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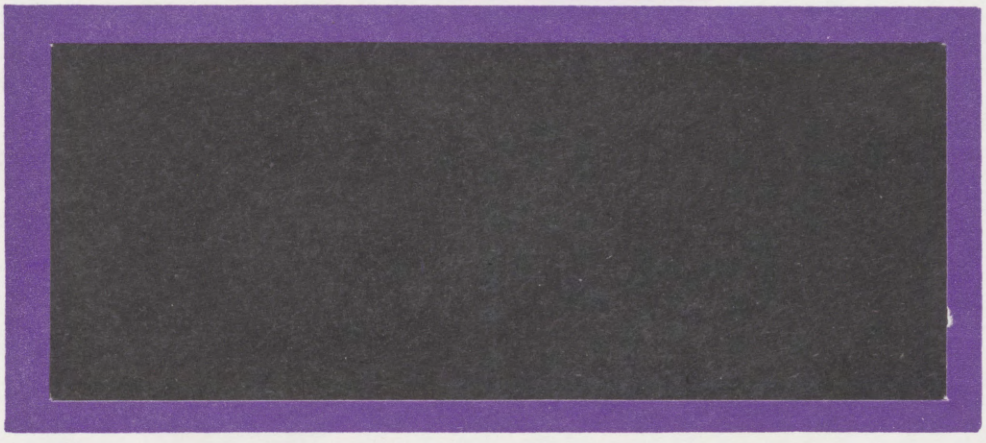

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MARRIAGE MARKETS, LABOR MARKETS AND UNOBSERVED HUMAN CAPITAL: AN EMPIRICAL EXPLORATION FOR SOUTH-CENTRAL IND

by

Jere Behrman, Nancy Birdsall and Anil Deolalikar

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Abstract

Micro empirical studies of labor market outcomes, such as wage rates or labor force participation, tend to focus on the impact of human capital in the form of schooling. Some studies with special data suggest that in addition to schooling there also are important usually unobserved (by the researcher) components of human capital that are rewarded in the labor market. In this study we use special data from rural South Central India to estimate the role of unobserved characteristics of men, estimated from their marriage market experience, on their wage rates and their paid labor market participation. This estimation is possible because the marriage to a wife with certain characteristics (e.g., schooling, age, dowry) depends not only on the man's own schooling and other characteristics, but also on the characteristics of the man's parental household. This allows identification of the man's unobserved characteristics (as estimated from the determination of his wife's characteristics) in his labor force experience determination. The estimates suggest that the characteristics of the man's parents are important in determining characteristics of his wife and that the man's unobserved human capital as estimated from his marriage market experience has a major impact on the level and rate of growth of his wage rate, his paid labor force participation, and his productivity in time spent other than in the labor market.

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Most studies of wage determinants focus on the impact of schooling and labor market experience of an individual on that individual's subsequent earnings, in the tradition of Becker (1967) and Mincer (1974). Typically the estimated impact of schooling on individual labor market outcomes appears significant in such studies,[1] but also typically there is considerable variance in such outcomes that is left unexplained by schooling and other observed variables. A few studies using special data on adult siblings or on cognitive abilities have found that measures of human capital not reflected in a person's schooling are quite important in determining labor market outcomes (e.g., Behrman, Hrubec, Taubman and Wales 1980; Behrman and Wolfe 1984; Boissiere, Knight and Sabot 1985; Olneck 1977).

Most studies of marriage market outcomes focus on assortative mating, especially in terms of schooling (e.g., Becker 1981, Behrman and Wolfe 1989; Boulier and Rosenzweig 1984). Empirically, correlations between schooling levels of spouses are considerable, but less than perfect (e.g., Becker 1981; Behrman, Hrubec, Taubman and Wales 1980; Behrman and Wolfe 1989; Olneck 1977; Schirm 1986; Rao 1990). Such results suggest that unobserved characteristics of individuals may play important roles in the marriage market as well as in the labor market.

In this paper we explore some aspects of the linkage between dimensions of unobserved human capital that are rewarded in the marriage market and in the labor market. We posit that in rural South-Central India the schooling, age and dowry of a man's wife are determined by his observed characteristics (e.g., schooling, caste) and those of his parents (e.g. parental wealth, parental occupation), and dimensions of his unobserved (by the researcher, but observed by prospective wives and their families) human capital. We obtain estimates of dimensions of the man's unobserved human capital from the differences between his wife's actual schooling, age and dowry and her expected schooling, age, and dowry given the observed characteristics of the man and of his parental household. We then explore whether such unobserved human capital affects the man's paid labor force participation, wage rates, and wage growth.

Our results suggest that in these poor rural communities, schooling has a significant impact on a man's paid labor force participation and wage growth, though not on his wage rates.[2] A man's

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[1]Though there are some exceptions in the estimates for developing countries, perhaps because of selectivity of more capable individuals out of the paid labor force into own-enterprise activities. See, for example, Behrman and Deolalikar (1990), Blau (1986), Jamison and Lau (1982), and Walker and Ryan (1990).

