6

The Demand for Dowries and Bride Characteristics in Marriage: Empirical Estimates for Rural South-Central India

Anil B. Deolalikar and Vijayendra Rao

INTRODUCTION

Households in many traditional societies exchange cash, valuables, consumption goods and land at the time of marriage. When these exchanges are made from the bride or her family to the groom or his family, they are broadly classified as dowries. A transaction made in the opposite direction—that is, from the groom's family to the bride's—is generally called a bride-price. Both kinds of transactions are widespread in traditional, non-Western societies all over the world (Schlegel and Eloul 1988). While pecuniary exchanges of both types were common in the part of India covered by this study, dowry transactions have become extremely pervasive all over South Asia in recent times—especially after 1950—and the amounts involved have increased to the point where they often cause severe destitution of households with marriageable daughters.[1]

We wish to thank R. P. Singh and Tom Walker at ICRISAT, and Mark Rosenzweig for allowing us use of the VLS data and for providing the retrospective data. We are grateful to participants at the MacArthur-NCAER conference on 'Gender Perspectives in Population, Health and Development in India', held in New Delhi in January 1996 for valuable suggestions. Deolalikar gratefully acknowledges funding from the Royalty Research Fund Grant (No. 65-9764) of the University of Washington.

[1] Unfortunately, this is not a problem that is confined only to rural and traditional communities in South Asia. Despite a government ban on dowry, it figures prominently in a large majority of middle-class marriages in urban India as well.

Surprisingly, while marriage transactions clearly have a great deal of economic content, they have rarely been studied by economists. One theoretical exception is Becker (1981), whose model of marriage derives the groom- and bride-prices as shadow prices related to the surplus of the joint value of the marriage over the single utility of one of the spouses. The potential spouse with the most to gain from the married state pays the surplus to the spouse who gains less. The surplus paid is a groom price if the less eager spouse is male, and a bride-price if the less eager spouse is female. Other models (Nugent and Walther 1983) adapt this to the developing country context, assuming that marriage decisions are made not at the individual but at the household level, and hypothesize that payments of dowry and bride-price equalise the value of marriage services exchanged by the households of the bride and the groom.[2]

Marriage in rural India is largely an alliance between two households. Most rural Indian marriages are typically arranged by the parents of the bride and the groom, with neither of the potential partners having much of a say in the matter. The family backgrounds (e.g., wealth, caste, and parental occupation) of the partners are given as much consideration as—if not more than—their personal traits (e.g., beauty, youth and schooling) in the partner selection and dowry/bride-price negotiation decisions. For example, parents might prefer to marry 'up', that is, they might *ceteris paribus* prefer to have wealthier and more educated families as in-laws and be willing to pay a premium for this privilege.[3]

To our knowledge, none of the models of marriage transactions have been subjected to an empirical test. An obvious reason for this lacuna in the literature is the unavailability of data; information on marital transactions, if and when they occur, are not easily revealed by respondents. In this paper, we use unique retrospective data on marriage transactions and on the personal and family traits of marital partners, collected from six villages in South-Central India, to test a simple marriage model relevant to the conditions of the rural Indian marriage market. This is to our knowledge, the first paper that empirically explores

[2] Another economic study of marriage for a developing country that is empirical is Boulier and Rosenzweig (1984), who analyze the marital search of women in the Philippines. Presumably because arranged marriages and dowry transactions are not very common in the Philippines, they focus exclusively on the assortative mating and marriage timing decisions.

[3] Of course, the motivation for selecting wealthier in-laws might be to insure oneself financially during periods of adversity (Rosenzweig and Stark 1989).

the extent of assortative mating and the influence of personal and family traits in determining pecuniary exchanges between families at the time of marriage. Two related papers (Rao 1993a, and 1993b) use the same data as we analyse here to focus on the question of dowry 'inflation' in these communities. Those papers point out that the strongest correlate of increases in dowry payments was an increase in population growth, which caused a 'marriage squeeze', by increasing the supply of women of marriageable age relative to men of marriageable age. This was caused by the increasingly pyramidal age structure caused by steady declines in mortality.

In this paper, in addition to verifying the hypotheses emanating from a theoretical model of marriage, our empirical findings address several questions of importance to social policy. For example, what is likely to happen to the institution of dowry and to dowry amounts with the spread of education? Will increasing affluence and wealth induced by economic development erode or reinforce dowries?

