Dowry and Property Rights*

Siwan Anderson
Department of Economics, University of British Columbia

August 2004

Abstract

Dowries traditionally serve as a pre-mortem bequest to daughters. In segregated societies, where men have economic value but women do not, dowry as a bequest is consistent with assortative matching in the marriage market. During the early stages of modernisation, increased income inequality across men leads dowries as bequests to no longer be consistent with desired marriage matching patterns. It is demonstrated here that, instead, modernisation necessarily leads to the emergence of dowry as a direct transfer to the groom ("groom-price"). It is then shown that the historical instances of dowry can be classified according to the schema implied by the model. The implications of the model are also tested using current data from Pakistan; a country of some relevance because dowry legislation is currently an active policy debate. The results suggest that the transformation of dowry from bequest to groom-price appears to be underway in some areas.

JEL Classification Codes:: J12, J16, J18, D10
Keywords: dowry, gender, property rights, marriage

*I thank Patrick Francois, David Green, Mauricio Drelichman, and Ashok Kotwal for suggestions. This paper has also benefited from comments by seminar participants at INRA (Paris) and the University of Toulouse. Financial help from the Social Sciences and Humanities Research Council of Canada is gratefully acknowledged.

1. Introduction

Dowry payments, which are an integral component of marriage in many traditional societies, can transform from a pure bridal bequest into a direct transfer to grooms. This paper identifies economic forces which cause this to occur. It demonstrates first that dowry as a bequest is consistent with assortative matching in socially stratified societies when individuals within each status group are sufficiently homogeneous. It then shows that increased heterogeneity, through the development process, undermines the possibility of dowries existing as bequests as modernisation occurs. Instead, modernisation forces dowries to act as a price, i.e., a pure transfer to grooms.

Since ancient Rome at least, dowry has served as a pre-mortem bequest to daughters.[1] In patrilocal societies, where brides join the household of their grooms, parents give resources to their daughters upon marriage.[2] These transfers follow the bride into her new household and potentially contribute to the conjugal fund. Dowry paying societies are stratified and endogamous, i.e., men and women of equal status marry.[3] In traditional societies, where men have economic value but women do not, dowry as a bequest is consistent with this marriage pattern. Wealthier parents tend to give higher dowries which in turn renders their daughters more attractive to grooms. Whereas grooms who have higher incomes are more attractive to brides. As a result, grooms with high incomes match with the daughters from families where the optimal size of bequest is larger, implying positive assortative matching in the marriage market.

Early stages of modernisation can be characterised by increased income inequality amongst men.[4] Increased heterogeneity in the pool of grooms necessarily implies that brides of equal wealth fathers match with grooms of differing wealth. If transfers were pure bequests, fathers of equal wealth would give bequests of equal size. However, as grooms prefer brides with higher bequests, ceteris parabus, brides receiving them obtain better grooms. This leads to a discontinuity in the benefits of bridal bequests, and undermines the bequest equilibrium. In short, an ε increase in transfers (bequests) attracts a higher quality groom, discretely raising brides (daughters) utility. Hence, with sufficient heterogeneity, dowry transfers cannot simultaneously satisfy optimal bequests and assortative matching in the marriage market. When the two motives for dowry transfer come into tension, equilibrium can only be maintained when a second price instrument emerges. Hence,

[1] See, Hughes (1985) and Quale (1988).

[2] See Botticini and Siow (2003) for evidence and rationale for why we see dowry given to daughters, at the time of marriage, and inheritance to sons, at the time of death, in patrilocal societies.

[3] See, for example, Jackson and Romney (1973), Harrell and Dickey (1985), and Gaulin and Boster (1990).

[4] A discussion of this component of the modernisation process is provided in Section 5.

a component of dowry as pure transfer to the groom (and his family), termed "groom-price", must also come into being.

This paper demonstrates, in a simple two-sided matching model of marriage, that dowry as groom-price must emerge with increased societal income heterogeneity.[5] The paper then shows that the historical instances of dowry can be classified according to the schema implied by this model. We identify periods of modernisation with increased income heterogeneity, where the institution of dowry transformed from its original purpose of endowing daughters with some financial security into a 'price' for marriage. In contrast to bridal bequests, women have no ownership rights over these more modern "groom-price" transfers. Many have argued that this transformation of the institution of dowry has been extremely detrimental to women's welfare.[6] Consequently, in countries where this has occurred, it has been of concern to policy makers: often evoking legislation designed to curb its spread.

The theoretical model can also potentially be used as a pointer for when dowry may begin to act to the detriment of women. This is important because though policy makers may want to limit groom-prices, they do not wish to ban transfers from parents to their daughters. But since precise ownership of the dowry transfer is usually impossible to decipher in data, it is difficult to uncover the role dowries are playing. The final part of the paper shows that the methodology developed can be implemented to discriminate between the motives using current data from Pakistan, where dowry legislation is currently an active policy debate. Evidence is found that, in urban but not rural areas, such a transformation appears to be occurring, so that efforts aiming to limit groom prices should be targeted at urban areas.

The following section develops a two-sided matching framework for analyzing the two roles for dowry in the context of modernisation. Equilibrium transfers are characterised in Section 3 and the empirical predictions are subsequently discussed. The relevance of the model for the history of dowry payments is discussed in Section 5. After which, the main conjectures of the model are empirically implemented for the case of Pakistan. Section 7 concludes.

2. Model

The aim of this section is to develop a model which embeds and distinguishes the two potential roles for dowry payments in a matching framework. Previous work has modeled the different roles

[5] See Anderson (2003) for an analysis of how this component of modernisation can cause real dowry inflation in a caste system. The paper assumes a groom-price model of dowries and does not consider the inheritance component.

[6] Refer to the discussion in Section 5.

of dowries independently. At the forefront is the pioneering work of Becker (1991), where dowries (and bride-prices) are pecuniary transfers to clear the marriage market.[7] Others, such as Zhang and Chan (1999) and Botticini and Siow (2003), model dowry as a pre-mortem inheritance given to daughters by altruistic parents.[8] As already emphasized, the most important distinction between the different roles of dowry is the (often unwritten) ownership right of the payment. We capture this in the preferences that follow.

2.1. Preferences

Both brides and grooms, are drawn from families that can be characterized according to familial income. We shall assume throughout the simplest form of stratification so that there are only two familial income groups, high and low, with corresponding family incomes y^h and y^l with $y^h > y^l$. Individuals are also differentiated in the marriage market along the lines of personal characteristics. Thus both brides and grooms are potentially differentiated by their quality, denoted respectively by variables q_b and q_g. Quality will most usually be determined by education and occupation opportunities, and will generally be linked to familial income, the precise form of which we specify subsequently.[9] It is assumed that higher quality means more desirable marriage partner, and that members of each sex agree on the rankings of the opposite sex. Marriages are monogamous (one bride matches with one groom) and there is full information and costless search in the marriage market.

A traditional marriage in dowry-paying societies is arranged by the parents of the prospective brides and grooms. As mentioned, upon marriage, brides join the household of the groom and his parents. At the time of marriage, bridal parents can make a lump sum transfer, τ, directly to their daughter. The variable τ represents the pre-mortem inheritance component of dowry. Additionally, a transfer, denoted by d, can be paid by the brides' families directly to that of the grooms at the time of marriage. The variable d represents the groom-price component of dowry. These transfers are derived endogenously and, as will be seen, vary by the quality of the bride and groom, q_b and q_g.

[7] See also Rao (1993), Tertilt (2003), Anderson (2003), and Grossbard-Shechtman (1993).

[8] Botticini (1999) examines the role of altruism in providing dowries as inter-generational transfers in fifteenth century Florence.

[9] This assumption is in line with Becker (1991) and Lam (1988) who analyse marriage matching equilibria where pre-marital investments are treated as exogenous and matching occurs according to potential wealth of brides and grooms. Peters and Siow (2002) instead treat pre-marital investments as endogenous and study equilibria where children use these investments to compete for spouses. It will be seen that treating pre-marital investments as exogenous does not affect the main results in the framework here.

For simplicity, it is assumed that all benefits and costs of marriage occur in one period only. In line with the marriage matching literature, we assume complementarity between the quality of marriage partners, q_b and q_g.[10] A convenient quasilinear specification of utility yields a relatively simple expression for the utility of bridal parents, i (which will be referred to simply as bride's utility), with a daughter of quality q_b^i who matches with a groom j of quality q_g^j:

$$U(q_b^i, q_g^j) = w(c^{ij}) + u(q_b^i, q_g^j) + \alpha\tau^{ij}, \tag{2.1}$$

where $0 < \alpha < 1$ represents the share of the bequest transfer the bride can appropriate. The notation τ^{ij} reflects the fact that parents of bride i may transfer an amount that varies with the match a daughter makes, groom j. Though τ is a direct transfer to the daughter, we allow for the possibility for the groom to gain some benefit from this transfer, a fraction $(1-\alpha)$.[11] The benefits for a bride to marrying a particular groom are captured by $u(\cdot)$ which is increasing in its' arguments. Complementarity implies that: $u(q_b^i, q_g^i) + u(q_b^j, q_g^j) > u(q_b^i, q_g^j) + u(q_b^j, q_g^i)$. Parents also value their own consumption, c^{ij}, where $w(\cdot)$ is increasing and concave in c^{ij}. Brides' parents maximize (2.1) subject to the following budget constraint:

$$y^i \geq d^{ij} + \tau^{ij} + c^{ij} \tag{2.2}$$

where recall that y^i is the (total life-time) income of bridal parents.[12] Assuming the budget constraint, (2.2), is binding, the utility of bride (or equivalently bridal family) i matching with groom j, under transfers d^{ij} and τ^{ij}, is given by:

$$U(q_b^i, q_g^j) = w(y^i - d^{ij} - \tau^{ij}) + u(q_b^i, q_g^j) + \alpha\tau^{ij} \tag{2.3}$$

The reciprocal groom j's utility from marrying is:

$$V(q_b^i, q_g^j) = d^{ij} + v(q_b^i, q_g^j) + (1-\alpha)\tau^{ij}, \tag{2.4}$$

where $v(\cdot)$ is increasing in its' arguments. Complementarity implies that: $v(q_b^i, q_g^i) + v(q_b^j, q_g^j) > v(q_b^i, q_g^j) + v(q_b^j, q_g^i)$.[13]

[10] This assumption allows us to focus on positive assortative matching equilibrium. Refer to Becker (1991) for this result in the case of transferable utility and to Gale and Shapley (1962) for the case of non-transferable utility.

[11] Typically dowry as a pre-mortem inheritance contributed to the productive capacity of the new conjugal unit. The funds could also be managed by the husband, however, no decisions with regards to its usage could be undertaken without consent from the wife. See, for example, Caplan (1984), Herlihy (1978), and Kaplan (1985).

[12] The price of consumption, c_{ij}, is assumed to be one as it plays no role in the analysis.

[13] We do not consider marriage payments in the other direction and hence do not model grooms' budget constraint.

2.2. Marriage Market Equilibrium

Marriage market equilibria are characterised by analogous conditions to those found in standard two-sided matching models with transferable utility. An equilibrium is a set of marriage transfers specifying the amount paid for each potential marriage match $\left\{\tau^{*ij}, d^{*ij}\right\}$ for all i, j and a pattern of matching such that the following conditions hold. Given that equilibria are symmetric, unless otherwise explicitly stated, equilibrium transfers will be denoted by * and will be fully characterized by the rank of the matching partners. The first equilibrium condition asserts that, given equilibrium transfers for a bride and groom to be matched, they must both prefer to be married rather than remain unmarried. Let $\overline{U}^i = w(y^i) + \overline{u}(q_b^i)$ and $\overline{V}^j = \overline{v}(q_g^j)$ represent the respective utilities of brides and grooms who remain unmarried for their lifetime. Using (2.3) and (2.4), we have:

Definition 1. *A match between a bride of rank i and a groom of rank j is <u>feasible</u> if and only if equilibrium transfers $\left\{\tau^{*ij}, d^{*ij}\right\}$ satisfy:*

$$w(y^i - d^{*ij} - \tau^{*ij}) + u(q_b^i, q_g^j) + \alpha\tau^{*ij} \geq w(y^i) + \overline{u}(q_b^i) \tag{2.5}$$

$$d^{*ij} + v(q_b^i, q_g^j) + (1-\alpha)\tau^{*ij} \geq \overline{v}(q_g^j) \tag{2.6}$$

for all i and j.

We refer to conditions (2.5) and (2.6) as the respective participation constraints of brides and grooms. Throughout the analysis we assume that there is a surplus created by marriage, independent of marriage transfers, so that $u(q_b^i, q_g^j) \geq \overline{u}(q_b^i)$ and $v(q_b^i, q_g^j) \geq \overline{v}(q_b^j)$ are satisfied for all i and j. A second equilibrium condition requires that for a pair to be matched, neither individual prefers to marry another spouse, at equilibrium marriage transfers. Using (2.3) and (2.4), we have:

Definition 2. *A match between a bride of rank i and a groom of rank j is <u>stable</u> if and only if at equilibrium transfers $\left\{\tau^{*ij}, d^{*ij}\right\}$ there does not exist a groom k, and transfers τ^{ik} and d^{ik}, for which both:*

$$\begin{aligned} w(y^i - d^{*ij} - \tau^{*ij}) + u(q_b^i, q_g^j) + \alpha\tau^{*ij} &< w(y^i - d^{ik} - \tau^{ik}) + u(q_b^i, q_g^k) + \alpha\tau^{ik} \\ d^{*zk} + v(q_b^z, q_g^k) + (1-\alpha)\tau^{*zk} &\leq d^{ik} + v(q_b^i, q_g^k) + (1-\alpha)\tau^{ik} \quad \forall\, z \end{aligned}$$

Bride-prices have been known to occur in polygamous societies (see Tertilit 2003). Here we consider only monogamous marriage customs, which are almost always a characteristic of dowry paying societies (see, for example, Gaulin and Boster 1990).

and there does not exist a bride h, and transfers τ^{hj} and d^{hj}, for which both:

$$\begin{aligned} w(y^h - d^{*hz} - \tau^{*hz}) + u(q_b^h, q_g^z) + \alpha\tau^{*hz} &\leq w(y^h - d^{hj} - \tau^{hj}) + u(q_b^h, q_g^j) + \alpha\tau^{hj} \quad \forall\, z \\ d^{*ij} + v(q_b^i, q_g^j) + (1-\alpha)\tau^{*ij} &< d^{hj} + v(q_b^h, q_g^j) + (1-\alpha)\tau^{hj} \end{aligned}$$

These conditions ensure that there does not exist another groom (bride) and corresponding marriage transfers for whom matching with a bride (groom) at those transfers makes both the bride (groom) and that groom (bride) better off than with the equilibrium match. An implication of these conditions is that, both brides and grooms must be weakly better off in their equilibrium match than they would be matching with someone else at the equilibrium transfers that this individual would receive, i.e.:

$$w(y^i - d^{*ij} - \tau^{*ij}) + u(q_b^i, q_g^j) + \alpha\tau^{*ij} \geq w(y^i - d^{*ik} - \tau^{*ik}) + u(q_b^i, q_g^k) + \alpha\tau^{*ik} \tag{2.7}$$

$$d^{*ij} + v(q_b^i, q_g^j) + (1-\alpha)\tau^{*ij} \geq d^{*zj} + v(q_b^z, q_g^j) + (1-\alpha)\tau^{*zj} \tag{2.8}$$

for all $k \neq j$ and $z \neq i$. We refer to conditions (2.7) and (2.8) as the respective stability constraints of brides and grooms.

A final condition stipulates that for a marriage market equilibrium, where brides of rank i are matched with grooms of rank j, to be feasible in the aggregate, the supply of these types must be equal. We assume this always holds.

2.3. Process of Development

The modernisation process typically entails increasing average wealth. When considering socially stratified societies, the way in which increased wealth is distributed across status groups is also an important component. What is relevant for this paper is the degree of income heterogeneity (or inequality) within each status group which comes about from new economic opportunities. Increased income dispersion within status groups may occur with social mobility; individuals with newly acquired wealth are able to join higher status groups. Alternatively, the within group income distribution may widen when traditional jobs are rendered redundant and customary barriers to education and occupational opportunities are broken down with modernisation. A discussion of how this aspect of the modernisation process pertains to the history of dowry payments is presented in Section 5.

For now, the aim here is to illustrate as simply as possible how increased income heterogeneity among men, in a segregated society, necessarily leads to the emergence of dowry as a price, in contrast to dowry as a bequest. Recall that we have already defined two status groups, high and low, denoted by h and l respectively, corresponding to family income. We start with the simplest case where, in terms of spousal quality, heterogeneity is only on the grooms side of the match. Accordingly, we assume, in Case 1, that grooms qualities take one of only two possible values, i.e., $q_g^j \in \left\{q_g^l, q_g^h\right\}$, for all j, where $q_g^h > q_g^l$ and the high type grooms come from families with high income, whereas brides are of identical quality, normalized to zero, $q_b^i = 0$ for all i.

We then consider a process of development allowing differentiation to emerge among the high type men. Thus Case 2 analyses equilibrium matching in a population where opportunities open up differentially for high type men. Again, the simplest case corresponds to adding one additional level of heterogeneity, specifically, in Case 2 $q_g^j \in \left\{q_g^l, q_g^h, q_g^{h+}\right\}$ with $q_g^{h+} > q_g^h > q_g^l$.

