

*Explaining Marriage Payments in the MHSS Survey:
The Rise of Dowry in Rural Bangladesh*

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Abstract

Using 1996 data on ever-married women from the Bangladeshi district of Matlab, I investigate common hypotheses explaining variation in dowry payments cross-sectionally and over time. The *equalizing differentials* hypothesis predicts that brides who marry up will compensate their grooms with higher dowries. The *endogamy* hypothesis states that in-group marriages seldom involve material exchange. While the latter hypothesis is confirmed, I find that education and wealth gaps in favor of the husband are associated with lower dowry. I also find that each year that girls' marriage is delayed reduces dowry. Finally, I test the hypothesis that the historical emergence and inflation of dowries is caused by a *marriage squeeze*, or shortage of eligible men relative to women, using multilevel models. Although marriage squeeze is positively associated with rising dowry across marriage cohorts, controlling for other cohort characteristics causes this association to disappear, suggesting that previous reports of a squeeze effect were capturing other secular changes in Bangladeshi society.

Overview and Justification

Union formation in many societies requires considerable resources; Malthus's classic statement on the expansion and contraction of human populations hinged on men's ability to afford marriage. Since then the patterns of resource flows between partners and their families have commanded the attention of social scientists concerned with the intersection of the family and the economy. The South Asian context is a particularly interesting setting in which to study the exchange of monies and assets that accompany marriage. The high cost of dowry here is described as "burdensome" and "crippling" (Rao 1993) (Amin and Cain 1997) (Caldwell et al 1983), with some estimates indicating that a daughter's dowry payments may constitute as much as 100% of a family's annual income (Bhat and Halli 1999). Because of the strong stigma associated with women's adult singlehood, families save for several years to ensure that their daughters make a suitable match, just as the concern for dowry costs influences investments in girls' education and marriage timing (Field 2004). Others have suggested that dowry is one factor behind South Asia's skewed sex ratio at birth and under age five. (Maitra 2006).

There is also a widespread perception in many parts of the subcontinent that dowry costs have risen over time, an observation which is corroborated by some empirical studies (Rao 1993), but which has been called into question by others (Dalmia and Lawrence 2005). "Dowry deaths," murders of young women by their husbands attributed to the inability of the wife's natal family to fulfill the husband's demands for dowry payments, have politicized the matter of marriage transactions greatly. In Bangladesh, dowry payments have been prohibited by national law since 1980¹, and the millions of Bangladeshi women who receive microcredit through the Grameen Bank (which was awarded the 2006 Nobel Peace Prize) can only do so under the condition that they disavow the giving or receiving of dowry. (Amin and Cain 1997)

Perhaps the most curious aspect of marriage transactions in this region is that until recently, many communities practiced not dowry but brideprice, where gifts, cash and property are given by the groom or his family to the bride or her family. Where it has occurred, this reversal in the direction of resource flows is thought to have taken place in the

¹ Such legal proscriptions however, are poorly enforced and therefore seem to have had little success in deterring dowry payments. (Bates et al 2004)

decades between the 1920's and the 1960s. (Lindenbaum, Amin and Cain, Caldwell et al 1983). Although several hypotheses have been tested as explanations for this change, no systematic empirical consideration of competing accounts has appeared, largely due to the paucity of large-scale surveys dedicated to investigating this topic². This paper uses data from Bangladesh collected in 1996 by the RAND Corporation to examine the most common explanations for the switch from brideprice to dowry and to investigate the determinants of dowry payment for the most recent marriage cohorts.

A deeper understanding of marriage costs holds great promise for both scholarship and policy-making regarding gender and family dynamics. Marriage transactions are clearly a neglected aspect of the household economy. Their magnitude attests to their importance as an element of household savings, expenditures and consumption. The investigation of marriage transactions also helps to shed light on how gender dynamics in families (both before and after marriage) affect and are affected by the material exchanges which occur at the time of union formation . Furthermore, accounting for marriage payments is necessary in order to foster a better understanding of the intergenerational flow of resources, including the transmission of social status, and how the family influences processes of social mobility for young people. Finally, an exploration of marriage across cohorts can help us elaborate on the long-term processes of social, economic and cultural change in which marriage costs are implicated. Secular trends such as demographic shifts (fertility declines and a move to nuclear households), labor market change (including women's entry into the workforce as wage-earners), increasing access to education, changing consumption patterns, changing gender norms, urbanization and the associated housing shortages, legal reforms, and a rise in the age at first marriage all play an important role in explaining how families manage material resources and labor, with important policy ramifications.

Literature Review

A number of conceptual models explaining marriage payments have been put forward, primarily from the fields of anthropology, economics, or demography. The Darwinian view, for instance, holds that marriage payments can be explained as a

² A notable recent example is Dalmia and Lawrence's 2005 article in which they use survey data collected in Uttar Pradesh and Karnataka.

reproductive tactic used by brides or grooms and their kin to attract the wealthiest spouse and perpetuate their line. (Schlegel and Eloul 1988; Gaulin and Boster 1990) Others argue that sex imbalances in the marriage market account for transfers of wealth which flow from bride to groom upon marriage. (Caldwell et al 1983; Bhat and Halli 1999) Yet another school interprets marriage payments as a mechanism which establishes a normative power balance between the genders by defining the roles and obligations of each party to the marriage (Goody 1973; Zhang and Chang 1999). Alternatively, some have likened marriage payments to a pre-mortem inheritance altruistically transmitted at marriage. (Suran et al 2004) Boserup famously posited that payment customs are determined by the dominant mode of production and women's role within it. (1970) Neoclassical economists' accounts liken marriage payments to firm startup costs. Studies from the literature on assortative mating echo an economic view. These studies suggest that marriage payments reflect the value of a partner on the marriage market, effectively putting a price on the social value assigned to particular individual traits. (Kilmijin 1994, 1998) We may alternatively treat marriage payments as an institutionalized means of family control over mate choice in order to maintain social stratification given the threat posed by romantic love, (Goode 1959) a view related to the proposition that marriage payments are more common in closed and highly stratified societies (Gaulin and Boster 1990; Schlegel and Eloul 1988).

Much of the early research on marriage payments has concerned itself with explaining the variation in payment customs across societies, although more recent research has attended to differences within societies either longitudinally or in cross-section. The literature from South Asia offers many examples. In the following section I review empirical material from South Asia with special attention to the determinants and consequences of dowry payments, as well as changes over time.

Although variations exist from one community to the next, typical marriage transactions in Bangladesh involve a number of items exchanged at several stages of the marriage process. Patrilocal residence is the norm in Bangladesh today as in the past, and young couples often take up residence with the groom's family upon marriage. According to Lindenbaum (1981), in earlier generations the groom customarily paid gold and cash (used to cover wedding expenses) to the bride's father if she was a social equal or superior. More recently however, the onus falls on the bride's father to initiate the marriage discussions, provide most of the bride's jewelry and make a payment of cash or goods to the groom.

Exceptions to these new rules may occur if the couple is related, if they are from the same village, or if the bride is of higher status. Many marriages involve no payments at all. At the same time, some payments have remained unchanged – gifts from guests, clothing given by groom to bride and her relatives, payment of the mullah by the groom, etc. are still the norm. (Lindenbaum 1981) Amin and Cain (1997) contend that brideprice and dowry are never practiced simultaneously (in contrast to Taiwan and mainland China, for instance, where both exchanges often occur in the same union). (Zhang and Chang 1999; Zhang 2000) The payment of many dowry commitments in India and Bangladesh are deferred until after marriage, prompting husbands to threaten their wives with abuse in order to extract payments from their parents – payments which may or many not have been agreed upon prior to marriage.

One of the earliest observers to note the switch from brideprice to dowry in South Asia was Shirley Lindenbaum. (1981) She marshals ethnographic evidence from several villages in rural Bangladesh to argue that a change in the direction of wealth flows occurred in the mid-1960's. According to Lindenbaum, these changes occurred among urban and wealthy families, later being taken up by rural and poor families. These shifts, in her view, are largely rooted in changes in Bangladesh's position in the global economy as well as the attendant changes in labor market opportunities and aspirations for men. The end of the colonial era and the beginning of incorporation into the capitalist economy by the commercial classes marks the decline of a prestige system based on land and aristocracy – one now based on the accumulation of money and wage work. As the labor value of men has risen, a focus in making a marriage match has gone from finding a desirable bride to finding a desirable groom – that is, a groom with a monthly salary. This is indicative of the rising relative status of grooms, who now make “demands” of dowry. Grooms appear to be using the opportunity of marriage to secure consumer goods, especially foreign status symbols like rings, tape recorders, watches, bicycles, and clothing which signal their urban employment and construct an image/identity that is beneficial to their kin groups (and by extension, their brides'). (Lindenbaum 1981)

Another early and much-cited account of the switch to dowry is Caldwell, Reddy and Caldwell (1983). Like Lindenbaum, these authors were concerned with the rising age at marriage for women and the implications for women's welfare. Their study used survey and micro-anthropological data from a rural district of the southern Indian state of Karnataka to

describe two changes Indian society was witnessing. The *first* was the switch from bridewealth to dowry. In the past, it appears from ethnographic accounts that most marriages involved brideprice, but hypergamy (or 'marrying up') among women led to the inflation of dowries in the 18th and 19th centuries in Northern India where the presence of the British heightened the status of men for whom women competed. This did not occur in the South because of greater homogeneity, kin marriage and the emphasis on marital alliances. Here dowries only began to appear in the upper castes in the 1950's. Respondents in the authors' study claimed that the reason for the switch to dowries had to do with the surplus of brides. They also claimed that it had to do with hypergamy; parents seek better educated men with steady urban incomes. The *second* major change described by Caldwell et al was dwindling kin marriages. Respondents also said that the decline in kin marriages was due to the groom's desire for dowry, the need for appropriate matches in terms of education and wealth, and the belief that sickly children result from kin marriages. At the time of Caldwell et al's study, parents often conducted a wider search geographically for an appropriate match than in previous generations. Furthermore, although marriages were still arranged, parents said they consulted children before making a final decision. These changes in the institution of marriage are important, since they may all be implicated in the adoption of dowry payments.

But Caldwell et al's most influential contribution lies in their test of the claims about a "marriage squeeze" made by their local respondents. In societies where women are expected to marry older men, a decline in mortality will result in cohorts of women that outnumber the men in the cohorts immediately older than them. The authors use an indicator of this "marriage squeeze" consisting of the ratio of men aged 15-54 (or 20-29) to women aged 10-44 (or 10-19) from national census data, confirming the popular perception of a recent surplus of eligible women, due to declining mortality in a period when birth rates were high, the spousal age gap wide, and an excess of unmarried widows over widowers existed.