[2]Other studies suggest that the returns in schooling in poor developing stagnant rural areas may be quite small, though they may be much larger if there are important changes in markets and in

unobserved human capital generally has a significant and positive effect on his wage rates and wage growth, though a negative effect on his paid labor force participation. Apparently there are some important dimensions of human capital broadly defined beyond schooling that have important effects in both marriage and labor markets in such contexts. Females in this society, together with their parents, presumably value such characteristics in part because they increase the expected earnings power of potential husbands.

Section 1. Theoretical Model

Our model consists of two sets of equations, the first describing the determination of wife's characteristics through the marriage market and the second the determination of the man's wage and wage growth and his paid labor force participation.

We posit that the observed characteristics of a man's wife (i.e., her schooling, age, and net dowry) are determined in the marriage market by his schooling and caste, his parents' household land holdings when he was 15 years old, his father's schooling and occupation, his year of marriage, his unobserved human capital and a stochastic disturbance term:[3]

$$(1) \qquad Z_w = a + b\,S_m + c\,C_m + d\,H_m + e\,Y + \mu_m + \epsilon,$$

where

Z_w = a vector of wife's characteristics (i.e., her schooling, age and dowry),

S_m = the man's schooling,

C_m = the man's caste,

H_m = a vector of characteristics of the man's parental household (wealth in the form of land ownership, father's schooling and occupation),

Y = year of marriage,

μ_m = a vector of dimensions of the man's unobserved human capital, including attributes or endowments such as attractiveness or intelligence,[4]

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technologies. For example, see Jamison and Lau (1982), Schultz (1975) and Sussangkarn (1990).

[3]The relation for the determination of spouse's schooling is similar to that used by Boulier and Rosenzweig (1984), though they do not focus on the unobserved individual characteristics.

[4]Since this is a vector of unobserved variables, the units can be selected so that the coefficients are equal to one.

ϵ = a vector of i.i.d. disturbance term with zero means, and

a - **e** are vectors (or matrices in the case of **d**) of parameters of observed variables that are estimated.

From the point of view of the man and his family, we assume that ceteris paribus a more-schooled, younger wife with a larger dowry is more desirable. The man's characteristics are included in the determination of the wife's characteristics because they are presumed to be important from the point of view of potential brides and their families. Wives are posited to have more desirable observable[5] characteristics (i.e., be more schooled, bring larger dowries, be younger) if the man has more desirable characteristics (i.e., is more schooled, more industrious, more attractive). The schooling and caste of the man are observed, but not others of his characteristics. Therefore μ_m is included, with a vector rather than a scaler representation in order to allow for the possibility that the unobserved characteristics of the man that are relevant for the determination of the different observed characteristics of his wife may vary across these characteristics. But in addition to the man's characteristics, characteristics of his parental family may be important. This is the case for at least two reasons. First, potential brides and their families may think that there is information regarding future wealth and status of the man that is embodied in the characteristics of his parents since, for example, he may inherit wealth from them. Second, and perhaps more important in the context of rural India, marriage is much more an alliance between families than only between a husband and a wife, and parents typically dominate in selecting marriage partners. Therefore the characteristics of the man's parents may be very important, perhaps more important than his characteristics, to the parents of potential brides who are major participants in the marriage decision. Finally, over time, the relative scarcity of potential brides and grooms may change due to demographic changes. If population is growing rapidly and if there is a constant age differential between brides and grooms (with the latter older), for example, a man with given characteristics may be able to attract a better wife than if population were stable or declining.[6] In such a case the year of marriage variable would have

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[5]They also are presumed to have more characteristics that are not observed in this data set (e.g., beauty, charm, industriousness, humor, etc.). If any such characteristics were observed, it would be possible to expand $\mathbf{Z}_w$ to include them.

[6]Rao (1990) presents some evidence consistent with such changing scarcity of eligible males relative to females for the same sample.

positive coefficients in the relations for wife's schooling and dowry and a negative coefficient in the relation for her age. For this reason we also control for the year of marriage.

The second set of equations concern the determination of the wage rate, wage growth and paid labor force participation for the man. The wage and wage growth relations are posited to be:[7]

$$(2) \qquad W_m = \alpha + \beta S_m + \gamma C_m + \delta A_m + \rho \mu_m + \psi \lambda_m + \nu,$$

where

W_m = is a vector of wage rates and wage growth,

A_m = is the man's age in 1975,

λ_m = a vector of selectivity correction terms,

ν = is a vector of i.i.d. disturbance term, such that cov $(\epsilon,\nu) = 0$, and

the other Greek letters are vectors of parameters to be estimated.