The assumption that women have no economic value, and thus no quality differentiation, is rarely realistic. Moreover, we are interested in exploring the effects of variation in female heterogeneity. To this end we also consider two cases which introduce heterogeneity in female quality. The first, Case 3, allows that brides are also quality differentiated, but not as greatly as men, i.e. $q_g^j \in \left\{q_g^l, q_g^h, q_g^{h+}\right\}$ and $q_b^i \in \left\{q_b^l, q_b^h\right\}$, where $q_b^h > q_b^l$. Finally, Case 4 analyses the outcome of marriage markets when bridal heterogeneity matches that of men, i.e., $q_g^j \in \left\{q_g^l, q_g^h, q_g^{h+}\right\}$ and $q_b^i \in \left\{q_b^l, q_b^h, q_b^{h+}\right\}$, where $q_b^{h+} > q_b^h > q_b^l$.

One way of thinking of these cases is as corresponding to the development process. Initially, women are of no economic value and groom's quality differentiation is small (Case 1). Modernisation opens up opportunities for high status men, but does so differentially, introducing inequality and differentiation within the high group of men (Case 2). Eventually, along the path of development, female labor comes to have market value and this introduces minimal heterogeneity amongst women (Case 3). Finally, women are as heterogeneous as men, as they too have full access to income earning opportunities (Case 4).

We make a final assumption on the valuation of quality differences relative to income (status) differences. Specifically, we assume:

Assumption 1: $u(q_b^h, q_g^h) - u(q_b^l, q_g^l) < (1-\alpha)[y^h - y^l]$

The above assumption ensures the existence of positive assortative matching in the marriage market. It amounts to assuming that the income difference between high and low quality parents is sufficiently large so that optimal marriage transfers are in turn large enough to ensure positive assortative matching.

3. Equilibrium Marriage Transfers

In this section, equilibrium marriage transfers are solved for in each of the stages of modernisation described in Section 2.3.

3.1. Segregated society

Consider Case 1 of Section 2.3, where the distribution of potential grooms within a given status group is homogenous.

Proposition 1. *In a segregated society where only men have economic value and the quality distribution of men within each status group is homogenous, there exists a positive assortative matching equilibrium where only pre-mortem inheritances are given to daughters and no groom-price is transferred.*

All proofs are in Appendix A. An equilibrium here is a pattern of matching for brides and grooms with accompanying pre-mortem inheritances. Parents of equal wealth give the same sized transfers to their daughters, and wealthier parents, $y^h > y^l$, give higher transfers, $\tau^{*hh} > \tau^{*ll} \geq 0$. Grooms prefer brides with higher transfers, whereas higher quality grooms, $q_g^h > q_g^l$, are more attractive to brides. It is demonstrated that optimal transfers, (i.e., those that would be made to daughters if such transfers had no effect on matching patterns) satisfy incentive compatibility constraints which ensure that brides from families with high incomes marry grooms of high quality. Thus, the proof demonstrates that, given equilibrium transfers, $\tau^{*hh} > \tau^{*ll} \geq 0$, payments required to induce out of rank matching would render one side of the marriage market strictly worse off. Intuitively, parents of lower ranked brides have lower income and hence a lower willingness to pay for marriage transfers. As a result, they are not able to attract a higher ranked groom for their daughter. Hence, grooms with high quality, q_g^h, match with the daughters from families where the optimal size of bequest is larger, τ^{*hh}. Therefore, positive assortative matching, with dowries as bequests, is an equilibrium.

Given that brides have no quality of their own, $q_b^i = 0$ for all i, an assortative matching equilibrium with no transfers is not possible. Alternatively, an equilibrium with positive groom-prices, in lieu of pre-mortem inheritances, does exist as long as groom-prices are sufficiently high so that brides cannot instead afford to offer a pre-mortem inheritance, which they would prefer. Although the equilibrium with only pre-mortem inheritances is not unique, Proposition 1, as will be discussed later, is consistent with historical evidence, where before modernisation, dowries as pre-mortem inheritances existed in segregated societies. Moreover, the equilibrium of Proposition 1 provides an interesting contrast to the marriage market equilibrium with modernisation which we now consider.

3.2. Men reap the benefits of development

Consider Case 2 of Section 2.3, where though all families continue to be drawn from the same distribution of family income and thus either take value y^h or y^l, grooms in the high group vary in their income earning potential, and hence quality.

Proposition 2. *In a segregated society where only men have economic value and the quality distribution of men within a given status group is heterogenous, the unique matching equilibrium is positive assortative matching, where groom-prices are transferred.*

Proposition 2 demonstrates the main result of this paper, that dowries which act purely as bequests are no longer consistent when modernisation occurs. Instead, dowries which serve as a price *must* also emerge with positive assortative matching in the marriage market. Increased heterogeneity amongst grooms introduces an additional incentive compatibility constraint which binds. In this case, identical family income or status group brides, y^h, matched with grooms of differing quality q_g^h and q_g^{h+}, must be indifferent with respect to their matches in equilibrium. From the perspective of brides, those who match with the higher quality groom, q_g^{h+}, must receive a lower equilibrium bequest for this indifference condition to be satisfied. However, in a positive assortative matching equilibrium, higher quality grooms match with brides with higher transfers. Therefore dowry transfers cannot simultaneously satisfy optimal bequests and assortative matching in the marriage market. Necessarily, when the two motives for dowry transfer come into tension, equilibrium can only be maintained when a second price instrument emerges. Hence, the unique equilibrium has positive groom-prices, $d^{*hh+} > d^{*hh} \geq 0$, so that grooms of higher quality, q_g^{h+}, receive corresponding higher groom-prices, d^{*hh+}. Intuitively, as long as homogeneous brides are competing for a smaller supply of high quality grooms, groom-prices will emerge.

Given that brides' families in the high status group face an identical budget constraint, those brides who pay higher groom-prices in equilibrium receive correspondingly lower pre-mortem inheritances in equilibrium. As a result:

Corollary 1. *Equilibrium groom-price is increasing in the relative quality of grooms. Pre-mortem inheritance is decreasing in the relative quality of grooms.*

Another aspect of modernisation is an increase in average wealth. In the model here this could be easily represented by an uniform increase in q_g^h without the introduction of increased heterogeneity. But an increase in q_g^h alone would not alter the existence result of Proposition 1, where dowries as bequests are consistent with assortative matching in the marriage market. Given that bequests are optimal for a given bridal parent income, increasing the average quality of grooms would also not alter the size of optimal dowry transfers.

Previous economic models have explained the existence of groom-prices by a scarcity of potential grooms in the marriage market (see Becker 1991). By contrast, Proposition 2 demonstrates that a groom-price necessarily emerges with a scarcity of *high quality* grooms, q_g^{h+}. Unlike previous work (Becker 1991), Proposition 2 does not imply that the excess supply of brides in the marriage market go unmarried. Instead, some brides match with lower quality grooms, q_g^h. This is an important difference since, in reality, groom-prices have been accompanied by no discernible change in the proportion of women marrying.[14]

3.3. Women reap benefits of development

Consider now Case 3 of Section 2.3 where women also have economic value but restricted opportunities compared to men.

Proposition 3. *In a segregated society, where men and women have economic value but the quality distribution of men is more dispersed than that of women, the unique matching equilibrium is positive assortative matching where groom-prices are transferred.*

The proof for the above follows analogously to that of Proposition 2. The main difference between the equilibria of Propositions 2 and 3 is that equilibrium groom-prices are larger in the latter case. This is somewhat counter-intuitive as one would expect an increase in bride quality, from 0 to $q_b^h > 0$, to decrease the price that a bride must pay to marry a groom of a given quality. This result follows from the complementarity between bride and groom quality. Recall that in equilibrium, brides in the high status group are indifferent between the different quality grooms in their same status group. Given complementarity, the benefit to matching with a higher quality groom, q_g^{h+}, increases when brides have quality, $q_b^h > 0$. As a result, for the indifference condition to be satisfied, groom-prices must be even larger for those brides matching with higher quality grooms.

[14] This is particularly true for South Asia where the groom-price phenomena is currently pervasive. Rao (1993) reports that 99% of men are married by the age of 25 and 99% of women are married by the age of 20.

Given that brides' families in the high status group face an identical budget constraint, those brides who pay higher groom-prices in equilibrium receive correspondingly lower pre-mortem inheritances in equilibrium. This is demonstrated in what follows:

Corollary 2. *In a segregated society, where men and women have economic value but the quality distribution of men is more dispersed than that of women, equilibrium groom-prices increase with the relative quality of brides, and equilibrium pre-mortem inheritances decrease with the relative quality of brides.*

Previous empirical models of groom-price have posited a hedonic price function which is positively related to grooms' quality and negatively to brides' quality (see Rao 1993). Despite these predicted relationships, the empirical estimates more generally confirm a positive relationship between bride and groom characteristics and the value of the groom-price (see Edlund 2000 and Dalmia 2000). This non-negative relationship between brides quality and groom-price is also borne out in case studies (see, for example, Saroja and Chandrika 1991 and Sandhu 1988). The model here demonstrates that, by considering the complementarity between brides and grooms characteristics, the predictions for groom-price payments in a positive assortative matching equilibrium can be reconciled with these empirical findings.

More generally, even if the opportunities for women are not restricted, so that the quality distribution of potential brides has also widened, equilibrium groom-prices are increasing with the heterogeneity of grooms relative to brides:

Corollary 3. *Equilibrium groom-prices are increasing with the heterogeneity of grooms relative to brides. Equilibrium pre-mortem inheritances are decreasing with heterogeneity of grooms relative to brides.*

3.4. Disappearance of Dowry

Turning to Case 4 of Section 2.3, we see that as development progresses and the relative within gender inequality between men and women declines, marriage transfers can cease to exist:

Proposition 4. *In a segregated society, where the quality distributions of potential brides and grooms (in a status group) are equal, a positive assortative matching equilibrium exists with (i) only pre-mortem inheritances, or (ii) zero marriage transfers, if the benefits to marriage for brides and grooms are sufficiently similar.*

Given the assumption of equal numbers of brides and grooms within a given rank, the binding indifference condition which held for high status brides in Proposition 3 need no longer hold. Instead, grooms and brides of a given quality match according to rank. Given complementarity between bride and groom quality, no marriage transfers are necessary. This follows as long as the benefit to marriage is sufficiently similar between brides and grooms (case (ii)). Alternatively, if the benefits to marriage for grooms are smaller, then there are incentives for lower quality brides to offer a positive transfer (dowry as pre-mortem inheritance) in order to match with higher quality grooms (case (i)).

Propositions 3 and 4 point out that increasing the economic value of women is not sufficient for groom-prices to cease. Instead, the key element is the relative within gender equality between men and women in the marriage market. Only when the distribution of potential brides is comparable to that of grooms, does groom-price cease to exist. Intuitively, as long as homogeneous brides are competing for a smaller supply of high quality grooms, groom-prices will emerge. By contrast, if grooms and brides are equally heterogeneous then the supply of high quality brides and grooms is equal and groom-prices do not exist. In this case, a pre-mortem inheritance can exist if high quality brides are worth less than high quality grooms in the marriage market. Otherwise, no marriage transfer need exist. This prediction for the disappearance of dowries as pre-mortem inheritances is in line with that of several others (see, for example, Goody 2000), who conjecture dowries to decline when they become an inferior way of providing brides with future wealth relative to investing in daughters' human capital. The point of difference here is that daughters acquiring human capital is not a sufficient condition for the disappearance of the groom-price component of dowry, instead comparable economic opportunities for men and women is required.

We have not explicitly considered heterogeneity amongst parents within status groups, i.e., amongst the y^h and y^l. But an alternative interpretation of Proposition 4 is that groom-price ceases to exist if the degree of groom heterogeneity is comparable to that of bridal fathers. Under this interpretation, brides are equally heterogeneous in quality, as measured by their father's wealth and corresponding willingness to give a dowry as pre-mortem inheritance to grooms, and in essence there is an equal supply of each quality of groom and bride in the marriage market. In other words, groom-price may disappear, when the dispersion of wealth across generations of men is comparable. In this scenario, it is important to note that the average levels of wealth may be increasing but the degree of inequality should not be. These predictions apply only to the income distribution within a marriageable pool. The prevalence of endogamy in stratified societies greatly limits this pool. If endogamy did begin to break down, inducing larger potential marriage pools, then it is more likely that the dispersion of wealth across bridal fathers and grooms is comparable. In this sense, the collapse of inherited status and the importance of endogamy could also lead to the disappearance of groom-price.

A simplifying assumption in the above analysis is that the quality of grooms and brides is exogenous to the model. This is likely not the case in reality, where parents may invest in their children conditional on their potential returns in the marriage market.[15] This issue of endogeneity will be addressed in the empirical analysis. With respect to the theoretical analysis, the main existence results still hold if the quality of brides and grooms is instead endogenous, as long as for some exogenous reason, the process of development restricts opportunities so that grooms are more heterogenous than brides at some stages.

4. Empirical Predictions

The theoretical model illustrates how the process of development can affect the role of dowry. In a segregated society, where men have economic value but women do not, dowry as a pre-mortem inheritance is sufficient for assortative matching in the marriage market. As development increases income inequality amongst men, groom-prices necessarily emerge. Proposition 2 demonstrates that the key determinant of this transition is relative within group groom and bride heterogeneity. The larger this is, the larger the groom-price component of dowry and the smaller the pre-mortem inheritance component, as shown in Corollary 3. Corollaries 1 and 2 further demonstrate how the groom-price component of dowries is increasing in the relative quality of grooms and the relative quality of brides, whereas the opposite holds for the pre-mortem inheritance component. These implications of the theoretical model are summarized as follows.

Conjecture 1. *Dowry as a pre-mortem inheritance is more likely to exist when relative groom and bride heterogeneity is small. The transfer decreases with grooms' and brides' relative quality, and relative groom and bride heterogeneity.*

Conjecture 2. *Dowry as a groom-price is more likely to exist when relative groom and bride heterogeneity is high. The transfer increases with grooms' and brides' relative quality, and relative groom and bride heterogeneity.*

[15] Refer to Peters and Siow (2002) who analyze this precise issue but do not explicitly model marriage transfers.

The model further predicts that brides' parents income is a key determinant of the pre-mortem inheritance component to dowry payments. By contrast, the relationship between parents income and groom-price is not as direct. However, this mainly follows from the assumption that pre-marital investment in children is exogenous to the model. If instead it were endogenous, the quality of brides and grooms would generally be increasing in the income of their respective parents. Since the groom-price increases in these qualities, correspondingly it may increase in the income of both sets of parents. Therefore the predictions for parents income are likely not distinguishable for the two components of dowry, but this variable will enter into the empirical estimations.

Conjectures 1 and 2 provide testable implications for the two roles of dowry and if data contained both information on pre-mortem inheritances and groom-prices, these could be used to test the predictions of the model. However, typically the motive for paying a dowry is difficult to identify in data, which simply report the total amount of dowry, $d + \tau$. An alternative strategy is to use the implications of the model to identify which role of dowry is prominent in the data. This is the strategy followed in Section 6 for the case of Pakistan. Before analysing present-day data, the next section demonstrates how the historical instances of dowry can be classified according to the schema implied by the theoretical model.

5. Historical Discussion

The central result of the theoretical model links the emergence of groom-price to the process of modernisation. In particular, Proposition 2 demonstrates that a key factor to explain this transformation is a male-biased development process which increases the heterogeneity (or inequality) amongst marriageable men relative to women. The main aim of this section is to trace the links, if any, between the occurrences of groom-prices, in the historical record, to this characteristic of the modernisation process. We first establish historical instances where there has been a transformation from dowries as bequests into dowries as groom-prices. We then show that concurrent economic forces for many of these instances are consistent with those hypothesized by the model.

5.1. Dowry as Groom-Price

The dowry system dates back to at least the ancient Greco-Roman world (Hughes 1985). With the Barbarian invasions, the Greco-Roman institution of dowry was eclipsed for a time as the Germanic observance of bride-price became prevalent throughout much of Europe; but dowry was widely reinstated in the late Middle Ages. Dowry continued to be prevalent in Renaissance and

Early Modern Europe and is presently widespread in South Asia.[16] Dowry paying societies are patrilocal (upon marriage the bride joins the household of her groom) and dowry payments are wealth transfers from the bride's family, at the time of marriage, which travel with the bride into her new household. Most commonly, the traditional dowry transfer is considered to be a "pre-mortem inheritance" to a daughter, which formally remains her property throughout marriage.[17] This is consistent with what we have termed τ in the model. However, property rights over this transfer can vary. In particular the traditional institution can transform from its original purpose of endowing daughters with some financial security into a so-called 'price' for marriage. This component of dowry, corresponding to d in the model, often termed a "groom-price", consists of wealth transferred directly to the groom and his parents from the bride's parents, with the bride having no ownership rights over the payment.