Others since Caldwell et al have employed the marriage squeeze model. Rao (1993; 1993) used Indian census data to calculate the ratio of women 15-20 to men aged 20-25 in each of three districts from which he had retrospective data on marriage payments. Although he reported that there is a scarcity of men in the local marriage market, Edlund (2000) later critiqued Rao's work on several methodological points and argued that his sex

ratio coefficient on dowry payments was inflated. Bhat and Halli (1999) have offered the most methodologically sophisticated test of the marriage squeeze hypothesis to date. They demonstrate with data from eight censuses since 1911 that there has been a deficit of men and a surplus of women in the Indian marriage market. They point out that improved chances of joint survival for couples means that widowers are less likely to be available to marry, and they decompose the sex ratio indicator used by other authors to consider different sources of change such as remarriage rates of widows and widowers, celibacy, backlogs of unmarried individuals, and so forth. Their measures overcome a recent critique of the 'marriage squeeze' literature, namely that models do not account for the flexibility of preferences for normative spousal age gaps. (Bhrolchain 2001) Despite their important contribution to the demographic debate, a key shortcoming of Bhat and Halli's work is their failure to show whether rises and falls in net transfers to grooms corresponded with fluctuations in the availability of spouses over time.

Researchers such as Billig (1991) have combined the emphasis on demography with attention to the new normative expectations for marriage pointed out by early observers such as Caldwell et al. He says that there is not only a shortage of single men in India but also a dearth of eligible men, as defined by an educational and occupational status superior to that of Indian brides. This argument as well as other hypotheses regarding marriage transactions are evaluated in two reassessments of the evidence in India and Bangladesh. Amin and Cain (1997) review evidence presented in existing studies and supplement this with analysis of a small survey of two villages in northern Bangladesh. Dalmia and Lawrence (2005) draw on data from villages in Uttar Pradesh and Karnataka, as well as Indian census data.

Like Billig, both authors look to individual traits and family backgrounds of the spouses as a key determinant of resources exchanged at marriage. Dalmia and Lawrence (2005) posit that marriage payments equalize the imbalances in brides', grooms' and their families' valuations of a match. The level of dowry therefore indicates the extent to which men are being compensated for unfavorable characteristics of a bride or her family, and vice versa. They find that the groom's education is most prized in the marriage market in North India, age is most prized in the South, and height follows in both regions. Brides are penalized in additional dowry payments for their height (perhaps a proxy for wealth) in the South. Education also raises bride's dowry in both regions, but more in the South. (Dalmia

and Lawrence 2005) Dalmia and Lawrence do not offer a direct test of the hypothesis that female hypergamy (or 'marrying up') is associated with higher dowry, although indirect evidence suggests this is the ideal form of marriage and therefore carries a premium in the form of dowry payments. (2005) Similarly, Amin and Cain (1997) contend that there is a preference for village exogamy in Bangladesh, since village matches carry the potential for conflict which could spread beyond the conjugal unit into the community and therefore involve higher dowries. Kin marriages on the other hand, seldom involve high dowry payments. (Amin and Cain 1997)

At the same time, both studies cast doubt on Boserup's early contention that women's economic role is at the root of the shift from brideprice to dowry. Amin and Cain (1997) point out that Bangladesh has seen no transformation in modes of agricultural production over time, while Dalmia and Lawrence (2005) argue that while the main crops and agricultural technologies differ in the two sites they examined, both still practice dowry. However, they do note that women's labor force participation and earnings potential may represent an important explanatory factor. Surprisingly, Dalmia and Lawrence find that women's work before marriage is not significantly related to the net value of payments to the groom.

Finally, a number of studies have sought to explore the relationship between marriage payments and outcomes for wives. Suran et al, for example, discount the hypothesis that dowry is a sort of pre-mortem inheritance whose intention it is to signal parental support of a daughter and improve her bargaining position within marriage³ (2004). Using data from Bangladesh they show that brides who paid dowry are more likely to experience domestic violence, and those who paid dowry after marriage are at even greater risk of abuse. Among those who did pay dowry, the likelihood of abuse decreases as dowry values rise. (Suran et al 2004) In her study of early marriage in Bangladesh, Field (2004) similarly notes that while delaying marriage confers many health and welfare benefits upon women, these delays incur a higher dowry price⁴.

³ Dalmia and Lawrence join these two studies in arguing against interpreting dowry as an altruistic bequest made by parents of the bride. If we are to see dowry as pre-mortem inheritance, then a greater number of sisters should reduce the dowry payment of a bride, which is not supported by their finding

⁴ One of the final hypotheses is not relevant in the Bangladeshi context, although it has been influential in Indian debates on dowry payment. This is the Sanscritization hypothesis, which posits that the adoption of dowry is due to the emulation of Brahmins, who practice dowry, by lower-caste communities (Epstein 1973). This is unlikely to be the case in Bangladesh with its Muslim majority population. Another interesting aspect of

In summary, while the research on marriage payments in South Asia has resulted in a rich array of conceptual models and a number of plausible explanations, the debate has suffered from the absence of large-scale survey data that can test several explanations simultaneously. Ethnographic evidence and census data have been used to further our understanding of the reversal of the direction of resource flows at marriage in some South Asian communities. However, the former seldom allow us to confirm or refute hypotheses, and the latter have rarely been linked to data on actual marriage payments. (See Appendix A for a summary of the empirical tests conducted to date) The Matlab Health and Socioeconomic Survey (MHSS), which interviewed a total of 4,364 households in the Matlab area of rural Bangladesh, makes an investigation of the relative merits of a number of competing hypotheses possible.

Data and Research Design

This study will utilize cross-sectional survey data collected from rural Bangladesh in 1996. The Matlab region of Bangladesh is located in the Chandpur district southeast of Dhaka. It has been the site of an ongoing Demographic Surveillance System (DSS) which has recorded vital events and conducted period censuses in the area since the late 1960's. A number of controlled interventions in the areas of public health and family planning have been fielded in the area, with data from the DSS aiding in the assessment of program impacts⁵. The Matlab Health and Socioeconomic Survey (MHSS) is a major family and community survey primarily concerned with rural adults and the elderly. The main survey, one of four separate data collection efforts, collected information from 4,364 households pertaining to linkages between well-being, social and kin network characteristics, resource flows, health, human capital acquisition, community services and infrastructure. The other three components of the study were a survey on the determinants of natural fertility, an outmigrant survey, and a community survey.

My analysis will employ the main survey, which contains data at both the individual and the household level for 141 villages in the study area. The basic sampling unit for this

the Bangladeshi case is the demise of the Muslim tradition of mehr, or brideprice, which is a condition for Muslim marriage contracts, to a merely symbolic practice.

⁵ Unfortunately, the International Center for Diarrheal Disease Bangladesh (ICDDR,B) does not make the DSS vital registration or census data which they manage publicly available.

survey was the bari, or residential compound, which usually contains several households which may or may not be related. Using a sampling frame from the DSS, a probability sample of barsis was randomly drawn. Two households were then selected from each bari. The first (or primary) household was chosen randomly, and the second was selected purposively, with preference given to households in the same bari containing family members of the primary household. For each household selected for inclusion in the main survey, all individuals over 50 were interviewed, plus all household heads aged 14-49 and their spouses, plus one randomly selected 14-49 year-old and her/his spouse. Response rates for individuals selected to participate in the survey were 95.4% overall.

In addition to variables on employment, asset ownership, migration history, family background and characteristics of non-resident kin, the main survey questionnaire contains a module on marriage history which is of special interest to this analysis. Ever-married men and women were asked about their marriage history, their spouse's characteristics, the items in their dowry, and the total value of the dowry. The MHSS contains marriages dating from the 1920's to the year of the survey, and therefore marriage cohorts can be constructed and characteristics of spouses and their marriage transactions compared over time through retrospective reporting.

The fact that ever-married individuals aged over 14 had a high probability of being sampled makes this study sample well-suited for the research topic I am proposing to investigate. The MHSS contains information on individuals as well as their spouses, which will allow me to verify reporting on key variables. Ideally, addressing the question of why marriage payment customs and the determinants of payments have changed over time would involve longitudinal data; however, such data does not exist at this time. Nonetheless, there is reason to believe that there is no great problem of selection on the dependent variable, dowry payment, for this data. Dowry is nearly universal in Bangladesh. This is particularly true for women, so there is little chance that those who do have the resources to offer dowry remain unmarried and thereby go unrepresented in the MHSS. Furthermore, since dowry has been shown to be associated with domestic violence, we may ask whether women who pay dowry are less likely to survive. Examination of the MHSS data for married men suggests that there is no correlation between having received a dowry and subsequent widowerhood, suggesting that there is no significant selection by mortality. The data do, however, have a number of other limitations. There are obvious disadvantages to relying on

retrospective reports on items such as marriage transactions. Rao (1993) asserts that problems of recall should be minimal since marriage is a significant life event in which dowry payment is a key element. Because the MHSS contains dowry reports from both men and women, one way to gauge whether or not there is any response bias is to compare reports given by matched husband-wife pairs. This is investigated further in Appendix B, which suggests that while wives report dowry more frequently and of greater values than their husbands, this discrepancy is weakly and inconsistently associated with the predictor variables of interest in this analysis. We may also expect some inaccuracy in age reporting and the reporting of date of marriage in a rural setting such as Matlab. Finally, the MHSS only elicited reports about payments from bride to groom; there is no data for resource flows in the opposite direction. However, the wide range of variables afforded by the study, as well as the detailed probing on household economic resources and flows are unique to this study.

Hypotheses

The hypotheses this study sets out to test correspond with the key explanations offered for the appearance of dowry in South Asia. However, if we think of marriage payments as existing on a continuum with brideprice (net payments flow from groom's side to bride's side) on one end, and dowry (net payments flow from bride's side to groom's side) on the other (and with a net payments value of zero for both parties somewhere in the middle⁶), we can see that many of these hypotheses not only explain change over time but can also account for the value of payments made in any given union. *One objective* of this research is therefore to identify the key determinants of dowry cross-sectionally. Of particular interest from a program and policy standpoint is what factors allow young women or their families to opt out of giving dowry. For this analysis I restrict my analysis to women married within the last three decades. The *second objective* is to determine whether the explanatory factors outlined below can account for the adoption of dowry in Bangladeshi marriages, and whether their influence changes over time for successive marriage cohorts. For this analysis I examine all first marriages among women in the MHSS data.

⁶ For the majority of male and female respondents in the MHSS, no dowry is reported, with great variation in both the items given and the overall value of the dowry reported for those who did give or receive dowry. This echoes the findings of Amin and Cain (1997) and Hallman (2000).

