Setting the dowry optimally to extract the full surplus: a contract theory perspective

Batabyal, Amitrajeet and Beladi, Hamid

Department of Economics, Rochester Institute of Technology,
Department of Economics, University of Texas at San Antonio

19 March 2013

Setting the Dowry Optimally to Extract the Full Surplus: A Contract Theory Perspective[1]

by

Amitrajeet A. Batabyal[2]

and

Hamid Beladi[3]

[1] Batabyal acknowledges financial support from the Gosnell endowment at RIT. The usual disclaimer applies.

[2] Corresponding Author. Department of Economics, Rochester Institute of Technology, 92 Lomb Memorial Drive, Rochester, NY 14623-5604, USA. Internet aabgsh@rit.edu

[3] Department of Economics, University of Texas at San Antonio, One UTSA Circle, San Antonio, TX 78249-0632, USA. Internet Hamid.Beladi@utsa.edu

Setting the Dowry Optimally to Extract the Full Surplus: A Contract Theory Perspective

Abstract

In this note, we study the contractual interaction between the fathers of a prospective groom and a prospective bride in a traditional society. Based on his valuation of the groom, the bride's father approaches the groom's father with an offer of marriage. The groom's father does *not* know the quality of the bride. Even so, he holds superior bargaining power. He uses this power to select the dowry optimally and this selection leads to a marriage between his son and the bride. We use a simple model and show that if the bride's father's risk aversion increases in his valuation of the groom then despite being asymmetrically informed, the groom's father can implement the first-best dowry contract and extract all the surplus from the bride's father.

Keywords: Contract, Dowry, Randomization, Risk Aversion, Uncertainty

JEL Codes: J81, D81

1. Introduction

The word "dowry" today has many interpretations. Even so, Batabyal (2005) and Batabyal and Beladi (2007) note that one key interpretation refers to dowry as the money, goods, or property that are put forth by the family of a prospective bride to the family of a prospective groom at the time of marriage. Even though this practice of making dowry payments was and is common in many parts of the world, today, it is most common in countries such as India where a large majority of all marriages are still arranged.[4] With regard to India, Sheel (1999) has pointed out that the practice of making dowry payments can be traced back to Vedic times in which valuable clothes, jewelry, and other goods were commonly given voluntarily to both the bride and to the groom's families at the time of marriage. This tells us that the initial objective of dowry payments was to consecrate material wealth and also to enhance one's social standing at the time of marriage.

The practice of making dowry payments has, unfortunately, changed considerably in contemporary times. In many arranged marriages in India and in other nations, dowry payments are now largely involuntary. Further, as Leslie (1998) and Srinivasan (2005) have pointed out, such payments are often used by the groom's family to impoverish the bride's family by extracting large amounts of monetary and/or material resources as a precondition for marriage. The groom's family is able to do this because in India and in other countries where arranged marriages are common, women tend to occupy an inferior position in the pertinent nation's patrilineal kinship and family system.

---

[4] See Bumiller (1990), Menski (1998), and Sheel (1999) for additional details on the phenomenon of dowry. See Batabyal (2001, 2004), and Batabyal and Beladi (2003) for more on decision making in arranged marriages.

The economic and the social standing of the groom's family has a significant bearing on the actual amount of the dowry that is collected in any specific instance. In this regard, given the work of Sheel (1999, p. 18), it is fair to say that the higher the socioeconomic standing of the groom's family, the higher is generally the demand for dowry. This state of affairs naturally gives rise to the following question. How do the involved parties in an arranged marriage setting come to an agreement over the actual amount of the dowry payment?

There is a large literature in the social sciences and some research in economics on the above question. Specifically, research by Rao (1993), Sharma (1993), Dalmia (2004), Srinivasan (2005), and Peters (2011) yields three findings that are worth emphasizing. First, in many arranged marriage settings, the prospective bride and the prospective groom's families *directly* negotiate with each other to determine the amount of the dowry.[5] Second, even though the father of a groom does *not* know the quality of a bride with certainty, his bargaining power in the marriage transaction typically *exceeds* that of the father of the bride. Finally, putting the first two points together, the father of a groom is generally able to set the amount of the dowry.

Given the three results in the preceding paragraph, is it possible for the father of the groom to extract all the informational rents (the full surplus)[6] from the father of the bride in a contractual setting? Put differently, can the groom's father implement the first-best outcome even when there is asymmetric information? Our objective in this note is to shed light on this hitherto unstudied question. The rest of this note is organized as follows. Section 2.1 describes the theoretical

---

[5] To avoid repetition, we shall not use the word "prospective" in the remainder of this note. It is understood that the interaction we study—on which more below—occurs before the actual marriage takes place.

[6] See Bolton and Dewatripont (2005) for an excellent introduction to contract theory and for a discussion of the notion of "full surplus."

framework. Sections 2.2 and 2.3 together answer the question at the beginning of this paragraph affirmatively. Section 3 concludes and then offers suggestions for future research on the subject of this note.