There are numerous instances in the historical record where dowry as bequests appear to have been superseded by groom-prices. Chojnacki (2000) documents the emergence of a gift of cash to the groom (*corredo*) as a component of marriage payments in Renaissance Venice. In response, the Venetian Law of 1420 limited the 'groom-gift' component to one third of the total marriage settlement (Chojnacki 2000).[18] Reimer (1985) discusses laws implemented in the late thirteenth century Siena which are akin to the formal emergence of groom price. These comprised both an increase in the proportion of a woman's dowry her husband had rights over, and forbade a woman from using her portion of the dowry without the consent of her husband. Krishner (1991) similarly confirms a pattern in which legislators across northern and central Italy were granting husbands broader control over a wife's dotal assets beginning in the fourteenth century. Herlihy (1976) argues that outside of Italy, there also are many indications that the financial treatment of women in marriage was deteriorating after the late middle ages in Europe.[19] For example, common law, in which dowry came under immediate control of husbands, predominated in England during the sixteenth and seventeenth centuries (Erickson 1993 and Stone 1979). Reher (1997) remarks that during the Early Modern period in Spain, husbands had greater control over their wives' dowries

[16]See, Kaplan (1985) for a survey of dowries in European history. See, for example, Epstein (1973), Chauhan (1995), Paul (1986) and Srinivas (1984) for studies on the dowry phenomenon in South Asia.

[17]In several countries, dowry as a pre-mortem inheritance given to women was written into the constitution. Refer to Botticini and Siow (2002) for a historical synopsis of dowries and inheritance rights.

[18]Legislation of dowries was pervasive in Early Europe. For example, the Venetian Senate first limited Venetian dowries in 1420 and payments were abolished by Law in 1537. Dowries were limited by Law in 1511 in Florence and prohibited in Spain in 1761. Similarly, the Great Council in Medieval Ragusa (Dubrovnik) repeatedly intervened to regulate the value of dowries between the thirteenth and fifteenth centuries (Stuard 1981).

[19]Relative to Italy, a limited number of surviving marriage agreements make the evolution of customs more difficult to follow in other parts of Europe.

in Castile relative to other parts of the country. Kleimola (1992) documents a decline of female property rights over their dowries in seventeenth century Muscovy, Russia. Historians also point out that the transformation from dowry in the form of property to dowry as cash, which occurred throughout the Western Mediterranean after the late middle ages, is indirect evidence of a loss of property rights for wives over their dowries.[20] A cash dowry was more easily merged with the husband's estate whereas dowry as property was a more visible sign of the wife's patrimony. Further indirect evidence of dowries working to the detriment of women is given by early feminists who attacked the dowry system and objected to husbands' control over the funds (see, for example, Goody 2000 and Cox 1995).

Nowhere, however, has there been a more dramatic example than in present-day India, where in contrast to the traditional custom, *stridhan,* of a parental gift to the bride, modern-day groom-prices have taken on a contractual and obligatory nature; generally a bride is unable to marry without providing such a payment.[21] The amounts of these payments typically increase in accordance with the 'desirable' qualities of the groom, and the total cash and goods involved are often so large that the transfer can lead to impoverishment of the bridal family.[22] Accordingly, the Dowry Prohibition Act of 1961 attempted to distinguish and discriminate between the two components of the payment: that which was a gift to the bride, and that which was transferred to the groom and his parents. The aim was to abolish the groom-price component which allows bridal transfers to remain in tact (see, Caplan 1984).[23]

There is comparatively little research explaining the dowry phenomenon in the rest of South Asia, despite substantial suggestive evidence that the transformation into groom-price is occurring.[24] Following numerous complaints, the Pakistan Law Commission reviewed dowry legislation and suggested an amendment in 1993 which updated the limits placed on dowries and also added a subclause stating grooms should be prohibited from demanding a dowry.[25] In Bangladesh there seems

[20]For example, the transformation to cash dowries from real property occurred during the thirteenth century in Siena, thirteenth and fourteenth centuries in Genoa, fourteenth and fifteenth centuries in Toulouse, and fifteenth century in Provence (Hughes 1985).

[21]For evidence of a groom-price in India, see, Caldwell et. al. (1983), Rao and Rao (1980), Upadhya (1990), Caplan (1984), Billig (1992), Srinivas (1984), Hooja (1969) and Bradford (1985).

[22]In the economic literature, see Rao (1993), Deolalikar and Rao (1998), and Edlund (2000). Within the sociological and anthropological literature, see, Caldwell et. al. (1983), Rao and Rao (1980), Billig (1992), Caplan (1986), and Hooja (1969).

[23]The practice of dowry in India has essentially continued unabated despite its illegal standing. It has been argued that it is the clause in the Law which aimed to maintain the gift component of the dowry which provided a legal loophole (see Caplan 1984). The original Law of 1961 continues to be amended to address these issues.

[24]See Lindenbaum (1981) and Esteve-Volart (2003) for investigations on dowry payments in rural Bangladesh.

[25]The Pakistani parliament first made efforts to reduce excessive expenditures at marriages by an Act in 1976.

to be a clear distinction between the traditional dowry, *joutuk*, gifts from the bride's family to the bride, and the new groom payments referred to as *demand*, which emerged post-Independence in the 1970s, (Amin and Cain 1995). The scale of these demands do not appear to have reached that of urban India,[26] but the escalation of these groom payments lead to them being made a punishable offense by the Dowry Prohibition Act of 1980.[27]

In considering the historical record, the central result of the model links the emergence of groom-price to increases in heterogeneity (or inequality) amongst marriageable men. We now attempt to trace the connection between the occurrences of groom-prices outlined above, in both historic Europe and present-day South Asia, to this characteristic of the modernisation process.

5.2. Heterogeneity and Dowries

Societies in which dowries appear seem to exhibit substantial socio-economic differentiation and class stratification.[28] Moreover, their marriage practices are typically monogamous, patrilineal, i.e., class status follows from the husband's, and endogamous, i.e., men and women of equal status tend to marry (Gaulin and Boster 1990). These features have already been embedded in the model. Proposition 1, which demonstrates that dowry as a bequest is consistent with positive assortative matching in a traditional segregated society where only men have economic value, corresponds with the historical picture. Quale (1988) describes how the desire to find a spouse of at least equal standing favoured the use of dowry as a pre-mortem inheritance, matched to the status and prospects of the groom, in societies from ancient Babylon, Israel, Greece, and Rome to India and China. All of these societies were complex, both economically and socially, by the time dowry began to be used. Contrasting these commercial societies to earlier agricultural and pastoral ones, Quale links the emergence of dowry to, among other things, a decline in women's participation

[26] See, for example, Kishwar and Vanita (1984), White (1992), and Rozario (1992).

[27] In addition to the economic repercussions, the increasing demands of groom-prices in South Asia have led to severe social consequences. The custom has been linked to the practice of female infanticide and, among married women, to the more obvious connection with bride-burning and dowry-death, i.e., physical harm visited on the wife if promised payments are not forthcoming (Bloch and Rao (2002), Kumari (1989), and Sood (1990) address these issues). The National Crime Bureau of the Government of India reports approximately 6000 dowry deaths every year. Numerous incidents of dowry-related violence are never reported and Menski (1998) puts the number to roughly 25000 brides who are harmed or killed each year. Relative to research on dowry related violence in India, there are few corresponding investigations for the rest of South Asia. However, this does not imply that such abuse towards women does not occur. In a recent international conference on the 'dowry problem', it was stated that consolidated research on the Pakistani and Bangladeshi experience is urgently needed (see Menski 1998). The case of Pakistan was particularly emphasized, where there was argued to be a need for legislation in light of the growing number of dowry abuse reports.

[28] This is in contrast to more homogenous tribal societies where bride-price is pervasive. For comparisons of marriage payments across societies, see, Goody (1973), Jackson and Romney (1973), Harrell and Dickey (1985), and Gaulin and Boster (1990).

in the mode of livelihood. She describes how this decline seemed to lead parents to ensure that their daughters still had economic value, by bringing a dowry with them. The use of dowry tended to become a means of maintaining elite status, as it attracted another elite as a husband for the daughter.

In both the European and South Asian context, the emergence of a groom-price in lieu of dowry as a bequest seems to have corresponded with increased commercialization. This is consistent with Proposition 2 if commercialization increases heterogeneity (or inequality) amongst marriageable men. This aspect of modernization, or development, has, in the form of the Kuznet's curve, reached the status of a stylized fact in development economics. Though the evidence for the Kuznet's curve is beyond the present scope, and the subject of considerable debate, we seek here to draw links between increased inequality and the instances of transformation of dowry to groom-price.

This is a feature of European modernisation when the groom-price component of dowry began to emerge in the late Middle Ages and Early Renaissance period. Several countries in Europe experienced rebirths in their economies at this time of the commercial revolution; which was a period of discovery and trade corresponding with a burgeoning of commercial capitalism and the emergence of urban centers.[29] The growth of commerce and banking reshaped economic lines as the increased variety and volume of commercial opportunities altered the income earning potential of men. Massive recruitment of talented men into the urban centers from villages and small towns occurred, and social change accompanied this, as men of newly acquired wealth were drawn into the upper and middle urban classes (Herlihy 1978). Watts (1984) argues that by the late fifteenth/early sixteenth century, in almost all areas of Europe to the west of the Elbe, the urban social structure bore little relationship to the high medieval ordering of society as wealth inequality began to increase in the main centers of merchant capitalism during this period (Van Zanden 1995).

But this commercial revolution did not spread evenly.[30] Northern and central Italy were the homes of great mercantile centers, such as Venice, Florence, and Genoa, in the late fourteenth and fifteenth centuries, Siena was a center of commerce in the thirteenth century, but fell into relative decay following the Black Death of the fourteenth century (Molho 1969, Luzzatto 1961, Riemer 1985). Spain's mercantile period came later when Castile dominated in the sixteenth and seventeenth centuries (Vives 1969).[31] England was also undergoing its mercantile period at this

[29] See, for example, Gies and Gies (1972), Lopez (1971), and Miskimin (1969).

[30] During this time, urbanisation first occurred in areas of northern and central Italy, southern Germany, the Low Countries, and the Spanish Kingdoms.

[31] Catalonia was also an early economic center in the thirteenth and fourteenth centuries (Vives 1969).

time (Lipson 1956). In accord with Proposition 2, these periods of economic expansion in different centers of Europe corresponded with groom-prices emerging: in late thirteenth century Siena, in the urban centers of northern and central Italy during the fourteenth and fifteenth centuries, and in Early Modern Spain and England, as outlined in the previous section. Moreover, a common report is that, over these periods, the groom-price component of dowries served to secure matches with more desirable grooms of high quality. For example, Chojnacki (2000) documents the evolution of groom-gift in fifteenth century Venice. At a time of social and economic upheaval, it was used to secure grooms from prominent families.

This characteristic of modernisation also pertains to present-day India. Traditionally, one's caste (status group) innately determined one's occupation, education, and hence potential wealth. Modernisation in India has weakened customary barriers to education and occupational opportunities for all castes and, as a result, increased potential wealth heterogeneity within each caste.[32] The main hypothesis (Proposition 2) that increased heterogeneity amongst marriageable men forces dowries to serve as a price, is also in accord with research for present-day India. Several studies connect groom-price to competition amongst brides for more desirable grooms.[33] For example, Srinivas (1984) dates the emergence of groom-prices in India to the creation of white collar jobs under the British regime. High quality grooms filling those jobs were a scarce commodity, and bid for accordingly. In the same vein, Chauhan (1995) links the widespread transformation of dowries into a groom-price to directly after Independence in 1947. This was a time of significant structural change where unprecedented opportunities for economic and political mobility began to open up for all castes (see also Jayaraman 1981). The same connection has been made in Bangladesh for the emergence of their post-Independence groom-prices.[34]

The degree of relative heterogeneity in the marriage market may also explain why the role of dowries differed in Ancient Greece. According to Schaps (1979), in Athens, dowries served the purpose of attracting a suitable husband, who could freely dispose of the funds whereas, by

[32] See Singh (1987) for a survey of case studies which analyze upward and downward occupational mobility within caste groups. The recent work of Deshpande (2000) and Darity and Deshpande (2000) shows that within-caste income disparity is increasing in India. This notion of modernisation causing increased heterogeneity within status (caste) groups also applies to Pakistan and Bangladesh. Despite that caste is rooted in Hinduism and is not a component of Islamic religious codes, for the purposes here, caste (or status group) does exist amongst Muslims in both Pakistan and Bangladesh. That is, there traditionally exists a hierarchical social structure based on occupation, where group membership is inherited and endogamy is practised within the different groups. See, for example, Korson (1971), Dixon (1982), Beall (1995), Ahmad (1977), and Lindholm (1985) for Pakistan. Ali (1992) provides an in-depth study of this issue for rural Bangladesh.

[33] See, for example, Srinivas (1983), Nishimura (1994), and Caplan (1984).

[34] See, for example, Kishwar and Vanita (1984), White (1992), and Rozario (1992).

contrast, in Gortyn (on the island of Crete) dowry was the personal property of the bride, which was equivalent to her share of her parents' inheritance. Tribes existed in both Athens and Gortyn, but only in Gortyn did they still determine a man's choice of bride (Schaps 1979). A possible interpretation is that the pool of grooms within a given tribe is relatively homogeneous, whereas across tribes there is quality heterogeneity. If this is the case, it could explain why dowries served as bequests in Gortyn and groom-prices in Athens. The same argument may apply to the evolution of dowries in Medieval Ragusa (Dubrovnik). Stuard (1981) compares dowry payments between the thirteenth and fifteenth centuries there and finds that a bride's direct share of her dowry had decreased during this time. Though, by the fifteenth century, dowries were again permitted to serve their original purpose of securing financial security for daughters, as they had done prior to the thirteenth century. Stuard describes the decades of the thirteenth and fourteenth centuries as a time when the status of the elite was being threatened. This is again consistent with Proposition 2, where the pool of elite grooms was made more heterogeneous by the entrance of non-nobles. By the fifteenth century the status of the elite was again secure.

Proposition 4 characterises conditions under which to expect the disappearance of dowry payments, both as bequests and as groom-prices. The disappearance of dowries in general is not extensively documented, and as a result it is difficult to bring to bear evidence on the paper's claims. As pointed out in Section 3.4, groom-price may disappear when the wealth dispersion across potential brides (or their fathers) and grooms is comparable. In other words, when income inequality ceases to increase with modernisation. Van Zanden (1995) documents evidence of a decline in wealth inequality in the seventeenth and eighteenth centuries in the big merchant cities of Europe. Knapp (1976) similarly characterises eighteenth century Europe as a static society with little social mobility compared to the three previous centuries. As mentioned above, the main evidence for a groom-price component to dowries in Europe takes place in the late middle ages and Renaissance period (1200s to 1500s). The lack of evidence of groom-prices in subsequent periods may correspond to the relative income equality at that time, as prescribed by the model.

The predictions from the model apply only to the income distribution within a marriageable pool. The prevalence of endogamy in stratified societies greatly limits this pool so that a break down of endogamy, inducing larger potential marriage pools, generally leads to greater equality in the dispersion of wealth across bridal fathers and grooms. In this sense, the collapse of inherited status and the importance of endogamy could also lead to the disappearance of groom-price. This seemed to occur beginning in 18th century Europe where mate selection gradually became more free.[35] This prediction is also consistent with the evolution of dowries in Ancient Rome. There, women's rights over their dowry increased by first century B.C., relative to earlier times when dowries automatically became part of their husband's estates (see, Saller 1994). This may correspond to non-endogamous matching which characterised Roman society at the same time, as documented by Shaw and Saller (1984).

For the case of dowries as bequests, Proposition 4 predicts that these transfers will disappear when they become an inferior way of providing brides with future wealth relative to investing in daughters' human capital. This is consistent with Goody (2000), who documents how dowry tended to disappear first among the urban workers of northwestern Europe where it was replaced by the aim, already existing in poorer classes, of providing children with education and training. A similar phenomenon affected the middle classes by the end of the nineteenth century (Goody 2000).

We now turn to a more in depth analysis for the case of Pakistan.

6. Empirical Analysis

This section aims to empirically assess the model (laid out in Section 4) using data from Pakistan. To my knowledge, there have been no direct studies on dowry payments in Pakistan. However, there is suggestive evidence that the transformation into groom-prices is occurring, particularly in urban areas (see Beall 1995 and Sathar and Kazi 1988). Aside from testing the implications of the theoretical model, analysing data from Pakistan may prove informative since a policy debate on dowry is currently taking place. Unlike India and Bangladesh, where dowries have been prohibited, the Law in Pakistan only limits payments, and stops short of an outright ban.

6.1. Data

The household level data used in this study are from the Living Standards Measurement Study (LSMS) of Pakistan, collected in 1991 under the direction of the World Bank and the Government of Pakistan. The sample is divided equally between Pakistan's urban and rural areas, with provincial shares approximating population shares. The data contain detailed information on the education, income, and all labor activity of individuals. Approximately 4700 households were surveyed, however information on dowries was requested only from females who had married in the past five years. This leaves a female sample eligible for the dowry question of roughly 1300. Approximately

[35] See, Stone (1977) for Britain, Barber (1955) for France, and Watts (1984) for northern Italy.