Two prominent explanations for the institutional change witnessed in South Asian marriages are beyond the scope of this study, but because of their centrality to the debate on dowry I provide a brief rationale here:

Women's Labor Value: Originating with Boserup (1970), this perspective traces transformations in marriage exchanges to shifts in the economic contribution of women to the household's main economic activity. If women are perceived to be an economic burden, the bride's family will compensate the groom for taking on a dependent by paying dowry. On the other hand, if a daughter was a productive member of her natal family, a groom might offset their loss by offering a brideprice.

Ideally one would like a measure of each female respondent's work status and contribution to household expenses both before and after marriage, however the MHSS data only contains information on respondents' current agricultural and non-agricultural employment and income, along with ownership of other productive assets. Since employment measures before marriage are not available and current employment measures are fairly crude, this explanations will not be tested in my analysis.

Bequest: Originating with Goody, this perspective states that daughters receive their inheritance at marriage rather than upon their parents' death. It is cast as beneficial for the bride, although evidence to the contrary can be found in Suran et al (2004) largely because the assumptions of bequest theory do not hold in the Bangladeshi setting. For example, women have little control over their dowries once married (unlike sons who inherit land). In the MHSS data women are asked whether they have received any inheritance but since this applies only to those whose fathers have died, testing the bequest hypothesis directly would require the incorporation of selection models. In the results presented here, I included control variables measuring whether a woman's father was alive at the time of her marriage, and find this to have no association with dowry payment.

This analysis focuses on testing the following explanations:

General: Based on the findings of Field (2004) and others, I hypothesize that there will be an inverse relationship between age at marriage and dowry:

Hypothesis 1.1 - *The younger the wife's age at marriage, the greater the dowry*

Hypothesis 1.2 - *Women's age at marriage will increase over time, corresponding with the increased prevalence and value of dowries*

Equalizing Differentials/ Hypergamy: Many accounts have characterized marriage payments as representations of a spouse's price on the marriage market, with this price being determined in absolute terms (by the spouse's individual traits), but more importantly, relative terms (the spouse's traits compared to their partner's). Although this prediction may seem commonsensical, there are reasons to believe this hypothesis will not always hold. Field (2004), Dalmia and Lawrence (2005) and Rao (1993) all furnish examples contradicting this interpretation of marriage payments as suggested in the literature cited above⁷.

A variant of this hypothesis posits that the driving force behind dowry inflation is the demand by brides and their families for husbands of higher status. These related hypotheses would be confirmed if the data show that women who "marry up" pay greater dowries. Specifically, I hypothesize that:

Hypothesis 2.1 - An education gap in favor of the husband will be associated with greater dowry

Hypothesis 2.2 - A wealth gap in favor of the husband will be associated with greater dowry

Hypothesis 2.3 - Hypergamy will increase over time, corresponding with the increased prevalence and value of dowries

Village and Kin Endogamy: The ethnographic data are ambiguous as to how kin marriages are perceived in Bangladesh. However, most accounts agree that these unions involve little material transaction. Similarly there is consensus that village exogamy is preferred, and therefore grooms from outside of the bride's village of origin command a greater dowry. The MHSS data allow us to test whether the rise in dowries over time is associated with fewer kin marriages and more village exogamy over successive marriage cohorts. I hypothesize that:

Hypothesis 3.1 - Marrying a spouse from another village or family will be associated with greater dowry

Hypothesis 3.2 - Village and kin exogamy will increase over time, corresponding with the increased prevalence and value of dowries

Marriage Squeeze: The ratio of single women to single men in next five-year age group has often been used as a measure of the marriage squeeze. While ideally this study would apply the refinements advanced by Bhat and Halli (1999), national and Matlab census

⁷ An outstanding question from previous research is whether female education functions as a substitute to dowry because of the higher status and female earnings it brings, or if education raises dowry because a more educated husband is needed. (Hallman 2000, Field 2004)

microdata cannot be obtained for Bangladesh. Instead I will rely on population sex ratios that can be found in published census reports. The marriage squeeze hypothesis would be confirmed if I find that a surplus of women in a given cohort and year is associated positively with dowry values. Specifically:

Hypothesis 4.1 - A surplus of brides (as measured by a sex ratio greater than one) in a given period will be associated with greater dowry

Hypothesis 4.2 - The sex ratio will increase over time, corresponding with the increased prevalence and value of dowries

Analysis and Results

Descriptives

Table 1 displays basic demographic characteristics for the 9,150 ever-married men and women in the MHSS dataset, including self-reported details regarding their first marriages. Educational attainment in Matlab is low for all adults, with 56% reporting that they received no schooling. There is a wide gender gap at all levels of education, although gender disparity in ever-attendance is somewhat smaller among younger cohorts. The majority of all respondents are currently married, with about 1% being divorced or separated. Due to higher male mortality, the proportion of women who are widowed in this sample is 18% compared to 2% of men.

Table 1. Demographic Characteristics by Sex, Ever-Married Men and Women

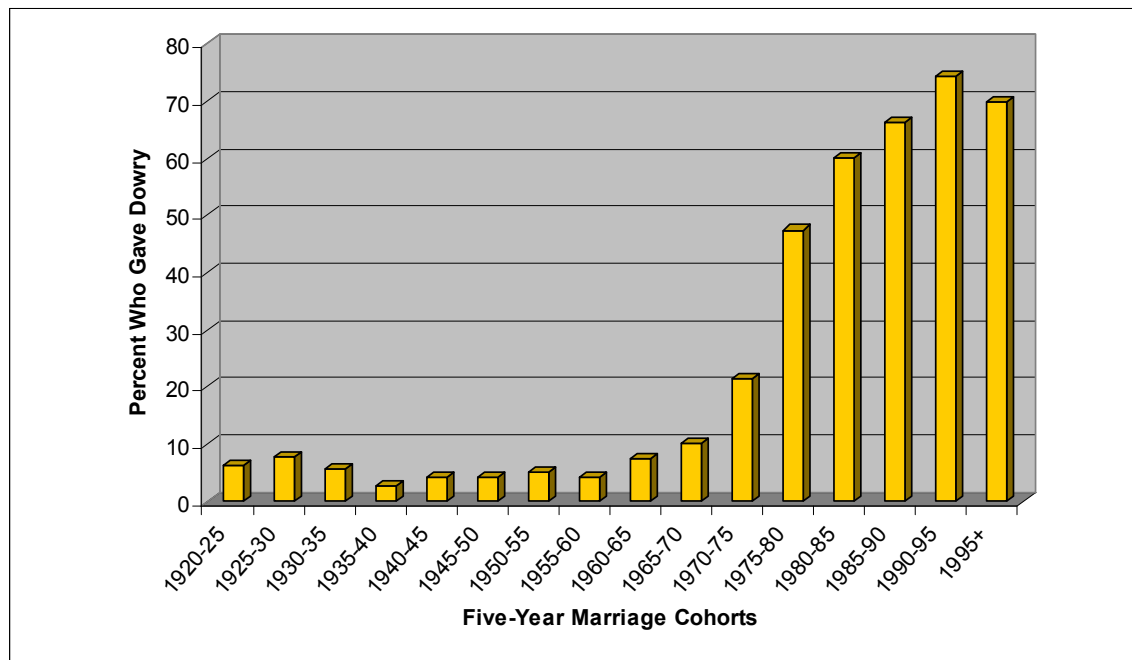
	Percent of Men	Percent of Women	Total
<i>Education</i>			
No Schooling	46.11	63.17	56.10
Some Primary	20.72	19.10	19.77
Completed Primary	8.96	7.88	8.33
Some Secondary	13.05	7.22	9.64
Completed Secondary	5.48	1.94	3.41
College or University	5.67	0.69	2.75
<i>Marriage</i>			
Currently Married	97.15	81.16	87.79
Divorced or Separated	0.42	1.39	0.99
Widowed	2.43	17.45	11.22
<i>Religion</i>			
Muslim	88.98	89.08	89.04
<i>N's</i>	3793	5357	9150

SOURCE: Matlab Health and Socioeconomic Survey, 1996

So is there evidence of a switch from brideprice to dowry in the MHSS data? To address this question I restrict myself to women's responses to a question about what dowry was exchanged, the items it included, and the total value of these items for their *first marriages*. The data contain 5,306 ever-married women for whom a date of first marriage could be calculated. Figure 1 below shows that dowry was practiced only very rarely in the earliest marriage cohorts. It is only in the late 1960's that a discernible upward trend in the practice of dowry is seen. Among women marrying in the five year period from 1965 to 1970, only 10% report having given a dowry. An exponential rise in the practice occurs in the 1970's, however, and in the 1980-1985 marriage cohort the rate of dowry-giving is 60%. Three important points should be noted about these descriptive results. First, Figure 1 shows clearly that dowry was practiced even in the very earliest marriages reported in Matlab, although they were a very tiny minority. Second, there still seems to be a sizeable proportion of marriages in Matlab in which no dowry is given at all; in the 1990-1995 marriage cohort which has the highest rate of dowry-giving, a full 26% of all marriages involved no dowry. Finally, there is a clear s-shaped pattern to dowry practices across marriage cohorts,

suggesting a social contagion effect which is decelerating and possibly even dropping off in the most recent marriage cohorts.