It might be helpful to briefly outline both the limitations and the advantages of the neo-classical economics approach that we follow in this paper. The advantages are obvious. Neo-classical models offer a simple and convenient way of characterizing the marriage market following from the work of Becker (1981). These simple models generate testable predictions that can be econometrically analysed using survey data and hence enable us to make generalised statements about the population that we are studying. However, the approach has at least one major limitation: Marriage is not entirely an economic phenomenon and may involve behaviour that is symbolic and ceremonial and not strictly economic. Such behaviour is not captured in our model, which assumes a rational economic calculus. However, we believe that much can be learned from an economic approach to the question. Given that economists usually do not study marriage, neo-classical economics may reveal aspects of behaviour that could be lost with a strictly sociological analysis.

A MODEL OF BRIDE SELECTION AND DOWRY EXCHANGE

Given that marriage in rural India is largely an alliance between two families, the groom household typically undertakes a search for a bride for its son. Both individual traits (such as beauty, intelligence and schooling) and family background (such as wealth, father's occupation

and caste) are given consideration in the search for a 'perfect' bride. In the large majority of marriages, a dowry is negotiated and paid by the bride household to the groom household, the value of which depends upon the traits of the groom, the bride, and their respective households. However, in the area under study (viz., South-Central India), the reverse transaction—viz., from the groom to the bride household—also takes place with some frequency, although the frequency of such exchanges has declined over time.[4]

To model the demand for bride traits, we assume that the groom household's utility function is defined over the traits of the potential bride and her parental household, *conditional* on the traits of the groom and his parental household:

$$U = U(\Omega_b, H_b, X; \Omega, H, R), \qquad U' > 0,\ U'' < 0, \tag{1}$$

where the subscript b refers to the bride, and

Ω = vector of individual traits,
H = vector of parental household traits,
X = consumption of a composite good (having a price of unity) by the groom household, and
R = vector of taste shifters, captured by time and residential location.

The groom household is assumed to maximize the utility function in (1), subject to a budget constraint that includes the dowry receipts from the bride household, viz.:

$$X = Y + D(\Omega_b, H_b, \Omega, H; T), \tag{2}$$

$$\partial D/\partial \Omega_b < 0, \quad \partial D/\partial H_b < 0, \quad \partial D/\partial \Omega > 0, \quad \partial H/\partial H > 0,$$

where,

Y = exogenous (non dowry-related) income of the groom household,
D = dowry received (or, if $D<0$, bride price paid) by the groom household, and

[4] In part, the reverse transaction may take place because of the ceremonial aspects of marriage, which involve a fair number of ritual transactions between affinal households. In this paper, we focus on the net exchange, which should differentiate those transactions that are made purely for ceremonial purposes and thereby isolate the groom- and bride-prices.

T = vector of exogenous dowry shifters, some of which are the same as in R.

The dowry relation in (2) can be viewed as a hedonic price that is increasing in the groom (and his parental household's) traits and decreasing in the bride's (and her parental household's) traits.

The constrained maximization problem yields a set of first-order conditions, which can be expressed as the shadow prices for the desired traits of the bride (π_1) and her parental household (π_2):

$$(\partial U/\partial \Omega_b)/\lambda \equiv \pi_1 = -\partial D/\partial \Omega_b, \tag{3}$$

$$(\partial U/\partial H_b)/\lambda \equiv \pi_2 = -\partial D/\partial H_b. \tag{4}$$

Equations (3) and (4) imply that the optimizing groom household will demand traits of the potential bride and her parental household such that the marginal utility it gains from these traits will equal the marginal loss in dowry suffered from the improved traits.

Solution of the first-order conditions and the budget constraint for all the endogenous variables yields the groom household's reduced-form demand for bride and bride household traits:

$$\Omega_b = \Omega_b(\Omega, H, Y; T, R), \tag{5}$$

$$H_b = H_b(\Omega, H, Y; T, R), \tag{6}$$

which, when substituted back into the dowry relation in (2), yield a reduced-form dowry function:

$$\begin{aligned} D &= D[\Omega_b(\Omega, H, Y; T, R), H_b(\Omega, H, Y; T, R), \Omega, H; T] \\ &= D(\Omega, H, Y; T, R). \end{aligned} \tag{7}$$

