FORCED MARRIAGE: Models of *Ala-kachuu*

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Abstract
This paper provides an economic analysis of the practice of bride abduction based on a neoclassical model of family fertility and consumption. The point of reference is the Kyrgyz Republic in Central Asia, though the practice is not unique to Central Asia. We show that social acceptance of bride kidnapping is rational behavior for an elder generation that values offspring more than the younger generation. It is also rational for prospective grooms seeking to lower wedding costs, and for some potential brides who seek to increase their chances of getting married.

Keywords: Forced Marriage, Bride Kidnapping, Marriage Models, Sorting Models, Kyrgyzstan

JEL classification: I12, J12

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I. INTRODUCTION

Although conventional "love marriage" is perceived as the standard type of marriage in modern societies, especially among the middle and upper classes, other types of marriage still play important role in forming families elsewhere. The most common alternative is that of "arranged marriage," in which parents (or their agents) negotiate a marriage on behalf of their children, who may or may not have input into spousal selection. However, in some societies, non-consensual abduction of women into marriage is also an accepted practice. While such abduction occurs along with violent conflict across cultures, it also takes place in some communities within an ethnic group in a stable society. These abductions are the ones on which we focus here: why is it that a socially stable community in which women have considerable agency will permit the coercive kidnapping for the sake of marriage of a substantial proportion of its young women?

This paper studies the social rationale for the practice of *ala kachuu*, or bride abduction, a form of marriage practiced in rural Central Asia and elsewhere. Strong empirical evidence (Becker *et al.,* 2017) exists that this practice is not simply elopement, ritualized courting, or an effort to reduce costly social obligations related to wedding ceremonies. Yet, while abduction is not common at the very top of society, it is also not relegated to those at the bottom of the social pyramid. This fact begs the question as to why kidnapping is socially tolerated. We build a model in which older generations who control social norms have an interest in accelerating the marriage process for younger generations, and can use the mandate that a prospective groom abduct a bride by a certain date as an enforcement mechanism to deter unduly long search processes.

The fact that Kyrgyz society tolerates bride abduction also requires that its social benefits match or exceed social costs, especially as it coexists with both arranged and "love" marriages. There are clear damages, and, while it is possible that lower birthweights would go unnoticed, more visible consequences such as a far higher divorce rate are difficult to ignore. Rural Kyrgyzstan is extremely hierarchical (elders have authority over younger people; men have power over women; age dominates gender) with de facto power lying in the hands of wealthy individuals and clans, and de jure power lying in the hands of the local head of government (*akim*) and semi-official assembly of elderly men (*ak sakal*s, or "white beards"). Moreover, nobody is going to be foolish enough to kidnap the daughters of the *akim* or other powerful men; at the same time, since big wedding ceremonies help reinforce the authority of the powerful, their sons are also unlikely to kidnap women. Thus, those families in authority themselves are relatively untouched by kidnapping, and they have the power to greatly curtail if not eliminate bride abduction – but do not.

Why they do not is the question we address in this paper. We present a model of marriage where men weight the benefits and costs of alternative forms of marriage. The groom's parents, who are less patient then their son, will mandate kidnapping if he fails to marry by other means, or if they cannot afford wedding ceremony (*toi*) and bride-price (*kalym*) costs of conventional marriage. In equilibrium, this induces the son to accept less than ideal marriages in order to marry sooner, or to abduct a young woman.

Kidnapping of young women is not an easy topic to address, and is not a typical subject for the analytical tools used by economists. To the layperson who reads accounts or watches interviews of distraught kidnapped women – or of the grieving parents of women who have committed suicide – pedantically documenting that kidnapping is harmful or mathematically modeling the process must seem trivial or insensitive at best and voyeuristic at worst. We, too, are also shaken by these accounts. Yet, we also believe that addressing a practice that has many tragic consequences must be preceded by an understanding of the reason for its existence.