2. The Theoretical Framework

2.1. Preliminaries

Consider the dowry related contractual interaction between the fathers of a groom and a bride. The groom's father wishes to get his son married and to keep things straightforward, we assume that the contractual negotiations are costless to him. The bride can be either of high or low quality. More formally, the bride is of two possible types β where $\beta \in \{\beta_L, \beta_H\}$ and $\beta_H > \beta_L$. The bride's father represents her and hence, in what follows, we shall think of the bride's father himself also being of either high (β_H) or low (β_L) quality. This type related information is private information to the bride's father and hence *not* known to the groom's father.

The bride's father does not know the quality of the groom. In addition, the work of Srinivasan (2005) and others clearly tells us that many arranged marriages consummated with dowries have subsequently turned out to be detrimental to the bride. Given these two points, we suppose that the bride's father is risk averse. As such, his utility function $U(\cdot)$ is either

$$U = \beta_L - D \text{ or } U = \log_e(\beta_H - D), \tag{1}$$

where $D \geq 0$ is the dowry paid by the bride's father to the groom's father. The reader should note that an implication of (1) is that the bride's father's risk aversion *increases* with his valuation of what he is "buying." The results we obtain subsequently in section 2.3 of this note depend on this specification of the utilities in equation (1) for the bride's father. One reason why dowry payments

are made by the fathers of brides is to reduce or ideally eliminate the likelihood of domestic violence after marriage. To fix ideas, let us measure the quality of a bride by the number of years of schooling completed by her. Now, intuition suggests that a more educated bride ought to be less vulnerable to domestic violence than a less educated bride. However, the work of Suran *et al.* (2004) shows that this need not be the case. This finding tells us that even if a father has educated his daughter to spare her from domestic violence after marriage, there is no guarantee that this desired result will, in fact, materialize. Put differently, being high quality—at least in terms of education—does not always lessen the likelihood of domestic violence. This kind of finding provides a rationale for our modeling the father of the high quality bride as being more risk averse than the father of a low quality bride.[7] With this background in place, our task now is to determine how the groom's father sets the dowry optimally when he knows the quality of the bride's father and when he does not.

2.2. The first-best optimum

To ascertain the first-best or full information dowry, we begin by supposing that the inequality $\beta_H - 1 > \beta_L$ holds. Now, because there is no asymmetric information, when the groom's father knows that he is dealing with the low quality bride's father, he will simply set the dowry D_L so that

$$D_L = \beta_L. \tag{2}$$

Similarly, when the groom's father knows that he is interacting with the high quality bride's father, he sets the dowry D_H so that

[7] We are unaware of any empirical studies that have attempted to directly study the connection between dowry payments and risk aversion on the part of the fathers of brides.

$$D_H=\beta_H-1. \tag{3}$$

Inspecting (2) and (3) and recalling the bride's father's utility function given by (1), it is clear that in both states of nature, the groom's father extracts the full surplus from the bride's father and leaves him with no informational rents. Finally, we note that our assumption $\beta_H-1>\beta_L$ means that the groom's father prefers to interact with the high quality bride's father rather than with the low quality bride's father. We now proceed to ascertain how the groom's father sets the dowry optimally when he is faced with asymmetric information because he does not know the quality of the bride's father that he is interacting with.

2.3. The second-best optimum

In this case, the groom's father's intent is to extract all the informational rents from the risk averse high quality bride's father by confronting the low quality bride's father with a *random* dowry contract (incentive scheme). In fact, some thought ought to convince the reader that the groom's father can implement the first-best optimum described above in section 2.2 by offering the following choice of dowry contracts to the bride's father.

Specifically, the groom's father offers marriage with his son with probability one and he sets the dowry at

$$D=\beta_H-1 \tag{4}$$

for the high quality bride's father. In addition, the groom's father offers marriage with his son with certainty and he sets the dowry at

$$D=\beta_L+\zeta \ \textit{with probability} \ 1/2 \tag{5}$$

and at

$$D=\beta_L-\zeta \text{ with probability } 1/2. \quad (6)$$

for the low quality bride's father. In this contract, ζ is a positive constant.

The reader should note that the dowry contract described in (4)-(6) above does, in fact, implement the first-best optimum. This is because this contract exhibits three properties. First, the groom is married for sure. Second, no informational rents accrue either to the low quality bride's father or to the high quality bride's father. Third, the groom's father ends up paying no risk premium.[8]

Observe that the dowry contract described in (4)-(6) above can be made incentive compatible by setting the value of the constant ζ high enough so that the high quality bride's father will have *no* incentive to select the dowry contract designed for the low quality bride's father. We reiterate that in the setting of this note, the high quality bride's father will have no incentive to select the dowry contract designed for the low quality bride's father. Mathematically, this last claim follows because

$$\log_e(1)=0\geq\frac{1}{2}\log_e(\beta_H-\beta_L+\zeta)+\frac{1}{2}\log_e(\beta_H-\beta_L-\zeta). \quad (7)$$

To comprehend the results of this sub-section intuitively, note the following. When a certain dowry contract is offered by the groom's father, the high quality bride's father will normally prefer the dowry contract designed for the low quality bride's father because this implies a lower dowry payment. However, by offering a *random* dowry contract to the low quality bride's father, the