800 of those females responded to the dowry question and of those, roughly 700 received a dowry from their parents, and reported the value and contents of the transfer. The distribution of the dowry sample across provinces and between rural and urban areas very closely matches that of the entire LSMS sample. For all the estimations, rural and urban areas are analyzed independently to allow for the fact that the dowry phenomenon may exist in these areas for different reasons.[36]

A very large proportion of the sample, 87%, paid a dowry (88% in urban areas and 86% in rural areas), and the variation in the payments is substantial, (the standard deviation is roughly double the mean). The table below lists the averages and percentiles of absolute dowry payments and as a proportion of annual household income.[37]

	Dowry		**Dowry/Income**	
	Rural	**Urban**	**Rural**	**Urban**
Average	18196.02 (22525.04)	32451.53 (38532.51)	1.13 (3.00)	1.23 (4.14)
25%	5000	10000	0.17	0.15
50 %	10151	20000	0.38	0.35
75%	22000	41000	0.93	0.76
No. Obs.	296	316	296	316

Table 1 - Summary statistics of dowry payments[38]

In general, average dowry payments are significantly higher than median dowry payments, thus reflecting a small proportion of families giving large dowries. Dowry payments are higher in urban areas; however, as a proportion of grooms' household income they are comparable in rural and urban areas, though higher in rural areas for the higher percentile groups.

Table 2 below lists summary statistics on the variables which reflect the 'quality' of brides and grooms and their parents.

[36]The survey defines urban areas as all settlements with a population of 5000 or more in 1981.
[37]The value of dowry is in 1991 rupees. There are approximately 25 rupees to the dollar.
[38]Standard deviations are in parentheses.

Variable	Urban	Rural
Bride literate	0.42 (0.49)	0.14 (0.35)
Bride's education level	3.72 (4.73)	1.07 (2.53)
Bride earns a wage	0.11 (0.14)	0.43 (0.22)
Bride's earnings	125.5 (146.7)	57.4 (59.8)
Bride's parents income (predicted)	75105.58 (34273.15)	60328.3 (26098.37)
Groom literate	0.70 (0.46)	0.49 (0.50)
Groom's education level	6.45 (5.13)	3.97 (4.33)
Groom earns a wage	0.54 (0.50)	0.53 (0.50)
Groom's earnings	517.1 (500.1)	339.5 (179.6)
Groom's Household income	77017.58 (90590.09)	56773.12 (156291.9)
Number of observations	358	340

Table 2 - Summary statistics of brides and grooms[39]

Grooms are significantly more educated than brides and the education level for brides in urban areas is more than double that in rural areas. On average, 43% of brides work outside of the home in rural areas, and 11% in urban areas. Approximately 55% of grooms work in a wage earning job in both rural and urban areas. The remaining grooms work in family farms and businesses, whereas approximately 30% of brides do so.[40] The average income of grooms in rural areas is roughly equal to 65% of their urban counterparts.[41] For rural brides it is approximately 46%. Parents household income in the sample is higher in urban areas than in rural, where median rural incomes are approximately half that of urban incomes.[42] In general, the data do not reveal any large discrepancies across the characteristics of parents of brides and grooms (refer to Table 8 in Appendix B).

The theoretical model predicts that gender asymmetries are important determinants of the different motives for dowry payments. The table below lists summary statistics on variables which

[39]Because it is always the case that brides join the household of the groom upon marriage, the income of the bride's parents is not available in the data as only the groom's household, where the bride lives, is surveyed. However information on each woman's parents' education, occupation, and geographical location is known. We subsequently estimated the household income for all households in the entire sample of the data (3000 households once eliminating those with household heads and their spouses of an unreasonably young age to be parents of an adult child) using education, occupation, and geographical location of the household head and his spouse as the determinants of income. Coefficients from this estimation were used to form the predicted values of a bride's parents' annual income.

[40]Women are more likely to work on family farms than in businesses. Although women are less likely to engage in work outside of the household compared to men, their average hours per week are slightly higher when total hours include household work.

[41]Weekly individual income of the bride and groom are only their earnings from wage labor and are conditional on them working outside of the home. These earnings include cash and in kind payments. All income variables are in 1991 rupees.

[42]Annual household incomes include revenue from a family farm or enterprise in addition to total wage income from all family members.

represent male and female inequality.[43] The variables which pertain directly to the conjectures of Section 4, are the relative heterogeneity in quality between grooms and brides. To reflect quality, the relative heterogeneity in both years of education and weekly earnings is calculated.[44]

Variable	**Urban**	**Rural**
Relative educ. heterogeneity	0.615 (1.306)	2.055 (1.59)
Stan. dev. male education	4.53 (0.9)	4.0 (1.12)
Stan. dev. female education	3.92 (1.4)	1.96 (1.59)
Avg. male education	6.44 (2.60)	4.05 (2.11)
Avg. female education	4.10 (2.83)	1.17 (1.33)
Relative earnings heterogeneity	253.53 (296.66)	158.35 (91.78)
Stan. dev. male earnings	311.25 (324)	179.4 (85.3)
Stan. dev. female earnings	57.72 (68)	21.1 (28.8)
Avg. male earnings	246.28 (214.25)	152.88 (93.55)
Avg. female earnings	19.96 (27.38)	9.68 (16.26)
Number of observations	150	150

Table 3 - Gender differences

The relative degree of heterogeneity in education is computed as the standard deviation of years of education of females subtracted from the standard deviation of years of education of males in the area. The standard deviations and average levels are equal to zero if no individuals have completed any education in the area. The relative degree of heterogeneity in earnings is computed in an analogous way. We see from Table 3 that the relative heterogeneity of male and female education is higher in rural areas, reflecting more equality in education between men and women in urban areas. The opposite holds true for earnings, where there is much greater inequality between men and women in urban areas. If we consider the standard deviations alone, we see that the means of those in the urban areas are almost double those in rural areas with the exception of male education where the mean is almost equal across the areas. The main estimations use the variables above to capture the relative degree of heterogeneity of potential grooms and brides. A more suitable measure would be the coefficient of variation, however, this cannot be computed accurately because of the number of zeros in the data for the average levels. Nevertheless, this measure is included in one version of the regression results reported in Section 6.3.

[43] These variables are computed by taking averages across geographic regions from the entire LSMS sample (36,000 individuals). This procedure produces 303 possible values corresponding to the different sampling locations (151 rural areas and 152 urban areas). We are implicitly assuming that a sampling unit reflects a potential marriage market.

[44] The sample of men and women are of comparable ages to those in the dowry sample; between 20 and 40 for men and between 15 and 35 for women.

6.2. Estimation

The theoretical analysis provides testable implications (Conjectures 1 and 2) for the two roles of dowry. The value of dowry, denoted D, is represented by the following equation:

$$D = \beta_D X_D + \varepsilon_D \tag{6.1}$$

The vector X_D contains variables which pertain to Conjectures 1 and 2. For a given match these include: the determinants of groom and bride quality, and in particular groom quality relative to other grooms and bride quality relative to other brides. A measure of groom and bride relative heterogeneity is also included.

6.2.1. Sample Selection

Before estimating equation (6.1), there are sample selection issues to address. In particular, as noted in the previous section, there are two selection processes which affect the sample of women who paid a dowry: first, not all women eligible for the dowry question responded, and second, some who did respond did not pay a dowry.

The latter selection rule, the probability that a dowry is paid, is represented by the following:

$$P = \beta_P X_P + \varepsilon_P \tag{6.2}$$

where P is equal to one if a dowry is paid and equal to zero otherwise. The vector X_P contains the variables pertaining directly to Conjectures 1 and 2, which the model predicts should affect dowry payments. Although the matching model does not explain the existence of dowries in lieu of other marriage transfers it does suggest when dowries are more likely to be positive. Ethnic dummy variables are used to identify this selection rule into the dowry sample.[45] The included categories are the Punjabis (56% of the sample), Pakhtuns (15% of the sample), and Baloch (7% of the sample). Typically the custom of dowry is found in stratified societies, whereas, bride-price is usually found in societies which are relatively homogeneous, egalitarian, and tribal. There is a very low occurrence of the dowry custom amongst the Baloch (46%) compared to the other ethnic groups (Punjabis (91%), Pakhtuns (86%), and Sindhis (94%)). This data does not contain information on bride-prices but other evidence suggests that bride-price is instead the traditional social custom among the Baloch (see, for example Pastner 1981). The Baloch are a tribal population who are

[45]When an alternative tobit estimation was run on the value of dowry, with these variables included, they did not play a prominent role and the main results from the empirical analysis to follow were unaltered. Religious affiliation does not enter into the estimation because almost all individuals in the sample are Muslim.

typically pastoral nomadic. In contrast to the other societies, lineages play a minimal role and marriage patterns embody substantial flexibility (see, Blood 1995). These customs go against the typical dowry paying society.[46]

The response rate to the dowry question is represented by:

$$R = \beta_R X_R + \varepsilon_R \tag{6.3}$$

where R is an index function such that $R = 1$ if an eligible women did respond to the dowry question and $R = 0$ otherwise. It is most plausible that women did not respond to the dowry question principally because of confusion with respect to the eligibility criteria. Women were asked to respond to the dowry question only if they had married within the past five years. As a result, it is likely that women who married recently answered the question but those who married earlier, but were eligible, did not. In essence, the selection process excludes some women who married earlier. The year each female married is used to identify this selection rule into the dowry sample, i.e., the probability that an eligible woman answered the dowry question.

Since the aim is to investigate the role of dowry payments in present-day Pakistan, the omission of women who married earlier from the sample should not bias the estimates. It may be the case, however, that women did not respond to the dowry question because their parents did not give a dowry. If this is true then the two selection processes, (6.2) and (6.3), are not independent. However, a bivariate probit estimation with sample selection reveals that there is no significant correlation between these two processes. The analysis therefore proceeds assuming that these two selection processes are independent.

The estimation of the value of dowry will account for both of the above sampling issues, that is, whether women responded to the dowry question and whether they in fact paid a dowry. To this end, the standard Heckman two-step approach is used, where inverse Mills' ratios from probit estimations of the response rate, equation (6.3), and the probability of paying a dowry, equation (6.2), are computed and used as regressors in the estimation of the value of dowry. This procedure follows the technique developed in Behrman, Wolfe, and Tunali (1981) and is a special case of the more general structure developed in Tunali (1986) which formally addresses a model of double-selection when selection into the second subsample is conditional on the first selection rule. In

[46]By contrast, the Punjabis form a stratified society which is typically divided into *qaums*. These *qaums* are based on occupational specialization which gives each group its name and position in the social hierarchy. Pakhtuns, on the other hand, are also a tribal society organized into segmentary clans. The left out category forms an ethnically diverse group which is typically educated and resides in the province of Sindh. See, Blood (1995) and Wilber (1964) for descriptions of these different ethnic groups which are primarily concentrated in their home provinces.

other words, $P = 1$ if and only if , $R = 1$.

6.2.2. Endogeneity

In the theoretical model, education, which reflects the quality of a potential spouse at the time of marriage, is a main determinant of dowries. However, as discussed, it is easily argued that this is an endogenous variable. Parents of girls plausibly must decide, when their daughters are young, whether to invest more in their daughter's education, or save for her dowry. These variables are then simultaneously determined, although the investment in education occurs prior to the transfer of dowry. Similarly, parents of boys may take into account the potential marriage market returns when investing in their son's education. To address these problems of endogeneity, regressions in which the education of brides and grooms are the dependent variables are run prior to the dowry estimations. The predicted values from these regressions then enter into the estimation of the value of dowry. The education of brides and grooms are represented respectively by the following:

$$E_b = \beta_{E_b} X_{E_b} + \varepsilon_{E_b} \tag{6.4}$$

$$E_g = \beta_{E_g} X_{E_g} + \varepsilon_{E_g} \tag{6.5}$$

The vectors X_{E_b} and X_{E_g} contain personal characteristics of their parents, and also the proximity to schools in the individual's area of origin. This latter variable is used to identify the education effect in other estimations. Presumably, parents are more likely to educate their children in areas where schools are easily available.

As a result of the above discussion, the main estimating equation of (6.1) is better represented by:

$$D = \alpha_0 X_D + \alpha_1 \widehat{E_b} + \alpha_2 \widehat{E_g} + \alpha_3 \lambda_R + \alpha_4 \lambda_P + \varepsilon_D \tag{6.6}$$

where λ_R and λ_P are the inverse Mills' ratios from the estimations of equations (6.3) and (6.2) respectively; and $\widehat{E_b}$ and $\widehat{E_g}$ are the respective predicted values from the estimations of (6.4) and (6.5).

6.3. Results

The results from the first stage estimations of (6.2), (6.3), (6.4), and (6.5) are listed in Appendix B. The results from the regressions on the value of dowry, equation (6.6), are listed in Tables 4 (a and b) and 5 (a and b) below for urban and rural samples respectively. The central components of the estimations are characteristics which pertain to the determinants of dowries in Conjectures 1 and

2. These include the quality of the bride and groom, which is represented by their education and income. Not only are the individual traits potentially important in absolute terms, but the theoretical model suggests that their relative quality affects dowry payments. Because the correlation between the absolute and relative values of these variables is very high, they enter into separate estimations. Conjectures 1 and 2 place predictions on the relative groom and bride heterogeneity in quality which is captured by the variables described in Table 3 in Section 6.1.

Variable	**(1)**	**(2)**	**(3)**
Bride's earnings	57.5 (22.4)***	67.5 (24.1)***	70.8 (24.1)***
Bride's education	2448.57 (1132.68)**	2542.85 (1347.45)*	2715.96 (1331.00)**
Groom's earnings	24.3 (10.0)***	26.2 (12.3)**	20.5 (11.0)*
Groom's education	2925.52 (957.48)***	2889.47 (1082.41)***	2531.48 (1099.27)**
Bride's parents' inc	-0.011 (0.19)	-0.10 (0.20)	-0.19 (0.19)
(Bride's parents' inc)^2	7.40e-7 (9.27e-7)	1.07e-6 (9.21e-7)	1.32e-6(8.98e-7)
Groom's parents' inc	0.20 (0.06)***	0.14 (0.07)**	0.13 (0.07)**
(Groom's parents' inc)^2	-3.31e-7 (1.18e-7)	-1.9e-7 (1.5e-7)	-1.88e-7 (1.43e-7)
Educ. Heterogeneity			-2458.31 (1294.79)*
Pay Heterogeneity			23.38 (12.96)*
Inv. Mill's Ratio λ_P		-11561.35 (36630.61)	3520.53 (43453.43)
Inv. Mill's Ratio λ_R		14495.47 (10449.43)	14646.98 (10031.47)
Constant	-17117.02 (102221.48)*	-7444.13 (18115.76)	1584.82 (17912.42)
Observations	285	285	285
$\overline{R}^2$	0.35	0.36	0.39

Table 4a - Estimation of the value of dowry for the urban sample[47]

The first two columns in the above table compare a basic regression, with only bride and groom characteristics as regressors, with and without sample selection. We see that the main results do not substantially differ. In general bride and groom quality are positively related to the value of dowry. The third column includes a measure of relative heterogeneity in quality. This determinant of dowries is explored more fully in the subsequent table.

[47]Robust standard errors, using the Huber/White/sandwich estimator of variance, are in parentheses. Bride and groom's education are assumed endogenous. The method of two-stage least squares is used where the $\overline{R}^2$ of the instrumenting equations are 0.37 and 0.24 respectively. A single asterix denotes significance at the 10% level, double for 5%, and triple for 1%.

