

Dowry and Intrahousehold Bargaining: Evidence from China

Philip H. Brown[†]
University of Michigan

**Prepared for the 2002 NEUDC conference
Williamstown, Massachusetts**

October 7, 2002

DRAFT – PLEASE DO NOT CITE

Abstract

This paper investigates the effects of dowry in determining wife's welfare in China via a cooperative Nash bargaining framework. The analysis implements a two stage least squares identification strategy that controls for both simultaneity and omitted variables bias that has troubled much of the previous research; the two instruments employed – lagged historical deviation from trend in provincial per capita grain yield and sibling sex composition – are highly correlated with dowry while remaining plausibly exogenous to intrahousehold allocation decisions. I find that dowry has a robustly positive impact on a variety of household resource allocations of interest to the wife, including the time that her husband allocates to performing specific household chores, the wife's leisure time, the share of household spending allocated to women's goods, and the probability that wives self-identify as being satisfied with their lives. I also find that dowry impacts the degree to which the wife has the final authority when disputes over household issues arise, a direct measure of her bargaining position. These findings provide considerable evidence for the theoretical literature linking control of resources to marital outcomes.

Acknowledgements

This paper has benefited from the insights and suggestions of Albert Park, David Lam, Jan Svejnar, and Bob Willis. I am also grateful for helpful comments from Rachel Connelly, Yang Du, Charlene Kalenkoski, Yun Li, Bill Parish, Rohini Somanathan, Sangui Wang, Mingren Zhao, participants of the University of Michigan Comparative Economic Development Seminar in Ann Arbor, participants of the 2002 RAND Economic Development Workshop in Atlanta, and seminar participants at Northwest Normal University in Lanzhou, China.

JEL Classifications: 012, J12, D12, P36

Keywords: marriage, dowry, intrahousehold bargaining, economic development, China

[†] Department of Economics & Population Studies Center
611 Tappan Street, Ann Arbor, Michigan 48109-1220
phbrown@umich.edu tel: (734) 996-3460 fax: (734) 764-2769

I Introduction

The predominant model of household behavior formalized by Becker (1965, 1991) assumes that families maximize a single utility function, i.e., that either all household members have identical preferences, or that one household member functions as a dictator, determining all allocations within the household. While this “unitary” model has provided numerous important insights into household behavior (Browning, 1992 provides a survey), it offers little perspective on how individual preferences inform these allocations. More general models of the household that explicitly account for differences in preferences have followed. One prominent set of models treats household decisions as the result of household members engaging in cooperative Nash bargaining (e.g., Manser and Brown, 1980; McElroy and Horney, 1981).¹ In such “collective” approaches to household behavior, the bargaining position of household members plays an important role in determining allocations, with household members who have better bargaining positions able to realize better outcomes.

While the concept of bargaining position is theoretically straightforward, measuring bargaining position empirically is difficult in practice. Of particular are the paucity of socioeconomic data that include both plausible measures of household bargaining and individual welfare measures and the difficulty of correcting endogeneity problems with existing data (Behrman, 1997). Nevertheless, numerous studies have been undertaken which find evidence supporting the collective models of households in many developing countries.

Due to intuitive appeal and empirical tractability, many early studies focused on men’s and women’s income as relative measures of intrahousehold bargaining position, e.g., Folbre (1984), Von Braun (1988), Garcia (1990), and Hoddinott and Haddad (1995). They find grounds to reject the income pooling hypothesis central to the unitary model and find considerable evidence that control of resources has strong implications for how those resources are used by the household. However, by using income as a regressor, they assume that labor supply decisions are exogenous, a supposition that may not be defensible, and their findings may be susceptible to simultaneity bias. To avoid this issue, other studies have relied on nonlabor income to measure relative bargaining power within the household, e.g. Schultz (1990) and Thomas (1990). Yet nonlabor income may be dependent on the individual being in a particular

¹ A more general model assumes only that household members allocate resources in a Pareto efficient manner (Chiappori, 1988, 1992).

state. For example, income in the form of insurance benefits due to temporary illness may have little influence on bargaining position (Hoddinott, Alderman, and Haddad, 1997). Further, persistent unobservable differences in productivity and taste may have influenced past asset accumulation (Behrman, 1997). Finally, nonlabor income may reflect previous labor supply decisions and are thus potentially endogenous in a “life-cycle context” (Strauss and Thomas, 1995; Hoddinott et al., 1997; Schultz, 2001).² An appealing alternative to income as an indicator of bargaining position is what McElroy (1990) calls “extrahousehold environmental parameters” that shift threat points within marriage. Examples include sex ratios at the relevant marriage ages and marriage laws. In principal, difference in such parameters can serve as natural experiments in predicting household allocations. However, in the absence of randomized experiments, certain environmental differences may not be exogenous (Hoddinott et al., 1997).³

In the search for exogenous determinants of intrahousehold bargaining position, one interesting recent approach has stressed assets controlled by individuals at the time of household formation, such as brideprice (a transfer from the groom’s family to the bride’s family or to the conjugal unit) and dowry (an analogous transfer originating with the bride’s family).⁴ If divorce sees the assets reverting to the original holder, they may affect bargaining position without the simultaneity concerns that arise in the previously described studies. Zhang and Chan (1999) find that dowry is associated with a greater probability that husbands do household chores in Taiwan. To reach these conclusions, they implement a two-stage least squares (2SLS) estimation strategy using parent education as an instrument for dowry. Yet unobservable characteristics of the wife (e.g., intelligence) could be correlated with characteristics of her parents’ education, and thus the error terms in the first and second stage regressions may not be independent. In addition, the authors do not control for time trends, further biasing the estimates if younger husbands both have more educated parents and contribute more time to housework. Their identification

² Nevertheless, Schultz (2001) points out that there is a dearth of studies that systematically establish simultaneity bias between nonlabor income and household outcomes.

³ For example, Rao and Greene (1993) find a negative relationship between the regional sex ratios of 25-29 year old males and 15-19 year old females (the preferred marrying ages) and fertility in Brazil. One interpretation is that higher sex ratios imply a greater availability of unmarried men, leaving women in better positions to bargain for smaller family size. However, because of the age gap at marriage, regions with preferences for lower fertility will also have higher sex ratios at marrying age, suggesting that these estimates may suffer from simultaneity problems.

⁴ Other endowments have been considered in the literature as well. For example, Duraisamy and Malathy (1991) find that Indian children are more likely to attend school and receive medical care when their mothers have more jewelry. However, the extent to which jewelry is acquired before household formation (as opposed to being the result of intrahousehold bargaining in marriage) is not clear.

strategy is thus subject to endogeneity problems similar to those in many previous studies of household behavior.

This paper makes use of detailed new data from China to investigate the effects of dowry (as a measure of wife's bargaining position) on household allocation in a cooperative Nash bargaining framework. To control for the potential endogeneity of marital payments, I use 2SLS estimation with lagged historical deviation from trend in provincial per capita grain yield as an instrument. Every household surveyed depends on farm production to some extent, with over half deriving all of their income from agriculture and livestock. Therefore, unexpected shocks to grain yield have a substantial impact on household wealth accumulation, and thus on the ability of households to make transfers associated with marriage. Differences in dowry between like families in different years are thus identified by exogenous randomness in the weather. A second instrument I employ is sibling sex composition, a strong indicator of savings available for marital payments due to different costs incurred in the marriages of sons and daughters. For this identification strategy to be successful, sibling sex composition cannot correlate with important unobservable characteristics of the bride or groom;⁵ in contrast to many other studies, I include family background measures as control variables. Sibling sex composition is thus used to identify differences in dowry between different families in the same year. In addition, estimates include a time trend to account for the possibilities that marital payments reflect contemporary norms and that household bargaining outcomes are related to the generation involved. I also use location fixed effects to minimize unobserved heterogeneity. This identification strategy represents a significant departure from previous studies in that omitted variables and simultaneity concerns are largely eliminated.

I find that dowry has a robustly positive impact on a variety of household resource allocations of interest to the wife, including the time that her husband allocates to performing specific household chores (both as a level and as a percentage of the couple's total time allocated to chores), the wife's leisure time (as a level and as a percentage of the couple's total leisure), and the share of household spending allocated to women's goods. Dowry also affects the probability that wives self-identify as being satisfied with their lives, likely reflecting numerous household allocation decisions beyond those estimated directly. I also find that dowry impacts

⁵ To confirm the exogeneity of this instrument, I regressed characteristics of individuals such as earnings and education on sibling sex composition, parent education, and family size. The point estimates were not significant in any case.

the degree to which the wife has the final authority when disputes over household issues arise, a direct measure of her bargaining position.

The remainder of the paper is organized as follows: section II briefly introduces a stylized model of intrahousehold bargaining; section III describes the role of marital payments in the marriage ritual in China; section IV details the identification strategy used in the empirical investigation; section V introduces the data used in the analysis; section VI presents empirical evidence that dowry affects a wife's bargaining position; and section VII summarizes the results and discusses several implications.