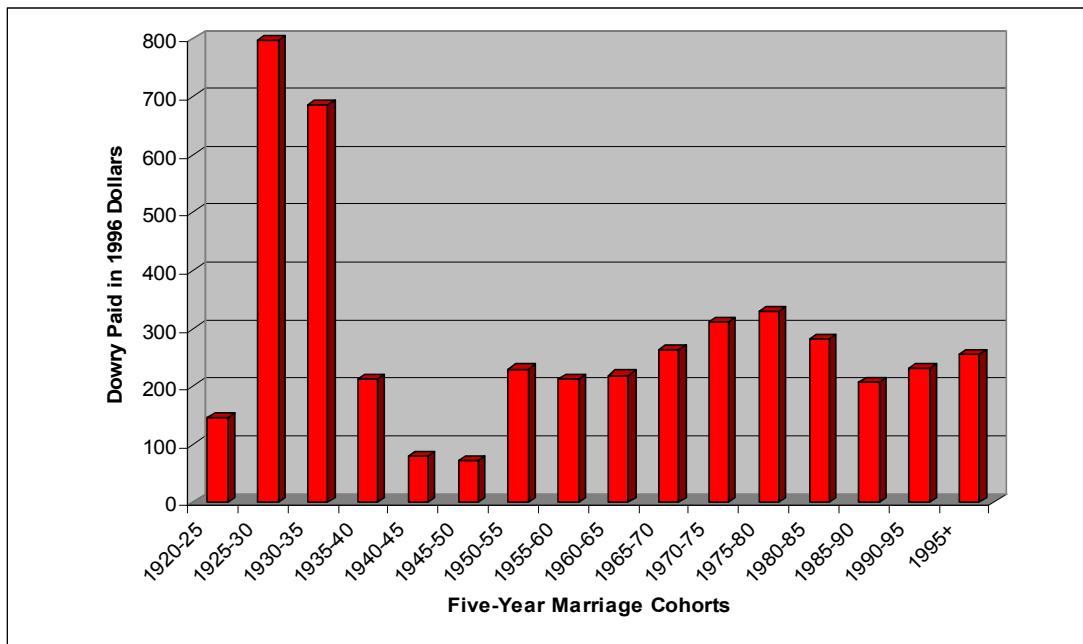
Figure 1. Percent of Ever-Married Women who report Giving Dowry in their First Marriage by Marriage Cohort, MHSS 1996 (N=5,306)



While the dichotomous variable of having given dowry or not in Figure 1 shows a clear pattern of rising dowry prevalence, an examination of trends over time using the reported monetary values of the dowries given is inconclusive. Using a published Consumer Price Index time series for Bangladesh (Global Financial Data 2007), I standardize the taka values for dowries reported by women in the MHSS to 1996 takas. I then convert this to US dollars based on the 1996 market exchange rate (zero values for dowry are included in this measure). Figure 3 shows that the dispersion in dowry values is greater the earlier the marriage cohort. There are also a large number of high dowry values whose accuracy is questionable (for instance 117 women, 7% of those who gave any dowry, report dowry values greater than \$2,000). There are several factors which contribute to the problems apparent in this measure. First, there is the problem of recall, which may distort values cited by the oldest women. This is likely compounded by the fact that Bangladesh has seen two

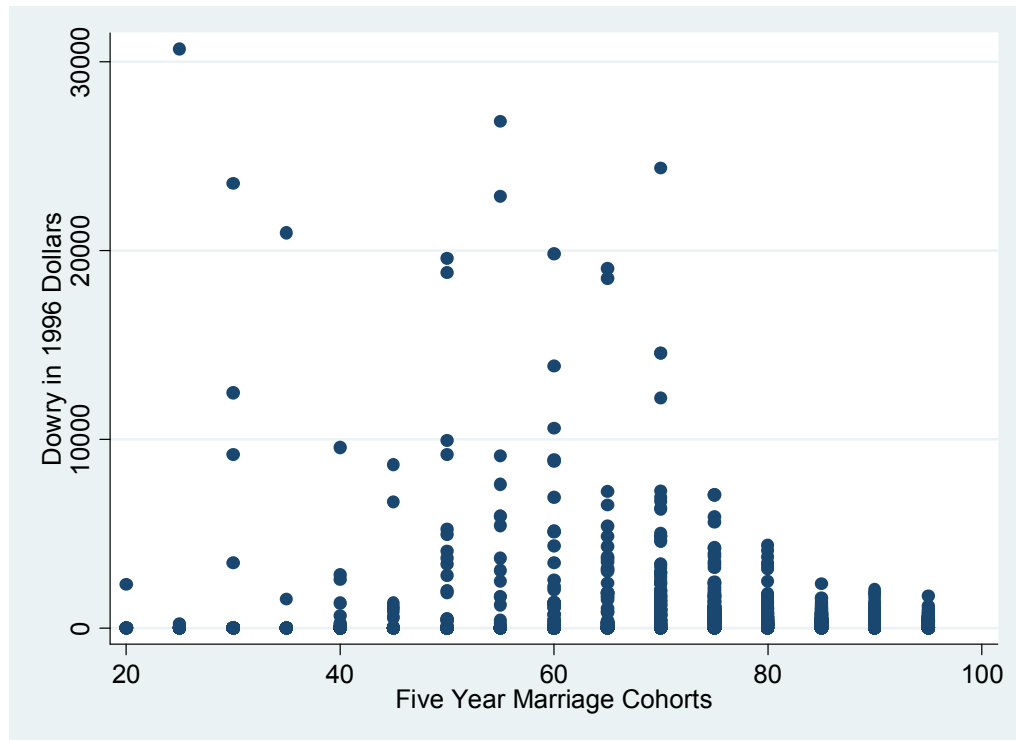
changes to the national currency during the lifetimes of the oldest women in the sample. Second, a general complaint about Consumer Price Indices – that they tend to overstate price inflation – may be inflating dowry values as they move further into the past. Finally, concerns about CPI measures in developing countries (where data collection for a measure that is most commonly used by external actors rather than for internal policy-making may not be a high priority, where the urban bias of CPI measures is well-documented, and where historical time series are not available⁸) (Deaton 2003) are probably applicable to Bangladesh.

Figure 2. Mean Dowry Value for Woman’s First Marriage in Standardized 1996 Dollar Equivalent by Marriage Cohort, MHSS 1996 (N=5,306)



⁸ The Global Financial Data CPI measure for Bangladesh is available no earlier than 1952. I extrapolated to earlier years using a simple exponential growth formula. Especially problematic is the fact that Bangladesh switched from Indian rupees to Pakistani rupees in 1948. The taka was adopted in December 1971, but this is reflected in the Global Financial Data I employed.

Figure 3. Dowry Values for Woman’s First Marriage in Standardized 1996 Dollar Equivalent by Marriage Cohort, MHSS 1996 (N=5,306)



The bottom panel of Table 2 details the prevalence of the items that most commonly comprise a bride’s dowry in Matlab. Lindebaum’s assertion that modern consumer goods feature more prominently in dowries today is not borne out by the data; such items account for less than 2% of dowry items women reported. While the percentage of brides bringing jewelry into the marriage surged and then declined in recent marriage cohorts, the proportion who report giving a cash dowry has risen dramatically over time. 80% of those who married in the 1990’s and gave any dowry said their dowry included cash.

Table 2 also shows some of the key demographic traits of each 10-year marriage cohort of women included in my analysis. It also shows key aspects of their marriages which will feature as explanatory factors for resource exchanges between bride and groom. For example, we see that over time there has been a slow but steady increase in the average age

at first marriage. As women's educational attainment has improved, the percentage of women whose husband's education exceeds their own has declined. The percentage of women who report that their husband's father was richer than their own is fairly steady over time (about one-fifth marry-up by father's wealth), although a very slight downward trend is discernible. Only about one-fifth of all women marry someone from the same village or kin-group, and both types of endogamy show a very slight decline in recent marriage cohorts⁹.

⁹ Note that there are several indicators for which the 1920's marriage cohort does not follow the trend over time. This could be due to the misreporting of ages and marriage dates (a special concern for older women in particular) – ie. the women who report marrying in the 1920's actually married later. It could also be due to selection – women who have survived into their late seventies in Matlab are those who were unique in terms of educational attainment, marriage practices, etc.

Table 2. Education, Spouse's Traits and Marriage Payments of Ever-Married Women by Marriage Cohort

	Year of First Marriage								Total
	1920's	1930's	1940's	1950's	1960's	1970's	1980's	1990's	
<i>Education</i>									
Ever Attended School (percent)	5.45	4.52	15.20	19.36	30.69	43.33	50.38	69.77	36.96
Completed Primary (percent)	1.82	0.00	3.31	5.94	13.06	19.37	25.38	48.10	17.81
Years of School Completed (mean)	0.00	0.16	0.11	0.51	0.66	1.22	2.47	4.22	1.71
<i>Age</i>									
Current Age (mean)	81.65	72.41	63.78	54.80	45.99	36.47	29.06	22.34	42.55
Age at First Marriage (mean)	11.44	11.50	12.81	13.60	14.28	14.97	17.08	19.07	15.10
<i>Marriage</i>									
Currently Married (percent)	5.45	16.38	44.25	67.93	87.83	94.37	96.95	96.01	81.29
Widowed (percent)	94.55	83.62	54.58	31.71	11.38	4.18	1.05	0.76	17.36
Chose Spouse Herself (percent)	0.00	0.00	0.97	0.48	0.22	0.88	2.39	4.37	1.32
<i>Spouse's Traits</i>									
Spouse Wealthier (percent)	10.91	24.86	24.56	24.23	21.65	21.06	19.08	19.96	21.52
Spouse More Educated (percent)	94.55	98.87	94.54	94.42	89.17	82.88	75.10	62.74	84.04
<i>Village & Kin Endogamy</i>									
Spouse from same Village (percent)	25.45	23.16	23.78	23.52	22.10	21.22	21.18	18.82	21.90
Spouse a Relative (percent)	18.18	18.64	22.22	20.07	19.64	20.26	17.94	17.11	19.45
<i>Bequest & Father's Land Wealth</i>									
Father Alive at time of Marriage (percent)	74.55	77.40	75.05	74.94	86.83	84.41	83.02	84.41	81.79
Father Alive today (percent)	0.00	0.00	1.56	4.99	20.76	41.80	62.60	78.14	34.36
Any Inheritance at father's death (percent)	29.09	31.64	39.41	37.88	30.14	35.64	27.55	28.70	34.08
Father owns Farmland (percent)	80.00	84.18	79.14	81.83	79.46	77.33	74.14	71.67	77.63
Father owns Homestead land only (percent)	5.45	10.17	12.09	13.06	15.18	15.43	17.65	15.02	14.79
<i>Marriage Payments</i>									
Had Dowry (percent)	7.27	3.95	4.09	4.51	8.59	34.81	62.79	73.38	30.63
Dowry included Jewelry (percent)	50.00	57.14	57.14	76.32	70.13	76.21	56.38	53.11	61.97
Dowry included Cash (percent)	25.00	42.86	42.86	26.32	23.38	38.34	69.60	80.31	60.00
Dowry Paid in 1996 Dollars (mean)	607.80	402.01	74.84	220.95	239.52	371.76	249.15	236.90	262.57
<i>N's</i>	55	177	513	842	896	1244	1048	526	5306

SOURCE: Matlab Health and Socioeconomic Survey, 1996

Regression Analysis

Do any of the variables described above help account for variation in dowry-giving among women in the MHSS? In this section I present the results of regression analysis that attempts to begin exploring this question. I focus on women who entered into their first

marriages from 1976 to the time of the survey, a total of 2,101 women. Bangladesh experienced a series of political upheavals (independence from British colonial rule in 1947 and secession from West Pakistan in 1971, as well as famine and several military coups up until late 1975, when General Ziaur Rahman took over), together with associated population movements and currency changes. I therefore restrict my cross-sectional analysis to those who married in times of relative stability, following 1975.