Variable	(1)	(2)	(3)	(4)
Bride's earnings Brides's pay - avg	73.4 (24.7)***	70.8 (27.0)***	66.3 (19.8)***	69.5 (24.7)***
Bride's education Bride's educ. - avg	1798.66 (1392.46)	1655.21 (1380.91)	2100.07 (1322.94)	1547.5 (1389.5)
Groom's earnings Groom's pay - avg	22.2 (11.4)**	20.9 (10.4)**	27.6 (12.0)**	21.8 (11.3)**
Groom's education Groom's educ. - avg	2119.7 (1144.5)*	2183.2 (1129.5)**	2655.5 (1067.5)***	1985.6 (1097.2)*
Bride parents inc	-0.11 (0.19)	-0.18 (0.19)	-0.20 (0.20)	-0.10 (0.19)
(Bride parent inc)^2	9.94e-7 (8.7e-7)	1.31e-6 (8.87e-7)	1.34e-6 (8.78e-7)	1.02e-6 (8.8e-7)
Groom parent inc	0.10 (0.07)	0.09 (0.07)	0.15 (0.07)**	0.10 (0.06)
(Groom parent inc)^2	-1.17e-7 (1.41e-7)	-1.13e-7 (1.46e-7)	-1.85e-7 (1.47e-7)	-1.2e-7 (1.4e-7)
Educ. Heterogeneity	1501.37 (1932.88)			1580.5 (1926.7)
Pay Heterogeneity	36.47 (18.60)**			35.7 (18.4)**
Avg. male pay	-36.38 (32.82)	-26.58 (30.91)		-13.4 (29.3)
Avg. female pay	14.40 (100.49)	-174.71 (261.13)		87.0 (98.2)
Avg. male educ.	-760.6 (1170.3)	-1340.1 (1257.8)		1276.3 (1243.9)
Avg. female educ.	3811.2 (1508.0)**	3357.9 (1508.6)**		5383.1 (1801.5)***
Stan. dev. male pay		31.43 (18.08)*		
Stan. dev. fem. pay		44.06 (120.62)		
Stan. dev. male educ		4244.02 (2804.20)		
Stan. dev. fem. educ		458.66 (1942.10)		
Coeff. var. male educ.			-2308.60 (5563.47)	
Coeff. var. fem. educ.			-5239.3 (1780.6)***	
Coeff. var. male pay			11687.5 (3718.0)***	
Coeff. var. female pay			-1005.51 (1072.22)	
Inv. Mill's Ratio λ_P	-4708.28 (45402.98)	6116.74 (46110.31)	-57698.79 (39083.38)	8851.4 (42438.2)
Inv. Mill's Ratio λ_R	13168.28 (9763.87)	16126.44 (10170.54)	15671.26 (9810.94)	13195.4 (9759.5)
Constant	-6487.01 (17697.45)	-13439.66 (188225.19)	-17196.97 (20301.92)	-1968.2 (16702.0)
Observations	285	285	285	285
$\overline{R}^2$	0.41	0.42	0.40	0.42

Table 4b - Estimation of the value of dowry for the urban sample

All four of the above estimations show that groom and bride quality are important positive determinants of the value of dowry paid in urban areas.[48] This result is reflected in both the earnings and education of brides and grooms in absolute terms and in relative terms (Column 4). However, the positive effect of brides education becomes insignificant when we include the average level of female education in the area. The relative heterogeneity in earnings is a positive

[48]It could be argued that grooms' household income is an endogenous determinant of dowry payments, given that dowries amount to roughly 35% of that income. However, the main results of this section ensue if instead total food expenditures enter into the estimations.

and significant determinant of dowries. We see from the results in Column 2 that this is driven by the standard deviation of male earnings. The importance of the quality of the grooms and brides, together with the positive significance of relative heterogeneity in earnings provides support for the groom-price role of dowry payments in urban areas, given Conjecture 2. This model is further supported by the results listed in Column 3 where the coefficient of variation for male earnings enters positively and the coefficient of variation for female education enters negatively into the estimation. Recall from Table 4 that heterogeneity is highest amongst male earnings compared to education levels whereas the opposite holds true for females in urban areas.

Similar estimations were run for the different contents of dowry. In particular, it could be argued that dowry as jewelry is more likely to be the property of the bride. The main results from Table 4 (a and b) are more significant for the non-jewelry component of dowry. Thus lending further support for the groom-price model in urban areas. It should be noted, however, that often dowry jewelry does not remain the property of the bride. The groom's household may sell the gold or use it as collateral for loans (see, for example, Heyer 1992 and Srinivas 1984).

Variable	**(1)**	**(2)**	**(3)**
Bride's earnings	-91.1 (42.0)**	-56.0 (31.8)*	-73.4 (37.1)**
Bride's education	3455.5 (1553.8)**	3528.3 (2091.8)*	3774.8 (2131.8)*
Groom's earnings	-6.6 (6.5)	-7.3 (6.8)	-5.8 (6.7)
Groom's education	1829.7 (1243.7)	1988.4 (1328.7)	2339.0 (1369.6)*
Bride's parents' inc	-0.04 (0.18)	0.01 (0.19)	0.01 (0.19)
(Bride's parents' inc)^2	9.34e-7 (1.43e-6)	-1.1e-7 (1.25e-6)	-1.48e-7 (1.3e-6)
Groom's parents' inc	0.19 (0.04)***	0.16 (0.05)***	0.15 (0.05)***
(Groom's parents' inc)^2	-3.57e-7 (7.75e-8)***	-3.1e-7 (8.2e-8)***	-2.80e-7 (8.21e-8)***
Educ. Heterogeneity			-1950.9 (899.7)**
Pay Heterogeneity			-18.22 (18.55)
Inv. Mill's Ratio λ_P		39841.8 (36324.3)	5348.9 (37375.9)
Inv. Mill's Ratio λ_R		12226 (4535.1)***	9511.4 (4569.1)**
Constant	-1176.3 (7988.1)	21253.4 (15776.1)	13175.5 (15837.4)
Observations	247	247	247
$\overline{R}^2$	0.33	0.30	0.31

Table 5a - Estimation of the value of dowry for the rural sample

The first two columns in the above table show that the results do not differ much with and without sample selection. Comparing the results from Tables 4a and 5a, for the rural case, groom and bride quality are not necessarily positive determinants of dowry. The significant positive result for grooms' and brides' education disappears when we include average levels as seen in the table below.

Variable	(1)	(2)	(3)	(4)
Bride's earnings Brides's pay - avg	-77.1 (51.1)	-74.3 (52.6)	-74.6 (50.4)	-90.7 (46.8)
Bride's education Bride's educ. - avg	3291.8 (2110.9)	3291.0 (2077.2)	4208.1 (2343.3)*	-846.2 (1184.7)
Groom's earnings Groom's pay - avg	0.2 (6.8)	0.4 (6.9)	0.38 (6.9)	-3.3 (7.3)
Groom's education Groom's educ. - avg	2143.03 (1420.3)	2089.4 (1445.1)	1040.1 (1237.1)	283.8 (819.0)
Bride parent inc	0.09 (0.18)	0.10 (0.19)	0.06 (0.19)	0.17 (0.19)
(Bride parent inc)^2	-6.9e-7 (1.3e-6)	-7.1e-7 (1.3e-6)	-6.0e-7 (1.4e-6)	4.2 e-7 (1.2 e-6)
Groom parent inc	0.17 (0.05)***	0.16 (0.05)***	0.17 (0.05)***	0.19 (0.06)***
(Groom parent inc)^2	-2.9e-7 (8.0e-8)***	-2.8e-7 (8.0e-8)***	-3.0e-7 (8.1e-8)***	-3.5 e-7 (1.0 e-7)***
Educ. Heterogeneity	881.7 (1112.5)		818.4 (1107.0)	
Pay Heterogeneity	4.9 (23.6)		10.9 (23.6)	
Avg. male pay	-42.9 (19.1)**	-46.6 (19.7)**	-48.4 (19.6)***	
Avg. female pay	112.3 (98.8)	83.0 (158.3)	26.6 (79.8)	
Avg. male educ.	-283.8 (822.9)	-122.6 (896.6)	1048.0 (1264.0)	
Avg. female educ.	5119.3 (1738.5)***	5960.2 (2449.2)**	9036.3 (2789.1)***	
Stan. dev. male educ.		508.5 (1148.5)		
Stan. dev. fem educ.		-1915.9 (2144.9)		
Stan. dev. male pay		12.6 (28.1)		
Stan. dev. fem pay		18.77 (80.0)		
Inv. Mill's Ratio λ_P	920.7 (36828.8)	6832.9 (39548.3)	1902.2 (35831.0)	77782.6 (28872.6)***
Inv. Mill's Ratio λ_R	4260.2 (4747.3)	4412.6 (4738.0)	4861.3 (4725.8)	12460.7 (5381.8)**
Constant	-3677.9 (15850.2)	-806.2 (17374.8)	1449.7 (15210.2)	33248.3 (12020.3)***
Observations	247	247	247	247
$\overline{R}^2$	0.37	0.37	0.37	0.26

Table 5b - Estimation of the value of dowry for the rural sample

The results of columns 1 and 2 in Table 5b show that relative heterogeneity in bride and groom quality is not a significant determinant of dowry payments. In contrast to the urban case, these results for rural dowries do not support the groom-price model of dowries. Most importantly, groom quality is not a significant determinant of dowries and, as seen from the above table, the average level of groom earnings is negatively related to dowry payments. The most significant determinant of rural dowry payments is grooms family income, which appears to be a concave relationship. This result is consistent with the bequest motive for dowry payments, where higher status families, captured by grooms household wealth, transfer higher dowries. In this case, bridal family wealth should also be a positive significant determinant of dowry payments. The insignificance of bridal family wealth could be attributed to the fact that this variable is predicted from the larger sample and not actually observed in the data.

7. Conclusion

This paper makes sense of what had previously been thought of as a disparate set of historical instances of dowry payments: dowry as a pre-mortem inheritance and dowry as a groom-price. It is demonstrated here that simple economic reasoning suggests that in both cases, dowries given by altruistic parents are consistent with assortative matching in the marriage market. The main insight is that dowries as a transfer directly to grooms emerges with increased within status group heterogeneity among men in stratified societies. In this scenario, dowry transfers cannot simultaneously satisfy optimal bequests and assortative matching in the marriage market. When the two motives for dowry transfer come into tension, equilibrium can only be maintained when a second price instrument emerges. This is a simple point, but the connection has not been made before. This notion of increased heterogeneity of men within status groups is consistent with a male biased development process which increases inequality (or alternatively social mobility) within stratified societies, and corresponds to the emergence of dowries as transfers directly to grooms in the historical records.

The model can also be used as a guide for when dowry may begin to transform into a groom-price. The methodology developed is applied to the case of Pakistan. To my knowledge, there have been no direct studies of dowry payments in Pakistan. The key component of the development process highlighted in this paper is relevant for Pakistan, where female formal labour force participation rates are low and modernisation appears to be causing increased heterogeneity within status (or marriageable) groups. The results of the empirical analysis seem to support the groom-price explanation in determining the value of these payments in urban areas, where we would expect the development process to have more of an impact. This finding is consistent with suggestive evidence that the transformation into groom-prices is occurring, particularly in urban areas. As argued earlier, these changes in the dowry phenomenon could be to the detriment of women and the findings of this paper therefore lend support to the growing concern in Pakistan amongst women advocates campaigning for a ban on dowry payments. Unlike India and Bangladesh, where dowries have been prohibited, the Law in Pakistan only limits the payments. The results are less conclusive in rural areas, although the groom-price model seems to be rejected. Rural dowries may still serve as a pre-mortem inheritance.

8. Appendix A

Proof of Proposition 1:

We first establish the necessary conditions which must hold in this positive assortative matching equilibrium for a set of pre-mortem inheritances (denoted by $*$). We then demonstrate that there always exists a set of such pre-mortem transfers which satisfy these necessary conditions.

In any equilibrium, brides must be behaving optimally so that their utility, (2.3), is maximized. Using (2.3), the optimal transfer, τ^{ii}, for $i = l, h$, satisfies the following first order condition:

$$w_1(y^i - \tau^{ii}) = \alpha \tag{8.1}$$

for $i = l, h$. Given concavity and $y^h > y^l$, (8.1) implies that equilibrium transfers must satisfy $\tau^{*hh} > \tau^{*ll}$.

The equilibrium conditions set out in Section 2.2 must also be satisfied. Using participation condition (2.5), brides of rank $i = l, h$ prefer to marry according to rank, rather than not marry at all iff.:

$$w(y^i - \tau^{*ii}) + u(0, q_g^i) + \alpha\tau^{*ii} \geq w(y^i) + \overline{u}(0). \tag{8.2}$$

Similarly, using (2.6), grooms of rank $i = l, h$ prefer to marry according to rank, rather than not marry at all iff.:

$$v(0, q_g^i) + (1-\alpha)\tau^{*ii} \geq \overline{v}(q_g^i). \tag{8.3}$$

Given that $u(0, q_g^i) \geq \overline{u}(0)$ and $v(0, q_g^i) \geq \overline{v}(q_g^i)$, any optimal transfer, $\tau^{*ii} \geq 0$, which satisfies (8.1) also satisfies (8.2) and (8.3) for $i = h, l$.

Using the stability condition (2.7), brides prefer to match according to rank, if:

$$w(y^l - \tau^{*ll}) + u(0, q_g^l) + \alpha\tau^{*ll} \geq w(y^l - \tau^{*hh}) + u(0, q_g^h) + \alpha\tau^{*hh} \tag{8.4}$$

$$w(y^h - \tau^{*hh}) + u(0, q_g^h) + \alpha\tau^{*hh} \geq w(y^h - \tau^{*ll}) + u(0, q_g^l) + \alpha\tau^{*ll}. \tag{8.5}$$

Conditions (8.4) and (8.5) yield:

$$w(y^l - \tau^{*ll}) - w(y^l - \tau^{*hh}) \geq w(y^h - \tau^{*ll}) - w(y^h - \tau^{*hh}) \tag{8.6}$$

Given concavity, (8.6) is always satisfied for $\tau^{*hh} > \tau^{*ll}$ which satisfies (8.1) for $i = l, h$.

This positive assortative matching equilibrium, with $\tau^{*hh} > \tau^{*ll} \geq 0$, exists if there does not exist a worthwhile deviation with either different pre-mortem inheritances, positive groom-price payments, or brides and grooms preferring to marry out of rank.

First note that since brides are offering their optimal transfers, such that (8.1) is satisfied, they cannot do better by offering different transfers and remaining in the same marriage match. Given preferences, represented by (2.3), brides of rank h do not find it worthwhile to offer τ^{*hh} to a lower quality groom, q_g^l, instead. On the other hand, brides of rank l would prefer to match with higher quality grooms, q_g^h, and transfer τ^{*ll}. However, given preferences, represented by (2.4), grooms of rank h, would not prefer to marry a bride receiving $\tau^{*ll} < \tau^{*hh}$.

Now consider a possible deviation from a bride with a positive groom-price. First note that, given (2.3), brides of rank i are never better off by offering a positive groom-price and a lower transfer, τ, to a given groom of rank j for $j \leq i$. On the other hand, for brides of rank l, consider a worthwhile deviation to a groom of rank h with a positive groom price, $\widetilde{d} > 0$, and a corresponding $\widetilde{\tau}$. Such a deviation must satisfy:

$$w(y^l - \widetilde{d} - \widetilde{\tau}) + u(0, q_g^h) + \alpha\widetilde{\tau} \geq w(y^l - \tau^{*ll}) + u(0, q_g^l) + \alpha\tau^{*ll} \tag{8.7}$$

Using (2.3), the optimal $\widetilde{d}$ and $\widetilde{\tau}$ a bride of rank l is willing to transfer satisfies the following first order condition:

$$w_1(y^l - \widetilde{\tau} - \widetilde{d}) = \alpha. \tag{8.8}$$

We restrict ourselves to showing that transfers satisfying (8.8) are not preferred to the equilibrium transfers. This is sufficient because any transfers which are even worse will also not be preferred. Using (8.1), for $i = l$, and (8.8), $\widetilde{\tau} + \widetilde{d} = \tau^{*ll}$, which implies that (8.7) yields:

$$u(0, q_g^h) - u(0, q_g^l) \geq \alpha\widetilde{d} \tag{8.9}$$

Using (2.4), grooms will accept this deviation iff.

$$\widetilde{d} + (1-\alpha)\widetilde{\tau} \geq (1-\alpha)\tau^{*hh} \tag{8.10}$$

which yields:

$$\alpha\widetilde{d} \geq (1-\alpha)(\tau^{*hh} - \tau^{*ll}) \tag{8.11}$$

Using (8.1), $y^h - \tau^{*hh} = y^l - \tau^{*ll}$, which implies that (8.11) is equivalent to:

$$\alpha\widetilde{d} \geq (1-\alpha)(y^h - y^l). \tag{8.12}$$

Using (8.9) and (8.12), this deviation exists iff.:

$$(1-\alpha)(y^h - y^l) \leq u(0, q_g^h) - u(0, q_g^l)$$

which never holds given Assumption 1. ■

Proof of Proposition 2:

Proof of existence:

We first show that a set of transfers, $\left\{\left(\tau^{*hh+}, d^{*hh+}\right), \left(\tau^{*hh}, d^{*hh}\right), \left(\tau^{*l}, d^{*l}\right)\right\}$, corresponding to the stated marriage pattern and satisfying the equilibrium conditions can be found, and then demonstrate that equilibria with other matching patterns, or without marriage transfers, cannot exist. Using (2.3), an optimal transfer, τ^{ij}, given equilibrium groom-prices, d^{ij}, satisfies the following first order condition:

$$w_1(y^i - \tau^{ij} - d^{ij}) = \alpha \tag{8.13}$$

for $i = l, h$ and $j \in \{l, h, h+\}$. Using the stability condition (2.7), brides of rank h prefer to match according to rank, iff.:

$$\begin{aligned} w(y^h - \tau^{*hh} - d^{*hh}) + u(0, q_g^h) + \alpha\tau^{*hh} &\geq w(y^h - \tau^{*hh+} - d^{*hh+}) + u(0, q_g^{h+}) + \alpha\tau^{*hh+} \\ w(y^h - \tau^{*hh+} - d^{*hh+}) + u(0, q_g^{h+}) + \alpha\tau^{*hh+} &\geq w(y^h - \tau^{*hh} - d^{*hh}) + u(0, q_g^h) + \alpha\tau^{*hh} \end{aligned}$$

These inequalities imply:

$$w(y^h - \tau^{*hh+} - d^{*hh+}) + u(0, q_g^{h+}) + \alpha\tau^{*hh+} = w(y^h - \tau^{*hh} - d^{*hh}) + u(0, q_g^h) + \alpha\tau^{*hh} \quad (8.14)$$

We see from (8.13), that if $\tau^{hj} > \tau^{hk}$, then $d^{hj} < d^{hk}$, for $j, k \in \{h, h+\}$. It thus follows that the only orderings of groom-prices and transfers which are consistent with both equilibrium conditions, (8.13) and (8.14), are as follows: $d^{hh+} > d^{hh}$ and $\tau^{hh+} < \tau^{hh}$.