The critical point of these wage relations is that unobserved characteristics of the man may have important effects on his wage rate and wage growth. It is because a man's unobserved characteristics may have a return in terms of his wage rates that we call them dimensions of "unobserved human capital." If there are such characteristics, if they are observed by potential wives and their parents, and if potential wives and their parents value more those men who have more earning potential in labor markets, then these same characteristics also enter into the determination of the man's wife's characteristics in relation (1) as we indicate above.[8]

This possibility enables us to obtain an estimate of the man's unobserved human capital and of its impact on men's wage rates under the additional assumption that the elements of μ_m are orthogonal to the linear combination of the observed variables in relation (1).[9] Under this assumption, the estimated vector of residuals ζ from equation (1) can be used as proxies for dimensions of the unobserved human capital

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[7]This relation can be viewed as a hedonic wage index, as suggested by Rosen (1974) and Tinbergen (1951, 1956). We also estimate a semilog form for the wage rate with the same right-side variables.

[8]Of course there may be other unobserved characteristics of men that have an impact only in the marriage market, but such characteristics are not of interest in the present study. Effectively they enter into the random component of the disturbances ϵ.

[9]This assumption is parallel to the assumption that Rosenzweig and Schultz (1983, 1987) make in their birth production function estimates (i.e., that fecundity endowments are orthogonal to adult schooling).

of the man in equation (2). Since $\zeta = (\mu_m + \epsilon) = (\mathbf{Z}_w - \bar{\mathbf{Z}}_w)$ from equation (1) and the elements of ϵ are i.d.d. with zero mean, plim ζ = plim μ_m so ζ is a consistent representation of μ.[10]

In addition to the man's observed and unobserved characteristics, we include in relation (2) selectivity controls since wage rates and wage growth are not observed for all men. We posit, in the usual manner, that the paid labor force participation decision depends on a comparison between the return in the paid labor market (i.e., relation 2) versus the return from using time in other activities. We further posit that, in these rural communities, the return from other activities primarily depends on his access to land, particularly irrigated land, and on household demographic characteristics that affect the opportunity cost of time. Therefore we also estimate relations for the probabilities of observing wage rates and wage growth for each man in which the right-side variables are all of those in relation (2) plus land access, percentage of land irrigated, and household demographic characteristics. These relations are of interest in themselves to see to what extent the man's unobserved human capital affects his receipt of wages in the paid labor market. They also provide the bases for the selectivity control in the estimation of relation (2).

Section 2. Data for Rural South-Central India

The data that we use are part of the Village-Level Studies (VLS) panel data collected by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in rural semi-arid south India. Ten villages, purposively selected to represent different agro-climatic zones in semi-arid agriculture, were surveyed regularly in the VLS project over the period 1975-6 to 1984-5. A sample of 40 households (30 cultivating and 10 labor) was selected from each village.[11] Not all of the villages were surveyed during each of the 10 years; some were added half-way into the project, while others were dropped at that time.

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[10] ζ is a noisy, though consistent, proxy for μ. If there were identifying instruments available, it therefore might be of interest to use an instrumented estimate of μ, but we do not see what instruments would be useful for this purpose in our data set given that we posit that observed parental characteristics appear among the right-side variables in relation (1).

[11] To ensure equal representation of different farm size groups, cultivating households were first divided into three strata, with each stratum having an equal number of households. From each stratum, 10 households were selected at random, thus ensuring an equal sampling fraction in each farm size group. For labor households, a random selection was made from those who owned less than .2 hectares of land and those whose main occupation or source of income was agricultural labor.

However, a total of 120 households from three villages were surveyed continuously in each of the 10 years. The VLS data contain detailed information on farm management, income, consumption, time allocation, and asset ownership. We have used the time allocation schedule to construct wage rates for individuals who participated in wage employment activities at any time between 1975-6 and 1984-5.[12]

In 1984 a special survey was undertaken in which retrospective data on marriage, bequests, and inter-generational changes in land holding and wealth were collected for all the sample households (all of whom were married, so there is not a question of selectivity regarding marriage for our analysis). In particular, information on the land assets owned by the families of each household head when he was 15 years of age and on dowries was collected with specifically-designed questionnaires that sought to carefully reconstruct important events in a family's history. We have merged these retrospective data with the regular VLS data on wages and on the personal, spouse and household characteristics of sample individuals.

One potential problem with using data from villages such as those included in this sample is that there may be substantial migration that causes selectivity bias in any relations that are estimated if there is not control for selectivity in such migration. As is well known, in recent decades migration has accelerated substantially in many parts of the developing world, and migrants are likely to be selected, not random.[13] However, up to the end of the sample period, male[14] migration was very limited.[15] Over

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[12]For more details, see Walker and Ryan (1990).

[13]For some of the recent more interesting work on migration in developing countries, as well as references to other recent studies, see Stark (1991).

[14]Female migration over short distances for marriage was more common (see the quotation in the next note), but the modeling in this paper is based primarily on data collected about males and their families over a long time period, with the characteristics of females being relevant as wives of those males. Also, since the female migration for marriage largely was over short distances, there were opportunities for the families of the brides and grooms to collect information about each other's families, as is assumed for the modeling.

