? In equations (10) and (11), labor suppy and experience are the principal explanators of variation across individuals in wage rates and in wage growth. There is no information in the Income Dynamics data set about the

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[12]That is, 1.020 - .022 MAGED is not significantly different from zero for adult values of MAGED. See Theil, Principles of Econometrics, p. 138.

number of hours worked prior to 1967. Moreover, since the initial stock of human capital ($W_{s,i}$) is unobservable, the coefficients of a regression estimating equation (10) may be biased. Accordingly, equation (11) rather than equation (10) has been estimated. The sample consists of the set of males who reported a wage rate (<$9.98) for regular work on their main job in 1970 and in 1974.[13] The following regression was estimated:

$$
\begin{aligned}
\text{LWM04} = {} & \underset{(.0534)}{.2031^{*}} + \underset{(.00000543)}{.00001954^{*}}\ \text{HOURA} - \underset{(.00000009)}{.00000019^{*}}\ \text{HTCEXP} \\
& - \underset{(.00245)}{.00303}\ \text{EH} + \underset{(.0190)}{.0793^{*}}\ \text{DUN04} - \underset{(.00000849)}{.00000392}\ \text{SICK} \\
& - \underset{(.015988)}{.000869}\ \text{RACE1} - \underset{(.00000004)}{.00000006}\ \text{DCITY04} - \underset{(.002193)}{.000168}\ \text{DJAN04} \\
& - \underset{(.0471)}{.0993^{*}}\ \text{DSTATO} \qquad R^2 = .049 \quad \text{No. Obs.} = 799
\end{aligned}
$$

The variables HOURA and HTCEXP correspond to the first and second terms in equation (10), respectively. Both are significant and take on the predicted signs. Only two of the remaining variables are significant. Change in union membership (DUN04) has a significant and positive impact on wage growth, while changing states (DSTATO) is associated with significantly smaller wage growth.

What does this regression imply about the wage differential between continuously married males and never-married males of the same age? Assume that there is no difference in labor supply between the two groups in the first two years of experience and that group A (married or about-to-be-married males) work 250 more hours annually than group B (never-married males) over the rest of the life cycle. The wage differentials

[13] The regression of coefficients obtained from this sample will be less biased than regression coefficients estimated from a sample in which wage rates must be estimated.

under these assumptions between groups A and B at several points in the life cycle are shown in the second column of Table 12. A continuously married male with group A characteristics and 20 years of experience is estimated to have a wage rate which is 7.4 percent greater than a never-married male with group B characteristics and 20 years of experience. Thus, over one-third of the unexplained wage differential between married and never-married males appears to be attributable to differences in labor supply. The third column in Table 12 is calculated under the assumption that the difference in annual labor supply between the two groups equals 100 hours rather than 250 hours. The estimated wage differentials under this assumption are correspondingly smaller.

TABLE 12

Experience	Percentage Wage Differential between Groups A and B	
	Group A works 250 more hours annually from 3rd year of experience until retirement	Group A works 100 more hours annually from 3rd year of experience until retirement
5	1.0	.4
10	3.2	1.3
20	7.4	3.0
30	11.1	4.4
40	14.4	5.7

IV. CONCLUSION

The evidence presented in this paper suggests that marriage-associated investment in human capital is a small but important component of the wage differential that is observed in many earnings regressions. Married males are shown to work over 10 percent more hours than single males. However, no significant increase in labor supply accompanies marriage, despite the fact that males significantly decrease the time they spend working when they become separated or divorced. The evidence on the extent of the specialization in the labor market that accompanies marriage is thus mixed. Furthermore, reasonable estimates of this specialization are shown to account for less than one-half of the unexplained wage differential between married males and never-married males.

The direct evidence on the relation between marriage and wages is weak. Introducing variables measuring the number of years married into earnings regressions causes marital status coefficients to fall by 20 to 50 percent. Wages are significantly related to the number of years married in the Project TALENT data but not in the Income Dynamics data. Furthermore, in the Income Dynamics data, a significant relationship between wage growth and the number of years married is found; a sizable wage differential between married and unmarried males emerges after three and a half years of marriage. Of course, the significant relationship between wage growth and the number of years married may reflect a selectivity phenomenon. In the Project TALENT data, the number of years married is unrelated to wage growth. Finally, evidence from the Income Dynamics data suggests that the annual growth in wage rates when an individual is married is greater than the annual growth in wage rates for the same individual when he is not married.