II. BACKGROUND: BRIDE ABDUCTION IN KYRGYZSTAN

Across the globe, most marriages stem from mutual agreement by those directly involved (commonly termed "love" marriages, though love for one's partner is neither a necessary nor sufficient condition) or their contractors (usually parents or their agents; these are commonly termed "arranged" marriages). But some marriages also involve coercion, generally of the bride. A large subset of these occur within a community, and often involve a groom and bride who know one another. Such marriages are distinct from what is referred to as "human trafficking," involving the kidnapping and sale to a distant buyer of a young woman for the purpose of marriage (as, for example Stöckl *et al.*, 2017). We focus on these intra-community coercive marriages, known as *ala-kachuu* marriages in the Kyrgyz context. Bride kidnapping occurs also in other part of the world, as documented in Becker *et al.* (2017): our focus on Kyrgyzstan is driven by open social discussion of the practice and, hence, data availability.

Coercive marriage occurs frequently in Kyrgyz society. The prevalence of "bride capture" marriage varies across surveys and temporal trends are unclear. On the high end, as many as one-third of Kyrgyz marriages involves bride kidnapping and half of them are non-consensual (Nedoluzhko and Agadjanian, 2015). Some researchers believe that the prevalence is increasing (Hanrahan, 2004), but this does not appear to be borne out by the Life in Kyrgyzstan (LiK) surveys, which serve as our main data source. Overall, the 2013 LiK survey records 16.3 percent of ethnic Kyrgyz marriages as having been concluded by bride capture (as opposed to 20.3% via arranged marriages and 60.2% via love marriages; see Steiner and Becker, 2018).

Formally, kidnapping is illegal in Kyrgyzstan, with prison sentences imposed both today and in the Soviet era.[1] In practice, there are few reports of kidnapping to the authorities; prosecutions are very rare. Eurasianet (http://www.eurasianet.org/node/65989) reports that, during January-August 2012, 666 cases of livestock theft but only 10 cases of bride kidnapping resulted in criminal charges.

With the exception of European populations (Russian, Ukrainian, Belarusian, German, and Jewish nationalities, together comprising less than 10 percent of the nation), Kyrgyzstan's population is virtually all Moslem. However, the practice of kidnapping is essentially limited to ethnic Kyrgyz, who account for 71 percent of the population (NSC, 2009). In particular, kidnapping does not occur among the Uzbeks, who are the second largest ethnic group. Kidnapping also does not tend to occur across ethnic lines; sharp differences in physical features and dress make it easy to distinguish non-European nationalities from one another. Because the various ethnicities are not geographically separated, a model of social acceptance of bride abduction must explain different incentives for the Kyrgyz than for Uzbeks, Tajiks, and others. Since they share a common religion, other cultural aspects must be the distinguishing force.

Bride abduction generally involves the prospective groom and several male friends – often highly intoxicated – seizing a young woman, shoving her into a car (obviously, a recent innovation, since private vehicles were virtually unknown in rural Kyrgyzstan prior to the mid-1990s), and then driving her to the groom's home. The locations from which the woman is seized vary, and the circumstances may or may not involve a ruse. Female relatives may be complicit as well.

[1] These penalties are determined in a new bride kidnapping bill that came into law in January 2013. Bride kidnapping has been illegal since the Soviets banned the practice in the 1920s (Werner, 2009).

Non-consensual kidnapping most commonly is initiated by either the groom himself (with his friends or brothers), or by a family member, most often his mother. In the first case, usually with his parents' permission, a young man abducts a woman and takes her to his home, at which point his female relatives are responsible for persuading the kidnapped woman to put on a white scarf that represents her consent to the marriage. The groom's family then sends an emissary to the bride's family to "apologize," announce her consent, and discuss the wedding and *kalym*.

In the second case, as described in Ismailbekova (2014), a young man's mother deceptively brings a young woman who she believes is a suitable wife for her son to their home and declares that the young woman is kidnapped. Although her son initially may feel shocked, the mother will endeavor to persuade both his son and the kidnapped woman to accept the marriage.

Once in the groom's home, the prospective bride is turned over to the groom's female relatives. They pressure her to write a letter of "consent" to her family and to put a marriage scarf over her hair, thereby signifying that she accepts the marriage (Borbieva, 2012). This "persuasion" can go on for any period from a few hours to several days. Even women who are eloping will make a token show if resistance; others will resist for longer or shorter periods depending on their interest in getting married, whether or not they have viable alternatives (and will continue to have them after the kidnapping if it fails), their attitude toward the groom, and the groom's family's social status. Most but not all kidnappings lead to marriage: estimates of failure due to resistance either by the bride or her family range from 8 percent (Kleinbach et al., 2005) to 17 percent (Amsler and Kleinbach, 1999).