It is easy to show that, in equilibrium, the sign of the effect of groom traits on bride traits will depend upon (i) whether the traits of the bride and her parental household are complements or substitutes in the groom household's utility function, and (ii) whether the traits of the bride and the groom are complements or substitutes in the dowry function. Below we assume complementarity in the utility function and substitutability in the dowry function, such that:

$$\partial^2 U/\partial \Omega_b \partial H_b > 0, \tag{8}$$

$$\partial^2 D/\partial Z_b \partial Z < 0. \quad \text{for} \quad Z = \Omega, H. \tag{9}$$

Given these assumptions, the following comparative static predictions are obtained:

$$\partial \Omega_b/\partial \Omega > 0, \quad \partial \Omega_b/\partial H > 0, \quad \partial H_b/\partial \Omega > 0, \quad \partial H_b/\partial H > 0. \tag{10}$$

These are the familiar results of positive assortative mating obtained by Becker (1981) in his model of marriage. According to Becker, likes mate each other when their traits are complements (in producing marital output), and unlikes mate each other when their traits are substitutes. The dowry function is somewhat analogous to Becker's marital output function.

Rewriting relation (7) with the predicted signs in (10) and under the assumption that bride characteristics are normal goods, we have

$$\begin{aligned} D &= D[\underset{-}{\Omega_b}(\underset{+}{\Omega}, \underset{+}{H}, \underset{+}{Y}; T, R), \underset{-}{H_b}(\underset{+}{\Omega}, \underset{+}{H}, \underset{+}{Y}; T, R), \underset{+}{\Omega}, \underset{+}{H}; T] \\ &= D(\underset{?}{\Omega}, \underset{?}{H}, \underset{-}{Y}; T, R), \end{aligned} \tag{11}$$

where the sign below each variable indicates the sign of the partial derivative of the preceding function with respect to that variable. Interestingly, with the exception of the income effect (which is negative), none of the co-efficients in the dowry equation can be signed unambiguously a priori. The reason for this is that, while improved groom characteristics increase the dowry he can command, they also secure him a bride with better traits and family background, which in turn lowers the dowry amount that he can obtain. The two opposing effects render the effect of improved groom characteristics on equilibrium dowry ambiguous.

DATA

The data 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. A total of ten villages, purposively selected to represent different agro-climatic zones in semi-arid agriculture, were surveyed regularly in the VLS project over the period 1975–76 to 1984–85. A sample of 40 households (30 cultivating and 10 labour) was selected from each village.[5] Not all

[5] 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 house-

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. 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.

In 1975–76 and 1976–77 a supplementary survey on health and nutritional intake was conducted in which dietary intake data, based on 24–hour recall, and basic anthropometric indicators, including height, weight, arm circumference and skin fatfold, were collected on all household members.

Subsequently, in 1984 another special survey was undertaken in which retrospective data on marriage, marriage exchanges, bequests, and inter-generational changes in land holding and wealth were collected for all the sample households. In addition, information on the land assets belonging to the families of each household head and his spouse at the time of their marriage were collected with specifically-designed questionnaires that sought to carefully reconstruct important events in a family's history. Retrospective data are always potentially subject to recall error. However, a woman's marriage in India is the single most important event in her life and marriage transactions represent a very large proportion of a household's assets. Remembering how much was spent or received during a marriage is somewhat akin, in the western context, to remembering the amount spent on purchasing a house or on a private college education. It is likely that such information in rather accurately recalled. We have merged these retrospective data with cross-sectional information for 1984 on the income, personal characteristics, and non-bequeathed assets of individuals.

We have merged data from the 1984 Retrospective Survey with those from the 1975–77 Health/Nutrition Survey and from the regular VLS Survey to create a data file on the personal and parental household traits of all household heads (in 1984) and their spouses, the year of their marriage, and the amount of dowry or bride-price exchanged at the time of their marriage.

---

holds. From each stratum, 10 households were selected at random, thus ensuring an equal sampling fraction in each farm size group. For labour households, a random selection was made from those who owned less than 0.2 hectares of land and those whose main occupation or source of income was agricultural labour.

EMPIRICAL MODEL AND ESTIMATION

The empirical version of relations (5)–(7) contain three individual (Ω) and three parental household (H) traits. The individual attributes include age at marriage, schooling years, and height, while the parental household characteristics consist of father's schooling, father's occupation, family wealth, and caste affiliation.