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APPENDIX

VARIABLE DEFINITIONS

Income Dynamics Data Set

AGEH4: age in 1974

AGE2: $(\text{AGEH4})^2$

AGND4: state value of land and buildings per acre in agriculture

CHIL4: number of children under 18 years of age in family unit

CITY4: size of the largest city in the primary sampling unit (PSU) in 1974

DCITY: average annual change in city size between adjacent married years less the average annual change in city size between adjacent unmarried years

DCITY84: CITY4 - size of the largest city in the PSU in 1968

DENS4: county population per square mile in 1974

DIFF: average annual change in wage rates between adjacent married years less the average annual change in wage rates between adjacent unmarried years

DIST4: distance in 1974 to the nearest city of at least 50,000 people

DJAN: average annual change in state January temperatures between adjacent married years less the average annual change in state January temperatures between adjacent unmarried years

DJAN84: JAN4 - state average January temperature in 1968

DKID: CHIL4 - CHIL8

DSTATE: 1 if state in which respondent lives in 1974 is not the same state in which respondent lives in 1968

0 otherwise

DSTATO: 1 if individual lived in a different state in 1974 than in 1970

0 otherwise

DUN84: UN4 - union membership in 1968

Income Dynamics Data Set (continued)

EH: number of grades of school completed

EW4: education of the wife in 1974; if no wife, EW4=0

EW84: EW4 - EW8

EXP: number of years of fulltime-equivalent experience since age 18 in 1974

EXP2: $(EXP)^2$

EXPC84: EXPCU4 - EXPCU8

EXPCU4: number of years on current job in 1974

HOURH4: annual hours working for money in 1973 (asked in 1974)

JAN4: state average January temperature in 1974

HOUR84: HOURH4 - HOURH8

HOURA: HOURH0 + HOURH1 + HOURH2 + HOURH3

HTCEXP: HOURH0 × (EXP-4) + HOURH1 × (EXP-3) + HOURH2 × (EXP-2) + HOURH3 × (EXP-1)

JULY4: state average July temperature in 1974

JULY42: $(JULY4)^2$

K: average age when married less the average age when unmarried

LOSS: 1 if individual is unmarried sometime in the 1969-1974 period

0 otherwise

LW4: natural logarithm of the ratio of total labor income in 1973 to HOURH4

LWM04: natural logarithm of the wage rate for regular work on the individual's main job in 1974 less the natural logarithm of the wage rate for regular work on the individual's main job in 1970

MAGED: the average age during the married years

MARR4: 1 if individual currently married in 1974

0 otherwise

MARR84: MARR4 - MARR8

MARRYR: estimated number of years married as of 1973 = (AGEH8 - age of first marriage - SEP - 1) + MARR8 + MARR9 + MARR0 + MARR1 + MARR2 + MARR3; the term in parentheses is constrained to be nonnegative

MARRYR2: number of years married in the 1968-1973 period

NMARR: 1 if married sometime in 1969-1974 period

0 otherwise

PREC4: state annual inches of rainfall in 1974

RACE1: 1 if nonwhite in 1971

0 otherwise

SEC: 1 if marriage in 1968 is not first marriage

0 otherwise

SEP: number of years the respondent has been separated, widowed, or divorced by 1968 if widowed, separated, or divorced at the time of the survey in 1968

SICK: sum of the annual hours of illness in the 1967-1973 period

SICK84: number of hours sick in 1973 less the number of hours sick in 1967

STU4: 1 if student in 1974

0 otherwise

STU84: STU4 - STU8

UN4: 1 if belongs to union in 1974

0 otherwise

W84: estimated wage rate in 1973 (asked in 1974) less estimated wage rate in 1967 (asked in 1968)

WID4: 1 if currently widowed in 1974

0 otherwise

WID84: WID4 - WID8

Project TALENT Data Set

EH: number of grades of school completed

JOBS: number of different employers on full-time jobs held between June 1960 and September 30, 1971 less the number of full-time paid jobs held between June 1960 and September 30, 1965

LOSS: 1 if not married in 1971

0 otherwise

MARR: 1 if married in 1971

0 otherwise

MARRYR: 28 - age at first marriage; MARRYR $\geq$ 0

NMARR: 1 if ever married in 1971

0 otherwise

NMARR1: 1 if married in 1971

0 otherwise

NOMARR1: number of marriages in 1971 in excess of one

RACE: 1 if nonwhite

0 otherwise

RURAL: 1 if the pupils attending the respondent's secondary school came from an area primarily small town (under 5000) or rural-farm

0 otherwise

SICK1: fraction of the year spent sick at home or in the hospital between 1960 and 1961 times 100

W511: wage in 1971 - wage in 1965

WYEAR11: natural logarithm of wage in 1971