Other than in those rare cases that the prospective bride escapes unassisted, at some point the groom's family goes to visit the bride's parents to "apologize," to hand over their daughter's letter, and, traditionally, to offer sheep and other gifts that constitute *kalym*. As a stylized fact, although *kalym* in the case of a kidnapping is raised above the level that would prevail for arranged or love marriages, the total cost of the wedding to the groom's extended family is reduced, since the wedding is smaller and the ceremony (*toi*) costs are much lower. Since much of the *toi* cost is borne by the extended rather than the nuclear family, it is unclear whether the groom's nuclear family experiences lower costs, though certainly saving money is often cited as a reason for kidnapping.

How bride capture emerged among the Kyrgyz is shrouded in mythology. It is frequently argued that bride kidnapping served as a means to ensure marriages, thereby improving survival rates of the Kyrgyz people, a nomadic people living in low-density, mountainous regions (Hanrahan, 2004). The mythology also points to the independence of Kyrgyz women, who, when approached by suitors, were expected to gallop off on their ponies and to defend their honor with their whip and knife. Obviously, this made abduction of a strenuously resisting woman quite difficult – though low population densities would have reduced options for both bride and groom.

There can be little doubt that bride capture today differs from that in the past. Motorized vehicles have replaced horses; brides are generally unarmed. Society has also changed: while communities may be sparsely populated, populations are not as fragmented as they were a century ago. However, they also are not as connected as they were during the Soviet era, when it was standard for young boys and girls to mix in school, as Young Pioneers, as cotton and other harvest workers, and, for many, as Komsomols.

Today, two major reasons may underlie the continued popularity of bride abduction – and a possible change in its nature. Many argue that cost of weddings is primary reason for conducting abduction (Werner, 2009). Kidnapping can lower the cost of marriage in both Kyrgyz and Kazakh communities (Borbieva, 2012;

Ismailbekova, 2014; Nedoluzhko and Agadjanian, 2015). This is evidenced by its increasing trend beginning in the 1970s, when average wedding expenses increased (Weiner, 2009). There indisputably has been a huge rise in inequality within rural (and urban) areas of Kyrgyzstan, and the wealth of the upper end of the population has resulted in nearly explosive growth of *toi* costs. Consequently, enabling marriage without crippling expenditures is often cited as a rationale for *ala kachuu*.

A second reason can be credited to the elder generation, and above all the groom's mother, as addressed in Ismailbekova (2014). The mother can play a decisive role in her son's marriage, usually having the rights to decide whom her son should marry. The mother may have two incentives of permitting or initiating a bride kidnapping for her son. In addition to producing grandchildren, a bride can improve the mother-in-law's power in the household since the new bride is expected to be obedient in the groom's family (Borbieva, 2012). Turaeva and Becker (2016) address this 'Queen bee' effect where elder women often play a leading role perpetuating oppression against younger women. If their sons do not get married in a timely fashion, mothers may push them by mandating a bride abduction (Ismailbekova, 2014). Our model below focuses on the incentives of the older generation to encourage both young men and women to accelerate their courtship periods.

Before formally analyzing the bride-kidnapping, it is important to consider the limitations of a consistent, formal model. Rather than regarding non-consensual bride kidnapping as an *adat* (wedding) tradition, the anthropological literature suggests that as practiced today, *ala kachuu* is largely a "re-invented" tradition (Kleinbach and Babaiarova, 2013). As noted, as traditionally practiced, *ala kachuu* had a consensual or symbolic aspect, and Soviet rule would have cracked down harshly on egregious coercion – and also rendered it unnecessary. But, as Kyrgyz society experienced dramatic change after the Soviet era, kidnapping appears to have been reinvented as a way for Kyrgyz people to respond to changing social norms and competing ideals (Borbieva, 2012).