[15]Walker and Ryan (1990), in their recent book on analysis of these villages, emphasize several times the limited male emigration from the sample villages. Three relevant quotations from this book follow:

> "...A recent comparison of the 1971 and 1981 Indian census data suggest that migration patterns are qualitatively changing.... But those emerging trends are hard to detect in the study villages.

the 1975-1984 decade fewer than six per cent of male household heads in the sample emigrated from the sample villages, and of these over a third maintained land in their villages of origin. Therefore, migration does not seem to have been sufficient to cause concern about migration selectivity in using these data.

Three points about the variables in this data set that we use in our analysis merit further discussion.

First, it is important that the parental wealth variable reflect the man's parental household's wealth position before or at the time of the marital search -- not at the time of a survey undertaken several years (or decades) later. Since the 1984 Retrospective Survey obtained information on the parental household wealth (in terms of dry -- or unirrigated -- and wet -- or irrigated -- land owned) of the male partner when he was 15 years of age, we use these wealth variables. The use of this variable ensures that the groom's household wealth variable is predetermined with respect to the bride selection decision since, in this part of India, marriages generally are not arranged for males younger than 15.

Second, we use the most recent wage rates reported by individuals during the period 1975-84. For most individuals, the last year for which wage rates are reported is either 1983 or 1984. However, there are some individuals for whom the last reported wage is for an earlier year. All wage rates are deflated by the state-specific Consumer Price Index for Agricultural Laborers. Where individuals reported wage rates in more than one year, the earliest and most recent wages reported in the 1975-84 period are used to construct a measure of wage growth per annum. For these individuals, we estimate annual wage growth and annual percent wage growth equations as well. As noted in Section 1, the growth equations have the

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Compared to other parts of the world, Davis's (1951) conclusion on the immobility of the Indian population still rings true. The bulk of permanent migration is still comprised of the wife moving to the husband's village, often within the same taluka and usually within the same district. Few households, particularly those that own land, pull up stakes and permanently leave the village.... At no time in recent years has net emigration approximately equaled natural population increase in the study villages." (p. 24)

"Of the original 240 household sample, fourteen heads of household emigrated from the study villages between 1975 and 1984.... Six belonged to the landless labor stratum, and eight were cultivators, mainly from the medium farm-size group. Five of the eight cultivator households have kept their land in the village and lease it, mainly to relatives." (p. 154)

"...Out-migration to areas of higher production potential within and outside India's SAT [Semi-Arid Tropics] seems to be painfully slow (compared to the experience of other developing countries). (p. 356).

same regressors as the wage level equations.

Third, to control for the selectivity regarding reporting wages when the man is an adult, we must have some representation of the opportunity cost to him of not participating in the paid labor force. The major alternative economic use of time is to participate in own farming. The extent to which this is attractive depends primarily on access to land, particularly irrigated land, and on household demographics, so -- as noted in Section 1 -- we use these variables to control for the alternative to labor force participation.

Section 3. Estimates of Determinants of Wife's Characteristics

We first consider our estimates of the determinants of the wife's characteristics through the marriage market process that is summarized in relation (1). Table 1 presents estimates of this relation for the wife's schooling, net dowry, and age at marriage. Since schooling is relatively rare among adult women in rural India (with only 16.8 per cent of adult women in the sample having had any schooling), there is substantial censoring of the wife's schooling variable at zero. Therefore, we report tobit estimates for the wife's schooling equation. We summarize these estimates with respect to four characteristics.

First, the man's schooling has a significant effect on his wife's schooling and on her age, but not on the net dowry. Assortative mating on schooling is strong, with the wife's schooling increasing by about one year for every additional year of schooling of the man. For every additional year of schooling of the man, there also is a significant increase of about a third of a year in his wife's age at marriage. This contrasts with a general conjecture that younger brides are preferable, presumably because of a combination of factors such as that more-schooled men are older when they are married and they prefer attributes of wives (including more schooling) that are associated with older brides.

Second, the caste variable does not have significant direct effects on any of the three observed wife's characteristics. To the extent that caste affects the wife's characteristics, apparently it works through the observed variables (e.g., higher caste families may tend to educate their children more and have more wealth).