Five points relating to the empirical model deserve mention. First, since information on traits is not uniformly available for grooms and brides, a complete (and symmetric) demand system cannot be estimated. In particular, we do not have information on the schooling and occupation of the bride's father. Thus, these equations are excluded from the demand system. In addition, although information on the caste affiliation of the bride is available, assortative mating on the basis of caste is perfect in the sample, as all the marriages took place within the same caste (as is common in most Indian marriages). To avoid perfect collinearity, the caste affiliation of the bride is also excluded as an equation.

Second, since the groom's age at marriage is potentially endogenous to the marital search of the groom household, its inclusion as an explanatory variable may introduce simultaneous-equations bias in the estimation of the demand equations. Therefore, we present estimates with and without the groom's age at marriage as a right-hand side variable.

Third, since schooling is a rare attribute 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 bride schooling variable at zero. Therefore, in addition to the OLS estimates, we also report tobit maximum likelihood estimates for the bride schooling equation.

Fourth, it is important that the wealth variable reflect the groom 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. Fortunately, the 1984 Retrospective Survey obtained information on the parental household wealth (in terms of dry—or unirrigated—and wet—or irrigated—land owned) of both marriage partners just before they were married. This is the wealth variable we use. The use of this variable ensures that the groom household wealth variable is exogenous to the bride selection and dowry decisions.

Fifth and finally, data on the pre-marriage income of the groom parental household is not available. However, it is likely to be highly collinear with parental household wealth at the time of marriage. Hence, parental wealth will reflect both an assortative mating and an income effect in the empirically-estimated demand equations.

The dowry variable is constructed as the net exchange of all cash and in-kind gifts made from the bride household to the groom household at the time of marriage and the expenses incurred in marriage ceremonies by the bride household (net of those incurred by the groom household). A major problem with the net dowry variable is that the dowries in the sample were made at vastly different points in time, since the earliest marriage dates to 1923 and the most recent to 1984. We have dealt with this problem in two ways. First, all net dowry values have been converted to constant 1984 prices.[6] Second, the year when the marriage took place is included as an independent variable in the model to control for cohort-specific trends in assortative mating and dowry exchanges.

EMPIRICAL RESULTS

The means and standard deviations of the variables are reported in Table 6.1. The 'average' marriage took place in 1954 between a 15–year old bride and 21–year old groom with 0.8 and 2.4 years of schooling, respectively. The heights of the bride and groom were 149 cms. (approximately, 5') and 162 cms. (5' 5"), respectively. The parental households of the bride and the groom owned about the same amount of land (about 14 acres) at the time of marriage. The average net dowry received by the groom household, including reimbursement for marriage expenses, amounted to Rs. 4,246 in constant 1983 prices, which is equivalent to about one-half of average annual household income in 1984 (and considerably more if annual incomes in 1954—the mean year of marriage—were considered). Thus, net dowry receipts are large relative to household income in our sample. However, net dowry receipts were negative in about 43 per cent of the marriages—indicating a net flow of gifts and expenses from the groom to the bride household.

OLS estimates of relations (5)–(7) with the groom's age at marriage as an explanatory variable are shown in Table 6.2. Table 6.3 reports the OLS estimates with the groom's age at marriage excluded. Table 6.4 presents the tobit maximum likelihood results for the bride schooling equation.

[6] Since no price indices exist prior to 1960 for these sample villages, all values were deflated to 1984 levels, using historical data on the price of gold. Gold is the only commodity for which prices are available going back to the last century. Since gold is the most important source of wealth, after land and cattle, among the sample households, the price of gold may reflect accurately the real value of assets over time.

TABLE 6.1
Variable Dictionary, Means and Standard Deviations: Rural South-Central India

	Bride		*Groom*	
Variable	*Mean*	*Std. Dev.*	*Mean*	*Std. Dev.*
Age at marriage	15	5.7	21	4.5
Schooling years	0.8	2.01	2.37	3.10
Height (cms.)	149.47	4.90	162.16	6.23
Dry land owned by household at age 15 (acres)	1.34	8.74	1.87	5.07
Wet land owned by household at age 15 (acres)	12.55	38.94	12.21	32.93
Year of marriage (19—)	–	–	54.35	10.44
Whether father cultivator	–	–	0.54	0.50
Whether father agricultural labourer	–	–	0.04	0.19
Whether father had any primary schooling	–	–	0.07	0.26
Whether father completed primary schooling	–	–	0.11	0.32
Whether father completed middle or secondary school	–	–	0.05	0.22
Whether low caste	–	–	0.39	0.49
Whether medium-low caste	–	–	0.19	0.39
Whether medium-high caste	–	–	0.22	0.42
Net dowry paid by bride household to groom household (including marriage expenses) (constant 1983 Rupees)	4,246	32,569		

Note: Number of observations is 140. Year of retrospective survey was 1984.