Applying notions from biology, present bride kidnapping has appeared in history as a mutation, and evolved to adapt to the changing environment. Thus, while we may be able to explain not only why coercive bride kidnapping resurged after USSR collapsed, to explain why bride kidnapping is rare in other societies with similar social and economic condition is beyond the scope of our theory. The historic popularity of bride kidnapping makes it an informal institution of Kyrgyz society, although illegal. As North (1991) writes '…informal constraints … [play]… an important role in the incremental way by which institutions evolve and hence… [are] a source of path dependence'. If we regard bride kidnapping as an institution, its formation and evolution are path dependent. Thus, we need to focus on the social basis of its *status quo*, rather than arguing why it would appear.

In the model that follows, we view bride abduction as part of the marriage institution. In this setting, a family allocates its resources to acquire various goods and services, including daily consumption and investment in children (Becker and Lewis, 1973). By directing its sons to marry via *ala kachuu*, a household gains advantage in at least two aspects. First, the groom is able to have his own offspring; he and his parents then enjoy utility from additional children/grandchildren. Second, abduction lowers wedding costs and the family can use saved resources to increase consumption, invest more on quality of the youngest generation (in practice, not a major concern) or simply support more babies.

Becker's work on marriage also focuses on the production and distribution of family goods (Becker, 1973). If we regard a child as a family good, the quality of the bride/wife/ mother is essential to determine the quality of her offspring. There is ample evidence of maternal education's positive effect on child's health and other characteristics (Thomas, Strauss and Heriques, 1990); in the Kyrgyz context, wife quality also will be correlated

with the wealth and social standing of her parents, and thus the cost of her wedding. Thus, the groom's family faces a tradeoff between a lower wedding cost and a higher quality wife. To further complicate this cost-benefit analysis, we incorporate the possibility that the groom may work abroad for a period and return with savings. A family may choose to send its son(s) to work in Russia, thereby earning a far higher income than in rural Kyrgyzstan. Upon return, he will have greater wealth and can woo a higher quality wife – but at the cost of delayed marriage and fertility. In sum, the choice of when and how to marry largely reflects the groom's family's time discounting and preferences for wife/daughter-in-law and hence child/grandchild quality (and quantity).

Having outlined the main issues and parties involved, we now turn to next to a brief discussion of evidence of the effects of bride abduction, and then proceed to formal modeling in Section IV, which presents a formal model without abduction; this is added in Section V. Equilibrium incorporating brides' and *ak sakal* preferences is discussed in Section VI, while Section VII concludes and discusses extensions

III. ABDUCTION OR ELOPEMENT: A BRIEF OVERVIEW OF EMPIRICAL FINDINGS

The obvious concern faced by critics of *ala kachuu* is the retort by many that the practice is largely or entirely consensual, and that it reflects a stylized ritual that involves willing participants. In this tale, the bride must make a visible show of resistance to establish her virginity and purity (*dievstvennost'*, in Russian), while her actual resistance is minimal or nonexistent.

This claim is inconsistent with popular media reports and the presence of social organizations dedicated to supporting abused women. It is also belied by the efforts of the Republic of Chechnya in the Russian Caucasus, which has battled bride kidnapping, and which recently announced that it had been eliminated in the region (https://www.rg.ru/2017/11/28/reg-skfo/ombudsmen-chechni-v-regione-iskorenili-pohishchenie-nevest.html). In Kyrgyzstan, if the results of the small online questionnaire posed by www.openline.kg are to be believed, 66% respondents said that women forcibly kidnapped into marriage did not bother to contact the authorities because it would be "a complete waste of time" (*пустая трата времени/не будут реагировать*), though one also finds media announcements encouraging witnesses of bride kidnapping to contact the police and file a report (for example, http://wsc.kg/krazha-nevest-prestuplenie/).

Beyond being a topic in social media, the practice of bride kidnapping has documented consequences. Using 2011 LiK data, Becker *et al.* (2017) find that children born to women in a marriage formed following abduction have birthweights between 40 and 200 grams (roughly 1.3% to 6% of the mean) lighter than those born to mothers in love or arranged marriages. While the estimated loss depends upon the specification, the negative effect is robust. Specifically, it is robust to controls, comparison group, matching, and an IV approach. Similar patterns are not found for a range of placebos. While the precise mechanism is unclear, the most plausible causal chain runs from abduction to maternal stress to lower birthweight. Both this mechanism and the magnitude of the effect are consistent with Aizer's (2011) findings for children of American women who had suffered severe trauma from their partner. At the same time, Becker *et al.* (2017) do not find large differences in nutrition or work effort for women married via *ala kachuu* as opposed to other forms.