II Cooperative Nash Bargaining Model

Following McElroy and Horney (1981), consider two unmarried individuals, f and m , who each care about their own consumption of goods and leisure. Individual i 's utility is given by $U^i(g, x_i, l_i)$, $i = f, m$, which is assumed to be nondecreasing and quasiconcave. Here, x_i is a good consumed by i , l_i represents i 's leisure, and g is a private good that will become a jointly consumed household public good if f and m marry. Suppose that f has a private endowment given by D . In the single state, f maximizes utility subject to the constraint given by $p_g g + p_f x_f + w_f l_f = w_f T + D$ and m maximizes utility subject to $p_g g + p_m x_m + w_m l_m = w_m T$. Here, p_g is the price of g , p_i is the price of x_i , and w_i is i 's wage rate. This yields the strictly quasiconvex indirect utility functions $V^f(p_g, p_f, w_f, D)$ and $V^m(p_g, p_m, w_m)$. These utilities *outside* marriage correspond to the threat points of individuals *within* marriage, i.e., the minimum utility available to each individual in the event of marital dissolution, assuming D reverts to f .⁶

Within marriage, utilities are assumed to be defined over one's own consumption of goods and leisure as well as that of one's spouse. In the cooperative Nash bargaining framework, then, f and m jointly choose consumption to maximize the gains from marriage in symmetric von Neumann-Morgenstern utility functions given by:

$$(1) [U^f(g, x_m, x_f, l_m, l_w) - V^f(p_g, p_f, w_f, D)] [U^m(g, x_m, x_f, l_m, l_w) - V^m(p_g, p_m, w_m)]$$

⁶ Lundberg and Pollack (1993) have shown that that the central predictions of the model hold even when divorce is precluded in that couples may revert a noncooperative outcome within marriage, the "separate spheres" solution.

subject to the joint budget constraint wherein total household expenditure equals total household income:

$$(2) \quad p_g g + p_m x_m + p_f x_f + w_m l_m + w_f l_f = (w_m + w_f)T + D.$$

The solution to this game is characterized by Pareto optimality in the allocation of resources, symmetric roles of the players, invariance with respect to linear transformations of each player's utility function, and independence of irrelevant alternatives.⁷ Using the implicit function theorem, the solution to the maximization of equation (1) subject to the budget constraint (2) is a system of demand equations for goods and leisure:

$$(3) \quad \begin{aligned} x_0 &= h(p_g, p_m, p_f, w_m, w_f, D) \\ x_m &= h(p_g, p_m, p_f, w_m, w_f, D) \\ x_f &= h(p_g, p_m, p_f, w_m, w_f, D) \\ l_m &= h(p_g, p_m, p_f, w_m, w_f, D) \\ l_f &= h(p_g, p_m, p_f, w_m, w_f, D). \end{aligned}$$

The salient feature of this Nash bargaining model is that an increase in resources under one spouse's control increases his or her threat point within marriage by increasing the utility he or she receives outside of it,⁸ and the higher threat point of either spouse corresponds to joint allocations that more strongly reflect the preferences of that spouse. Therefore, the household demand functions in equation (3) reflect endowments, D , that individuals bring to the marriage. Dowry is a prime example of such endowments.

III Marital Transactions in Rural China

Multiple transfers between interested parties characterize the marriage ritual in China. Brideprice (*pinli* or *pinjin*) is a transfer or series of transfers from the groom's parents to the bride's parents, while dowry (*jiazhuang*) represents a subsequent transfer from the bride's family to the bride. Thatcher (1991) documents this system as far back as the Spring and Autumn period of the Eastern Chou dynasty (770 - 256 B.C.), and the system remained largely intact through the early 20th century. With the founding of the People's Republic of China, the Chinese

⁷ Manser and Brown (1980) discuss the implications of these properties.

government sought to combat “feudal” practices in marriage. Central to this objective was the 1950 Marriage Law that specifically prohibited “the exaction of money or gifts in connection with marriage” (Meijer, 1971). Yet as Parish and Whyte (1978) put it, “Poor peasants were less enthusiastic about marriage struggle than they were about class struggle,” and the new rules were largely ignored (Min and Eades, 1995; Ocko, 1991).

In rural China, brideprice is negotiated between the bride and groom’s parents using a matchmaker as intermediary.⁹ Because the bride formally leaves her own family at marriage to join her husband’s, the brideprice negotiation focuses on how the bride’s family should be compensated for investments made in rearing the bride (Croll, 1981) and the loss of rights over her (Goody, 1973). A further consideration, particularly after agricultural decollectivization when families could again profit from the sale of excess production, is the loss of a bride’s future productivity (Min and Eades, 1995; Parish and Whyte, 1978; Zhang, 2000). That is, brideprice is a mechanism for clearing the market, but not generally for making bequests to the husband or to the conjugal unit. Once a figure has been negotiated, brideprice is typically given to the bride’s family in several installments over the course of the engagement, which typically lasts a year or more (Liu, 2000).

Brideprice payments are adjusted to reflect quality of life issues in the village in which the couple will reside, with higher brideprices offered to induce women to marry into areas with lower comfort levels, e.g., remote or mountainous areas and areas with several major harvests (Croll, 1981), or into families of lower social status. Because brideprice represents a great financial burden for the groom’s family,¹⁰ parents often postpone a son’s marriage until a sister has been married, using the brideprice received in the daughter’s marriage to form the basis for the brideprice paid in the son’s marriage (Parish and Whyte, 1978; Siu, 1993).¹¹ Families whose sons outnumber their daughters may assume considerable debt to finance brideprice (Min and Eades, 1995).

⁸ Other aspects of the extramarital environment will similarly enter the household demand functions by influencing threat points. See McElroy (1990) for discussion.

⁹ Marriages that are arranged by the bride and groom themselves are increasingly common in throughout China (Cheng, 1992). Interestingly, brideprice and dowry are paid even in the majority of these marriages (Parish and Whyte, 1978).

¹⁰ Zhang (2000) reports that the value of brideprice payments more than tripled between 1984 and 1993 in one rural village in Hebei province.

¹¹ An alternative to this practice is the “exchange marriage” in which a sister of the groom marries a brother of the bride in lieu of formal brideprice. These marriages also tend to have lower dowries (Selden, 1993).

Brideprice then functions as the pool from which dowry is drawn.¹² The bride's family decides the size and composition of the dowry; unlike brideprice, it is not subject to negotiation by the groom's parents.¹³ Offering elaborate dowries provides a vehicle for prestige building (Liu, 2000; Potter and Potter, 1990; Siu, 1993), but also serves as an efficient pre-mortem inheritance (Croll, 1981; Parish and Whyte, 1978).¹⁴ In much of rural China, current practice is that brides' parents retain a portion of the brideprice received for their savings and pay out a portion as dowry.

Regardless of size or composition, dowry forms the basis of the new conjugal unit's household – the items needed for daily living as well as a cash component reserved for the bride's use. While the groom has equal access to the non-pecuniary aspects of dowry, the bride retains ultimate authority in its use. For example, Yan (1996) observes that brides charge high interest rates when make loans from her dowry, even when the borrower is a member of her husband's family. Furthermore, control of the dowry reverts to the bride in the event of marital dissolution (Ocko, 1991) and thus influences her threat point within marriage (Zhang, 2000).

Given that brideprice is an intragenerational transfer between parents of the bride and groom while dowry is an intergenerational pre-mortem bequest made by the bride's parents, it is not altogether surprising that multiple transfers in different directions occur for the same marriage.¹⁵ What is perhaps not intuitive, however, is why brideprice serves as the market clearing mechanism rather than dowry. Specifically, Becker (1991) establishes that the gains from marriage are distributed to the scarce sex in the marriage market until the plentiful sex is indifferent between marriage and the single state. If marital output is indivisible, then the plentiful sex reaps part of these gains. Members of this sex will bargain away these gains as an inducement to the scarce sex to marry via up-front, compensatory transfers, i.e., brideprice or dowry. In China, the sex ratio within each cohort is approximately equal, but population growth and the difference in age of marriage between men and women implies that the number of women exceeds the number of men in each marriage market. In this context, we expect

¹² Goody (1973) refers to this practice as “indirect dowry.”

¹³ Dowry is, however, influenced by local custom. Parish and Whyte (1978) find that dowry plays virtually no role in marital transactions in one village in Guangdong province. By contrast, Potter and Potter (1990) found that parents in a different Guangdong village during the same period typically converted the entire brideprice payment into dowry.

¹⁴ The difference in timing of inheritance for sons and daughters may be attributed to higher transaction costs for daughters who have married and left the household, and in many cases the local area.

¹⁵ Zhang and Chan (1999) analyze the coexistence of dowry and brideprice in the same marriages in Taiwan.

payments made to the groom or his family, not the opposite.¹⁶ Many benefits of marriage accrue primarily to the husband or his family, e.g., continuing the husband's family line and support for his parents in old age, and brideprice payments may compensate for these unequal gains. An alternative explanation is that divorced or widowed men remarry while divorced or widowed women do not, effectively eliminating the gender gap in the marriage market. Another possibility is that marital institutions may simply not have adjusted after a long history of concubinage. Edlund (1996) proposes that dowry payments serving as the market clearing mechanism despite the relative shortage of marriageable women in India may have resulted from increasing male heterogeneity relative to female heterogeneity, but this puzzle remains an issue for further investigation in China.

IV Identification

Section II describes a model in which dowry forms an important part of the endowment a woman brings to marriage, and hence her threat point within the household. The threat point, in turn, shapes the husband and wife's joint demands for goods and leisure, with a higher threat point corresponding to allocations that more strongly reflect the wife's preferences. Other factors that establish expectations about the distribution of marital output may also impact the wife's welfare. One measurable example is brideprice.