The exclusion of groom's age at marriage as an independent variable from the demand system makes little difference either to the number of statistically significant co-efficients or to the size of the estimated coefficients. This provides support for the hypothesis of men's age at marriage being pre-determined with respect to the bride selection and dowry exchange decisions. Indeed, Table 6.1 indicates that male age at marriage varies much less than female age at marriage in the sample.

For the most part, positive (although not perfect) assortative mating is borne out by the empirical results.[7] For instance, the individual traits

[7] The only example of statistically significant negative assortative mating that is observed in the empirical results is the effect on bride height of the schooling of the groom's father.

TABLE 6.2

OLS Demand Equations for Bride Characteristics and Net Dowry Payment by Groom Households, Rural South-Central India (Groom's Age at Marriage not included as an Independent Variable)

Independent Variable	*Bride's age at Marriage (yrs.)*		*Bride's Height (in cms.)*		*Bride's Schooling Years*		*Dry Land Owned by Bride Household at Age 15*		*Wet Land Owned by Bride Household at Age 15*		*Net Dowry (incl. expenses) Paid by Bride Household*	
	Co-efficient	*T-Ratio*	*Co-efficient*	*T-Ratio*	*Co-efficient*	*T-Ratio*	*Co-efficient*	*T-Ratio*	*Co-efficient*	*T-Ratio*	*Co-efficient*	*T-Ratio*
Intercept (+ 1,000)	0.003	0.2	0.123	10.4	−0.001	−0.4	−0.025	−1.1	−0.125	−1.5	116	1.6
Groom's height (in cms.)	−0.013	−0.2	0.137	1.9	−0.003	−0.1	0.128	0.9	0.662	1.3	−898	−2.0
Groom's schooling years	0.126	0.8	0.128	0.9	0.244	5.0	0.705	2.5	2.850	2.7	528	0.6
Dry land owned by groom household at age 15	−0.033	−0.3	0.045	0.4	0.107	3.3	−0.097	−0.5	0.202	0.3	−159	−0.3
Wet land owned by groom household at age 15	−0.022	−1.3	0.047	3.1	0.003	0.6	−0.039	−1.3	0.362	3.3	473	5.0
Year of marriage	0.280	6.6	0.051	1.3	0.035	2.8	0.070	0.9	0.342	1.2	442	1.8
Whether low caste	0.072	0.0	1.221	0.9	−0.146	−0.3	−1.525	−0.6	−12.586	−1.3	1,158	0.1
Whether medium–low caste	−1.181	−0.8	−0.261	−0.2	0.200	0.5	−2.094	−0.8	−7.898	−0.8	2,189	0.3
Whether medium–high caste	−3.127	−2.4	1.460	1.2	−0.279	−0.7	−1.493	−0.6	−5.908	−0.7	661	0.1
Whether groom's father cultivator	−0.506	−0.5	0.371	0.4	−0.489	−1.6	1.590	0.9	7.913	1.1	−1,946	−0.3