Birthweight effects provide the clearest evidence of trauma to women married via *ala kachuu*. Births tend to quickly follow marriage in Kyrgyzstan, and, obviously, birthweights by definition are not affected by the child's post-natal environment.

However, birthweights are not the only markers of discord. As Table 1 shows, albeit based on a small sample from 2011 LiK data, women married via *ala kachuu* are more than twice as likely to divorce as those in arranged marriages (the least contaminated comparison group, since some abducted women may be reluctant to report that they were kidnapped). They also appear to be less happy. An obvious hint as to why these patterns may occur is suggested by Table 2, which shows that spouses in kidnapped marriages tend to have less similar personality traits than those in arranged or love marriages.

The divorce effects also show up in the 2016 LiK data. Unlike previous rounds, the 2016 round also asked women whether their mothers had been kidnapped, which turns out to be an important determinant of the impact of being kidnapped oneself.

Table 3 shows that kidnapped women have roughly an 8 percentage point greater risk of being divorced (relative to a baseline of about 6 percent), and that this is robust to controlling for other types of marriage, and a host of other controls. However, the elevated risk declines by about one-third for kidnapped women whose mothers were also kidnapped.

Table 4 finds that kidnapped women tend to have 5-6 percent lower measures of life satisfaction, though so too do women in arranged marriages. A similar effect emerges for family life satisfaction (Table 5), though women in arranged marriages are not similarly penalized, and the effect for kidnapped women virtually disappears for those whose mothers were also kidnapped. Finally, and most shockingly, Table 6 provides estimates of the determinants of characteristics signifying severe depression. Women who were abducted exhibit 20-25% more signs of severe depression than those married in love or arranged marriages.

We emphasize that the non-birthweight regressions do not establish causality. It is possible that male suitors avoid depressed, unhappy women – and that sought-after women reject depressed, unhappy men, thereby making the story one of selection rather than the consequence of the nature of marriage. This seems unlikely, but it is possible. However, such stories still do not explain lower birthweights or the radically lower positive assortativeness in *ala kachuu* marriages (see Steiner and Becker, 2017).

In short, we believe that kidnapping is generally coercive and unwelcome, and that it has hugely negative consequences for women and their children. While it is likely that not all *ala kachuu* marriages are completely coercive, to the extent that they are not, those marriages that are coercive will have even more negative effects, since the mixing of different types will bias the coefficients toward zero relative to a sample restricted to coercive kidnappings.

IV. THE MODEL: MARRIAGE WITHOUT ABDUCTION

IV.1. Basic Setting: marrying at $t = 1$

Consider an intertemporal, three-period maximization problem faced by the prospective groom's family. At $t = 1$, a young man reaches (exogenously defined) marriage age. For him to marry, his family has to pay *kalym* to his a bride's family. As he is young, his desire for marriage is not overwhelming, so he faces two options: he can either get married immediately or work abroad in Russia for one period to increase his wealth so that he can marry a "better" wife somewhat later (the implicit assumption being that increased wealth improves a man's marriage prospects).

The quality of a wife has various components. Most obviously, greater wealth makes the prospective groom attractive to a larger set of potential brides, thereby enabling improved matching on idiosyncratic preferences and personality traits. The greater choice set also leads to improved selection on generally accepted qualities: physical attractiveness, productivity in producing family goods (Becker, 1973), support to the groom's parents by assisting in housework and elder care, social standing of the bride's family (perhaps the most important trait of all) and competence as a mother in such a way as to improve the expected health and human capital accumulation of children. That is, for a given the amount of investment (time, cash expenditures) on a child, the child will be of higher quality if his/her mother has higher quality. Following Becker and Lewis (1973), we assume that the decision-makers for a family regard children as durable goods and care about their quality. Thus, the decision maker's objective function depends on both the number and quality of children as well as consumption of other goods, which takes the form