Let U^* denote wife's welfare from the allocation of goods resulting from the cooperative Nash bargaining process. Then:

$$(4) \quad U^* = \hat{a}_1 D + \hat{a}_2 B + \mathbf{Z}_1 \hat{a}_3 + e_1$$

where D is the dowry a wife brings to marriage, B is the brideprice payment made to the bride's parents, and \mathbf{Z}_1 is a vector of demographic and explanatory variables including a vector of prices as described in section II, and e_1 is an error term. If dowry affects wife's welfare, then \hat{a}_1 is positive.

Suppose that dowry and brideprice are measured by:

$$(5) \quad D = \mathbf{Z}_2 \ddot{a} + e_2$$

¹⁶ Along these lines, Rao (1993) attributes rising dowries in India to a similar "marriage squeeze" caused by male – female differences in the age of marriage and population growth.

$$B = \mathbf{Z}_3\delta + e_3$$

where \mathbf{Z}_2 and \mathbf{Z}_3 are vectors of demographic variables that may or may not overlap with each other and with \mathbf{Z}_1 . Dowry and brideprice are unlikely to be exogenous; any unobserved characteristic of the wife that affects these payments may also affect her share of marital output. For example, Boulier and Rosenzweig (1984) show that physical attractiveness affects marital allocation, and it is not implausible that it might also affect dowry decisions. Alternatively, women with likable personalities may receive higher dowries from their parents and have better marital allocations than women with disagreeable personalities. In either case, the error term in equation (4) will not be independent of D and B , i.e., e_1 may correlate with e_2 and/or e_3 , and estimating equation (4) using ordinary least squares (OLS) may produce biased and inconsistent estimates.

Following Davidson and MacKinnon (1993), I test for the exogeneity of dowry as well as brideprice by separately regressing them on all of the exogenous variables in equation (2), saving the residuals, and including the saved residuals as additional regressors in estimating equation (4). I then test the hypothesis that the coefficients on the residuals are jointly zero. The joint exogeneity of dowry and brideprice is rejected at the 99 percent confidence level. OLS is thus an inconsistent estimator, and estimation using 2SLS is warranted.

Good instruments are both highly correlated with the endogenous right-hand-side variable and independent of the dependent variable (see Bound, Jaeger, and Baker, 1995 for discussion). The first instrumental variable employed in this study is lagged historical deviation from trend in provincial per capita grain yield. Deviation from trend in grain yield is measured by regressing historical grain output data in each province on a time trend; this identification strategy isolates the effect of transitory output shocks that are independent of overall trends in economic development in each locality. These exogenous shocks impact household wealth accumulation, and therefore the ability of households to make transfers associated with marriage. Liu (2000) reports that marriage typically takes place in the year following marriage negotiations, so shocks to grain are lagged one year. The second instrument is sibling sex composition, measured by the sex mix of the bride's younger siblings and the groom's older siblings. The sibling sex composition of the bride reflects the natal household's ability to save in order to pay the brideprice for younger brothers, and hence the amount available for dowry

payments to a daughter, while that of the groom's siblings reflects income from the marriages of older sisters and expenditures in the marriages of older brothers, and thus the ability of the household to finance brideprice in the marriage of a son (Min and Eades, 1995). For this identification strategy to be successful, sibling sex composition cannot be correlated with important unobservable characteristics of the individual; after controlling for location, time trend, and family background measures such as parent education and family size, I find that sibling sex composition does not have a significant effect on an individual's income or education (output omitted). Together, these instruments explain variation in marital payments between different household types within the same year (via differences in sibling composition) and between like household types in different years (via shocks to grain output) while remaining exogenous to intrahousehold allocation decisions.

Like dowry, assignable income may impact household allocations by shifting marital threat points. As described in section I, however, income may be correlated with omitted characteristics of the couple that also affect bargaining outcomes. Unfortunately, these data lack satisfactory instruments for assignable income, and including income in the estimates may produce biased results. The conservative strategy adopted here is thus to exclude income from the empirical analysis.¹⁷

This identification strategy is subject to a few caveats. First, without an analogous increase in men's endowments, it is impossible to conclude with certainty that dowry influences a woman's marital threat point. That is, it is possible (if unlikely) that an exogenous increase in men's pre-marital endowments would result in exactly the same marital allocation, and this possibility cannot be ruled out with certainty. Second, brideprice reflects the cost of marriage for men, and prices should not rise in windfall years (and fall in years of shortage) if the marital partner is predetermined. That is, grain output may be an inappropriate instrument for brideprice if matching has already occurred because the gains from marriage are fixed. If family wealth resulting from grain yield plausibly impacts the matching of husband and wife, however, this concern goes away. Finally, it is possible that dowry correlates with some other characteristic of the bride such as her social network, and that this trait is the true determinant of her marital bargaining position. To address this specific concern, I included several measures of the

¹⁷ I also estimated all models including income on the right hand side. There was no discernable effect on the other point estimates in any case.

family's social network (e.g., relationship to the family's main benefactors and whose relatives were visited during the previous New Year holiday) as additional regressors in each of the estimates that follow. I found that including these regressors had no discernable impact on the dowry coefficients (output omitted).¹⁸

V Data and Variables

The second wave of the China Rural Poverty Survey, a collaborative effort of researchers from the Chinese Academy of Agricultural Science Institute of Agricultural Economics and the University of Michigan (including the author), was conducted in February, 2001. The survey covered four counties, with one county in each of four interior provinces: Gansu, Guizhou, Shaanxi, and Sichuan.¹⁹ The household sample in each county was the same as that used by the Chinese State Statistical Bureau, which draws a nationally representative stratified sample each year. The survey encompassed 587 households evenly distributed across 40 villages. Approximately two-thirds of the households also participated in the first wave of the survey, conducted in December, 1997.²⁰ Excluding households wherein the head of household is widowed, divorced, single, or absent reduces the sample to 460. I restrict the sample further by dropping 5 households that have key variables missing and 4 households in which marriage preceded the 1950 Marriage Law. The final sample thus consists of 451 couples married between 1950 and 2000, inclusive.

Respondents were asked detailed information about their marriages, including the values of dowry and brideprice.²¹ Detailed demographic and time allocation data were collected for all members of the household. Additionally, household expenditures on a range of goods were collected, including spending on assignable goods. Last, a separate instrument designed to

¹⁸ The relative strength of the wife's social network was associated with each measure of wife's welfare, but never significantly so. Exploring this issue may be of interest for further study.

¹⁹ The sampled county in Guizhou is a designated minority county (with sizable *Miao* and *Yi* populations), but 80 percent of the sampled households in Guizhou are ethnic *Han* Chinese, making it difficult to distinguish differences between minority and non-minority households in dowry and brideprice practices.

²⁰ See Brown and Park (2002) and Park and Ren (2001) for more on the first wave of the China Rural Poverty Survey.

²¹ Detailed records of marital transactions are generally kept as part of the public record. When questioned, few respondents had difficulty recalling the exact amounts of their brideprice and dowry – or that of their siblings, children, or neighbors. Marital prices were converted to real values using 1985 as the base year. Dowry and brideprice for marriages occurring prior to 1985 were converted using the general retail price index, which was first calculated in 1950. Prices for marriages occurring from 1985 onwards were converted using the rural CPI, a more accurate reflection of rural prices that was introduced in 1985.

assess attitudes, preferences, and marital roles was asked of husbands and wives separately; data gathered from this instrument also include which spouse is responsible for making household decisions.²²

Wife's marital welfare, U^* in equation (4), is measured in 4 ways:

1. total time husbands allocate to three specific household chores – gathering wood, cooking meals, and cleaning – both as a level and as the percentage of the couple's total time allocated to these chores;
2. wife's leisure time, defined as time spent doing activities other than market work, farm work, or household chores, both as a level and as the percentage of the couple's total time allocated to leisure;
3. the share of annual household spending used to purchase goods for women's use; and
4. the degree to which the wife agrees with the statement "In general, I am satisfied with my life."

In addition, I estimate bargaining position directly via a measure of which spouse has the ultimate authority to make household decisions when the husbands and wives have differing preferences.

These outcomes may require some explanation. "Leisure time" is perhaps a misnomer because although I include the wife's time allocated to gathering wood, cooking meals, cleaning, and several other chores, I do not have data for every household activity, including time spent rearing children. Nor does this variable include time spent outside of work due to illness or other hardships. This measure represents a wife's total potential leisure time, therefore. Household spending on goods for women's use may not be limited to women's items alone. Specifically, this category of spending is "*ge ren yongpin zhichu* (expenditures on items of personal use)," and makeup, jewelry, and electric razors were given as examples. Because razors are inexpensive and durable, and thus likely contribute little to the total annual expenditure (unlike jewelry which is expensive or makeup which is consumed quickly), I attribute this consumption to the wife.²³

²² These forms were administered at a different time than the main household form. As a result, many households were not available on the re-visit. This is true for more husbands than wives. In the vast majority of cases wherein both husbands and wives were present, they reported the same household member as being responsible for household decisions.

²³ The interpretation is clearly problematic if many male goods are included in this expenditure category, but the results detailed below are difficult to explain if this is the case. In addition, similar (but slightly weaker) results are obtained when using the share of consumption attributed to children's clothing as the outcome variable of interest.

This variable is measured as a share of total household spending, as suggested by Deaton (1989), among others. Next, the “satisfaction” variable is interesting in that it may reflect wife’s welfare beyond those outcomes evaluated here. Finally, decision-making authority is measured by which member of the household is primarily responsible; a value of 0 is assigned if the husband is responsible, 1 is assigned if the wife is responsible, and 0.5 is assigned if they are jointly responsible.