First, I run an OLS regression using the measure of dowry value (in 1996 US dollar equivalents) as the outcome to test a group of hypotheses related to the influence of hypergamy and endogamy on the payment of dowry. Not surprisingly, given the many outliers found in the data for early dowry values, the year of marriage coefficient is negative. For each year a woman in Matlab delays marriage there is a \$17 *reduction* in the dowry she pays net of other factors. Exposure to schooling is associated with *greater* dowry payments when all else is held constant. When this predictor is included as a quadratic term in Model 2, we see that there is an important non-linearity in dowry values by educational attainment. For women with the fewest years of education, the value of dowry is comparatively low. Dowry values increase with the bride's educational attainment but only up to completion of primary school, beyond which dowry payments appear to decline with increasing education¹⁰.

¹⁰ Similar non-linearities on age at marriage were tested but found to be non-significant.

Table 3. Linear Regression of Dowry Value on Various Predictors, Women Married after 1975

	Model 1 (Betas)	Model 2 (Betas)
Constant	1,116.180***	1,076.136***
Year of Marriage	-7.341***	-7.445***
Age at Marriage	-17.280***	-16.127
Years of School Completed	20.505***	41.115***
Hindu	401.308***	401.914***
Village Husband	-53.978*	-52.071*
Kin Husband	8.052	9.693
Husband's HH Wealthier	-110.025***	-111.742***
Husband's HH Equally Wealthy	-52.692*	-52.524*
Husband More Educated	46.443	67.287*
Husband Equally Educated	-1.095	18.307
Father owns Farmland	-4.911	-8.270
Father owns Homestead only	-48.389	-48.009
Years of School Squared		-2.358*
N	2101	2101
R-Squared	0.095	0.097

NOTES: Categorical variables Husband's HH Wealthier and Husband's HH Equally Wealthy have a reference category of "Husband's HH Less Wealthy". Categorical variables Husband more Educated and Husband Equally Educated have a reference category of "Husband Less Educated". Categorical variables Father owns Farmland and Father owns Homestead only have a reference category of "Father owns No Land"

* p<.05, **p<.01, ***p<.001

SOURCE: Matlab Health and Socioeconomic Survey, 1996

Next, I run a logistic regression on women married after 1975 using a dichotomous outcome for giving dowry. In Table 4 we see that with each successive year after 1976, marriages in Matlab see a 11% increase in the odds of giving dowry. As in the linear model, each one-year increase in the age at marriage is associated with a small but highly significant *reduction* in the odds of giving dowry. An important discrepancy between the linear and logistic models is that increasing educational attainment for a bride is associated with significantly *lower* odds of giving dowry. The squared term for years of education completed in Model 2 of Table 4 is once again statistically significant. The inverted u-shape however, is less pronounced here; brides with the least schooling have approximately the same odds of giving dowry as those with slightly more schooling up to five years of schooling, when the odds of dowry-giving begin to drop. Here as in Table 3 we see that being Hindu is associated with the greatest increases in dowry value as well as odds of dowry-giving.

Table 4. Logistic Regression of Dowry Given on Various Predictors, Women Married after 1975

	Model 1 (Odds-Ratios)	Model 2 (Odds-Ratios)
Year of Marriage	1.105***	1.105***
Age at Marriage	0.935***	0.935**
Years of School Completed	0.860***	1.013
Hindu	2.512***	2.528***
Village Husband	0.752*	0.762*
Kin Husband	0.766*	0.777*
Husband's HH Wealthier	0.552***	0.544***
Husband's HH Equally Wealthy	0.673***	0.673***
Husband More Educated	0.634**	0.741*
Husband Equally Educated	0.625*	0.721
Father owns Farmland	1.596**	1.549**
Father owns Homestead only	1.357	1.358
Years of School Completed Squared		0.981***
N	2101	2101
Log Likelihood	-1262.963	-1256.356
Pseudo R-Squared	0.091	0.096

NOTES: Categorical variables Husband's HH Wealthier and Husband's HH Equally Wealthy have a reference category of "Husband's HH Less Wealthy". Categorical variables Husband more Educated and Husband Equally Educated have a reference category of "Husband Less Educated". Categorical variables Father owns Farmland and Father owns Homestead only have a reference category of "Father owns No Land"

* p<.05, **p<.01, ***p<.001

SOURCE: Matlab Health and Socioeconomic Survey, 1996

Multilevel Models

Recall that one of the of the most prominent explanations for the shift in marriage payments observed in South Asia is based on a demographic logic that holds that a shortage of men in the appropriate age range has forced brides to offer ever-rising dowries. I posit that an individual woman's marriage cohort constitutes an important context determining the resources she contributes to her marriage, and that one of the most important characteristics of this context is the supply of men relative to women at the time of marriage. To test this assertion, I use Multilevel Models to nest the 5,306 female respondents in the MHSS data in the five-year marriage cohorts to which they belong, and test the influence of cohort-level measures on individual dowry practices. The underlying rationale for Multilevel Models is particularly salient in the MHSS data, where the contexts in which women of

different generations married vary so widely. Among ever-married women in Matlab, variance between marriage cohorts was a significant percentage of total variance (the intraclass correlation coefficient for the unconditional means models ranged between .53 and .74, depending on whether a continuous or binary measure of the dowry outcome was used), indicating that Multilevel Models are necessary¹¹. It also suggests that previous findings of marriage squeeze effects on dowry, none of which account for this clustering of practices within marriage cohorts, may be a statistical artifact. By showing how variation in individual outcomes are explained by processes operating at the level of the cohort, a Multilevel analysis can also help represent how the contribution of each predictor variable changes over successive cohorts.

There are 16 five-year marriage cohorts in the MHSS data, from 1920-25 to 1995+. The smallest of these cohorts contains only 16 respondents and the largest 643. The first level-2 indicator of interest is a marriage squeeze measure obtained from Bangladeshi Census data and reported in Amin and Cain¹² (1997: 298). These measure consists of an average of two sex ratios – the ratio of 10 to 14-year old girls to 14 to 19-year old boys, *and* the ratio of 10 to 14-year old girls to 20 to 24-year old boys¹³. The second level-2 measure I use is the mean years of schooling for the marriage cohort.

I first examine results for the continuous outcome of the value of dowry in 1996 dollar equivalents. In Table 5 below I test a random intercept model, where the parameters for the intercept and the slopes are calculated at the cohort-level and then incorporated into an individual level equation estimating the outcome dowry value. Importantly, the random

¹¹ When variance between contexts is high and variance within contexts low, conventional regression will result in two problems. First, standard errors will be underestimated for individual parameters, resulting in significant findings where they don't really exist. Second, Multilevel Models correct for the fact that omitted variables and measurement error are often correlated when data are clustered.

¹² This measure ranges from 0.96 girls to every boy in 1920, peaking at 1.43 girls to every boy in 1975, then dropping to 1.15 girls to every boy by 1995.

¹³ There are a number of problems with these kinds of marriage squeeze measures, as is made apparent by the work of Bhat and Halli (1999). First, the ratios of interest are single girls to single boys, but population counts at this level of detail are not available in many census reports from Bangladesh. Second, it is not clear what level of aggregation is appropriate. For instance, is a national sex ratio (such as Amin and Cain's) the most salient for determining dowry-giving, or the sex ratio prevalent at the district or village level¹³? Furthermore, we know that not all unmarried males and females in a geographic space, whatever its size, participate in the same marriage market. Rather, the sex ratio for members of the same religious or socioeconomic group who are eligible marriage partners for one another is of greater relevance. Third, there are important changes over time in the age at first marriage and the normative spousal age gaps, which themselves are likely to be a response to the marriage market squeeze. Although my focus is on macro effects on micro-level behaviors, we should bear in mind that the reverse is also operating simultaneously.

intercept model incorporates an error term into the level-2 intercept equation, allowing it to vary randomly while slopes are assumed to be fixed. The intercept reported in the top row of the table represents the average dollar value of dowries paid across the population of marriage cohorts when all the predictors are set to zero. We see from Table 5 that while the level-2 predictors operated in the expected direction (increases in the cohorts' ratio of girls to boys are associated with increased dowry values, and improvements in the cohorts' mean years of education lower dowry values), neither is significant. The coefficients for each of the individual-level predictors is the average regression slope for that predictor across cohorts. For the most part, significant coefficients in Table 5 are consistent with the signs of significant coefficients in the cross-sectional linear analysis. Later age at marriage and marrying a wealthier husband reduces dowry paid, while being Hindu and greater education raise the sum of dowry paid. I also add cross-level interactions in the final two columns of Table 5. These show that being Hindu in a marriage cohort with a surplus of girls is especially deleterious, raising the dowry paid by \$971 when all else is held constant. In contrast, Hindu women seemed to have benefited more than Muslims from increases in the average female educational attainment of their marriage cohorts. Although increasing years of schooling are associated with greater dowry burdens for women, when the average education of the cohort as a whole is raised, additional years of education will actually reduce the dowry sum a bride pays. This is an important interaction effect that suggests that more educated brides are burdened with greater dowries only when female education is non-normative. As girls in Matlab have made overall progress in education, education for individual brides has come to carry benefits in terms of marriage payments.