Table 6.2 Continued

Table 6.2 Continued

Independent Variable	*Bride's Age at Marriage (yrs.)*		*Bride's Height (in cms.)*		*Bride's Schooling Years*		*Dry Land Owned by Bride Household at Age 15*		*Wet Land Owned by Bride Household at Age 15*		*Net Dowry (incl. expenses) Paid by Bride Household*	
	Co-efficient	*T-Ratio*	*Co-efficient*	*T-Ratio*	*Co-efficient*	*T-Ratio*	*Co-efficient*	*T-Ratio*	*Co-efficient*	*T-Ratio*	*Co-efficient*	*T-Ratio*
Whether groom's father agricultural labourer	−1.967	−0.8	0.580	0.3	−0.289	−0.4	0.095	0.0	−2.778	−0.2	11,303	0.9
Whether groom's father had any primary schooling	2.163	1.1	−1.410	−0.8	−0.294	−0.5	1.134	0.3	2.374	0.2	1,083	0.1
Whether groom's father completed primary schooling	−1.709	−1.2	1.515	1.2	2.049	4.9	4.653	1.9	13.985	1.5	16,007	2.0
Whether groom's father completed middle or secondary schooling	−1.704	−0.7	−3.639	−1.7	1.340	1.9	4.003	1.0	39.396	2.6	25,140	1.9
F-Ratio	4.84	–	3.23	–	10.73	–	1.47	–	6.14	–	5.20	
R-Square	0.333	–	0.250	–	0.525	–	0.132	–	0.388	–	0.349	

TABLE 6.3

OLS Demand Equations for Bride Characteristics and Dowry Payment by Groom Households, Rural South-Central India
(Groom's Age at Marriage Included as an Independent Variable)

Independent Variable	*Bride's Age at Marriage (yrs.)*		*Bride's Height (in cms.)*		*Bride's Schooling Years*		*Dry Land Owned by Bride Household at Age 15*		*Wet Land Owned by Bride Household at Age 15*		*Net Dowry (incl. expenses) Paid by Bride Household*	
	Estimate	*T-Ratio*	*Estimate*	*T-Ratio*	*Estimate*	*T-Ratio*	*Estimate*	*T-Ratio*	*Estimate*	*T-Ratio*	*Estimate*	*T-Ratio*
Intercept (÷ 1,000)	−0.001	−0.1	0.123	10.4	−0.001	−0.3	−0.024	−1.0	−0.122	−1.4	119	1.6
Groom's age at marriage (years)	0.626	7.5	−0.052	−0.6	−0.044	−1.5	−0.147	−0.8	−0.506	−0.8	−532	−0.9
Groom's height (in cms.)	−0.049	−0.7	0.140	1.9	0.000	0.0	0.137	1.0	0.691	1.3	−868	−2.0
Groom's schooling years	0.089	0.7	0.131	0.9	0.247	5.1	0.713	2.5	2.880	2.7	559	0.6
Dry land owned by groom household at age 15	0.026	0.3	0.040	0.4	0.103	3.2	−0.111	−0.6	0.155	0.2	−209	−0.3
Wet land owned by groom household at age 15	−0.018	−1.3	0.047	3.1	0.003	0.5	−0.040	−1.3	0.359	3.3	470	5.0
Year of marriage	0.209	5.7	0.057	1.4	0.040	3.1	0.087	1.1	0.400	1.4	503	2.0
Whether low caste	−0.003	0.0	1.227	0.9	−0.140	−0.3	−1.507	−0.6	−12.525	−1.3	1,222	0.1
Whether medium-low caste	−0.995	−0.8	−0.276	−0.2	0.187	0.4	−2.138	−0.8	−8.048	−0.8	2,031	0.2
Whether medium-high caste	−1.492	−1.3	1.324	1.1	−0.395	−1.0	−1.878	−0.8	−7.228	−0.8	−727	−0.1

Table 6.3 Continued

Table 6.3 Continued

Independent Variable	*Bride's Age at Marriage (yrs.)*		*Bride's Height (in cms.)*		*Bride's Schooling Years*		*Dry Land Owned by Bride Household at Age 15*		*Wet Land Owned by Bride Household at Age 15*		*Net Dowry (incl. expenses) Paid by Bride Household*	
	Estimate	*T-Ratio*	*Estimate*	*T-Ratio*	*Estimate*	*T-Ratio*	*Estimate*	*T-Ratio*	*Estimate*	*T-Ratio*	*Estimate*	*T-Ratio*
Whether groom's father cultivator	0.309	0.4	0.303	0.3	−0.547	−1.7	1.399	0.8	7.255	1.0	−2,638	−0.4
Whether groom's father agricultural labourer	−1.216	−0.6	0.518	0.2	−0.342	−0.5	−0.082	0.0	−3.385	−0.2	10,665	0.8
Whether groom's father had any primary schooling	1.228	0.7	−1.332	−0.7	−0.228	−0.4	1.354	0.4	3.129	0.2	1,876	0.2
Whether groom's father completed primary schooling	−1.535	−1.3	1.500	1.2	2.037	4.9	4.612	1.9	13.845	1.5	15,859	2.0
Whether groom's father completed middle or secondary schooling	−0.892	−0.5	−3.707	−1.7	1.283	1.8	3.812	0.9	38.740	2.5	24,450	1.8
F-Ratio	10.53	–	3.00	–	10.22	–	1.41	–	5.73	–	4.89	–
R-Squared	0.541	–	0.252	–	0.534	–	0.137	–	0.391	–	0.354	–