Third, the characteristics of the man's parental household have significant effects on each of the three observed characteristics of his wife. A one standard deviation increase in wet land area owned when

Table 1: Estimates of Wife's Schooling Years, Net Dowry received by Groom's Household, and Wife's Age at Marriage: Rural South India

Independent Variable	Wife's Schooling Years (Tobit)		Net Dowry (including Marriage Expenses)		Wife's Age at Marriage		Sample Mean	Sample Std.Dev.
	Estimate	T-ratio	Estimate	T-ratio	Estimate	T-ratio		
Intercept	-29.884	0.0	-24,396	-2.3	1.641	0.9		
Schooling of husband (years)	1.024	6.1	537	0.8	0.343	2.8	2.81	3.57
Whether husband from high caste	17.707	0.0	-1,274	-0.2	1.408	1.1	0.43	0.50
Whether husband from medium high caste	19.375	0.0	-2,409	-0.3	1.622	1.3	0.17	0.38
Whether husband from medium low caste	17.297	0.0	-2,251	-0.4	-1.698	-1.5	0.24	0.43
Acres of dry land owned by husband's household*	0.001	0.0	-89	-0.2	-0.007	-0.1	2.34	5.34
Acres of wet land owned by husband's household*	0.006	0.4	357	5.0	-0.030	-2.4	13.99	32.19
Year of marriage	0.083	1.7	375	2.0	0.243	7.4	53.45	10.83
Whether husband's father had any primary schooling	2.682	1.7	4,913	0.6	0.472	0.3	0.08	0.27
Whether husband's father completed primary schooling	3.917	3.0	22,810	3.5	-1.988	-1.7	0.11	0.32
Whether husband's father attended middle or high school	0.929	0.5	22,853	2.3	-2.509	-1.4	0.05	0.22
Whether husband's father cultivator	-0.014	0.0	2,315	0.5	-0.768	-0.9	0.58	0.49
Whether husband's father agricultural labor	-19.181	0.0	14,781	1.5	-1.241	-0.7	0.04	0.20
σ	4.454	8.5						
Number of observations	197		197		197		197	
Log likelihood ratio	-173.570							
F-Ratio			7.497		8.595			
Adjusted R-Squared			0.285		0.317			
Mean of dependent variable	1.240		6,520		14.827			
Std. dev. of dependent variable	2.500		30,900		5.623			

Note: *Obtained retrospectively for the year in which the husband was 15 years old (i.e., before his marriage).

the man was 15 years old increases the net dowry by 0.37 of the sample standard deviation[16] and reduces the wife's age at marriage by about one year. Whether the man's father had any primary schooling increases the wife's schooling by 2.7 years. Whether the man's father completed primary schooling increases the wife's schooling by 3.9 years, increases the wife's net dowry by almost three-quarters of the sample standard deviation, and reduces the wife's age at marriage by about two years. Whether the man's father attended middle or high school increases the wife's net dowry by about three-quarters of the sample standard deviation. Therefore the man's parental background is quite important in determining the wife's characteristics in this marriage market, as is hypothesized in Section 1. The significance of the man's parents' characteristics also means that the residual measures of dimensions of the man's unobserved human capital estimated from these results are identified in the wage rate, wage growth and paid labor force participation relations.[17]

Fourth, the year of marriage significantly increases the wife's schooling (by 0.08 years of schooling per year), the net dowry (by 1.2 per cent of the sample standard deviation per year), and the wife's age of marriage (by 0.24 years per year). The association of time with wife's schooling probably reflects the secular upward trend in female schooling in India -- for example, with primary enrollment rates increasing from 57 per cent of the age group in 1965 to 81 per cent in 1986 (World Bank 1990). The secular increase in net dowries probably reflects the increasing scarcity of males of marriage age relative to females of marriage age given the increasing population growth rate over most of the relevant period and the convention that husbands are older than wives (see Rao 1990). The secular increase in wife's age at marriage probably reflects both the secular trend in female schooling and in the relative scarcity of marriageable males.

Section 4. Estimates of the Determinants of the Man's Labor Market Outcomes

We now turn to the estimates of the man's reporting wages/labor force participation and of the wage

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[16]Note that the sample standard deviation for dowries is about 4.8 times as large as the sample mean. Therefore an increase of 0.37 sample standard deviations is about 1.8 times the sample mean.

[17]If, say, the wife's schooling were only dependent on the man's schooling (perhaps with a secular trend related to age), the unobserved human capital variable calculated as a residual from the determination of wife's schooling would not be identified from the impact of the man's schooling (perhaps with age) on the relation for the man's wage rate.

rates and wage growth.

Man's labor force participation: Table 2 gives OLS estimates of the probabilities of a wage rate being reported at least once and of the probabilities of a wage rate being reported at least twice (so that wage growth can be investigated) during the 1975-1984 decade. As implied by the means of the dependent variables at the bottom of the table, 35 per cent of the men in the sample never report wage rates and 54 per cent do not report wage rates in two years in the decade.

The estimates of the labor force participation/probabilities of reporting relations suggest that men with higher levels of observed and unobserved characteristics tend to select themselves out of the wage market. There are significantly negative associations between reporting wages and years of schooling, experience/age in 1975, two of the three dimensions of unobserved human capital (i.e., those associated with receipt of greater dowries and younger wives), the share of the land irrigated, and the number of children in the household.[18] These results are plausible in light of their relation to alternatives to paid labor force participation in the form of own-farm enterprise.