Schultz (2001) raises two objections to these measures of welfare. First, he observes that nothing prevents a husband or wife from deriving selfish pleasure from the consumption of his or her spouse. Higher spending on women’s goods category may thus reflect a husband’s higher bargaining position as well as his wife’s. Second, he questions whether nonmarket time (as opposed to leisure time in a pure sense) necessarily constitutes evidence of higher utility, particularly given that women are often responsible for household upkeep and child rearing. My measure of leisure omits time devoted to household chores, but not to child rearing, and may thus be subject to this criticism. A related concern is whether time allocation decisions reflect household specialization strategies that wives support (and may even prefer) rather than welfare. While I cannot rule out this possibility, it does seem unlikely that dowry should systematically affect these strategies. Moreover, including assignable income in the empirical analysis has no discernable effect on the point estimates for dowry, perhaps suggesting that husbands substituting income generating activities for household chores is not part of this strategy. In any event, specialization should not explain the impact of dowry on household consumption of women’s goods.

The vector of demographic variables, Z_1 in equation (4), is measured by the differences in age and education between husband and wife, the number of children and adults (other than the husband and wife) in the household, parent education, and the total number of siblings in the natal household. Age and education differences (defined as the husband’s age or years of education less the wife’s) may affect marital threat points and the experience needed to make household decisions. Household composition may affect the distribution of household chores and the opportunity to engage in work outside the home. Characteristics of the natal household are included to control for unobserved characteristics of the conjugal couple that might correlate

This result is consistent with higher female bargaining power resulting in improved conditions for children, a common finding in the household bargaining literature (e.g., Thomas, 1990).

with marital payments. Time trends are also included as a regressor and are allowed to vary by province. These are implemented via a set of three dummies in each province. In addition, a set of province or village dummies and province – time trend interactions are included to control for sex ratios, unemployment rates, unobserved heterogeneity at the local level, and trends in marital transactions.²⁴ Determinants of dowry, Z_2 in equation (5), are measured via the timing of marriage, the age and education differences between husband and wife, the location of the marital home, parent education, natal family size, and the instruments described in section IV.

Basic indicators for the 451 sample households are presented in Table 1. Husbands spend 44 minutes per week gathering wood, cooking meals, and cleaning, although roughly half of the surveyed husbands do none of this work. Husband's time spent helping with household chores amounts to 18 percent of the total time that couples devote to these activities, but 5 percent of husbands perform all of these chores for the couple. Women spend 35 hours per week engaged in income generating activities and household upkeep, leaving 6931 hours per year (133 hours per week) for sleeping, child rearing, and other household activities. The distribution of leisure between husband and wife is roughly equal in the mean household, with women spending 2.1 percent less time in leisure than their husbands.²⁵ Spending on women's goods accounts for 0.2 percent of annual household spending, although this figure varies widely. Surveyed households commonly spend nothing on this form of consumption, while 3 households spent in excess of 2 percent of their total expenditures on women's goods. In their responses to the qualitative question, women are split nearly evenly between feeling satisfied and feeling unsatisfied with their lives. The majority of women reported feeling either "somewhat satisfied" or "somewhat unsatisfied," with only 13 women at either extreme. Finally, wives have the ultimate decision-making authority when disputes arise over household issues household issues 35 percent of the time

Turning to independent variables, couples have been married for 20.5 years on average. The typical husband is 43 years old, 3 years older than his wife, and has completed primary schooling, 3 grades more than his wife. Households include 1.4 children and 0.6 other adults

²⁴ Ideally, dummies for bride's and groom's home villages would both be used, but the latter are not available in this survey. Still, marriages typically occur between households in neighboring villages or towns, and only rarely across long distances. Therefore, the village dummy should be largely representative of conditions in the bride's home area as well.

²⁵ Again, this measure excludes child rearing. These averages may be misleading if wives spend more time caring for children than their husbands.

(typically an elderly parent) on average. Total parent education averages just 2.4 years, and husbands and wives each have 3.8 siblings in their natal families.²⁶

Using 1985 as a base year, the mean real dowry and brideprice are 247 yuan²⁷ and 538 yuan, respectively, suggesting that the bride's family retains 54 percent of the brideprice received. Practice varies widely by province, however. In Gansu, dowry averages just 22 percent of brideprice, while dowry exceeds brideprice by 18 percent in Sichuan (Figure 1). Further, dowry and brideprice have been appreciating in real terms since 1950.²⁸

Section IV describes the selected instruments for dowry and brideprice. Descriptively, wives have 0.2 younger brothers than sisters and husbands have 0.1 older sisters than brothers. The average deviation from trend in grain yield mirrors trend quite closely, but there is some variation. For example, strongly negative deviations were experienced in all provinces during the 1959 - 1962 famine. First stage regressions for the determinants of dowry and brideprice are presented in Table 2. The instruments are good predictors of both dowry (the hypothesis that the coefficients on the instruments are jointly equal to zero is soundly rejected with $F = 6.53$) and brideprice ($F = 5.43$). These instruments are therefore used in the empirical work that follows.²⁹

VI Empirical Results

This section investigates the effect of dowry on four measures of wife's welfare: the amount of time that husbands devote to doing household chores, the wife's total potential leisure time, the amount spent on women's goods as a share of annual household spending, and the degree to which wives self-identify as being satisfied with their lives. In addition, I consider the

²⁶ All of the men and women in this analysis pre-date the introduction of China's One Child Policy. Household sizes in these areas are considerably smaller now.

²⁷ \$1US is worth approximately 8.2 Chinese yuan.

²⁸ Regressing dowry on marriage year yields highly significant, positive coefficients in each province. Regressing brideprice on marriage year produces highly significant, positive coefficients for Sichuan, Shaanxi, and Gansu. The effect in Guizhou is positive but not significant.

²⁹ I tried a variety of other instruments as well, including parent occupational status, historical provincial data on the area affected by natural disaster, historical county-level rainfall data, and historical county grain yield data. However, none of these measures explains as much variation in dowry or brideprice as the deviation from trend in provincial grain yield and sibling sex composition. The parents are farmers in all but 10 and 5 cases, respectively. Historical natural disaster data has strong predictive power, but is unavailable from the Cultural Revolution years. Rainfall data is problematic because low and high extremes both have negative consequences for household wealth. And like disaster data, county grain yield is unavailable for several years; moreover, this variable has surprisingly little predictive power even when it is available. Indeed, even including these variables as *additional* instruments lowers the first stage adjusted R^2 in some cases. A related issue may be that wealthier households are able to smooth consumption and are thus better insulated against income shocks (Foster, 1995 provides evidence for

impact of dowry on bargaining position directly by investigating which spouse makes decisions when husbands and wives disagree about household issues. The models are estimated via 2SLS using instrumental variables as described in section IV; table 7 presents OLS estimates for the same outcomes. In addition, location fixed effects and province – time interactions are in all estimates to reduce unobserved heterogeneity and to control for trends in marital transactions.

Table 3 presents estimates for the determinants of the number of hours husbands spend in gathering wood, cooking meals, and cleaning in an average week, both as a level (column 1) and as a percentage of the total time that the couple devotes to these activities (column 2). Dowry significantly increases the amount of time that husbands devote to household chores ($t = 2.212$ for the level measure of chores and $t = 2.357$ for the share measure), consistent with the notion that dowry influences the marital threat point. For every additional 100 yuan of dowry (an increase of 40 percent at the mean), husbands increase time devoted to household chores by 27 minutes, an average increase of 61 percent. This corresponds to an 11 percent increase in the share of household chores performed by men. Controlling for dowry, brideprice has a weakly negative impact on time devoted to household chores, although the coefficients are not significant at any conventional level. These results are robust to the time spent on other household chores as well (output omitted). In addition, the age difference between husband and wife and the wife's total number of siblings are also associated with husbands spending more time performing household chores.

A related measure of time allocation is wife's total leisure time (or total potential leisure time as noted in section V). Table 4 presents estimates for the total number of annual hours spent outside of wage work, farm work, work in private business, and household chores. Analogous to Table 3, column 1 presents estimates for the level of leisure time and column 2 presents estimates for the wife's share of the couple's total leisure time. Dowry has a positive effect on the total hours of wife's leisure time ($t = 2.209$) and on her share of leisure time ($t = 1.712$). Increasing dowry by 100 yuan increases women's annual leisure time by 270 hours (3.9 percent) at the mean. The corresponding effect on the wife's share of total leisure time is an increase of 0.008 percent. Exogenous changes in brideprice do not significantly affect the point estimates for either measure of wife's leisure time.

Bangladesh). In my sample, however, interacting the instruments with parent characteristics such as education and occupation provides no additional explanatory power.

The determinants of women's goods as a share of household expenditures (subject to the discussion in section IV) are presented in column 1 of Table 5. Again, dowry has a positive, significant effect ($t = 1.663$). Increasing dowry by 100 yuan corresponds to increasing the expenditure share by 0.007, or 4 percent of the average expenditure. Spending on women's good also increases significantly with the number of other adults in the household, a result that is not surprising. Column 2 of Table 5 presents estimates for the extent to which wives agree with the statement, "In general, I am satisfied with my life." This outcome may capture multiple household outcomes, including some not otherwise evaluated in this study. Due to a reduced sample size for this outcome (see note 22) and low variation within some villages, province fixed effects are implemented in this regression; errors are assumed to be clustered by village. Higher dowry ($t = 1.806$) and more adults in the household are both associated with higher levels of wife's satisfaction. Brideprice has an insignificantly negative effect on both consumption of women's goods and wife's satisfaction.