Table 5. Estimates of MLM Coefficients for Continuous Outcome Dowry Value, Random Intercepts Model

			Model 1	Model 2	Model 1	Model 2
			Random	Random	Random	Random
			Intercept	Intercept	Intercept with	Intercept with
					Interactions	Interactions
<i>Level 2 – Marriage Cohorts</i>						
	Intercept	Intercept	94.744	81.745	299.821	-172.187
		Girl to Boy Ratio	289.285	300.185	120.094	618.670
		Mean Schooling		-3.953		-88.290
<i>Level 1 – Individuals within Cohorts</i>						
	Age at Marriage slope	Intercept	-22.698**	-22.148**	-41.721	0.010
		Girl to Boy Ratio			15.463	-30.942
		Mean Schooling				8.824
	Years of School Completed slope	Intercept	30.855***	31.109***	74.880	98.590
		Girl to Boy Ratio			-35.132	-26.250
		Mean Schooling				-15.306**
	Hindu slope	Intercept	657.947***	657.976***	735.609	-93.145
		Girl to Boy Ratio			-63.756	970.477*
		Mean Schooling				-241.269***
	Village Husband slope	Intercept	33.259	33.279	33.387	35.074
	Kin Husband slope	Intercept	-35.028	-34.909	-35.619	-33.274
	Husband's HH Wealthier slope	Intercept	-111.069*	-111.338	-110.870*	-112.906*
	Husband's HH Equally Wealthy slope	Intercept	-46.455	-46.662	-46.252	-45.966
	Husband More Educated slope	Intercept	69.280**	67.922	70.458	77.024
	Husband Equally Educated slope	Intercept	113.405	112.671	113.891	120.525
	Father owns Farmland slope	Intercept	12.972	11.930	14.387	9.685
	Father owns Homestead only slope	Intercept	-58.589	-59.112	-57.292	-59.198
	N		5, 279	5, 279	5, 279	5, 279
	Sigma Squared		1458665.768	1458911.090	1459399.856	1452850.711
	Tau		150.514**	181.414**	154.453**	613.795**

NOTES: Categorical variables Husband's HH Wealthier and Husband's HH Equally Wealthy have a reference category of "Husband's HH Less Wealthy". Categorical variables Husband more Educated and Husband Equally Educated have a reference category of "Husband Less Educated". Categorical variables Father owns Farmland and Father owns Homestead only have a reference category of "Father owns No Land"

* p<.05, **p<.01, ***p<.001

SOURCE: Matlab Health and Socioeconomic Survey, 1996

In Table 6, I allow slopes to vary randomly by adding an error term to the level-2 slopes equations. The level-2 marriage squeeze predictor is statistically significant in the main effects Model 1, and remains so after including a predictor for the cohort's mean educational attainment. A one-point increase in the cohort's ratio of girls to boys is associated with an increase of more than \$300 in the dowry paid by the bride on average. The means educational attainment for women in the cohort does not explain variation in individual dowry values. Again, most of the significant individual-level predictors operate in the expected direction and are more or less consistent with previous models. The two significant cross-level interactions (Hindu and years of schooling) in Table 6 echo the findings reported for Table 5.

Table 6. Estimates of MLM Coefficients for Continuous Outcome Dowry Value, Random Slopes and Random Intercepts Model

			Model 1	Model 2	Model 1	Model 2
			Random Slopes	Random Slopes	Random Slopes	Random Slopes
			& Intercept	& Intercept	& Intercept	& Intercept
					with	with
					Interactions	Interactions
<i>Level 2 – Marriage Cohorts</i>						
	Intercept	Intercept	53.685	126.416	-1703.231	-1676.528
		Girl to Boy Ratio	392.243**	319.908**	1874.136	1936.649
		Mean Schooling		19.307		-52.974
<i>Level 1 – Individuals within Cohorts</i>						
	Age at Marriage slope	Intercept	-32.192*	-33.121*	91.262	90.095
		Girl to Boy Ratio			-106.511	-112.200
		Mean Schooling				4.622
	Years of School Completed slope	Intercept	29.123*	26.909	48.059	28.726
		Girl to Boy Ratio			-8.781	
	Hindu slope	Intercept	707.704***	706.379***	-26.119	-330.682
		Girl to Boy Ratio			638.536	1097.767
		Mean Schooling				-146.184*
	Village Husband slope	Intercept	86.717	85.053	96.125	94.888
	Kin Husband slope	Intercept	-99.556	-94.671	-95.407	-95.456
	Husband's HH Wealthier slope	Intercept	-136.743*	-142.900**	-135.127*	-139.743
	Husband's HH Equally Wealthy slope	Intercept	10.933	5.766	15.774	14.264
	Husband More Educated slope	Intercept	38.774	42.051	67.482	55.621
	Husband Equally Educated slope	Intercept	30.066	1.420	192.539	84.292
	Father owns Farmland slope	Intercept	100.8898	102.591	115.977	120.219
	Father owns Homestead only slope	Intercept	-66.066	-67.685	-72.498	-65.754
N			5, 279	5, 279	5, 279	5, 279
Sigma Squared			1404797.019	1405076.404	1404772.124	1404564.465
Tau			186611.575	178988.121	231217.550	240185.082

NOTES: Categorical variables Husband's HH Wealthier and Husband's HH Equally Wealthy have a reference category of "Husband's HH Less Wealthy". Categorical variables Husband more Educated and Husband Equally Educated have a reference category of "Husband Less Educated". Categorical variables Father owns Farmland and Father owns Homestead only have a reference category of "Father owns No Land"

* p<.05, **p<.01, ***p<.001

SOURCE: Matlab Health and Socioeconomic Survey, 1996

Next I run similar Multilevel analyses for the binary outcome of whether or not a woman gave dowry upon marriage. In Table 7 the coefficients for the random intercept model, which represent log-odds, are displayed. We see in the main effects version of Model 1 that as the marriage cohort's sex ratio increases, the log-odds of giving dowry rise significantly. However, this effect is diminished and reduced to non-significance once the cohort's mean education is taken into account. The direction of the mean schooling variable here is somewhat different from the previous Multilevel Models. Improvements in the cohort's education are associated with significantly greater odds of giving dowry for women. Note that the individual-level predictors are consistent with the effects reported in the

logistic models earlier. Nearly all these variables significantly reduce the log-odds of paying dowry, with the exception of being Hindu and father's land wealth which raise the log-odds of paying dowry when all else is held constant. In the final two columns of Table 7 I introduce interaction terms across levels. In contrast to the continuous Multilevel Models, Model 2 indicates that being Hindu under conditions of surplus women actually reduces the odds of giving dowry, though this is not significant. As in the previous models, being Hindu is advantageous when women's mean years of schooling rise, for Hindu brides' log-odds of giving dowry drop. The years of schooling by mean schooling interaction shows that when cohort education levels rise, more years of schooling allow women to refrain from giving dowry.

Table 7. Estimates of the MLM Coefficients for Binary Outcome Dowry Given, Cohort-Specific Model, Random Intercepts

			Model 1	Model 2	Model 1	Model 2
			Random	Random	Random Intercept	Random Intercept
			Intercept	Intercept	with Interactions	with Interactions
<i>Level 2 – Marriage Cohorts</i>						
	Intercept	Intercept	-10.994**	-5.310*	-16.168**	-9.379**
		Girl to Boy Ratio	9.196**	2.673	13.276**	5.692*
		Mean Schooling		1.200***		1.305**
<i>Level 1 – Individuals within Cohorts</i>						
	Age at Marriage slope	Intercept	-.059***	-.061***	0.301	.218
		Girl to Boy Ratio			-.284*	-.240
		Mean Schooling				.011
	Years of School Completed slope	Intercept	-.104***	-.105***	-.426*	.153
		Girl to Boy Ratio			.253	-.034
		Mean Schooling				-.083***
	Hindu slope	Intercept	1.613***	1.614***	4.799***	3.899**
		Girl to Boy Ratio			-2.555**	-1.074
		Mean Schooling				-.513***
	Village Husband slope	Intercept	-.070	-.070	-.068	-.063
	Kin Husband slope	Intercept	-.249*	-.252*	-.251*	-.253*
	Husband's HH Wealthier slope	Intercept	-.0558***	-.558***	-.553***	-.565***
	Husband's HH Equally Wealthy slope	Intercept	-.381***	-.381***	-.374***	-.382***
	Husband More Educated slope	Intercept	-.440***	-.437**	-.428***	-.387**
	Husband Equally Educated slope	Intercept	-.466*	-.465*	-.444*	-.398*
	Father owns Farmland slope	Intercept	.320*	.326*	.308*	.290*
	Father owns Homestead only slope	Intercept	.208	.209	.198	.174
N			5, 279	5, 279	5, 279	5, 279
Sigma Squared			.213	.213	0.213	0.213
Tau			2.496***	.480***	2.548***	0.435***

NOTES: Categorical variables Husband's HH Wealthier and Husband's HH Equally Wealthy have a reference category of "Husband's HH Less Wealthy". Categorical variables Husband more Educated and Husband Equally Educated have a reference category of "Husband Less Educated". Categorical variables Father owns Farmland and Father owns Homestead only have a reference category of "Father owns No Land"

* p<.05, **p<.01, ***p<.001

SOURCE: Matlab Health and Socioeconomic Survey, 1996

In Table 8, the binary outcome dowry given is modeled using random slopes and random intercepts. Results for the level-2 predictors follow the same pattern as in Table 7 – a greater marriage squeeze in a marriage cohort increases the log-odds of dowry giving but this is due primarily to improvements in women’s education driving up the chances of paying dowry. Again, most of the significant level-1 predictors reduce the odds of giving dowry except if the bride is Hindu and if she reports her father owns farmland. The cross-level interactions follow a pattern consistent with Table 7.

Table 8. Estimates of the MLM Coefficients for Binary Outcome Dowry Given, Cohort-Specific Model, Random Slopes and Random Intercepts

			Model 1	Model 2	Model 1	Model 2
			Random Slopes	Random Slopes	Random Slopes	Random Slopes
			& Intercepts	& Intercepts	& Intercepts with	& Intercepts with
					Interactions	Interactions
<i>Level 2 – Marriage Cohorts</i>						
	Intercept	Intercept	-5.236*	-4.428**	-16.584**	-9.217*
		Girl to Boy Ratio	3.787*	1.979	13.407**	5.546
		Mean Schooling		.957***		1.282**
<i>Level 1 – Individuals within Cohorts</i>						
	Age at Marriage slope	Intercept	-.038*	-.046*	.417	.214
		Girl to Boy Ratio			-.373*	-.232
		Mean Schooling				.011
	Years of School Completed slope	Intercept	-.102***	-.104***	-.367	.175
		Girl to Boy Ratio			.207	-.046
		Mean Schooling				-.084***
	Hindu slope	Intercept	1.769***	1.750***	4.853*	3.344*
		Girl to Boy Ratio			-2.64	-.761
		Mean Schooling				-.415*
	Village Husband slope	Intercept	-.078	-.080	-.075	-.068
	Kin Husband slope	Intercept	-.260*	-.261*	-.259*	-.259
	Husband’s HH Wealthier slope	Intercept	-.562***	-.564***	-.0560***	-.570***
	Husband’s HH Equally Wealthy slope	Intercept	-.343**	-.385**	-.381***	-.411**
	Husband More Educated slope	Intercept	-.412**	-.4223***	-.409**	-.387**
	Husband Equally Educated slope	Intercept	.006	-.103	-.252	-.245
	Father owns Farmland slope	Intercept	.323*	.331*	.311*	.295*
	Father owns Homestead only slope	Intercept	.233	.237	.222	.183
N			5, 279	5, 279	5, 279	5, 279
Sigma Squared			.213	.213	.213	.213
Tau			-.997	-.948	-.927	-.983
			-.978 .984	-.970 .996	-.946 .985	-.783 .843
			-.520 .480 .336	-.157 -.156 -.077	-.069 -.291 -.236	.039 -.152 -.615
			-.520 .487 .333 .975	-.807 .580 .642 .704	-.256 -.077 -.070 .900	-.906 .840 .453 .364