Man's wage rate: Table 3 gives estimates for the man's wage rate and for the ln wage rate, with the unobserved human capital as estimated from the estimates in Table 1 and the selectivity control as estimated from the estimates in Table 2[19] included in addition to the man's years of schooling, age and caste. The estimates indicate no direct significant impact at the standard 5 per cent level of caste, years of schooling, age, or the selectivity control.[20] The dimension of the man's unobserved human capital that results in a more-schooled wife than would be predicted by the observed characteristics of the man

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[18]Generally t tests indicate that these coefficient estimates are significantly nonzero at the 5 per cent level, but the last two are at the 15 and 10 per cent levels, respectively.

[19]To control for possible selectivity, we use the procedure developed by Olsen (1980) which involves OLS estimation of the probability of wage labor participation and the subsequent inclusion of this predicted probability minus one (i.e., λ_m in equation 2) in the wage equations in Table 3. Olsen's (pp. 1819-20) exploration with this procedure indicate that only in extreme cases do the results differ noticeably from those obtained using the Heckman correction: "In practice the two correction methods produce very similar results."

[20]In the ln wage rate relation age has a significant negative effect at the 10 per cent level and schooling has a significant negative effect at the 15 per cent level. The lack of impact of the selectivity control may be due to the fact that selectivity is due to such characteristics as the dimensions of unobserved human capital for which we control explicitly, but which usually are not controlled in such estimates.

Table 2: OLS Estimates of the Probabilities of Wage and of Wage Growth being Observed, Rural South India, 1975-84

Independent Variable	Probability of Wage Rate Being Reported at least once in 1975-84 period		Probability of Wage Rate Being Reported at least twice in 1975-84 period		Sample Mean	Sample Std. Dev.
	Estimate	T-ratio	Estimate	T-ratio		
Intercept	1.115	7.3	0.923	5.5		
Operated area (acres)	-0.005	-0.8	-0.005	-0.7	4.84	6.08
% of area irrigated	-0.001	-0.8	-0.001	-1.5	23.87	42.65
No. of adults in household	-0.001	0.0	-0.026	-1.3	4.65	2.34
No. of children in household	-0.036	-1.9	-0.009	-0.5	2.52	2.14
Schooling years	-0.036	-3.2	-0.027	-2.3	2.81	3.57
Whether high caste	-0.057	-0.5	-0.001	0.0		
Whether medium high caste	0.112	1.0	0.084	0.7		
Whether medium low caste	0.084	0.8	0.089	0.8		
Age in 1975	-0.006	-2.1	-0.005	-1.7	39.90	12.23
*Residual from equation for:**						
Wife's Schooling Years	0.026	1.4	0.008	0.4		
Net Dowry Received by Groom	0.000	-2.2	0.000	-1.1		
Wife's Age at Marriage	0.008	1.1	0.018	2.2		
Number of observations	197		197		197	
F Ratio	4.634		3.150			
Adjusted R-Squared	0.182		0.116			
Mean of dependent variable	0.650		0.462			
Std. dev. of dependent variable	0.478		0.500			

Notes: * Residuals obtained from equations reported in Table 1.

Table 3: Estimates of Last Daily Wage Rate reported for Males during 1975-84 period, Rural South-Central India

Indepedent Variable	Last Wage Observed in 1975-84 period		Log of Last Wage Observed in 1975-84 period		Average Annual Growth of Wages		Average annual % growth in wages	
	Estimate	T-ratio	Estimate	T-ratio	Estimate	T-ratio	Estimate	T-ratio
Intercept	5.381	3.2	1.953	9.5	-0.112	-0.1	-0.008	-0.1
Schooling years	-0.130	-0.6	-0.045	-1.6	0.131	1.6	0.030	2.1
Whether high caste	0.281	0.2	0.009	0.1	-0.457	-0.9	-0.124	-1.4
Whether medium high caste	0.859	0.7	0.167	1.2	-0.590	-1.2	-0.116	-1.4
Whether medium low caste	0.915	0.9	0.158	1.3	-0.245	-0.6	-0.005	-0.1
Age in 1975	-0.006	-0.2	-0.010	-1.9	0.027	1.3	0.004	1.3
*Residual from equation for:**								
Wife's schooling years	1.226	4.7	0.105	3.3	0.333	3.8	0.060	3.9
Net dowry received by groom	0.000	-1.3	0.000	-1.6	0.000	2.1	0.000	3.2
Wife's age at marriage	-0.025	-0.3	0.001	0.1	-0.017	-0.4	-0.001	-0.1
Selectivity term**	-4.366	-0.9	-0.867	-1.4	2.296	1.3	0.372	1.2
Number of observations	123		123		79		79	
F-Ratio	3.613		2.156		2.913		4.341	
Adjusted R-Squared	0.162		0.079		0.181		0.278	
Mean of dependent variable	6.906		1.828		-0.139		0.003	
Std. dev. of dependent variable	3.914		0.451		1.379		0.256	

Notes:

* Residuals obtained from equations reported in Table 1.