The interpretation of the above results is predicated on the notion that dowry affects the threat point, i.e., the bargaining position within marriage, and hence marital allocations. The first part of this relationship may be investigated directly by investigating determinants of bargaining position, such as the wife's authority to make household decisions independent of her husband. Which spouse has the final say when husbands and wives disagree about household issues is examined in Table 6. This model is estimated with province fixed effects and the assumption that errors are clustered by village. As in the previous estimate, dowry has a positive and significant impact on the wife's decision-making authority ($t = 1.716$) and brideprice has no discernable effect.

OLS estimates for the determinants of wife's welfare are presented in Table 7. Column 1 presents estimates for husband's time devoted to chores, column 2 presents those for wife's total leisure time, column 3 lists estimates for women's goods as a share of household expenditures, column 4 indicates wife's "satisfaction," and column 5 presents estimates for decision-making authority when the husband and wife disagree about household issues (the "shares" measures of husband's help with chores and wife's leisure time have been omitted to save space). Fixed effects and other modeling assumptions follow those described above.

Unlike the 2SLS estimates, dowry has a negative impact on the time that husbands contribute to household chores in the OLS estimates. The effect is insignificant, however, and

the sign reverses when province fixed effects are substituted for village fixed effects. A more interesting difference between the OLS and 2SLS estimates is that the point estimates for dowry are smaller for the former than the latter. While this result may be surprising at first blush, one plausible explanation is that the model fails to capture negative aspects of the husband or his family, and that the bride's family compensates by making larger dowry payments. The net effect of these unobserved characteristics is to make it appear that there is no relationship between dowry and wife's welfare, when 2SLS estimation reveals that there is.

VII Summary and Discussion

Theory predicts that individual control of resources affects one's bargaining position within marriage and thus one's allocation of marital output in a cooperative Nash bargaining framework. While the concept of bargaining position is theoretically straightforward, measuring it for empirical investigation has proven difficult. One major issue has been a shortage of data that include exogenous proxies for bargaining position as well as assignable measures of welfare. Labor and nonlabor income, each an intuitively appealing measure of bargaining position, suffer from simultaneity bias in the absence of strong identifying assumptions. An appealing alternative indicator of bargaining position is individual endowments brought to the marriage, e.g., dowry and brideprice. Previous studies focusing on the impact of these transfers on welfare within marriage have used questionable identification strategies, however, and the results have been subject to similar concerns about endogeneity.

In the Chinese context, brideprice serves as a market clearing price by compensating a woman's family for human capital investments made during the woman's childhood (Croll, 1981), for the loss of rights over her (Goody, 1973), and for the loss of her (future) contribution to household income (Min and Eades, 1995; Parish and Whyte, 1978; Zhang, 2000). Dowry, on the other hand, serves primarily as a pre-mortem bequest to a daughter (Croll, 1981; Parish and Whyte, 1978). Because the wife controls dowry and because she retains this authority even in the event of divorce, dowry may serve as a proxy for a woman's bargaining position.

This paper makes use of new data from China to investigate the impact of dowry on numerous measures of wife's welfare as well as a direct measure of a wife's bargaining position. To control for the potential endogeneity of marital payments, I use 2SLS estimation with lagged historical deviation from trend in provincial per capita grain yield as an instrument. Exogenous

shocks to grain production due to random variation in the weather have a substantial impact on household wealth accumulation, and thus on the ability of households to make transfers associated with marriage. A second instrument I employ is sibling sex composition, another strong indicator of funds available for marital payments due to differences in the costs incurred in the marriages of sons and daughters. Unlike previous studies, I control for unobservable correlates of sibling sex composition that may affect marital outcomes by including family background measures as regressors. In addition, estimates include a time trend and location fixed effects. This identification strategy represents a significant departure from previous studies in that omitted variables and simultaneity concerns are largely eliminated.

The results show a consistently negative (if insignificant) effect of brideprice on wife's welfare. If brideprice only acts as a price mechanism, then it is unclear why it should have any impact on marital outcomes once dowry is controlled for. However, it appears that families who pay higher brideprices may compensate by extracting more labor or negotiating lower consumption for brides.³⁰ More fundamentally, I find that dowry has a robustly positive impact on the amount of time that husbands help with household chores, on a wife's total leisure time, on women's goods as a share of household expenditures, and on the probability that the wife self identifies as being "satisfied." In addition, dowry positively affects a wife's decision-making authority, a more direct test of her bargaining position within marriage. These results provide considerable empirical support for the theoretical literature linking control of resources to marital outcomes. Moreover, based on the robustness of these findings, it is plausible that dowry serves as a vehicle for altruistic parents to improve their daughter's marital welfare in addition to being a pre-mortem inheritance. This hypothesis is untestable with the data used in this analysis, however, so better understanding the motivation for giving dowry and the determinants of dowry size remain priorities for further research.

³⁰ In the cooperative Nash bargaining context, it is possible that this outcome is achieved by making private transfers sons thereby raising their marital threat points, but these data cannot confirm this hypothesis.