TABLE 6.4
Maximum Likelihood Tobit Estimates of Bride's Schooling, Rural South-Central India

Independent Variable	*Estimate*	*T-Ratio*	*Estimate*	*T-Ratio*
Intercept	−0.622177	−0.032	−4.4656	−0.233
Groom's schooling	0.866524	3.739	0.793322	3.614
Groom's height	−0.126649	−1.021	−0.07285	−0.602
Dry land owned by groom household	0.254223	2.225	0.189604	1.704
Wet land owned by groom household	0.0274364	1.723	0.024911	1.594
Year of marriage	0.218258	2.907	0.272606	3.216
Whether groom's father cultivator	−2.95441	−1.895	−3.31644	−2.196
Whether groom's father agricultural labourer	−10.7917	−0.008	−13.2945	−0.012
Whether groom's father had any primary schooling	1.38986	0.664	2.21832	1.058
Whether groom's father completed primary school	7.58117	4.464	7.45735	4.510
Whether groom's father completed middle/high school	−0.707249	−0.250	0.41367	0.154
Whether low caste	1.48324	0.521	2.3924	0.822
Whether medium-low caste	3.24978	1.201	4.46351	1.563
Whether medium-high caste	−0.714257	−0.234	−0.82024	−0.261
Groom's age at marriage	–	–	−0.385098	−2.014
Sigma	3.54582	6.167	3.37064	6.207
Log-Likelihood Ratio	−81.42	–	−78.912	–

of the groom (viz., schooling, height and age at marriage) have highly significant and positive associations with the respective traits of the bride. Similarly, men with more family wealth (in the form of land) are successful in obtaining brides with more family land wealth. In addition, there are a number of cross assortative mating effects. For example, men with more schooling are matched with brides from wealthier family backgrounds, while wealthier grooms marry taller and more-schooled women. Similarly, grooms with more-schooled fathers appear to be successful in attracting more-schooled brides from wealthier family backgrounds.

Of course, as discussed in the previous section, the effects of groom parental wealth on bride characteristics may capture income effects in addition to assortative mating effects. However, the large number of

positive associations between groom and bride characteristics, including traits such as height that are unlikely to have income effects, strongly supports the hypothesis of assortative mating on the basis of individual attributes and family background.

The caste affiliation and parental occupations of grooms have few significant effects on other bride characteristics (e.g., height, schooling or family wealth), possibly because assortative mating on the basis of caste and occupation is close to perfect in rural India.

Finally, the estimated co-efficients on year of marriage suggest that, holding groom characteristics constant, there has been a significant increase over time both in the schooling of brides and in their age at marriage. The co-efficient of year of marriage on bride heights is also positive, but barely approaches significance. All of this suggests that the average quality of female marriage partners improved considerably in the fifty-five years since 1923 in the sample under consideration.

As discussed in the theory section, the reduced-form effects of groom traits on dowry receipts cannot be signed unambiguously, since the indirect effects of improved groom traits on dowry (via their effects on enhanced bride characteristics) are opposite in sign (viz., negative) to the direct effects. This is seen most clearly in the estimated co-efficient of groom height in the dowry equation, which is significant and negative in sign. Although taller men are *ceteris paribus* able to command higher dowries, they also are more successful than shorter men in marrying taller women, which in turn lowers the dowry they can obtain. In spite of the theoretical ambiguity, however, two groom household characteristics do have significantly positive estimated effects on equilibrium dowry, viz., ownership of wet land and schooling of the groom's father. It must be emphasized that these results, while 'reasonable', should be treated with some caution since the sample on which these results are based is rather small. However, better data on marriage transactions in India, or anywhere else, are hard to come by.