---

[8] The dowry contract delineated here is *ex ante* in a particular sense. Specifically, the decision by the bride's father to accept (or decline) the contract offered by the groom's father occurs before the realization of any uncertainty associated with the dowry contract. This is why risk aversion matters in the scenario that we are analyzing. This *ex ante* way of studying dowry contracts is consistent with some existing studies about dowries. See Ambrus *et al.* (2010) for an empirical and theoretical perspective on this point.

groom's father ensures that this random dowry contract is unattractive to the high quality bride's father. This is why when the dowry contract offered to the low quality bride's father is "sufficiently uncertain" (see equation (7)), the high quality bride's father will prefer the certain dowry contract designed for him even though the average dowry payment is higher than the payment in the random dowry contract designed for the low quality bride's father.

Suppose the bride's father refuses to participate in or rejects the dowry contract designed by the groom's father. In this case, the reservation utility obtained by him is zero for both the high and the low quality types. However, moving from units of utility to monetary units, a simple calculation shows that in our modeling framework, this zero reservation utility translates to a monetary value of zero for the low quality bride's father and to a monetary value of one for the high quality bride's father. Intuitively speaking, we can interpret this state of affairs as one in which the high quality bride's father has more options than does the father of the low quality bride. This completes our discussion of the second-best optimum. We see that when the bride's father's risk aversion increases with his valuation of the groom, the groom's father can design a random dowry contract with which he effectively extracts the full surplus from the bride's father.

3. Conclusions

In this note, we analyzed the contractual interaction between the fathers of a prospective groom and a prospective bride in a traditional society. After noting that relative to the bride's father, the groom's father had superior bargaining power, we described the first-best dowry contract between the two fathers. Next, we showed that even in the second-best setting with asymmetric information, the groom's father could use a random dowry contract to effectively extract all the surplus from the bride's father.

The analysis in this note can be extended in a number of directions and we now suggest two possible extensions. First, one could analyze a scenario in which the preferences of either the groom or the bride explicitly affect the contractual interaction between the two fathers. Second, it would be useful to examine the impact on the optimal dowry when the bride's father, confronted with a large dowry, is able to get a third party such as a village headman to intercede on his behalf. Studies that analyze these aspects of the problem will increase our understanding of the properties of dowry determination in arranged marriage settings.

References

Ambrus, A., Field, E., and Torero, M. 2010. Muslim family law, prenuptial agreements, and the emergence of dowry in Bangladesh, *Quarterly Journal of Economics*, 125, 1349-1397.

Batabyal, A.A. 2001. On the likelihood of finding the right partner in an arranged marriage, *Journal of Socio-Economics*, 30, 273-280, 2001.

Batabyal, A.A. 2004. Meetings and exposure before an arranged marriage: A probabilistic analysis, *Applied Economics Letters*, 11, 473-476.

Batabyal, A.A. 2005. A game model of dowry determination in an arranged marriage context, *Economics Bulletin*, 10, 1-8.

Batabyal, A.A., and Beladi, H. 2003. Spouse selection in arranged marriages: An analysis of time invariant and time variant decision rules, *Journal of Economic Research*, 8, 187-201.

Batabyal, A.A., and Beladi, H. 2007. Mediator learning and dowry determination in an arranged marriage setting, *Economics Bulletin*, 15, 1-10.

Bolton, P., and Dewatripont, M. 2005. *Contract Theory*. MIT Press, Cambridge, MA, USA.

Bumiller, E. 1990. *May You be the Mother of a Hundred Sons*. Penguin, New Delhi, India.

Dalmia, S. 2004. A hedonic analysis of marriage transactions in India: Estimating determinants of dowries and demand for groom characteristics in marriage, *Research in Economics*, 58, 235-255.

Leslie, J. 1998. Dowry, dowry deaths, and violence against women: A journey of discovery, in W. Menski, Ed., *South Asians and the Dowry Problem*. Trentham Books Limited, London, UK.

Menski, W. Ed. 1998. *South Asians and the Dowry Problem*. Trentham Books Limited, London, UK.

Peters, C. 2011. Effects of family planning and health services on women's welfare: Evidence on dowries and intra-household bargaining in Bangladesh, *Review of Economics of the Household*, 9, 327-348.

Rao, V. 1993. The rising price of husbands: A hedonic analysis of dowry increases in rural India, *Journal of Political Economy*, 101, 666-677.

Sharma, U. 1993. Dowry in north India: Its consequences for women, in P. Uberoi, Ed., *Family, Kinship, and Marriage in India*. Oxford University Press, New Delhi, India.

Sheel, R. 1999. *The Political Economy of Dowry*. Manohar Publishers, New Delhi, India.

Srinivasan, S. 2005. Daughters or dowries? The changing nature of dowry practices in south India, *World Development*, 33, 593-615.

Suran, L., Amin, S., Huq, L., and Chowdury, K. 2004. Does dowry improve life for brides? A test of the bequest theory of dowry in rural Bangladesh, *Working Paper No. 195*, The Population Council.