NOTES: Categorical variables Husband’s HH Wealthier and Husband’s HH Equally Wealthy have a reference category of “Husband’s HH Less Wealthy”. Categorical variables Husband more Educated and Husband Equally Educated have a reference category of “Husband Less Educated”. Categorical variables Father owns Farmland and Father owns Homestead only have a reference category of “Father owns No Land”

* p<.05, **p<.01, ***p<.001

SOURCE: Matlab Health and Socioeconomic Survey, 1996

Discussion and Conclusions

The findings of the cross-sectional analysis of women married after 1976 in the MHSS data provide important clues about the individual, family background, and spousal traits associated with resource flows from bride to groom. Although there are some inconsistencies in the results for different specifications for dowry payment, the models tested do offer consistent findings with regards to the original hypotheses. First, my *general hypothesis* regarding the inverse association between age at marriage and dowry is refuted. In both the linear and logistic regression models, each additional year that a bride delays marriage actually reduces the odds and value of dowry when all else is held constant. This finding is especially interesting because it contradicts the findings of existing studies, but also because it has important practical implications. If the findings are robust, concerns that efforts to improve school retention for girls and delay marriage may result in a dowry penalty upon marriage (and the attendant risk of domestic abuse) may be alleviated. Second, recall that the *equalizing differentials hypothesis* posited that education and wealth gaps in favor of the husband would be associated with greater dowry. In both models, however, marrying a husband of equivalent or superior education or wealth actually lowers the odds and value of dowry. There are a number of explanations for this finding that are consistent with the equalizing differentials hypothesis¹⁴; however, it seems that this result represents an important challenge to the marriage market model of spousal matching on which the original observations of high-caste hypergamy was based. One interpretation of these findings may be that we need to discard the human-capital and assets-based understanding of what constitutes a ‘good match’ in the Bangladeshi context. What the results may indicate is that there is a strong expectation that women marry up or marry social equals. When this norm is violated, brides and their families pay dowry as a way of compensating for norm violation. Matters of interpretation aside, the consistently significant coefficients yielded by the education and wealth gap measures net of the bride’s own education and father’s wealth indicate that accounting for the individual traits of spouses is not enough when trying to explain variation in marriage payments; their traits relative to one another plays an important

14 Other interpretations might be that women’s marrying up means that they marry into high-SES families that shun dowry – this effect would disappear if we controlled for husband’s family’s SES at marriage, a measure which the MHSS lacks. Yet another interpretation might be that marrying down is an indicator that a bride is undesirable on some unmeasured variable (say physical attractiveness) that we cannot account for.

part in determining whether and how much dowry is exchanged. Third, the *village and kin endogamy hypotheses* are confirmed; in both models marrying a husband from the same village or family reduces dowry's odds and value as expected.

To summarize the results of the Multilevel analyses presented, an excess of women over men in the Bangladeshi marriage market does appear to be positively associated with dowry across cohorts in some instances. The marriage squeeze indicator was significant in 7 of the 16 Multilevel Models tested. The mean level of education across cohorts, on the other hand, was found to significantly explain variation in dowry practices in only 4 out of 8 models (all 4 of which modeled a binary outcome for giving dowry). Where it was statistically significant, the cohort education effect was positively associated with the log-odds that a bride would pay dowry, and eliminates the sex ratio effect entirely. Therefore it appears that the mean educational level of a bride's female peers is capturing some cohort characteristic that washes out the pressure excess women in the marriage market exerts on dowry giving. This is an important departure from the existing literature, which, when it considers sex imbalances alone, finds that the adoption of dowry corresponds with a dearth of eligible men. Clearly, this change in marriage customs over time is in part due not to a growing marriage squeeze, but rather secular changes such as women's gains in education.

But what do these findings tell us about change over time? Recall that Multilevel Models allow the parameters for cohorts to differ from one another. Therefore an examination of the intercepts and slopes across cohorts can be used to better understand how the influence of different predictors of marriage payments changed over time for women in Matlab. In light of the problems with the data on dowry values for the earliest marriage cohorts, I focus here on estimates from the binary Multilevel Models considered, specifically the main effects of Model 2 in the random slopes and random intercepts model¹⁵. Slope coefficients for each level-1 predictor aggregated to the cohort-level show clear patterns of influence over time. Being Hindu for example, is positively associated with the log-odds of giving dowry in all cohorts. Marrying a husband of superior or equivalent wealth or education appears to more or less consistently reduce the log-odds of giving dowry consistently across cohorts. In the earliest cohorts, delays in the age at marriage increase the log-odds of giving dowry. However, starting in the 1955 marriage cohort, the older the bride, the lower the log-odds of giving dowry. Finally the influence of brides' education

¹⁵ Slopes must be allowed to vary in order to observe different slope estimates across cohorts.

seems to have shifted over time. The slope representing the relationship between years of education and log-odds of dowry giving is positive up until 1975; women who married after this point could expect diminished log-odds of giving dowry with each additional year of education.

Therefore it seems that in the binary case at least, it is not enough to account for how change in contextual factors such as marriage squeeze and educational levels (both of which increased more or less monotonically during the period under consideration). The association between individual traits and dowry practices have changed over time. Most importantly, it seems that norms of dowry giving have had a remarkably fixed relationship with the relative traits of spouses (their education and wealth gaps). However, between 1955 and 1975 women's older age and educational attainment have gone from being liabilities in the marriage market in Bangladesh to being assets.

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Appendix A
Articles and Datasets Addressing Marriage Payments in South Asia

Article	Data	Year	N	Location	Notes
Amin and Cain, 1997	Family Structure and Change in Rural Bangladesh (BIDS); Census data at the national level	FSCRB 1991; Census 1950-85	240 households; 276 marriages	2 villages, Mohanpur, Rajshani district, Northern Bangladesh	BIDS http://www.bids-bd.org/history_&_mandate.htm Cross-sectional, so some data retrospective. Variables include year of marriage, different forms of payments, value of dowry in rice equivalent, wealth (landholding), marriage history, marriage migration
Caldwell, Reddy and Caldwell, 1983	District Survey; Census data for Karnataka state	1981(?)	5,000 in the study area, N not recorded	Rural area of Karnataka state, South India	
Dalmia and Lawrence, 2005	Poverty, Gender Inequality and Reproductive Choice (NCAER); Census data at national level	PGIRC 1995; Census 1961-91	1878 households	70 villages in Uttar Pradesh and Karnataka; Census data at national level	National Council of Applied Economic Research (NCAER) http://www.ncaer.org/ (Abusaleh Shariff and BL Joshi) Institute of Social Studies Trust http://www.isst-india.org/default.asp Cross-sectional, retrospective reports. Variables include marriage transfers, current wealth, caste, age, education, religion, landholdings, sibling composition, distance of marriage migration status.
Edlund 2000; Rao 1993	International Crops Research Institute for the Semi-Arid Tropics ; Census data at the district level	ICRISAT 1983; Census 1921-81	127 (in Edlund); 141 (in Rao)	6 villages in 3 districts in Maharashtra state and Andhra Pradesh state, rural South India;	Although part of a panel study, the data is retrospective. Variables from groom's side only, include height, age, education, parents' landholding at 15, father's occupation, caste, etc.
Field, 2004	Matlab Health and Socioeconomic Survey; Demographic Surveillance System (for cross-checking births and deaths)	MHSS 1996	4,364 households; 4,028 ever married women aged 25-75	Matlab region of rural Bangladesh	http://www.rand.org/labor/FLS/MHSS/index.html#_data Variables include age at marriage, current age, height, father's occupation, composition, parents' schooling, religion, parent survival, age at menarche, education, value of dowry, arranged marriage, reproduction, domestic violence, dress, decision-making, etc.
Hallman, 2000	Bangladesh Commercial Vegetable and Polyculture Fish Production	IFPRI-BIDS-DATA 1996	269 couples	47 villages in 3 districts of Manikganj, Jessore and Mymensingh, rural Bangladesh	http://www.ifpri.org/data/Bangladesh01.htm http://www.ifpri.org/data/datasets/Bangladesh_CVFP.zip Variables include HH data, individual reports about current assets, marital premarital assets, inheritance were asked (only women reported on transfers marriage), anthropometric data, HH sanitation, extended family information
Suran, Amin, Huq, Chowdury, 2004	Adolescent Livelihoods Panel Study	2003	1,279 married adolescents aged 15-24	3 rural districts of Chittagong, Sherpur and Capainawabganj in Bangladesh	http://www.popcouncil.org/projects/TA_BanglaSchoolLiveliMarr.html This is the second panel survey, but only 2003 data is used in this analysis

Appendix B

Response Bias in Dowry Estimates

One key weakness of the MHSS data is the fact that dowry reports are retrospective. There are 5,354 co-resident husband-wife pairs in the MHSS data, allowing us to assess response bias in women's dowry reports through comparison with their husbands'. Men in polygamous unions were dropped from the data for the purpose of this part of the analysis. 36.45% of all women reported that they gave dowry at the time of their marriages, compared to only 19.33% of their husbands who reported receiving dowries for the same marriages. A paired-sample t-test confirms that this difference in dowry reporting by sex is statistically significant. Still this masks even greater discrepancies in the reports of husbands and wives. There was a conflicting dowry report for 23.62% of all couples. Wives were far more likely to report giving dowry than were their husbands – in 20.37% of all couples, the wife was the only one to report giving a dowry whereas in only 3.25% the husband reported a dowry when his wife did not. For women in these couples the mean value of dowry reported was \$301.03, exactly twice the mean dowry value reported by men (\$150.65).

How do these reporting biases differ over time? There are many cases in which husbands' and wives' reported year of marriage do not match¹⁶, so for simplicity I rely on the year of marriage reported by the wife. In Figure B1 we see that the percentage of men who report giving dowry when their wives do not are a small but consistent minority over time. In contrast, the percentage of couples in which the wife alone reports that the marriage involved a dowry payment follows a clear pattern. Couples who married in the 1975-1980 marriage cohort saw a surge in the percentage of wives reporting dowry while their husbands reported no dowry. This persists until the marriages of the 1990's, where this discrepancy starts to drop off. One notable matter in Figure B1 is that even in marriages which occurred

¹⁶ Mismatched dates could exist in the data either because one spouse said they could not recall the year of marriage and the other gave a year, or because they reported years of marriage that differed slightly. However, there is also a chance that spouses were not matched properly in the case of individuals who had married more than once. The MHSS questionnaire collected full marital histories, and although these were supposed to be entered with the most recent marriage coded first, in some instances this rule was not followed very closely. I matched spouses who were currently residing in the same household, but the marriage information provided by an individual's spouse and merged to that individual's record could pertain to another earlier marriage in some cases. Since age at marriage and year of marriage data were poor, there is no way to verify that the correct marriage data was merged in all cases.

within two years of the MHSS, more than one-fifth of couples gave conflicting reports about whether or not a dowry was exchanged. This along with the stark contrast in reporting by gender would suggest that the difference in husbands' and wives' reports are due primarily to social desirability bias and to a lesser extent perhaps, to problems of recall.