Using the stability condition (2.7), brides prefer to match according to rank, iff:

$$w(y^l - \tau^{*ll} - d^{*ll}) + u(0, q_g^l) + \alpha\tau^{*ll} \geq w(y^l - \tau^{*hj} - d^{*hj}) + u(0, q_g^j) + \alpha\tau^{*hj} \quad (8.15)$$

$$w(y^h - \tau^{*hj} - d^{*hj}) + u(0, q_g^j) + \alpha\tau^{*hj} \geq w(y^h - \tau^{*ll} - d^{*ll}) + u(0, q_g^l) + \alpha\tau^{*ll}. \quad (8.16)$$

for $j \in \{h, h+\}$. Conditions (8.15) and (8.16) yield:

$$w(y^l - \tau^{*ll} - d^{*ll}) - w(y^l - \tau^{*hj} - d^{*hj}) \geq w(y^h - \tau^{*ll} - d^{*ll}) - w(y^h - \tau^{*hj} - d^{*hj}) \quad (8.17)$$

Given concavity, and that $y^h > y^l$, (8.17) is always satisfied for $\tau^{*hj} + d^{*hj} > d^{*ll} + \tau^{*ll}$, where $j \in \{h, h+\}$. Therefore for any $\tau^{*hj} + d^{*hj} > d^{*ll} + \tau^{*ll}$, for $j \in \{h, h+\}$, which satisfies (8.13) also satisfies equilibrium condition (8.17).

Using participation conditions (2.5) and (2.6), brides and grooms prefer to marry according to rank, rather than not marry at all iff:

$$w(y^i - \tau^{*ii} - d^{*ii}) + u(0, q_g^i) + \alpha\tau^{*ii} \geq w(y^i) + \overline{u}(0) \quad (8.18)$$

$$d^{*ii} + v(0, q_g^i) + (1 - \alpha)\tau^{*ii} \geq \overline{v}(q_g^i) \quad (8.19)$$

for $i = l, h$ and:

$$w(y^h - \tau^{*hh+} - d^{*hh+}) + u(0, q_g^{h+}) + \alpha\tau^{*hh+} \geq w(y^h) + \overline{u}(0) \quad (8.20)$$

$$d^{*hh+} + v(0, q_g^{h+}) + (1 - \alpha)\tau^{*hh+} \geq \overline{v}(q_g^{h+}) \quad (8.21)$$

Given that $u(0, q_g^i) \geq \overline{u}(0)$ and $v(0, q_g^i) \geq \overline{v}(q_g^i)$, for $i \in \{l, h, h+\}$,any transfer, $\tau^{*ij} \geq 0$, for a given $d^{*ij} \geq 0$, for $i = l, h$ and $j \in \{l, h, h+\}$, which satisfies (8.13) also satisfies (8.18) through to (8.21).

Thus, a set of transfers can be found under which necessary conditions for an equilibrium simultaneously hold. In addition, it is necessary that there does not exist a worthwhile deviation where either groom-price or inheritance transfers follow a different ordering, or brides and grooms prefer to marry out of rank. In considering deviations, we restrict attention only to those that are not dominated by other deviations; for if a deviation which strictly dominates another one can be shown to not be worthwhile, then the dominated one is also not worthwhile.

First note that, given equilibrium condition (8.14), brides of rank i, where $i = h, l$, are better off only if they can offer a lower d to a groom of rank j for $j \leq i$. Given preferences, grooms might accept a lower d as long as τ increases accordingly. In particular, given (2.4), τ must increase more than the absolute fall in d, so that the total transfer at marriage is higher than the total equilibrium transfer. However, as we see from condition (8.13), under the best possible deviations, the sum of deviation transfers and dowries, $\widetilde{\tau} + \widetilde{d}$, must equal the equilibrium set of transfers. Therefore if $\widetilde{\tau}$ is higher than in equilibrium, then necessarily $\widetilde{d}$ is lower by the same absolute amount, so that grooms never accept this deviation.

Now consider a possible deviation, $\widetilde{d}$ and a corresponding $\widetilde{\tau}$, from a bride of rank l to a groom of rank j, for $j \in \{h, h+\}$. Such a deviation must satisfy:

$$w(y^l - \widetilde{d} - \widetilde{\tau}) + u(0, q_g^j) + \alpha\widetilde{\tau} \geq w(y^l - d^{*ll} - \tau^{*ll}) + u(0, q_g^l) + \alpha\tau^{*ll}. \tag{8.22}$$

Using (8.13), non-dominated deviation transfers, $\widetilde{d}$ and $\widetilde{\tau}$, that a bride of rank l is willing to transfer satisfies $\widetilde{\tau} + \widetilde{d} = \tau^{*ll} + d^{*ll}$, which implies that (8.22) yields:

$$u(0, q_g^j) - u(0, q_g^l) \geq \alpha(\widetilde{d} - d^{*ll}) \tag{8.23}$$

for $j \in \{h, h+\}$. Using (2.4), grooms will accept this deviation iff.

$$\widetilde{d} + (1 - \alpha)\widetilde{\tau} \geq d^{*hj} + (1 - \alpha)\tau^{*hj} \tag{8.24}$$

for $j \in \{h, h+\}$. Using that $\widetilde{\tau} + \widetilde{d} = \tau^{*ll} + d^{*ll}$, inequality (8.24) yields:

$$\widetilde{d} + (1 - \alpha)(\tau^{*ll} + d^{*ll} - \widetilde{d}) \geq d^{*hj} + (1 - \alpha)\tau^{*hj} \tag{8.25}$$

which can be rewritten as:

$$\alpha(\widetilde{d} - d^{*ll}) \geq d^{*hj} - d^{*ll} + (1 - \alpha)(\tau^{*hj} - \tau^{*ll}) \tag{8.26}$$

Using (8.13), $y^h - \tau^{*hj} - d^{*hj} = y^l - \tau^{*ll} - d^{*ll}$, hence $(1 - \alpha)(y^h - y^l) = (1 - \alpha)(d^{*hj} - d^{*ll}) + (1 - \alpha)(\tau^{*hj} - \tau^{*ll})$. Given this, inequality (8.26) necessarily implies:

$$\alpha(\widetilde{d} - d^{*ll}) > (1 - \alpha)(y^h - y^l) \tag{8.27}$$

Using (8.23) and (8.27), a deviation satisfying these conditions can exist iff.:

$$(1 - \alpha)(y^h - y^l) \leq u(0, q_g^h) - u(0, q_g^l)$$

which contradicts Assumption 1.

Proof of uniqueness:

We now demonstrate that equilibria with alternative matching patterns, where brides and grooms do not marry according to rank, or equilibria with no groom-prices, do not exist. Consider first an equilibrium where no transfers occur. Using the stability condition (2.7) for brides of rank h, brides prefer to match according to rank, iff:

$$w(y^h) + u(0, q_g^j) \geq w(y^h) + u(0, q_g^k) \tag{8.28}$$

for all $j, k \in \{h, h+\}$. Inequality (8.28) yields:

$$w(y^h) + u(0, q_g^h) = w(y^h) + u(0, q_g^{h+}). \tag{8.29}$$

But inequality (8.29) can never hold as $q_g^h < q_g^{h+}$.

Consider an equilibrium without groom-prices for either rank h or $h+$. Using the stability condition, (2.7), brides prefer to match according to rank iff:

$$w(y^h - \tau^{hh}) + u(0, q_g^h) + \alpha\tau^{hh} \geq w(y^h - \tau^{hh+}) + u(0, q_g^{h+}) + \alpha\tau^{hh+}$$

$$w(y^h - \tau^{hh+}) + u(0, q_g^{h+}) + \alpha\tau^{hh+} \geq w(y^h - \tau^{hh}) + u(0, q_g^h) + \alpha\tau^{hh}$$

These inequalities imply:

$$w(y^h - \tau^{hh}) + u(0, q_g^h) + \alpha\tau^{hh} = w(y^h - \tau^{hh+}) + u(0, q_g^{h+}) + \alpha\tau^{hh+}. \tag{8.30}$$

Using (2.3), any candidate transfers, τ^{hj}, satisfies the following first order condition:

$$w_1(y^h - \tau^{hj}) = \alpha \tag{8.31}$$

for $j \in \{h, h+\}$. The only set of transfers consistent with (8.31) are $\tau^{hh} = \tau^{hh+}$, which can never satisfy (8.30) given that $q_g^h < q_g^{h+}$.

Now consider an equilibrium where brides and grooms do not marry according to rank. Given condition (8.13) for brides, equilibrium transfers satisfy $\tau^{hl} + d^{hl} > \tau^{lj} + d^{lj}$, for $j \in \{h, h+\}$. Given (8.13), any candidate deviation from higher ranked brides to higher ranked grooms, $\widetilde{\tau}^{hj} + \widetilde{d}^{hj}$, must satisfy: $\widetilde{\tau}^{hj} + \widetilde{d}^{hj} = \tau^{hl} + d^{hl}$, for $j \in \{h, h+\}$. Using (2.7), this deviation exists iff.:

$$w(y^h - \widetilde{\tau}^{hj} - \widetilde{d}^{hj}) + u(0, q_g^j) + \alpha\widetilde{\tau}^{hj} > w(y^h - \tau^{hl} - d^{hl}) + u(0, q_g^l) + \alpha\tau^{hl}$$

for $j \in \{h, h+\}$, which implies:

$$u(0, q_g^j) + \alpha\widetilde{\tau}^{hj} > u(0, q_g^l) + \alpha\tau^{hl} \tag{8.32}$$

Grooms j, for $j \in \{h, h+\}$, will accept deviation iff:

$$d^{lj} + (1-\alpha)\tau^{lj} < \widetilde{d}^{hj} + (1-\alpha)\widetilde{\tau}^{hj} \tag{8.33}$$

Given that $\tau^{hl} + d^{hl} = \widetilde{\tau}^{hj} + \widetilde{d}^{hj} > \tau^{lj} + d^{lj}$ and $q_g^j > q_g^l$, for $j \in \{h, h+\}$, there always exists a deviation such that (8.32) and (8.33) are both satisfied. ■

Proof of Corollary 1: From Proposition 2, we know that $d^{*hh+} > d^{*hh}$ and $\tau^{*hh+} < \tau^{*hh}$. ■

Proof of Proposition 3:

Proof of existence:

The proof follows analogously to the proof of Proposition 2. Using the stability condition, (2.7) for brides of rank h, brides prefer to match according to rank, iff:

$$w(y^h - \tau^{*hh} - d^{*hh}) + u(q_b^h, q_g^h) + \alpha\tau^{*hh} = w(y^h - \tau^{*hh+} - d^{*hh+}) + u(q_b^h, q_g^{h+}) + \alpha\tau^{*hh+} \tag{8.34}$$

$$w(y^l - \tau^{*ll} - d^{*ll}) + u(q_b^l, q_g^l) + \alpha\tau^{*ll} \geq w(y^l - \tau^{*hj} - d^{*hj}) + u(q_b^l, q_g^j) + \alpha\tau^{*hj} \tag{8.35}$$

$$w(y^h - \tau^{*hj} - d^{*hj}) + u(q_b^h, q_g^j) + \alpha\tau^{*hj} \geq w(y^h - \tau^{*ll} - d^{*ll}) + u(q_b^h, q_g^l) + \alpha\tau^{*ll}. \tag{8.36}$$

for $j \in \{h, h+\}$. The optimal transfer, τ^{ij}, given equilibrium groom-prices, d^{ij}, satisfies the first order condition (8.13) from Proposition 2, for $i = l, h$ and $j \in \{l, h, h+\}$. As in Proposition 2, the only orderings of groom-prices and transfers which are consistent with both (8.13) and (8.34) are $d^{*hh+} > d^{*hh}$ and $\tau^{*hh+} < \tau^{*hh}$. Conditions (8.35) and (8.36) yield (8.17) from Proposition 2, which is always satisfied for any a set of transfers, $\left\{\left(\tau^{*hh+}, d^{*hh+}\right), \left(\tau^{*hh}, d^{*hh}\right), \left(\tau^{*l}, d^{*l}\right)\right\}$ which satisfy (8.13).

Using participation conditions (2.5) and (2.6), brides and grooms prefer to marry according to rank, rather than not marry at all iff.:

$$w(y^i - \tau^{*ii} - d^{*ii}) + u(q_b^i, q_g^i) + \alpha\tau^{*ii} \geq w(y^i) + \overline{u}(q_b^i) \tag{8.37}$$

$$d^{*ii} + v(q_b^i, q_g^i) + (1-\alpha)\tau^{*ii} \geq \overline{v}(q_g^i) \tag{8.38}$$

for $i = l, h$, and:

$$w(y^h - \tau^{*hh+} - d^{*hh+}) + u(q_b^h, q_g^h) + \alpha\tau^{*hh+} \geq w(y^h) + \overline{u}(q_b^h) \tag{8.39}$$

$$d^{*hh+} + v(q_b^h, q_g^{h+}) + (1-\alpha)\tau^{*hh+} \geq \overline{v}(q_g^{h+}) \tag{8.40}$$

Given that $u(q_b^i, q_g^j) \geq \overline{u}(q_b^i)$ and $v(q_b^i, q_g^j) \geq \overline{v}(q_g^j)$, for $i = l, h$ and $j \in \{l, h, h+\}$, any optimal transfer, $\tau^{*ij} \geq 0$, for a given $d^{*ij} \geq 0$, which satisfies (8.13) also satisfies (8.37) through to (8.40).

Therefore, a set or transfers can be found under which necessary conditions for an equilibrium simultaneously hold. As in Proposition 2, it is also necessary that there does not exist a deviation where either groom-price or inheritance transfers follow a different ordering, or brides and grooms prefer to marry out of rank. First, given equilibrium condition (8.34), brides of rank i, where $i = h, l$, are better off only if they can offer a lower d to a groom of rank j for $j \leq i$. However, as in the proof of Proposition 2, given preferences, grooms never accept such a deviation. Consider instead a possible deviation, $\widetilde{d}$ and a corresponding $\widetilde{\tau}$, from a bride of rank l to a groom of rank j, for $j \in \{h, h+\}$. Such a deviation must satisfy:

$$w(y^l - \widetilde{d} - \widetilde{\tau}) + u(q_b^l, q_g^j) + \alpha\widetilde{\tau} \geq w(y^l - d^{*ll} - \tau^{*ll}) + u(q_b^l, q_g^l) + \alpha\tau^{*ll} \tag{8.41}$$

for $j \in \{h, h+\}$. Using (8.13), $\widetilde{\tau} + \widetilde{d} = \tau^{*ll} + d^{*ll}$ and (8.41) yields:

$$u(q_b^l, q_g^j) - u(q_b^l, q_g^l) \geq \alpha(\widetilde{d} - d^{ll}) \tag{8.42}$$

for $j \in \{h, h+\}$. Using (2.4), grooms will accept this deviation iff.

$$\widetilde{d} + v(q_b^l, q_g^j) + (1-\alpha)\widetilde{\tau} \geq d^{*hj} + v(q_b^h, q_g^j) + (1-\alpha)\tau^{*hj} \tag{8.43}$$

for $j \in \{h, h+\}$. Given that, $\widetilde{\tau} + \widetilde{d} = \tau^{*ll} + d^{*ll}$, inequality (8.43) yields:

$$\alpha(\widetilde{d} - d^{ll}) \geq d^{hj} - d^{ll} + (1-\alpha)(\tau^{hj} - \tau^{ll}) + v(q_b^h, q_g^i) - v(q_b^l, q_g^i) \tag{8.44}$$

Analogous to the proof for Proposition 2, (8.13) and (8.44) imply:

$$\alpha(\widetilde{d} - d^{*ll}) > (1-\alpha)(y^h - y^l) + v(q_b^h, q_g^j) - v(q_b^l, q_g^j) \tag{8.45}$$

for $j \in \{h, h+\}$. Using (8.42) and (8.45), this deviation exists iff.:

$$(1-\alpha)(y^h - y^l) \leq \left[u(q_b^l, q_g^j) - u(q_b^l, q_g^l)\right] - \left[v(q_b^h, q_g^j) - v(q_b^l, q_g^j)\right] \tag{8.46}$$

for $j \in \{h, h+\}$. Inequality (8.46) never holds given Assumption 1.

Proof of uniqueness:

The proof is analogous to that of Proposition 2 where we demonstrate that equilibria with alternative matching patterns, where brides and grooms do not marry according to rank, or equilibria with no groom-prices, do not exist. Consider first an equilibrium where no transfers occur at all. Using the stability condition (2.7) for brides of rank h, an analogous condition to (8.29) must hold:

$$w(y^h) + u(q_b^h, q_g^h) = w(y^h) + u(q_b^h, q_g^{h+}) \tag{8.47}$$

Inequality (8.47) can never hold given $q_g^h < q_g^{h+}$.

Consider an equilibrium where no groom-prices occur for either rank h or $h+$. Using the stability condition, (2.7), an analogous condition to (8.30) must hold:

$$w(y^h - \tau^{hh}) + u(q_b^h, q_g^h) + \alpha\tau^{hh} = w(y^h - \tau^{hh+}) + u(q_b^h, q_g^{h+}) + \alpha\tau^{hh+} \tag{8.48}$$

As in Proposition 2, the only set of transfers consistent with (8.31) are $\tau^{hh} = \tau^{hh+}$, which can never satisfy (8.48) given that $q_g^h < q_g^{h+}$.