** Selectivity term is the predicted probability of a wage being observed, as reported in the first two columns of Table 2, minus one.

and of his parental family has a strong positive significant effect in the man's wage rate and ln wage rate equations. The former suggests, for example, that for every extra unit of unobserved human capital that results ceteris paribus in an extra year of wife's schooling, the man's wage rate increases by 18 per cent of the mean wage or by 31 per cent of the sample standard deviation for the wage.

Growth in the man's wage rate: Table 3 also presents estimates for the average wage growth per year and the average percentage wage growth per year, with the same right-side variables (except the selectivity control is for selection into the subsample for which wage rates were observed for at least two years). The man's schooling has a significant positive effect on the average wage growth per year at the 15 per cent level and on the average percentage growth rate in wages at the standard 5 per cent level. The only variables that have significantly nonzero coefficient estimates at the 5 per cent level in both of these relations are the dimensions of the man's unobserved human capital estimated from the residual of the wife's schooling and net dowry determination relations in Table 1. These estimates imply a large effect of the man's unobserved human capital. For every extra unit of the man's unobserved human capital that results ceteris paribus in an extra year of his wife's schooling, for example, the first regression implies that the growth rate in the man's wage rate increases by 0.333 Rupees, as compared with a mean level of 6.9 Rupees. This effect is over twice as large as the estimated impact of an increase of one year in the man's own schooling.

Section 5. Conclusions

On a priori grounds one would expect that there would be individual heterogeneity in human capital, observed by respondents but not by researchers, that affects the success of individuals in both marriage and labor markets. In this study we devise a means of testing this proposition, using unusually rich data in some dimensions (e.g., the retrospective data on wealth and dowries) from rural south central India. Our estimates indicate that, consistent with our priors, unobserved determinants of success in marriage and in labor markets are positively correlated. The dimension of men's unobserved human capital that leads them to obtain more-schooled wives also results in significantly and substantially higher levels and growth rates in their market wage rates. The dimension of men's unobserved human capital that leads them to receive greater dowries also results in significantly greater growth rates in their market wages. In fact these unobserved human capital variables are by far the most important determinants of wages and wage growth in the data set examined -- much more important than schooling and experience representations of

human capital on which attention usually is focused. In addition, dimensions of unobserved human capital (as well as schooling and age/experience) apparently have even higher returns in the rural south Indian context to activities other than the wage market, such as own farming, so they help to select individuals out of the wage labor market. For this data set, thus, limiting attention to the usual schooling and experience variables would lead to a misunderstanding of the importance of human capital in the determination of wage levels and growth, paid labor force participation, and productivity in nonwage activities. We have gained a richer understanding by combining information from the marriage and the labor markets rather than limiting ourselves to the latter as in most related studies.

References

Becker, Gary S. 1967. "Human Capital and the Personal Distribution of Income: An Analytical Approach." Ann Arbor: University of Michigan, Woytinsky Lecture, republished in Gary S. Becker, Human Capital. New York: NBER, 2nd edition, 1975, 94-117.

_____. 1981. A Treatise on the Family. Cambridge, Mass. and London: Harvard University Press.

Behrman, Jere R. and Anil B. Deolalikar. 1990. "Unobserved Household and Community Heterogeneity and the Labor Market Impact of Schooling: A Case Study for Indonesia," Philadelphia: University of Pennsylvania, mimeo.

Behrman, Jere R., Zdenek Hrubec, Paul Taubman and Terence J. Wales. 1980. Socioeconomic Success: A Study of the Effects of Genetic Endowments, Family Environment and Schooling. Amsterdam: North-Holland Publishing Co.

Behrman, Jere R. and Barbara L. Wolfe. 1984. "The Socioeconomic Impact of Schooling in a Developing Country." Review of Economics and Statistics 66:2 (May), 196-303.

_____. 1989. "Who Marries Whom? -- And How It Affects the Returns to Schooling." Philadelphia: University of Pennsylvania, mimeo (original 1981).

Boissiere, M., J.B. Knight, and R.H. Sabot. 1985. "Earnings, Schooling, Ability, and Cognitive Skills," The American Economic Review 75:5 (December), 1016-1030.

Boulier, Bryan L. and Mark R. Rosenzweig. 1984. "Schooling, Search, and Spouse Selection: Testing Economic Theories of Marriage and Household Behavior," Journal of Political Economy 92:4 (August), 712-732.

Jamison, Dean and Lawrence J. Lau, 1982, Farmer Education and Farm Efficiency, Baltimore, MD: Johns Hopkins University Press.

Mincer, J.B., 1974, Schooling, Experience, and Earnings, New York: NBER.

Olneck, Michael R. 1977. "On the Use of Sibling Data to Estimate the Effects of Family Background, Cognitive Skills and Schooling." in Paul Taubman, ed., 125-160.

Olsen, R.J., 1980, "A Least Squares Correction for Selectivity Bias," Econometrica 48:7 (November), 1815-1820.