$$U = U(y, n, q) = u(y) + v(n, q),$$

and is subject to a (timeless) budget constraint: (1)

$$I = \pi_y y + \pi n q.$$

In the Becker-Lewis notation, π_y and π are the price of all other commodities y and the price of children, respectively, with "children" defined for simplicity as the product of child quantity n and quality q.[2] Meanwhile, as in Bethmann and Kvasnicka (2011), it is reasonable to have

$$v(0,0) = v(0, q) = v(n, 0) = 0. \quad (2)$$

If the young man chooses an immediate marriage, his family has to spend a wedding cost c (including *kalym*) on marrying a bride whose quality is a monotonic function of c, and hence is simply measured as c. We assume c augments child quality q: given per child investment q, the child's real quality will be qc, where $c > 1$. The utility function hence can be rewritten as $U = u(y) + v(n, qc)$. After marrying at $t = 1$, a prospective groom will have his own children in the next period and enjoy utility from offspring at $t = 2$ and $t = 3$. The family decision-maker thus has to trade-off between an instantaneous loss in utility resulting from a higher wedding cost c and future gain from having a child with higher quality. For simplicity, in the base model we assume the couple will only give birth to one baby.[3]

Before exploring the family's utility maximization problem, another effect of wedding cost c needs to be considered. In Kyrgyz society, a lavish wedding demonstrates the family's wealth and power and enhance a family's local reputation. As this demonstration effect strengthens – and, thanks to greatly increased social

[2] For expositional simplicity, we assume that all children are of identical quality. The household "decision-maker" is left intentionally vague: it can be the husband alone, the husband and wife together, or some combination of older (grandparents) and younger generations. The set-up of the problem is not affected by the choice of decision-maker, though, obviously, elasticities and parameters will be. Empirically, it appears that in most households, all adult parties influence major decisions (Turaeva and Becker, 2017).

[3] In practice, this is not a restrictive assumption. Few Kyrgyz couples seek to delay fertility once they marry, and nearly all will aim to have several children, so that in the short run following marriage, desired fertility can be approximated as being unconstrained (and so the number of children can be regarded as a constant, which we simplify to 1).

differentiation since the collapse of the USSR, it almost certainly has strengthened in the past 25 years – the groom's family's return to wedding expenses relative to their income increases. This phenomenon can be important in rural areas, and not only in Kyrgyzstan, but also in China and many other middle and upper middle-income countries. Formally, we model this effect by adding a term $k \ln c$ to the family's utility maximization problem to represent the reputation brought by the wedding cost, where k is the value attached to the demonstration effect. This parameter k is socially determined but also varies across particular households. The family's intertemporal utility maximization problem then becomes:

$$\max_{y_1,y_2,y_3,c,q,s_1,s_2} u(y_1) + \delta[u(y_2) + \beta v(1,qc)] + \delta^2[u(y_3) + \beta v(1,qc)] + k\ln c$$

$$\begin{gathered} s.t.\ \ I = s_1 + c + \pi_y y_1 \\ s.t.\ I + rs_1 = s_2 + \pi_y y_2 + \pi q \\ s.t.\ I + rs_2 = \pi_y y_3 \end{gathered} \tag{3}$$

where r is the real return to saving and s_1, s_2 are the amount of savings at $t = 1$ and $t = 2$; the coefficient β measures the relative importance that the groom or his parents put on the utility from a child compared with that from consumption of other commodities. We adopt the simple log linear form of the utility function both for tractability and the convenient feature of constant relative risk aversion (CRRA; Diamond and Köszegi, 2003). Then $u(y) = \ln y$ and $v(n, qc) = (1 - \alpha)\ln n + \alpha \ln qc$, where the latter reduces to $v(y) = \alpha \ln qc$ since $n = 1$. Solving this problem gives the groom's family's maximized indirect utility:

$$\begin{aligned} U_{marry} = {} & [1 + k + (1 + 2\alpha\beta)(\delta + \delta^2)] \ln y_1^m \\ & + (\delta + 2\delta^2) \ln r\delta + \alpha\beta(\delta + \delta^2)[\ln \frac{\alpha\beta(\delta + \delta^2) r\pi_y}{\pi} + \ln(\alpha\beta(\delta + \delta^2) + k)\pi_y \\ & + k \ln[(\alpha\beta(\delta + \delta^2) + k)\, \pi_y] \end{aligned}$$

where (4)

$$y_1^m = \frac{(1 + \frac{1}{r} + \frac{1}{r^2})I}{\pi_y[1 + k + (1 + 2\alpha\beta)(\delta + \delta^2)]}.$$