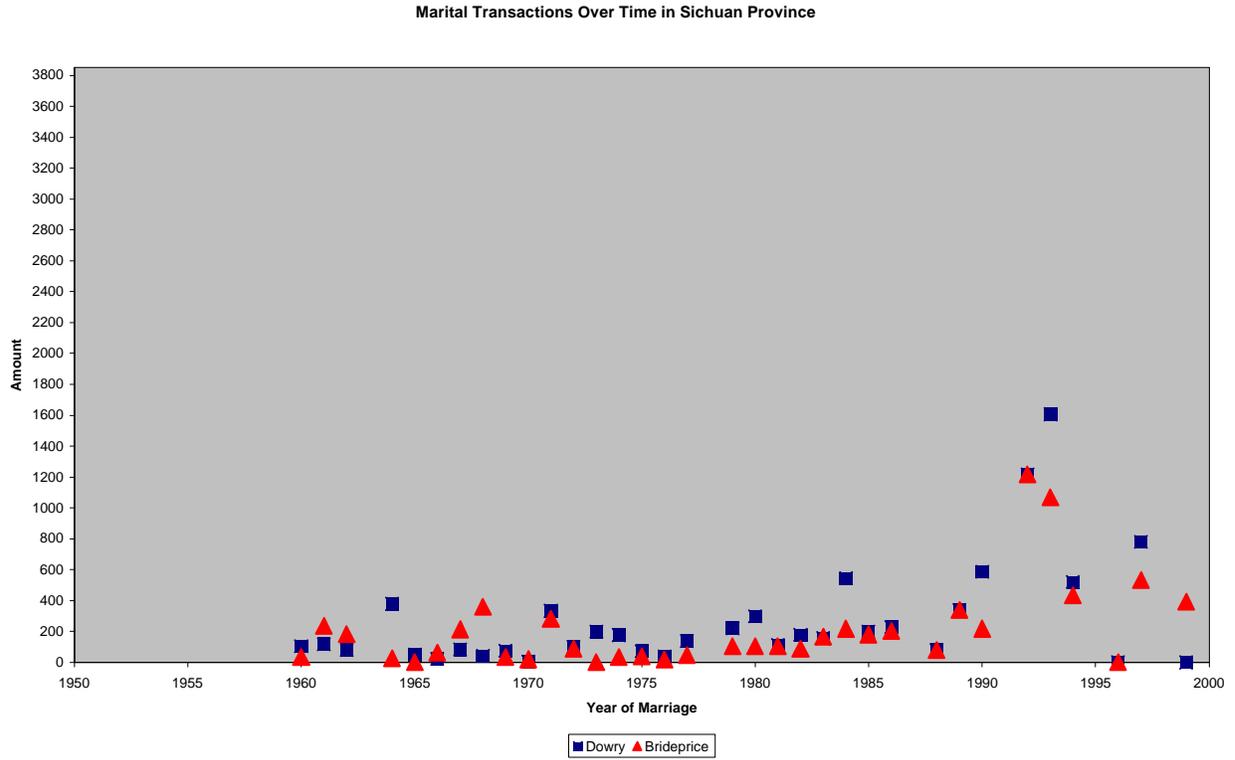
References

- Becker, G. (1965). "A Theory on the Allocation of Time." *Economic Journal*. 75: 493-517.
- _____. (1991). *A Treatise on the Family*. Enlarged Edition. Cambridge, MA: Harvard University Press.
- Behrman, J.R. (1997). "Intrahousehold Distribution and the Family." In Rosenzweig, M.R. and Stark, O., eds., *Handbook of Family and Population Economics*. Amsterdam: Elsevier Science B.V., 125-187.
- Bound, J., Jaeger, D.A., and Baker, R.M. (1995). "Problems of Instrumental Variables Estimation When the Correlation Between the Instruments and the Endogenous Explanatory Variables is Weak." *Journal of the American Statistical Association*. 90(43): 443-450.
- Boulier, B.L. and Rosenzweig, M.R. (1984). "Schooling, Search, and Spouse Selection: Testing Economic Theories of Marriage and Household Behavior." *Journal of Political Economy*. 92(4): 712-732.
- Brown, P.H. and Park, A. (2002). "Poverty and Education in Rural China." *Economics of Education Review*. forthcoming.
- Browning, M. (1992). "Children and Household Economic Behavior." *Journal of Economic Literature*. 30(3): 1434-1475.
- Cheng, D. (1992). "Nongcun Funu Zeou Wenti Diaocha (An Investigation into Spousal Choice Among Rural Women)." *Renkou yu Jingji*. (1): 44-49.
- Chiappori, P.-A. (1988). "Rational Household Labor Supply." *Econometrica*. 56(1): 63-89
- _____. (1992). "Collective Labor Supply and Welfare." *Journal of Political Economy*. 100(3): 437-467.
- Croll, E. (1981). *The Politics of Marriage in Contemporary China*. Cambridge: Cambridge University Press.
- Davidson, R. and MacKinnon, J.G. (1993). *Estimation and Inference in Econometrics*. New York: Oxford University Press.
- Deaton, A. (1989). "Looking for Boy - Girl Discrimination in Household Expenditure Data." *World Bank Economic Review*. 3(1): 1-15.
- Duraisamy, P. and Malathy, R. (1991). "Impact of Public Programs on Fertility and Gender-Specific Investments in Human Capital of Children in Rural India: Cross-Sectional and Time Series Analyses." In Schultz, T.P., ed., *Research in Population Economics, Volume 7*. Greenwich, CT: JAI Press, 157-187.
- Edlund, L. (1996). "Dear Son – Expensive Daughter: Why do Scarce Women Pay to Marry?" Stockholm School of Economics. Mimeo.
- Folbre, N. (1984). "Market Opportunities, Genetic Endowments, and Intrafamily Resource Distribution: Comment." *American Economic Review*. 74(3): 518-520.
- Foster, A.D. (1995). "Prices, Credit Markets, and Child Growth in Low Income Rural Areas." *Economic Journal*. 105(430): 551-570.
- Garcia, M. (1990). "Resource Allocation and Household Welfare: A Study of Personal Sources of Income on Food Consumption, Nutrition, and Health in the Philippines." The Hague: Institute of Social Sciences. Mimeo.
- Goody, J. (1973). "Bridewealth and Dowry in Africa and Eurasia." In Goody, J. and Tambiah, S.J., *Bridewealth and Dowry*. Cambridge: Cambridge University Press, 1-58.

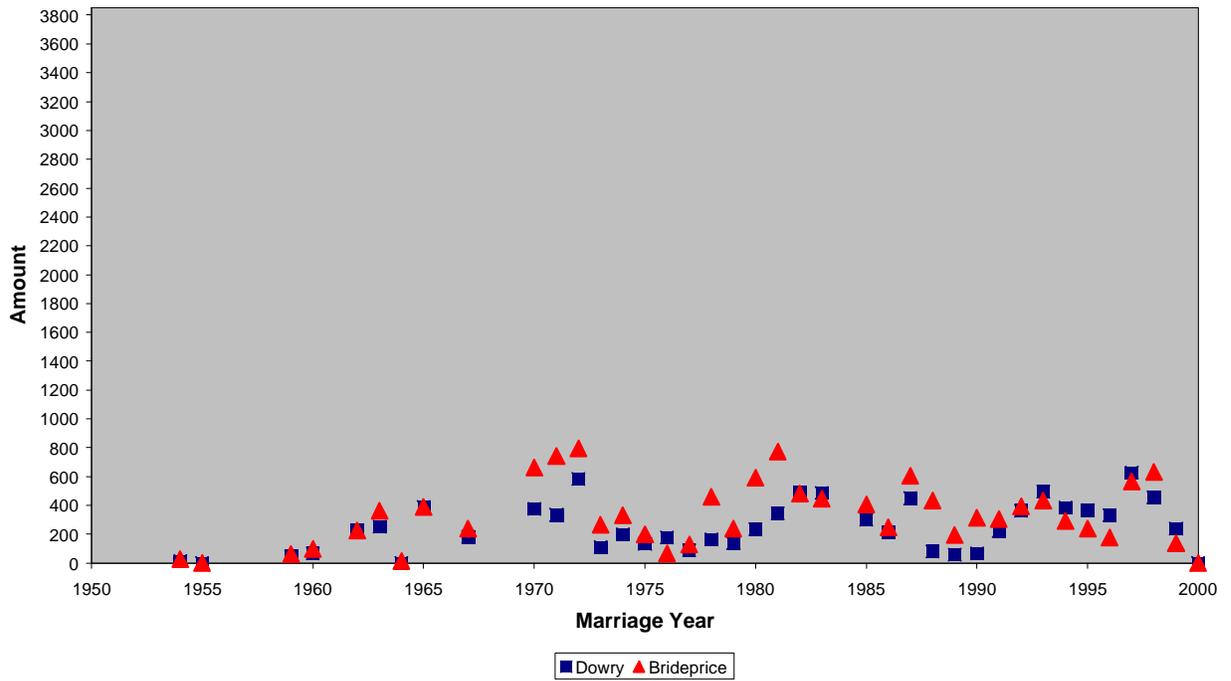
- Hoddinott, J., Alderman, H., and Haddad, L. (1997). "Testing Competing Models of Intrahousehold Allocation." In Haddad, L., Hoddinott, J., and Alderman, H., eds., *Intrahousehold Resource Allocation in Developing Countries: Models, Methods, and Policy*. Baltimore: Johns Hopkins University Press, 129-141.
- Hoddinott, J. and Haddad, L. (1995). Women's Income and Boy – Girl Anthropometric Status in Côte d'Ivoire. *World Development*. 22(4): 543-553.
- Liu, X. (2000). *In One's Own Shadow: An Ethnographic Account of the Condition of Post-Reform China*. Berkeley: University of California Press.
- Lundberg, S. and Pollack, R.A. (1993). "A Separate Spheres Bargaining and Marriage Market." *Journal of Political Economy*. 101(6): 988-1010.
- Manser, M. and Brown, M. (1980). "Marriage and Household Decision-Making: A Bargaining Analysis." *International Economic Review*. 21(2): 31-44.
- McElroy, M.B. (1990). "The Empirical Content of Nash-Bargained Household Behavior." *Journal of Human Resources*. 25(3): 559-583.
- _____. (1997). "Policy Implications of Family Bargaining and Marriage Markets." In Haddad, L., Hoddinott, J., and Alderman, H., eds., *Intrahousehold Resource Allocation in Developing Countries: Models, Methods, and Policy*. Baltimore: Johns Hopkins University Press, 53-74.
- McElroy, M.B. and Horney, M.J. (1981). "Nash-Bargained Household Decisions: Toward a Generalization of the Theory of Demand." *International Economic Review*. 22(6): 333-350.
- Meijer, M.J. (1971). *Marriage Law and Policy in the People's Republic of China*. Hong Kong: Hong Kong University Press.
- Min, H. and Eades, J.S. (1995). "Brides, Bachelors, and Brokers: The Marriage Market in Rural Anhui in an Era of Economic Reform." *Modern Asian Studies*. 29(4): 841-869.
- Ocko, J.K. (1991) "Women, Property, and Law in the People's Republic of China." In Watson, R.S. and Ebrey, P.B., eds., *Marriage and Inequality in Chinese Society*. Berkeley: University of California Press, 313-346.
- Parish, W.L. and Whyte, M.K. (1978). *Village and Family Life in Contemporary China*. Chicago: University of Chicago Press.
- Park, A. and Ren, C. (2001). "Microfinance with Chinese Characteristics." *World Development*. 29(1): 39-62.
- Potter, S.H. and Potter, J.M. (1990). *China's Peasants: The Anthropology of a Revolution*. Cambridge: Cambridge University Press.
- Rao, V. (1993). "The Rising Price of Husbands: A Hedonic Analysis of Dowry Increases in Rural India." *Journal of Public Economy*. 101(4): 666-677.
- Rao, V.J. and Greene, M. (1993). "Marital Instability, Intrahousehold Bargaining, and their Implication for Fertility in Brazil. Population Research Center, University of Chicago. Mimeo.
- Schultz, T.P. (1990). "Testing the Neoclassical Model of Family Labor Supply and Fertility." *Journal of Human Resources*. 25(4): 599-634.
- _____. (2001). "Women's Role in the Agricultural Household: Bargaining and Human Capital." In Gardner, B.L. and Rausser, G.C., eds., *Handbook of Agricultural Economics*. Amsterdam: Elsevier Science, B.V., 383-456.

- Selden, M. (1993). "Family Strategies and Structures in Rural North China." In Davis, D. and Harrell, S., eds. *Chinese Families in the Post-Mao Era*. Berkeley: University of California Press, 139-164.
- Siu, H.F. (1993). "Reconstituting Dowry and Brideprice in South China." In Davis, D. and Harrell, S., eds. *Chinese Families in the Post-Mao Era*. Berkeley: University of California Press, 165-188.
- Strauss, J. and Thomas, D. (1995). "Human Resources: Empirical Modeling of Household and Family Decisions." In Behrman, J. and Srinivasan, T.N., eds. *Handbook of Development Economics, Volume III*. Amsterdam: Elsevier Science B.V., 1883-2023.
- Thatcher, M.P. (1991). "Marriages of the Ruling Elite in the Spring and Autumn Period." In Watson, R.S. and Ebrey, P.B., *Marriage and Inequality in Chinese Society*. Berkeley: University of California Press, 25-58.
- Thomas, D. (1990). "Intra-household Resource Allocation: An Inferential Approach." *Journal of Human Resources*. 25(4): 635-664.
- Von Braun, J. (1988). "Effects of Technological Change in Agriculture on Food Consumption and Nutrition: Rice in a West African Setting." *World Development*. 16(9): 1083-1098.
- Watson, R.S. and Ebrey, P.B., eds., (1991). *Marriage and Inequality in Chinese Society*. Berkeley: University of California Press.
- Yan, Y. (1996). *The Flow of Gifts: Reciprocity and Social Networks in a Chinese Village*. Stanford, CA: Stanford University Press.
- Zhang, J. and Chan, W. (1999). "Dowry and Wife's Welfare: A Theoretical and Empirical Analysis." *Journal of Political Economy*. 107(4): 786-808.
- Zhang, W. (2000). "Dynamics of Marriage in Chinese Rural Society in Transition: A Study of a Northern Chinese Village." *Population Studies*. 54(1): 57-69.