Rao, Vijayendra, 1990, "Birth, Marriage and Death: Three Essays in Demographic Economics," Philadelphia: University of Pennsylvania, unpublished Ph.D. dissertation.

Rosen, S. 1974. "Hedonic Functions and Implicit Markets. Journal of Political Economy 82, 34-55.

Rosenzweig, Mark R. and T. Paul Schultz, 1983, "Estimating a Household Production Function: Heterogeneity, the Demand for Health Inputs, and Their Effects on Birth Weight, Journal of Political Economy 91:5 (October), 723-746.

_____, 1987, "Fertility and Investments in Human Capital: Estimates of the Consequences of Imperfect Fertility Control in Malaysia," Journal of Econometrics 36, 163-184.

Schirm, Allan. 1986. "Cross-Sectional Variation in Preferences for Children, Assortative Mating, and Estimation of Fertility Response Parameters." unpublished Ph.D. dissertation, Philadelphia: University of Pennsylvania.

Schultz, Theodore W., 1975, "The Value of the Ability to Deal with Disequilibria," Journal of Economic Literature 13:3, 827-846.

Sussangkarn, Chalongphob, 1990, "Thailand," in Asian Development Bank, Human Resource Policy and Economic Development, Manila: Asian Development Bank, Economics and Development Resource Center, 283-357.

Stark, Oded, 1991, The Migration of Labor, Cambridge, MA: Basil Blackwell, Inc.

Taubman, Paul, ed. 1977. Papers in Kinometrics: Determinants of Socioeconomic Success Within and Between Families, Amsterdam: North-Holland Publishing Company.

Tinbergen, J. 1951. "Remarks on the Distribution of Labor Incomes." International Economic Papers 1, 195-207.

_____. 1956. "On the Theory of Income Distribution." Weltwirshaftliches Archiv 77, 155-73.

Walker, Thomas and James Ryan, 1990, Village and Household Economies in India's Semi-arid Tropics, Baltimore: The Johns Hopkins University Press.

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RM-68__	RM-94__	RM-120__	RP-08__	RP-34__	RP-60__	RP-86__	RP-112__	RP-138__
RM-69__	RM-95__	RM-121__	RP-09__	RP-35__	RP-61__	RP-87__	RP-113__	RP-139__
RM-70__	RM-96__	RM-122__	RP-10__	RP-36__	RP-62__	RP-88__	RP-114__	RP-140__
RM-71__	RM-97__	RM-123__	RP-11__	RP-37__	RP-63__	RP-89__	RP-115__	RP-141__
RM-72__	RM-98__	RM-124__	RP-12__	RP-38__	RP-64__	RP-90__	RP-116__	RP-142__
RM-73__	RM-99__	RM-125__	RP-13__	RP-39__	RP-65__	RP-91__	RP-117__	RP-143__
RM-74__	RM-100	RM-126__	RP-14__	RP-40__	RP-66__	RP-92__	RP-118__	RP-144__
RM-75__	RM-101__	RM-127__	RP-15__	RP-41__	RP-67__	RP-93__	RP-119__	RP-145__
RM-76__	RM-102__	RM-128__	RP-16__	RP-42__	RP-68__	RP-94__	RP-120__	RP-146__
RM-77__	RM-103__	RM-129__	RP-17__	RP-43__	RP-69__	RP-95__	RP-121__	RP-147__
RM-78__	RM-104__	RM-130__	RP-18__	RP-44__	RP-70__	RP-96__	RP-122__	RP-148__
RM-79__	RM-105__	RM-131__	RP-19__	RP-45__	RP-71__	RP-97__	RP-123__	RP-149__
RM-80__	RM-106__	RM-132__	RP-20__	RP-46__	RP-72__	RP-98__	RP-124__	RP-150__
RM-81__	RM-107__	RM-133__	RP-21__	RP-47__	RP-73__	RP-99__	RP-125__	RP-151__
RM-82__	RM-108__	RM-134__	RP-22__	RP-48__	RP-74__	RP-100_	RP-126__	RP-152__
RM-83__	RM-109__		RP-23__	RP-49__	RP-75__	RP-101_	RP-127__	RP-153__
RM-84__	RM-110__		RP-24__	RP-50__	RP-76__	RP-102_	RP-128__	RP-154__
RM-85__	RM-111__		RP-25__	RP-51__	RP-77__	RP-103_	RP-129__	RP-155__
RM-86__	RM-112__		RP-26__	RP-52__	RP-78__	RP-104_	RP-130__	RP-156__
RM-87__	RM-113__		RP-27__	RP-53__	RP-79__	RP-105_	RP-131__	RP-157__
RM-88__	RM-114__		RP-28__	RP-54__	RP-80__	RP-106_	RP-132__	RP-158__
RM-89__	RM-115__		RP-29__	RP-55__	RP-81__	RP-107_	RP-133__	RP-159__

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