IV.2. Working before the marriage: marrying at $t = 2$

The alternative to marrying in period 1 and having a child in period 2 is for the prospective groom to postpone his marriage and work abroad in Russia or neighboring Kazakhstan in period 1, returning with additional wealth ΔI to marry a better wife in period 2. The obvious cost to such a strategy is that of a later marriage: the groom would not realize a utility flow from having his own child until $t = 3$. This delay is unimportant in a model with no discounting and an infinite time horizon, because a child will bring utility in every period after she is born and the infinite sum of the two series of discounted utility flows will differ only by the first term. However, in the Kyrgyz setting, patience is costly. Thus, if the young man chooses to work first, the family's intertemporal utility maximization problem becomes

$$\max_{y_1,y_2,y_3,c,q,s_1,s_2} u(y_1) + \delta u(y_2) + \delta^2[u(y_3) + \beta v(1,qc)] + \delta k \ln c$$

$$s.t.\ \ I = s_1 + \pi_y y_1 \tag{5}$$

$$s.t.\ I + \Delta I + rs_1 = s_2 + \mathrm{c} + \pi_y y_2$$
$$s.t.\ I + rs_2 = \pi_y y_3 + \pi q$$

The maximization problem gives the family's maximized utility in case of working prior to marriage:

$$\begin{aligned} U_{work} = {} & [1 + (1+k)\delta + (1+2\alpha\beta)\delta^2] \ln y_1^w \\ & + (\delta + 2\delta^2) \ln r\delta + \alpha\beta\delta^2 \left[\ln \frac{\alpha\beta\delta^2 r^2 \pi_y}{\pi} + \ln(\delta k + \alpha\beta\delta^2)\, r\pi_y \right] \\ & + \delta k \ln(\delta k + \alpha\beta\delta^2) r\pi_y \end{aligned} \tag{6}$$

where

$$y_1^w = \frac{\left(1 + \frac{1}{r} + \frac{1}{r^2}\right) I + \frac{1}{r}\, \Delta I}{\pi_y [1 + (1+k)\delta + (1+2\alpha\beta)\delta^2]}.$$

The groom's family will prefer an early marriage if $U_{marriage} > U_{work}$ and *vice-versa*. Denoting the difference between these two utilities as $\Delta U_w = U_{marry} - U_{work}$, we have following observations.

PROPOSITION 1 The groom's incentive of postponing his marriage in order to marry a better wife is:
(1) Increasing in ΔI, the extra amount wealth he can make from the working opportunity
(2) Decreasing in I, his income level;
(3) Usually decreasing in β, the weight placed on having a child, if $U_{marriage} \geq U_{work}$.

Proof.
The first statement is obvious. To prove the second statement, notice that

$$\begin{aligned} \frac{\partial \Delta U_w}{\partial I} &= [1 + k + (1+2\alpha)(\delta + \delta^2)] \frac{1}{I} - [1 + (1+k)\delta + (1+2\alpha)\delta^2] \frac{1}{I + \frac{r\Delta I}{1 + r + r^2}} \\ &> [1 + k\delta + (1+2\alpha)\delta + (1+2\alpha)\delta^2] \frac{1}{I} - [1 + (1+k)\delta + (1+2\alpha)\delta^2] \frac{1}{I} > 0. \end{aligned}$$

The third statement is slightly trickier as it is complicated to take the derivative of ΔU_w with respect to β. But it is easy to observe this fact by plotting ΔU_w in response to a change of β. Numerical simulation suggests that $\frac{\partial \Delta U_w}{\partial \beta} > 0$ holds not only when $U_{marriage} \geq U_{work}$, but also for almost all $\beta > 0$ under different parameter settings.