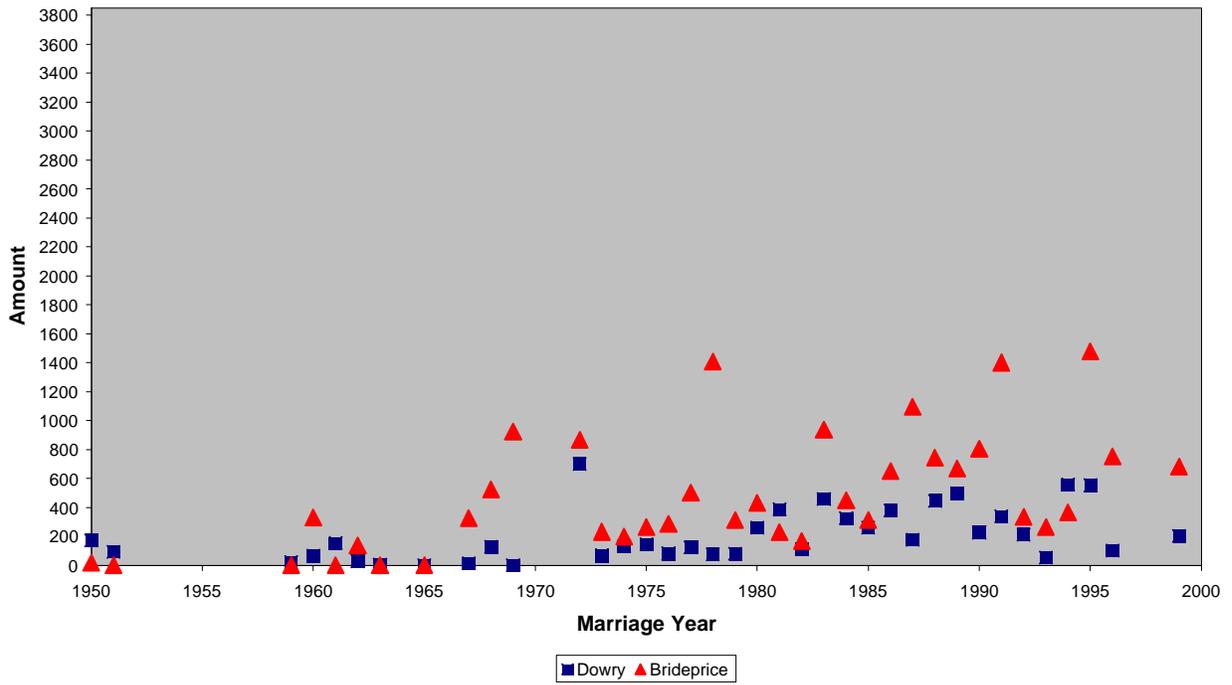
Figure 1: Value of Marital Transactions Over Time by Province (in 1985 yuan)



Marital Transactions Over Time in Guizhou Province



Marital Transactions Over Time in Shaanxi Province



Marital Transactions Over Time in Gansu Province

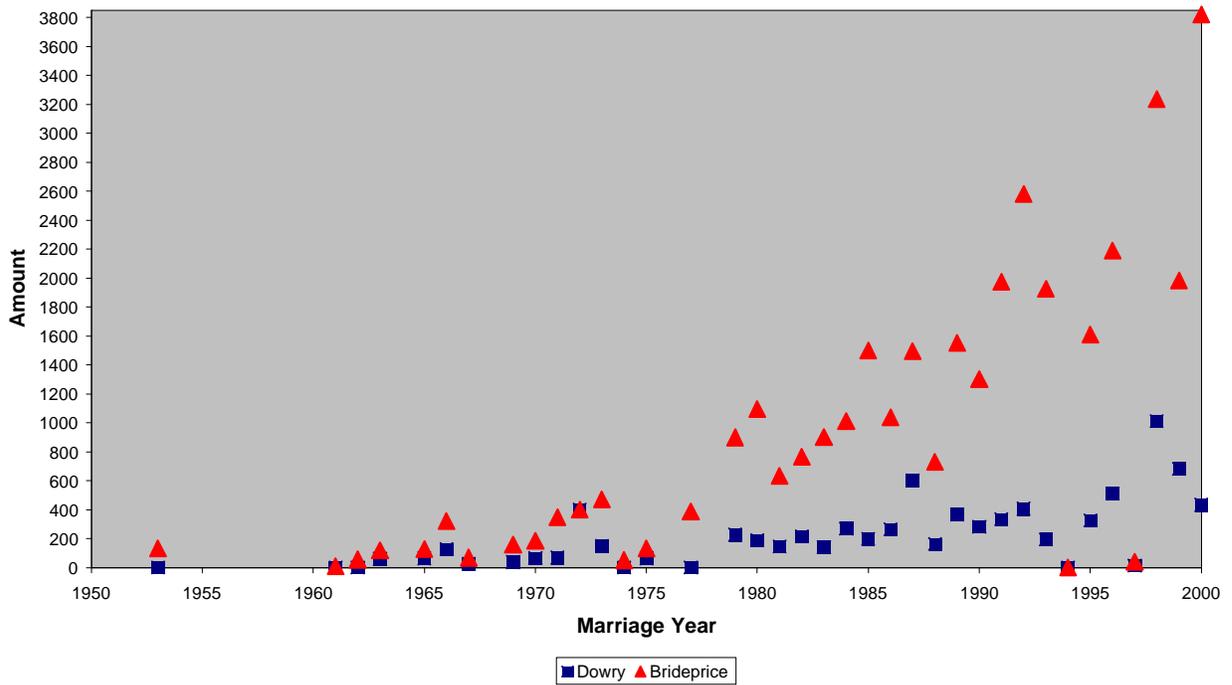


Table 1: Variables and Summary Statistics

Variable	Obs	Unit	Mean	Std. Dev.	Min	Max
husband's help with chores	451	hours per week	0.74	1.41	0	15
husband's help with chores as a share	451	% of couple's total time devoted to chores	17.73%	27.13%	0%	100%
wife's free time	451	hours per year	6943.82	937.46	4200	8760
wife's leisure time as a share	451	% of couple's total leisure time	47.86%	3.82%	33.02%	58.34%
spending on makeup and jewelry as a share	451	% of annual household spending	0.18%	0.36%	0%	2.36%
wife's "satisfaction with life"	295	index, 1=completely unsatisfied, 2=somewhat unsatisfied, 3=somewhat satisfied, 4=completely satisfied	2.60	0.57	1	4
wife's decision making authority	293	index, 0=husband makes decisions, 0.5=both make decisions, 1=wife makes decisions	0.35	0.43	0	1
dowry	451	yuan, in 1985 real value	247.12	313.79	0	2044
brideprice	451	yuan, in 1985 real value	537.89	748.19	0	7493
duration of marriage	451	years	20.47	10.81	1	51
husband's age	451	years	40.45	10.38	21	70
wife's age	451	years	43.18	10.79	23	74
age difference	451	husband's age - wife's age	2.73	3.24	-7	16
husband's education	451	grades completed	2.90	3.47	0	14
wife's education	451	grades completed	6.14	3.80	0	16
education difference	451	husband's education - wife's education	3.24	3.75	-12	12
children present in household	451	number	1.43	1.14	0	5
other adults present in household	451	number	0.64	0.91	0	4
wife's parents' education	451	total years	2.38	4.01	0	24
husband's parents' education	451	total years	2.36	3.70	0	24
wife's total siblings	451	number	3.84	1.74	0	11
husband's total siblings	451	number	3.70	1.74	0	8
Sichuan	451	province dummy	0.24	0.43		
Guizhou	451	province dummy	0.30	0.46		
Shaanxi	451	province dummy	0.23	0.42		
Gansu	451	province dummy	0.23	0.42		
wife's sibling sex composition	451	difference in numbers of younger sisters and brothers	-0.21	1.38	-4	4
husband's sibling sex composition	451	difference in numbers of older sisters and brothers	0.11	1.41	-6	6
lagged historical deviation from trend in provincial per capita grain yield	451	kg/person	-1.65	27.86	-90.82	64.01