The empirical results also lend support to a disturbing fact that has been recognized by anthropologists, viz., that the amount of dowry exchanged at marriages has increased steadily over time, holding constant groom characteristics. Indeed, it is claimed that, in the course of the second decade of this century, most of the traditionally bride-price-paying areas of South Asia, including the region of South-Central India under study, witnessed a shift in regime—from bride-price to dowry (Lindenbaum 1981; Billig 1989). The shift was accompanied by an increase

in the magnitude of the transaction. The reasons for this shift are not known; demographers have speculated that dowries emerge as the result of a surplus of women over men in the marriage market (the 'marriage squeeze'), which occurs in a situation where (i) younger cohorts expand more rapidly than older cohorts due to rapid population growth, and (ii) younger women traditionally marry older men (Caldwell, Reddy and Caldwell 1983). This aspect of the data is dealt with by Rao (1993a and 1993b).

CONCLUSION

In this paper, we have used data from a retrospective sample survey in rural South-Central India to estimate a model of bride selection and dowry exchange. An important argument of this paper is that since most, if not all, marriages in rural India are arranged by the families of the groom and bride, with neither of the partners having much say in the matter, assortative mating takes place not only on the basis of individual traits (such as beauty, youth and schooling) but also on the basis of parental household characteristics (such as family wealth and father's schooling and occupation). However, the model we have developed does not permit us to sign a priori the effect of groom characteristics on equilibrium dowry, since improved groom traits—which *ceteris paribus* are certainly correlated with larger dowries—also are associated with enhanced bride attributes, which in turn lower the dowry that the groom can command.

The empirical estimates strongly support the hypothesis of assortative mating on the basis of both individual attributes and family background. In particular, younger men marry younger women; taller men are matched with taller brides; men with more schooling are able to obtain more-schooled brides; and men with greater family wealth in the form of irrigated land marry women with greater family wealth. As expected from the theoretical model, however, few groom characteristics are associated with larger dowry; in fact, only (wet) land ownership and schooling of the groom's father have significant positive effects on dowry. In fact, holding everything else constant, the effect of groom height on dowry is actually negative.

The finding that the reduced-form effects of land ownership and father's schooling on dowry amounts are significantly positive is disturbing, since it suggests that the institution of dowry is likely to be reinforced, instead of being eroded, with the spread of education and increasing affluence—events that are concomitant with socio-economic development. Further support for this deduction is provided by the finding that, holding groom characteristics constant, dowry amounts exchanged at the time of marriages have increased secularly during the fifty-five years (1923 to 1978) covered by the sample.

We must again emphasize that there may be other interpretations to our statistical results. As neo-classical economists we are testing predictions from a theory that assumes a strictly economic calculus and there may be other ways of looking at the data with, for instance, a model of symbolic exchange in mind. These are limitations that come from looking at marriage entirely as a market driven phenomena and further work will try to integrate both the symbolic and consumption motives (which we have emphasized in this paper) that drive marriage systems.

REFERENCES

Becker, Gary S. (1981): *A Treatise on the Family*, Harvard University Press, Cambridge, M.A.

Billig, Michael (1989): 'The Marriage Squeeze and Rise of "Dowry" in India's Kerala State', Department of Anthropology, Franklin and Marshall College, mimeo.

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): 712–32.

Caldwell, J.P., P. A. Reddy and Pat Caldwell (1983): 'The Causes of Marriage Change in South India', *Population Studies*, 37: 343–61.

Lindenbaum, Shirley (1981): 'Implications for Women of Changing Marriage Transactions in Bangladesh', *Studies in Family Planning*, 12 (11): 394–400.

Nugent, Jeffrey B. and Robin J. Walther (1983): 'A Model of Marriage Services in Rural Areas of Developing Countries', Economic Research Paper no. 8206, University of Southern California, Los Angeles, mimeo.

Rao, Vijayendra (1993a): 'The Rising Price of Husbands: A Hedonic Analysis of Dowry Increases in Rural India', *Journal of Political Economy*, 101(4): 666–77

Rao, Vijayendra (1993b): 'Dowry "Inflation" in Rural India: A Statistical Investigation', *Population Studies*.

Rosenzweig, Mark R. and Oded Stark (1989): 'Consumption Smoothing, Migration and Marriage: Evidence from Rural India', *Journal of Political Economy*, 97(4): 905–26.

Schlegel, Alice and Rohn Eloul (1988): 'Marriage Transactions: Labor, Property and Status', *American Anthropologist*, 90(2): 291–309.