Figure B1. Discrepancies in Spousal Reports on Whether or Not a Dowry was Given by Marriage Cohort, MHSS 1996 (N=5,354)

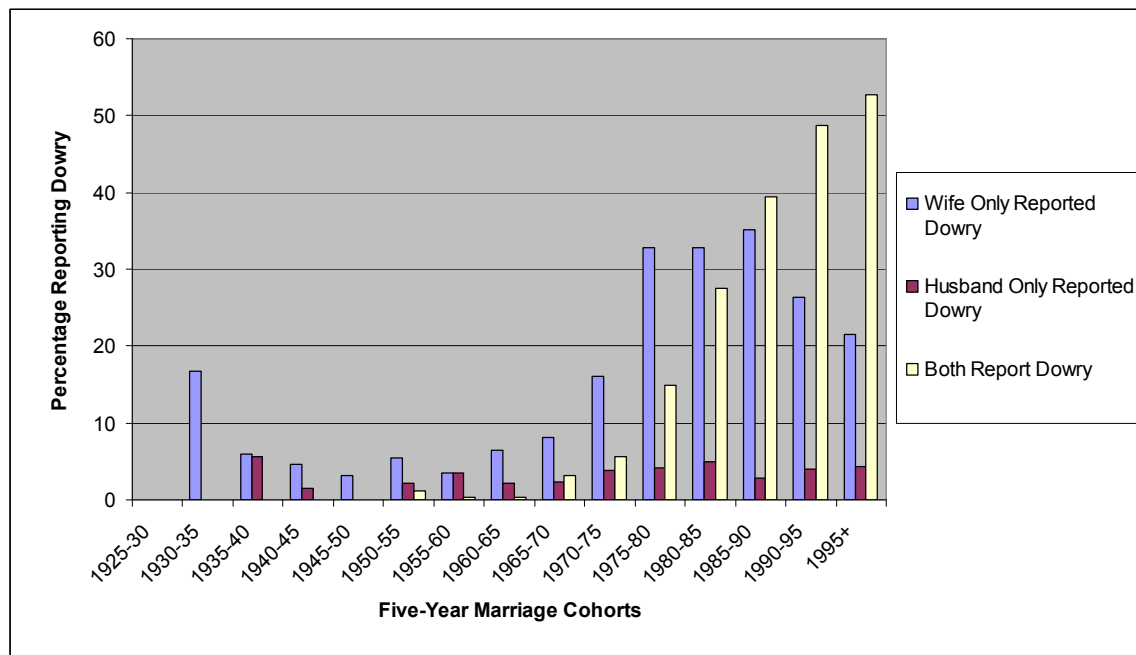
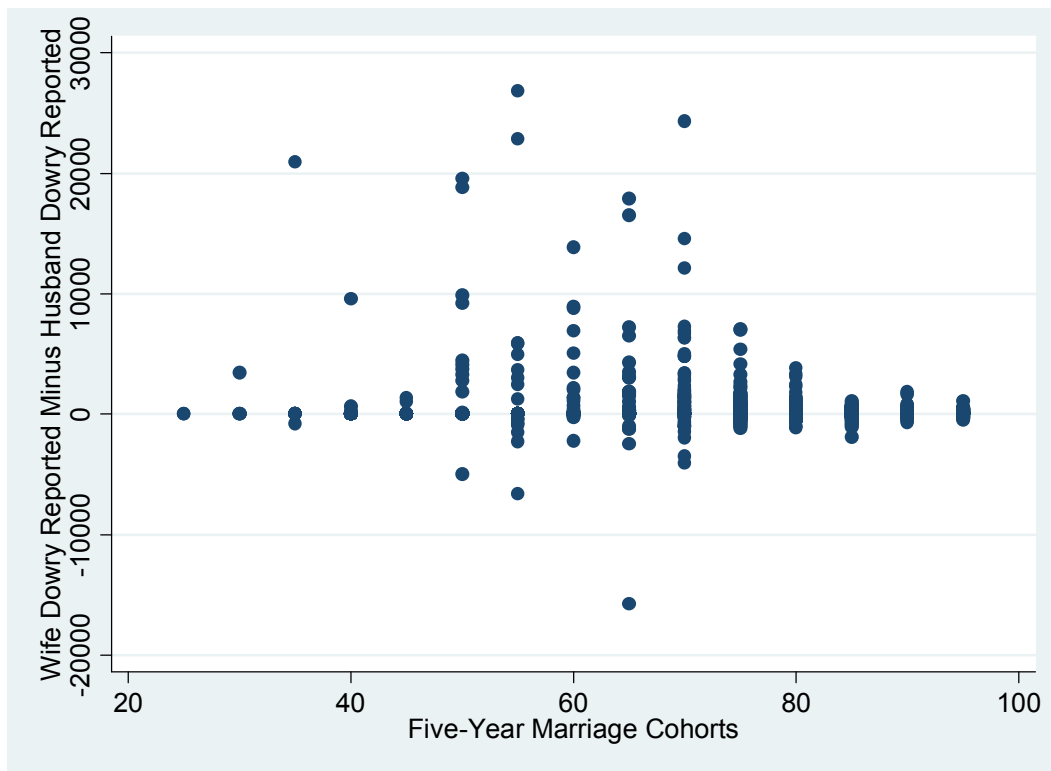


Figure B2 shows the observed difference between spouses' reported dowry values over successive marriage cohorts. Dowry values were standardized to 1996 takas and then converted to US dollars. The difference in dowry values is measured by subtracting husbands' reported dowry values from their wives' reported dowry values. Again we see that wives' reported dowry values typically exceed husbands'. In addition, there seems to be more agreement over dowry values in more recent marriage cohorts. Without making any assumptions about which partner is under- or over-reporting dowry we can see clearly in both Figure B1 and B2 that the reliability of dowry reports increases over time, suggesting that we may have greater confidence in the cross-sectional analysis where only women married after 1975 are examined.

Figure B2. Differences in Spouse’s Reported Dowry Values by Marriage Cohort, MHSS 1996 (N=5,354)



Next I run a multinomial logistic regression for all couples in which at least one partner reported a dowry exchange. For these couples, the odds that the wife alone will report dowry in comparison to both reporting dowry is affected by only three of the variables of interest to this analysis (see Table B1). First, if the couple is Hindu the odds of the wife only reporting dowry are diminished by 55% relative to both reporting dowry. As we might expect, the later the couple married, the lower the odds that the wife only will report dowry (this amounts to an odds reduction of 9%), compared to both spouses reporting dowry. Again this could be explained by the recency of the marriage eliminating problems of recall, or by growing acceptance of dowry payments as a social norm. Finally additional years of schooling for the wife seem to increase very slightly the odds that she alone will report dowry. Odds of husbands alone reporting dowry relative to both spouses reporting dowry are displayed in the second column of Table B1. Again, being Hindu and later year at marriage increase the odds that both spouses will report dowry. Wife’s schooling has no impact, although men from wealthier households (according to their wives)

have greater odds of reporting dowry alone compared to reporting dowry along with their wives.

Table B1. Multinomial Logistic Regression of Dowry Discrepancies on Various Predictors, Co-resident Couples with any Dowry Report

	Wife only Reported Dowry (Odds-Ratios)	Husband only Reported Dowry (Odds-Ratios)
Year of Marriage	0.913***	0.883***
Wife's Age at Marriage	1.046	1.045
Wife's Years of School Completed	1.062*	0.986
Hindu	0.455***	0.333**
Village Husband	0.955	0.815
Kin Husband	0.885	1.073
Husband's HH Wealthier	1.138	2.023*
Husband's HH Equally Wealthy	1.003	1.108
Husband More Educated	1.297	1.494
Husband Equally Educated	1.211	1.599
Wife's Father owns Farmland	1.214	1.926
Wife's Father owns Homestead only	1.155	0.883
N	1337	
Log Likelihood	-1129.770	
Pseudo R-Squared	.084	

NOTES: Odds-ratios are in comparison to the omitted category "Both Husband and Wife reported Dowry"

* p<.05, **p<.01, ***p<.001

SOURCE: Matlab Health and Socioeconomic Survey, 1996

Finally, I test the salience of the predictor variables of interest on the difference in dowry values reported by husbands and wives, using Ordinary Least Squares regression. The difference measure represents wife's reported dowry value minus husband's reported dowry value. Surprisingly, the year of marriage has no statistical effect on this difference. Also puzzling in light of the previous table, is the fact that being Hindu is associated with wives reporting \$648 more in dowry than their husbands. Each additional year of schooling for a woman in the data is associated with slightly more dowry reported by wives than by their husbands. The older the wife at marriage, the lower her dowry value is relative to her husband's. For every year's delay in marriage for women, there is an excess of \$24 in dowry reported by her husband.

Table B2. Linear Regression of Difference in Wives' and Husbands' Dowry Values on Various Predictors, All Co-resident Couples

	Model 1 (Betas)
Constant	719.174***
Year of Marriage	-3.214
Wife's Age at Marriage	-23.606**
Wife's Years of School Completed	29.958**
Hindu	647.651***
Village Husband	14.759
Kin Husband	-69.227*
Husband's HH Wealthier	-138.043
Husband's HH Equally Wealthy	-95.454
Husband More Educated	90.614
Husband Equally Educated	198.887
Wife's Father owns Farmland	-51.950
Wife's Father owns Homestead only	-113.042
N	3413
R-Squared	.030

NOTES:

* p<.05, **p<.01, ***p<.001

SOURCE: Matlab Health and Socioeconomic Survey, 1996

Table B1 and B2 provide some evidence of the extent to which the reliability of dowry reports are affected by socio-demographic characteristics. The multinomial logistic regression suggests that the variables of interest in the main body of the analysis do not for the most part influence whether a woman reports a dowry while her husband does not. Being Hindu seems to be the most important factor here, and the coefficient suggests that being Hindu improves the odds that spouses' dowry reports will be consistent. This is further confirmation of the strong positive effects of being Hindu on dowry payment reported in the main analysis. The linear regression suggests that while a few of the key demographic traits of wives have a significant effect on her reported dowry value relative to her husband's, none of the variables testing the my key hypotheses seem to matter. Because the value of dowry reported is itself a problematic measure whose interpretation should be approached with caution, these findings are not cause for concern.