Consider an equilibrium where brides and grooms do not marry according to rank. As in Proposition 2, using (2.7) and (8.13), an optimal deviation from h brides, $\widetilde{d}^{hj}$ and $\widetilde{\tau}^{hj}$, exists iff.:

$$u(q_b^h, q_g^j) + \alpha\widetilde{\tau}^{hj} > u(q_b^h, q_g^l) + \alpha\tau^{hl} \tag{8.49}$$

for $j \in \{h, h+\}$. Grooms will accept deviation iff:

$$d^{lj} + v(q_b^l, q_g^j) + (1-\alpha)\tau^{lj} < \widetilde{d}^{hj} + v(q_b^h, q_g^j) + (1-\alpha)\widetilde{\tau}^{hj} \tag{8.50}$$

for $j \in \{h, h+\}$. Given that (8.13) implies $\tau^{hl} + d^{hl} = \widetilde{\tau}^{hj} + \widetilde{d}^{hj} > \tau^{lj} + d^{lj}$ and $q_g^j > q_g^l$, for $j \in \{h, h+\}$, there always exists a deviation such that (8.49) and (8.50) are satisfied. ■

Proof of Corollary 2: Compare equilibrium conditions from Propositions 2 and 3. Let τ^{*hh}, d^{*hh}, τ^{*hh+} and d^{*hh+} solve equilibrium condition (8.14), and τ_*^{hh}, d_*^{hh}, τ_*^{hh+} and d_*^{hh+}solve equilibrium condition (8.34). Given optimality condition (8.13), $\tau^{*hh} + d^{*hh} = \tau^{*hh+} + d^{*hh+}$ and $\tau_*^{hh} + d_*^{hh} = \tau_*^{hh+} + d_*^{hh+}$, conditions (8.14) and (8.34) respectively yield:

$$u(0, q_g^{h+}) - u(0, q_g^h) = \alpha(\tau^{*hh} - \tau^{*hh+}) \tag{8.51}$$

$$u(q_b^h, q_g^{h+}) - u(q_b^h, q_g^h) = \alpha(\tau_*^{hh} - \tau_*^{hh+}) \tag{8.52}$$

Given complementarity, $u(q_b^h, q_g^{h+}) - u(q_b^h, q_g^h) > u(0, q_g^{h+}) - u(0, q_g^h)$, conditions (8.51) and (8.52) imply that:

$$\tau_*^{hh} - \tau_*^{hh+} > \tau^{*hh} - \tau^{*hh+} \tag{8.53}$$

Using (8.13), this implies that:

$$d_*^{hh+} - d_*^{hh} > d^{*hh+} - d^{*hh} \tag{8.54}$$

Given that τ^{*hh} and d^{*hh} satisfy condition (8.15) and τ_*^{hh} and d_*^{hh} satisfy (8.35), complementarity, $u(q_b^l, q_g^h) - u(q_b^l, q_g^l) > u(0, q_g^h) - u(0, q_g^l)$, and (8.13) yield $\tau^{*hh} > \tau_*^{hh}$ and $d_*^{hh} > d^{*hh}$. Using (8.53) and (8.54), this implies that $\tau^{*hh+} > \tau_*^{hh+}$ and $d_*^{hh+} > d^{*hh+}$. ■

Proof of Corollary 3: We first establish the necessary conditions which must hold in a positive assortative matching equilibrium for Case 4 in Section 2.3. Using the stability condition (2.7), h and $h+$ brides prefer to match according to rank, iff:

$$w(y^h - \tau^{*hh} - d^{*hh}) + u(q_b^h, q_g^h) + \alpha\tau^{*hh} \geq w(y^h - \tau^{*h+h+} - d^{*h+h+}) + u(q_b^h, q_g^{h+}) + \alpha\tau^{*h+h+} \tag{8.55}$$

$$w(y^h - \tau^{*h+h+} - d^{*h+h+}) + u(q_b^{h+}, q_g^{h+}) + \alpha\tau^{*h+h+} \geq w(y^h - \tau^{*hh} - d^{*hh}) + u(q_b^{h+}, q_g^h) + \alpha\tau^{*hh}. \tag{8.56}$$

Optimality condition (8.13) implies that $\tau^{*hh} + d^{*hh} = \tau^{*h+h+} + d^{*h+h+}$, hence (8.55) and (8.56) yield:

$$u(q_b^h, q_g^{h+}) - u(q_b^h, q_g^h) \leq \alpha(\tau^{*hh} - \tau^{*h+h+}) \leq u(q_b^{h+}, q_g^{h+}) - u(q_b^{h+}, q_g^h) \tag{8.57}$$

Let τ_*^{hh+}, d_*^{hh+}, τ_*^{hh} and d_*^{hh} solve equilibrium condition (8.34) from Proposition 2. Using (8.13),(8.34) implies:

$$\alpha(\tau_*^{hh} - \tau_*^{hh+}) = u(q_b^h, q_g^{h+}) - u(q_b^h, q_g^h) \tag{8.58}$$

Conditions (8.57) and (8.58) imply:

$$\tau_*^{hh} - \tau_*^{hh+} \leq \tau^{*hh} - \tau^{*h+h+} \tag{8.59}$$

Given optimality condition (8.13), $\tau^{*hh} + d^{*hh} = \tau^{*h+h+} + d^{*h+h+} = \tau_*^{hh} + d_*^{hh} = \tau_*^{hh+} + d_*^{hh+}$, then (8.59) yields:

$$d_*^{hh+} - d_*^{hh} \leq d^{*h+h+} - d^{*hh}.$$

■

Proof Proposition 4:

(i) We first establish the necessary conditions which must hold in this positive assortative matching equilibrium with pre-mortem inheritances and no groom-prices. The proof is analogous to that of Proposition 1. Using (2.3), the optimal transfer, τ^{ii}, satisfies the first order condition, (8.1), from Proposition 1, for $i \in \{l, h, h+\}$. Therefore, $\tau^{*hh} = \tau^{*h+h+} > \tau^{*ll}$, given concavity and $y^h > y^l$. Individuals prefer to marry according to rank, rather than not marry at all, iff.:

$$w(y^i - \tau^{*ii}) + u(q_b^i, q_g^i) + \alpha\tau^{*ii} \geq w(y^i) + \overline{u}(q_b^i) \tag{8.60}$$

$$v(0, q_g^i) + (1-\alpha)\tau^{*ii} \geq \overline{v}(q_g^i) \tag{8.61}$$

for $i \in \{l, h, h+\}$. Given that $u(q_g^i, q_b^i) \geq \overline{u}(q_b^i)$ and $v(q_g^i, q_b^i) \geq \overline{v}(q_g^i)$, any optimal transfer, $\tau^{ii} \geq 0$, which satisfies (8.1) also satisfies (8.60) and (8.61) for $i \in \{l, h, h+\}$.

Using the stability condition (2.7), brides prefer to match according to rank iff.:

$$w(y^i - \tau^{*ii}) + u(q_b^i, q_g^i) + \alpha\tau^{*ii} \geq w(y^i - \tau^{*kk}) + u(q_b^i, q_g^k) + \alpha\tau^{*kk} \tag{8.62}$$

$$w(y^k - \tau^{*kk}) + u(q_b^k, q_g^k) + \alpha\tau^{*kk} \geq w(y^k - \tau^{*ii}) + u(q_b^k, q_g^i) + \alpha\tau^{*ii}. \tag{8.63}$$

for $i, k \in \{l, h, h+\}$. Conditions (8.62) and (8.63) yield:

$$\Big[w(y^i - \tau^{*kk}) - w(y^i - \tau^{*ii})\Big] - \Big[w(y^k - \tau^{*kk}) - w(y^k - \tau^{*ii})\Big] \leq \Big[u(q_b^i, q_g^i) + u(q_b^k, q_g^k)\Big] - \Big[u(q_b^i, q_g^k) + u(q_b^k, q_g^i)\Big] \tag{8.64}$$

for $i, k \in \{l, h, h+\}$. Given complementarity and concavity, (8.64) is always satisfied for $\tau^{*ii} > \tau^{*kk}$ which satisfies (8.1) for $i, k \in \{l, h, h+\}$ and $i > k$.

This positive assortative matching equilibrium, with $\tau^{*ii} > \tau^{*kk} \geq 0$, for $i, k \in \{l, h, h+\}$ and $i > k$ exists if there does not exist a worthwhile deviation with either different pre-mortem inheritances, positive groom-price payments, or brides and grooms prefer to marry out of rank. As in Proposition 1, since brides are offering their optimal transfers they cannot do better by offering different transfers. Also, out of rank matching is not possible at these optimal transfers. Brides are also never better off by offering a positive groom-price and a lower pre-mortem inheritance to a groom of lower rank than themselves. Consider then a possible deviation from a bride with a positive groom-price, $\widetilde{d}$, and a corresponding $\widetilde{\tau}$, to a groom of higher rank. Such a deviation is worthwhile iff.:

$$w(y^k - \widetilde{d} - \widetilde{\tau}) + u(q_b^k, q_g^i) + \alpha\widetilde{\tau} \geq w(y^k - \tau^{*kk}) + u(q_b^k, q_g^k) + \alpha\tau^{*kk} \tag{8.65}$$

for $i, k \in \{l, h, h+\}$ and $i > k$. Using (8.1) and (8.8), $\widetilde{d} + \widetilde{\tau} = \tau^{*kk}$, which implies that (8.65) yields:

$$u(q_b^k, q_g^i) - u(q_b^k, q_g^k) \geq \alpha\widetilde{d} \tag{8.66}$$

Using (2.4), grooms will accept this deviation iff.:

$$\widetilde{d} + v(q_b^k, q_g^i) + (1-\alpha)\widetilde{\tau} \geq v(q_b^i, q_g^i) + (1-\alpha)\tau^{*ii} \tag{8.67}$$

for $i, k \in \{l, h, h+\}$ and $i > k$. Given that, $\widetilde{d} + \widetilde{\tau} = \tau^{*kk}$, (8.67) yields:

$$\alpha\widetilde{d} \geq (1-\alpha)(\tau^{*ii} - \tau^{*kk}) + v(q_b^i, q_g^i) - v(q_b^k, q_g^i) \tag{8.68}$$

for $i, k \in \{l, h, h+\}$ and $i > k$. Using (8.1), $y^i - \tau^{*ii} = y^k - \tau^{*kk}$, which implies that (8.68) is equivalent to:

$$\alpha\widetilde{d} \geq (1-\alpha)(y^i - y^k) + v(q_b^i, q_g^i) - v(q_b^k, q_g^i) \tag{8.69}$$

Using (8.66) and (8.69), this deviation exists iff.:

$$(1-\alpha)(y^i - y^k) \leq \Big[u(q_b^k, q_g^i) - u(q_b^k, q_g^k)\Big] - \Big[v(q_b^i, q_g^i) - v(q_b^k, q_g^i)\Big] \tag{8.70}$$

which never holds given Assumption 1 for $k = l$ and $i \in \{h, h+\}$. For $i, k \in \{h, h+\}$, (8.70) implies:

$$\Big[u(q_b^k, q_g^i) - u(q_b^k, q_g^k)\Big] \geq \Big[v(q_b^i, q_g^i) - v(q_b^k, q_g^i)\Big] \tag{8.71}$$

which does not hold for $i > k$, given concavity and under the assumption that $u(\cdot)$ and $v(\cdot)$ are sufficiently similar.

(ii) We first establish the necessary conditions which must hold in this positive assortative matching equilibrium with no transfers. Brides and grooms prefer to marry according to rank, rather than not marry at all iff.:

$$w(y^i) + u(q_b^i, q_g^i) \geq w(y^i) + \overline{u}(q_b^i). \tag{8.72}$$

$$v(q_b^i, q_g^i) \geq \overline{v}(q_g^i). \tag{8.73}$$

for $i \in \{l, h, h+\}$. Given that $u(q_b^i, q_g^i) \geq \overline{u}(q_b^i)$ and $v(q_b^i, q_g^i) \geq \overline{v}(q_g^i)$, (8.72) and (8.73) are satisfied.

Using the stability condition (2.7), brides prefer to match according to rank iff.:

$$w(y^i) + u(q_b^i, q_g^i) \geq w(y^i) + u(q_b^i, q_g^k) \tag{8.74}$$

for $i, k \in \{l, h, h+\}$. Similarly, using (2.8), grooms prefer to match according to rank iff.:

$$v(q_b^i, q_g^i) \geq v(q_b^k, q_g^i) \tag{8.75}$$

for $i, k \in \{l, h, h+\}$. Conditions (8.74) and (8.75) are always satisfied for $i > k$.

A positive assortative matching equilibrium with no transfers exists if there does not exist a worthwhile deviation with either positive pre-mortem inheritances or positive groom-price payments. First, it is never optimal for a bride of rank i to offer positive transfers to a groom of rank $k \leq i$. Consider then a possible deviation from a bride of rank k offering positive transfers, $\widetilde{d} \geq 0$ and $\widetilde{\tau} \geq 0$, to a groom of rank i, where $i > k$. From a bride's perspective, such a deviation is worthwhile iff.:

$$w(y^k - \widetilde{d} - \widetilde{\tau}) + u(q_b^k, q_g^i) + \alpha\widetilde{\tau} > w(y^k) + u(q_b^k, q_g^k), \tag{8.76}$$

which yields:

$$u(q_b^k, q_g^i) - u(q_b^k, q_g^k) > w(y^k) - w(y^k - \widetilde{d} - \widetilde{\tau}) - \alpha\widetilde{\tau} \tag{8.77}$$

Using (2.4), grooms will accept this deviation iff.

$$\widetilde{d} + v(q_b^k, q_g^i) + (1-\alpha)\widetilde{\tau} > v(q_b^i, q_g^i) \tag{8.78}$$

which implies:

$$\widetilde{d} + (1-\alpha)\widetilde{\tau} > v(q_b^i, q_g^i) - v(q_b^k, q_g^i) \tag{8.79}$$

Conditions (8.77) and (8.79) are more likely to hold if:

$$u(q_b^k, q_g^i) - u(q_b^k, q_g^k) > v(q_b^i, q_g^i) - v(q_b^k, q_g^i). \tag{8.80}$$

Condition (8.80) does not hold for $i > k$, given concavity, if $u(\cdot)$ and $v(\cdot)$ are sufficiently similar. ■

9. Appendix B

Below lists the results from the first stage estimations of (6.2), (6.3), (6.4), and (6.5).

9.1. Responded to Dowry Question

The results of a probit estimation of (6.3), the probability that an eligible female answered the dowry question, are listed in Table 6 below. Recall that the likely reason for women not to respond to the dowry question is confusion with respect to the eligibility criteria.[49] Women were asked to respond to the dowry question only if they had married within the past five years. As a result, it is likely that women who married recently answered the question but those who married earlier, but were eligible, did not. The year each female married is used to capture this type of confusion. Individual traits of the eligible females may also alter the response rate since it is conceivable, for example, that

[49]The response rate of the general female questionnaire is almost perfect.

less educated women were less likely to understand the eligibility criteria. Ethnic dummy variables (Punjabis, Baloch, Sindhis, Muhajirs) enter into the estimation to proxy for a social custom that may prohibit women from answering the dowry question for fear of embarrassment, or alternatively because confusion with respect to the eligibility criteria was more severe in particular regions.

Variable	**Urban**	**Rural**
Sindhis/Muhajirs	-0.24 (0.08)**	-0.23 (0.065)**
Punjabis	-0.11 (0.07)	0.093 (0.062)
Baloch	-0.25 (0.09)**	-0.16 (0.10)
Household income	-1.01e-7 (2.76e-7)	1.12e-7 (1.88e-7)
Bride's education level	-1.7e-4 (0.006)	0.008 (0.011)
Bride married to head	0.043 (0.048)	0.065 (0.05)
Bride from rural area	0.037 (0.054)	-0.12 (0.11)
Groom's education level	0.011 (0.005)**	0.002 (0.006)
Groom's income	1.8e-5 (1.4e-5)	2.05e-5 (2.04e-5)
Married for one year	-0.057 (0.09)	-0.14 (0.09)
Married for two years	-0.10 (0.09)	-0.11 (0.09)
Married for three years	-0.13 (0.09)	-0.16 (0.09)*
Married for four years	-0.19 (0.09)**	-0.26 (0.08)**
Married for five years	-0.42 (0.08)**	-0.42 (0.07)**
Observations	522	565
$\overline{R}^2$	0.08	0.12

Table 6 - Probit estimation of probability of answering dowry question[50]

The results show that household or individual characteristics of both grooms and brides are insignificant determinants of the response rate, with the exception of grooms' education in urban areas, which is positively related to the response rate. The ethnicity dummies do alter the response rate significantly. From the results, it is clear that years of marriage is a most important determinant of whether a woman responded. The dummy variables representing the number of years married before the survey year (1991) are negatively related to whether a female responded, that is, those females married earlier (i.e., for more years) were less likely to respond to the dowry question, hence providing support for the conjecture that the lack of response was caused by confusion over the eligibility criteria.