Table 2: Determinants of Dowry and Brideprice

<i>Dowry</i>				
Variable	Unit	Coef.	Std. Err.	
wife's sibling composition	deviation from linear spline time trend, in kg/person	34.51	(12.09)	
husband's sibling composition	grades completed	14.61	(10.20)	
lagged deviation from trend in provincial per capita grain yield	grades completed	1.81	(0.61)	
age difference	husband's age - wife's age	-7.09	(4.53)	
education difference	husband's education - wife's education	-3.00	(3.87)	
children present in household	number	30.87	(14.25)	
other adults present in household	number	1.43	(16.66)	
wife's parents' education	total years	4.83	(10.03)	
husband's parents' education	total years	15.02	(10.91)	
wife's total siblings	number	2.65	(8.46)	
husband's total siblings	number	3.47	(8.66)	
constant		299.10	(59.14)	
	village fixed effects		X	
	time trend		X	
	province * time trend interactions		X	
	n		451	
	F(3, 390) ¹		6.53	
<i>Brideprice</i>				
Variable	Unit	Coef.	Std. Err.	
wife's sibling composition	deviation from linear spline time trend, in kg/person	12.46	(26.23)	
husband's sibling composition	grades completed	79.09	(22.15)	
lagged deviation from trend in provincial per capita grain yield	grades completed	2.29	(1.33)	
age difference	husband's age - wife's age	-9.20	(9.82)	
education difference	husband's education - wife's education	11.42	(8.40)	
children present in household	number	66.38	(30.93)	
other adults present in household	number	9.28	(36.15)	
wife's parents' education	total years	-3.72	(21.76)	
husband's parents' education	total years	-16.21	(23.68)	
wife's total siblings	number	2.49	(18.35)	
husband's total siblings	number	3.45	(18.79)	
constant		580.68	(128.3)	
	village fixed effects		X	
	time trend		X	
	province * time trend interactions		X	
	n		451	
	F(3, 390) ¹		5.43	

1: tests the hypothesis that the coefficients on lagged per-capita grain production, wife's sibling composition, and husband's sibling composition are jointly equal to 0

Table 3: Instrumental Variables Estimates (Husband's Time Allocation)

<i>1: Husband's weekly time devoted to cooking, cleaning, and gathering wood</i>					
<i>2: Husband's share of total time couple devotes to cooking, cleaning, and gathering wood</i>					
Variable	Unit	1		2	
		Coef.	Std. Err.	Coef.	Std. Err.
dowry	yuan, in 1985 real value	0.0046 **	(0.0021)	0.0011 **	(0.00045)
brideprice	yuan, in 1985 real value	-0.0012	(0.0010)	-0.00031	(0.00023)
age difference	husband's age - wife's age	0.048	(0.032)	0.012 *	(0.0070)
education difference	husband's education - wife's education	0.043	(0.032)	0.011	(0.0070)
children present in household	number	-0.070	(0.11)	-0.02	(0.025)
other adults present in household	number	-0.12	(0.11)	-0.01	(0.024)
wife's parents' education	total years	0.040	(0.068)	-0.02	(0.015)
husband's parents' education	total years	-0.087	(0.089)	-0.02	(0.019)
wife's total siblings	number	0.090	(0.055)	0.012	(0.012)
husband's total siblings	number	-0.0004	(0.057)	-0.014	(0.013)
constant		1.15	(2.08)	0.34	(0.46)
village fixed effects			X		X
time trend			X		X
province * time trend interactions			X		X
n			451		451

*** significant at the .01 level

** significant at the .05 level

* significant at the .1 level

Table 4: Instrumental Variables Estimates (Wife's Leisure Time)

<i>1: Wife's leisure time</i>					
<i>2: Wife's share of couple's total leisure time</i>					
Variable	Unit	1		2	
		Coef.	Std. Err.	Coef.	Std. Err.
dowry	yuan, in 1985 real value	2.70 **	(1.22)	0.000080 *	(0.000047)
brideprice	yuan, in 1985 real value	-1.00	(0.62)	-0.000032	(0.000024)
age difference	husband's age - wife's age	-20.23	(18.92)	-0.00063	(0.00072)
education difference	husband's education - wife's education	4.92	(18.75)	0.00059	(0.00071)
children present in household	number	5.57	(66.55)	-0.00075	(0.0025)
other adults present in household	number	61.29	(64.89)	-0.000049	(0.0025)
wife's parents' education	total years	-14.47	(40.41)	-0.00023	(0.0015)
husband's parents' education	total years	-50.93	(52.51)	-0.0026	(0.0020)
wife's total siblings	number	2.48	(32.80)	-0.00045	(0.0012)
husband's total siblings	number	-31.23	(33.82)	-0.00072	(0.0013)
constant		7884.45	(1232.03)	0.54	(0.047)
village fixed effects			X		X
time trend			X		X
province * time trend interactions			X		X
n			451		451

*** significant at the .01 level

** significant at the .05 level

* significant at the .1 level

Table 5: Instrumental Variables Estimates (Spending on Female Goods and Wife's "Satisfaction")

<i>1: Share of household budget allocated to female goods</i>					
<i>2: Wife's "satisfaction"</i>					
Variable	Unit	1		2	
		Coef.	Std. Err.	Coef.	Robust Std. Err. ¹
dowry	yuan, in 1985 real value	0.0000071 *	(0.0000043)	0.0015 *	(0.00081)
brideprice	yuan, in 1985 real value	-0.0000033	(0.0000022)	-0.000149	(0.00039)
age difference	husband's age - wife's age	-0.0000040	(0.000066)	0.008	(0.017)
education difference	husband's education - wife's education	-0.0000094	(0.000065)	-0.0085	(0.014)
children present in household	number	-0.00011	(0.00023)	0.0082	(0.056)
other adults present in household	number	0.00061 ***	(0.00023)	0.076 *	(0.043)
wife's parents' education	total years	0.0000034	(0.00014)	-0.020	(0.031)
husband's parents' education	total years	0.000054	(0.00018)	-0.0020	(0.033)
wife's total siblings	number	0.000016	(0.00011)	-0.0089	(0.028)
husband's total siblings	number	-0.000094	(0.00012)	0.0052	(0.026)
constant		0.0051	(0.0043)	2.81	(0.17)
village fixed effects			X		
province fixed effects					X
time trend			X		X
province * time trend interactions			X		X
n			451		295

*** significant at the .01 level

** significant at the .05 level

* significant at the .1 level

1 standard errors clustered by village

Table 6: Instrumental Variables Estimates (Decision Making)

Variable	Unit	Coef.	Robust Std. Err. ¹
dowry	yuan, in 1985 real value	0.0013 *	(0.00075)
brideprice	yuan, in 1985 real value	-0.00036	(0.00048)
age difference	husband's age - wife's age	0.011	(0.010)
education difference	husband's education - wife's education	0.0075	(0.011)
children present in household	number	-0.035	(0.049)
other adults present in household	number	0.057	(0.050)
wife's parents' education	total years	-0.012	(0.025)
husband's parents' education	total years	-0.0049	(0.027)
wife's total siblings	number	0.011	(0.022)
husband's total siblings	number	0.019	(0.024)
constant		-0.046	(0.62)
province fixed effects			X
time trend			X
province * time trend interactions			X
n			293

*** significant at the .01 level

** significant at the .05 level

* significant at the .1 level

1 standard errors clustered by village

Table 7: Ordinary Least Squares Estimates

1: Husband's weekly time devoted to cooking, cleaning, and gathering wood											
2: Wife's leisure time											
Share of household budget allocated to female goods											
4: Wife's "satisfaction"											
5: Decision making											
Variable	Unit	1		2		3		4		5	
		Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Robust Std. Err. ¹	Coef.	Robust Std. Err. ¹
dowry	yuan, in 1985 real value	-0.00013	(0.00027)	0.37 **	(0.17)	0.00000068	(0.00000063)	0.00041 ***	(0.000094)	0.000082	(0.000077)
brideprice	yuan, in 1985 real value	-0.00010	(0.00013)	-0.09	(0.079)	-0.00000029	(0.00000029)	-0.000046	(0.000047)	0.000056	(0.000036)
age difference	husband's age - wife's age	0.022	(0.022)	-29.08 **	(14.03)	-0.000023	(0.000052)	-0.0066	(0.014)	-0.00092	(0.0076)
education difference	husband's education - wife's education	0.014	(0.019)	-14.35	(11.99)	-0.000070	(0.000045)	-0.011	(0.0090)	0.0013	(0.0064)
children present in household	number	0.030	(0.07)	26.92	(44.01)	-0.000092	(0.00016)	0.054	(0.037)	-0.012	(0.032)
other adults present in household	number	-0.12	(0.08)	56.40	(51.44)	0.00059 ***	(0.00019)	0.082 **	(0.038)	0.056 *	(0.032)
wife's parents' education	total years	0.12 ***	(0.04)	23.41	(28.16)	0.00011	(0.00010)	0.00068	(0.014)	0.010	(0.013)
husband's parents' education	total years	0.029	(0.053)	10.12	(33.54)	0.00023 *	(0.00012)	0.025	(0.017)	0.027 **	(0.013)
wife's total siblings	number	0.094 **	(0.041)	1.63	(26.03)	0.0000092	(0.00010)	-0.012	(0.024)	0.00327	(0.013)
husband's total siblings	number	0.018	(0.043)	-23.91	(26.72)	-0.000077	(0.00010)	0.0093	(0.025)	0.029 *	(0.015)
constant		1.40	(0.80)	7335.35 ***	(502.74)	-0.00074	(0.0019)	2.84 ***	(0.14)	0.86 ***	(0.10)
village fixed effects		X		X		X					
province fixed effects								X			X
time trend		X		X		X		X			X
province * time trend interactions		X		X		X		X			X
n		451		451		451		295			293

*** significant at the .01 level

** significant at the .05 level

* significant at the .1 level

¹ standard errors clustered by village