9.2. Dowry Paid

The results from a probit estimation of the probability of a bride paying a dowry, equation (6.2), are listed in Table 7 below.

[50]The coefficients reported are the derivatives of the probit function evaluated at the sample means. Robust standard errors are shown in parentheses.

Variable	Urban	Rural
Bride's earnings	6.3e-4 (2.0e-4)	-9.4e-5 (1.4e-4)
Bride's education	0.0053 (0.005)	0.029 (0.023)
Groom's earnings	-1.8e-6 (3.5e-6)	-1.02e-6 (2.3e-5)
Groom's education	0.01 (0.007)***	-0.0029 (0.013)
Bride's parents income	-4.54e-7 (3.7e-7)*	6.7e-8 (1.5e-6)
Groom's parents income	7.94e-8 (1.2e-7)	-5.7e-8 (9.2e-8)
Punjabis	-0.007 (0.015)	-0.08 (0.05)
Pakhtuns	-0.049 (0.05)	-0.10 (0.10)
Baloch	-0.17 (0.12)***	-0.48 (0.27)**
Pay heterogeneity	2.4e-5 (4.4e-5)	-3.4e-4 (3.3e-4)
Educ. heterogeneity	-0.009 (0.009)	-0.034 (0.018)*
Avg. male pay	-9.2e-5 (9.6e-5)	4.0e-5 (2.9e-4)
Avg. female pay	3.7e-4 (3.9e-4)	-8.5e-4 (0.001)
Avg. male educ.	-0.003 (0.003)	0.018 (0.011)
Avg. female educ.	-0.006 (0.006)	-0.01 (0.025)
Average income	5.6e-7 (4.1e-7)**	9.29e-8 (5.14e-7)
Observations	331	340
$\overline{R}^2$	0.30	0.17

Table 7 - Probit estimation of the probability of giving a dowry

No individual and household characteristics are very significant except groom's education which is a positive determinant. In urban areas, the higher the average income level in the area, the more likely a dowry is paid. In general, economic variables do not seem to explain much of the variation in the occurrence of dowries. It is a very high percentage (approximately 87%) of the sample which paid a dowry and hence there is not much variation to explain. However, on the other hand, social customs do seem to play a role. Ethnic variation is an important determinant of whether a dowry was paid at marriage. Being of Baloch ethnicity significantly lowers the probability that a dowry is given. As discussed, it is interesting to note that this result echoes conclusions elsewhere in the literature where dowry payments tend not to occur in societies which are relatively homogeneous, egalitarian, and tribal.

9.3. Bride and Groom's Education

The results from the estimation of brides and grooms' education, equations (6.4) and (6.5), are reported in Table 9 below. The regressors include the distance to the nearest secondary school in the individual's area of origin and personal characteristics of their parents, which are first summarized in the following table.

Variable	Urban	Rural
Bride's mother literate	0.16 (0.37)	0.03 (0.18)
Bride's father literate	0.37 (0.48)	0.21 (0.41)
Bride's father works in agriculture	0.20 (0.40)	0.51 (0.50)
Bride's father from rural area	0.55 (0.50)	0.95 (0.21)
Groom's mother literate	0.12 (0.32)	0.01 (0.09)
Groom's father literate	0.47 (0.50)	0.19 (0.39)
Groom's father works in agriculture	0.14 (0.35)	0.65 (0.48)
Groom's father from rural area	0.54 (0.50)	0.96 (0.18)
Number of observations	358	340

Table 8 - Summary statistics of parents of brides and grooms

Variable	Bride	Groom
Mother is literate	4.57 (0.45)**	4.72 (0.71)**
Father is literate	2.41 (0.31)**	3.34 (0.38)**
Father worked in agriculture	-0.22 (0.28)	-0.32 (0.37)
Father from rural area	-1.45 (0.31)**	-0.0036 (0.42)
Distance to secondary school	-0.069 (0.027)**	-0.13 (0.032)**
Constant	2.74 (0.30)**	4.58 (0.40)**
Observations	667	666
$\overline{R}^2$	0.37	0.24

Table 9 - OLS estimation of brides and grooms' education

As would be expected, a main positive determinant of an individuals education is the education of their parents. The education of brides is also negatively related to their father being from a rural area, this does not hold for grooms. Distance to the nearest secondary school in their area of origin is negatively related to an individual's education.

References

[1] Ahmad, S. (1977) Class and Power in a Punjabi Village. Monthly Review Press, New York.

[2] Ali, A. (1992) Social Stratification among Muslim-Hindu Community, Commonwealth Publishers, New Delhi.

[3] Amin, S. and M. Cain (1995) "The rise of dowry in Bangladesh", in The continuing demographic transition, G. Jones, J. Caldwell, R. Douglas, and R. D'Souza (eds.), Oxford University Press, Oxford.

[4] Anderson, S. (2003) "Why dowry payments declined with modernisation in Europe but are rising in India", Journal of Political Economy, April.

[5] Barber, E. (1955) The Bourgeoisie in 18th Century France. Princeton University Press, Princeton, New Jersey.

[6] Beall, J. (1995) "Social Security and Social Networks among the Urban Poor in Pakistan." Habitat International 19 (December), 427-445.

[7] Becker, G. (1991) A Treatise on the Family, Harvard University Press, Cambridge.

[8] Behrman, J.R. , B. L. Wolfe, and I. Tunali (1981) "Determinants of women's earnings in a developing country: a double selectivity, extended human capital approach", Discussion Paper No. 596-80, Univerisity of Wisconsin, Madison, WI.

[9] Billig, M.S. (1992) "The marriage squeeze and the rise of groom-price in India's Kerala state", Journal of Comparative Family Studies, 23 (2), 197-216.

[10] Bloch, F. and V. Rao (2002) "Terror as a bargaining instrument: Dowry violence in rural India", American Economic Review, 92 (4), 1029-43.

[11] Blood, P. (ed.) (1995) Pakistan: A country study. Federal Research Division, Library of Congress, Washington D.C.

[12] Botticini, M. (1999) "A loveless economy? Intergenerational altruism and the marriage market in a Tuscan town, 1415-1436", Journal of Economic History, 59(1), 104-121.

[13] Botticini, M. and A. Siow (2002) "Why Dowries?", mimeo, Department of Economics, University of Toronto.

[14] Botticini, M. and A. Siow (2003) "Why Dowries?", American Economic Review, 93 (4), 1385-98.

[15] Bradford, N.J. (1985) "From bridewealth to groom-fee: transformed marriage customs and socioeconomic polarisation amongst Lingayats", Contributions to Indian Sociology (n.s.), 19(2), 269-302.

[16] Caldwell, J., P. Reddy, and P. Caldwell (1983) "The causes of marriage change in South Asia". Population Studies, 37(3), 343-361.

[17] Caplan, L. (1984) "Bridegroom price in urban India: class, caste and 'dowry evil' among Christians in Madras". Man (n.s.), 19, 216-233.

[18] Chauhan, R. (1995) Dowry in twentieth century India: a window to the conflict of caste, class, and gender, Ph.D. Dissertation, Department of Sociology, State University of New York at Stony Brook.

[19] Chojancki, S. (2000) Women and Men in Renaissance Venice, Johns Hopkins University Press, Baltimore.

[20] Cox, V. (1995) "The Single Self: Feminist Thought and the Marriage Market in Early Modern Venice", Renaissance Quarterly, 48 (3), 513-581.

[21] Dalmia, S. (2000) "A hedonic analysis of marriage transactions in India", mimeo, Grand Valley State University.

[22] Deolalikar, A. and V. Rao (1998) "The demand for dowries and bride characteristics in marriage: empirical estimates for rural South-Central India", in Gender, population and development, K. Maithreyi, R. Sudershan, and A. Shariff (eds), Oxford University Press, Oxford, 122-140.

[23] Darity, W. and A. Deshpande (2000) "Tracing the Divide: Intergroup Disparity Across Countries." Eastern Economic Journal 26 (Winter), 75-85.

[24] Deshpande, A. (2000) "Does Caste Still Define Disparity? A Look at Inequality in Kerela, India." American Economic Review 90 (May), 322-325.

[25] Dixon, R. (1982) "Mobilizing women for rural employment in South Asia: Issues of class, caste, and patronage". Economic Development and Cultural Change, 30(2), 373-390.

[26] Edlund, L. (2000) "Dowry inflation: A comment", Journal of Political Economy, 108 (6), 1327-33.

[27] Epstein, S. (1973) South India: yesterday, today and tomorrow, Holmes and Meier, New York.

[28] Erickson, A. L. (1993) Women and property in Early Modern England, Routledge, London.

[29] Esteve-Volart, B. (2003) "Dowry in rural Bangladesh: participation as insurance against divorce", mimeo., London School of Economics.

[30] Gale, D. and L. Shapley (1962) "College Admission and the Stability of Marriage", American Mathematical Monthly, 69, 9-15.

[31] Gaulin, S. and J. Boster (1990) "Dowry as female competition", American Anthropologist, 92, 994-1005.

[32] Gies, J. and F. Gies (1972) Merchants and Moneymen: The Commercial Revolution 1000-1500. Thomas Y. Crowell Company, New York.

[33] Goody, J. (2000) The European Family. Blackwell Publishers, Oxford.

[34] Goody, J. and S. Tambiah (1973) Bridewealth and Dowry. Cambridge University Press, Cambridge.

[35] Grossbard-Shechtman, S. (1993) On the economics of marriage: a theory of marriage, labor and divorce. Westview Press, Boulder, Colorado.

[36] Harrell, S. and S. Dickey (1985) "Dowry systems in complex societies". Ethnology, 24(2), 105-120.

[37] Herlihy, D. (1976) "The Medieval Marriage Market" Medieval and Renaissance Studies, 6, 1-27.

[38] Herlihy, D. (1978) The Social History of Italy and Western Europe, 700-1500. Variorum Reprints, London.

[39] Heyer, J. (1992) "The role of dowries and daughters' marriages in the accumulation and distribution of capital in a South Indian community", Journal of International Development, 4 (4), 419-436.

[40] Hooja, S.L. (1969) Dowry System in India: a case study. Asia Press, Delhi.

[41] Hughes, D.O. (1985) "From brideprice to dowry in Mediterranean Europe" in The marriage bargain: women and dowries in European history, M. Kaplan (ed.), Havorth Press, New York, 13-58.

[42] Jackson, G. and A. K. Romney (1973) "Historical inference from cross-cultural data: the case of dowry". Ethos, 1(4), 517-520.

[43] Jayaraman, R. (1981) Caste and Class: Dynamics of Inequality in Indian Society. Hindustan Publishing Co., New Delhi.

[44] Kaplan, M. (ed.) (1985) The marriage bargain: women and dowries in European history, Havorth Press, New York.

[45] Kishwar, M. and R. Vanita (1984) In search of answers. Kali for Women, New Delhi.

[46] Kleimola, A. (1992) ""In Accordance with the Canons of the Holy Apostles": Muscovite Dowries and Women's Property Rights", Russian Review, 51 (2), 204-229.

[47] Klein, H. and R. Nestvogel (1992) Women in Pakistan. Vanguard Books Ltd., Lahore.

[48] Knapp, V. (1976) Europe in the Era of Social Transformation: 1700 - Present, Prentice-Hall, Inc., Englewood Cliffs, New Jersey.

[49] Korson, J. H. (1971) "Endogamous marriage in a traditional Muslim society: West Pakistan". Journal of Comparative Family Studies, Autumn, 145-155.

[50] Krishner, J. (1991) "Materials for a Gilded Cage: Non-Dotal Assets in Florence, 1300-1500" in The family in Italy from Antiquity to Present, D. Kertzer and R. Saller (eds.), Yale University Press, New Haven, 184-207.

[51] Kumari, R. (1989) Brides are not for burning. Dowry victims in India. Radiant Publishers, New Delhi.

[52] Lam, D. (1988) "Assortative matching with household public goods", Journal of Human Resources, 23, 462-487.

[53] Lindenbaum, S. (1981) "Implications for women of changing marriage transactions in Bangladesh", Studies in Family Planning, 12 (11), 394-401.

[54] Lindholm, C. (1985) "Paradigms of Society: A Critique of Theories of Caste among Indian Muslims." Archives Europeenes de Sociologie 26 (January), 131-141.

[55] Lipson, E. (1956) The Economic History of England. Adam and Charles Black, London.

[56] Lopez, R. (1971) The commercial revolution of the Middle Ages 950-1350. Cambridge University Press, New York.

[57] Luzzatto, G. (1961) An Economic History of Italy, Routledge & Kegan Paul, London.

[58] Menski, W. (1998) (ed.) South Asians and the dowry problem, Vistaar Publications, New Delhi.

[59] Miskimin, H. (1969) The Economy of Early Renaissance Europe, 1300-1460. Cambridge University Press, New York.

[60] Molho, A. (ed.) (1969) Social and Economic Foundations of the Italian Renaissance, John Wiley and Sons, Inc., New York.

[61] Nishimura, Y. (1994) "Marriage Payments among the Nagarattars in South India." Contributions to Indian Sociology (n.s.) 28 (June), 243-272.

[62] Pastner, C. (1981) "The negotiations of bilateral endogamy in Middle Eastern context: the Zikri Baluch Example". Journal of Anthropological Research, 37(4), 305-318.

[63] Paul, M. (1986) Dowry and position of women in India: a study of Delhi Metropolis, Inter-India Publications, New Delhi.

[64] Peters, M. and A. Siow (2002) "Competing Premarital Investments", Journal of Political Economy, 110 (3), 592-608.

[65] Quale, C. R. (1988) A History of Marriage Systems, Greenwood Press, New York.

[66] Rao, V. (1993) "The rising price of husbands: a hedonic analysis of dowry increases in rural India", Journal of Political Economy, 101, 666-77.

[67] Rao, V.V.P and V.N. Rao (1980) "The dowry system in Indian marriages: attitudes, expectations and practices", International Journal of Sociology of the Family, Vol. 10 (Jan-June), 99-113.

[68] Reher, D. (1997) Perspectives on the family in Spain, past and present. Clarendon Press, Oxford.

[69] Reimer,E. (1985) 'Women, dowries, and capital investment in thirteenth-century Siena, in The marriage bargain: women and dowries in European history, M. Kaplan (ed.), Havorth Press, New York, 59-79.

[70] Rozario, S. (1992) Purity and communal boundaries: women and social change in a Bangladesh village, Zed Books Ltd, London.

[71] Saller, R. (1984) "Roman Dowry and the Devolution of Property in the Principate." Classical Quarterly 34, 195-205

[72] Sandhu, M. K. (1988) "A Study of Dowry among Working and Non-Working Women." Indian Journal of Social Work 49 (April), 155-164.

[73] Saroja, K. and S. M. Chandrika (1991) "Income and Dowry: Some Revealing Connections." Indian Journal of Social Work 52 (April), 205-213.

[74] Sathar, Z. and S. Kazi (1988) "Choices of Metropolitan Women - Report of a survey in Karachi", Pakistan Institute of Development, Islamabad.

[75] Schaps, D. (1979) Economic Rights of Women in Ancient Greece, Edinburgh University Press, Edinburgh.

[76] Shaw, B. and R. Saller (1984) "Close-Kin Marriage in Roman Society?" Man 19 (September), 432-444.

[77] Singh, K. (1987) "Studies in Occupational Mobility in India." Indian Journal of Social Research (March), 70-96.

[78] Sood, S. (ed.) (1990) Violence against women, Arihant Publishers, Jaipur.

[79] Srinivas, M.N. (1984) Some reflections on dowry, Oxford University Press, New Delhi.

[80] Stone, L. (1977) The Family, Sex, and Marriage in England 1500-1800. Weidenfeld and Nicolson, London.

[81] Stuard, S.M. (1981) "Dowry increase and increments in wealth in medieval Ragusa (Dubrovnik)", Journal of Economic History, Vol. XLI, No. 4, 795-811.

[82] Tertilt, M. (2003) "Polygnyn and Poverty", mimeo, Department of Economics, Stanford University.

[83] Tunali, I (1986) "A general structure for models of double-selection and an application to a joint migration and wage process with remigration", in Ehrenberg, R. (ed.), Research in Labor Economics: A Research Manual, Vol. 8, Part B, JAI Press, Greenwich, CT.

[84] Upadhya, C.B. (1990) "Dowry and women's property in coastal Andhra Pradesh", Contributions to Indian Sociology (n.s.), 24(1), 29-59.

[85] Van Zanden, J. (1995) "Tracing the beginning of the Kuznets Curve: Western Europe during the Early Modern Period", Economic History Review, New Series, 48 (4), 643-664.

[86] Vives, J. (1969) An Economic History of Spain, Princeton University Press, Princeton, New Jersey.

[87] Watts, S. (1984) A Social History of Western Europe 1450-1720. Hutchinson and Co., London.

[88] White, S. (1992) Arguing with the Crocodile: Gender and class in Bangladesh. Zed Books Ltd., London.

[89] Wilber, D. (1964) Pakistan, Hraf Press, New Haven.

[90] Zhang, J. and W. Chan, (1999) "Dowry and wife's welfare: a theoretical and empirical analysis" Journal of Political Economy, 107(4), 786-808.