These results suggest that a richer family will be less willing to postpone a son's marriage. The third statement of Proposition 1 has an important implication. Thus far, we have treated the groom's family as a single decision-making entity. Yet, different household members are likely to have different preferences and valuations over the utility flow provided by children. Specially, the elder generation usually has an incentive to encourage their children to marry sooner than the younger generation would do so on its own. There are various reasons for this difference: the elder generation may hope to have grandsons and granddaughters sooner so that they can take care of their grandchildren when they are still capable of the task. In cultures in which having offspring is of vital importance, the elder generation wants to guarantee the continuation of

their ancestral line; hence may would pressure their children to get married and give birth to a baby as soon as possible. In conventional modeling, older generations also face a transversality condition that lowers their discount factors.

In contrast, some young adults may believe that marriage circumscribes freedom and hinders the realization of personal goals. They may rationally regard immediate marriage and child-bearing as less important to them than to their parents. In our model, these differing preferences are captured by the relative weight on the utility from children, *i.e.*, the β term, which we assume to be greater for the elder generation. The third statement in Proposition 1 suggests that, there must be some range of extra income ΔI for which the elder generation will prefer their son to marry at $t = 1$ while the young man wants to marry at $t = 2$. In rural Kyrgyz society controlled by *ak sakal*s, the elder generation will have both incentive and ability to impose marriages viewed by their children as suboptimally early. The result is shown in Figure 1.

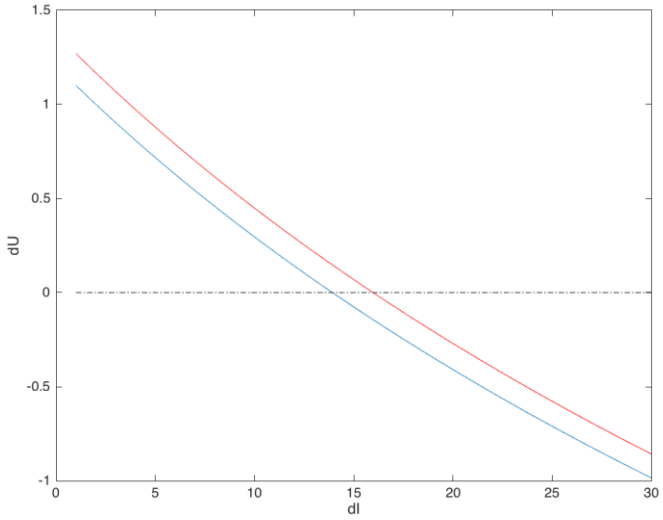


Figure1
Differing intergenerational preferences over children:
Utility from marriage – work declines in wealth and is lower for the younger (blue) generation

In Figure 1, the blue curve represents the younger generation while the red line on the right represents the elder generation with larger β. It shows that with a larger weight on the utility from having children, the elder generation will be reluctant to allow their sons to work outside the community even if this opportunity is attractive from their son's perspective. Family members can bargain over this decision, but power is not equally distributed between a son and his parents. The elder generation controls social norms, and finds it both rational and feasible to force a marriage for their son. The forced marriage can be an arranged marriage, a hurried love marriage, or a non-consensual kidnapped marriage.

In this sense, bride kidnapping initiated by the elder generation counters the younger generation's desire to postpone marriage and thus may be socially rational as it meets the needs of the group of people who control social norms. That said, elder generations across the globe yearn for grandchildren, and in many cases make life decisions for their offspring – but only in a small number of settings do they encourage their sons to abduct brides. Thus, incentives notwithstanding, the story thus far is highly incomplete.

V. MARRIAGE WITH ABDUCTION

V.1. The effect of bride kidnapping

Beyond accommodating the preferences of the elder generation, there are other reasons to consider bride abduction. An obvious consideration is that it may lower wedding costs (Werner, 2009; Borbieva, 2012; Ismailbekova, 2014; Nedoluzhko and Agadjanian, 2015). This motive likely increased in the 1990s with the collapse of the USSR, as real incomes plummeted, and in the 2000s as incomes rose but inequality surged, and *toi* costs rose dramatically as well.

Formally, bride abduction may be seen in this light as a way to reduce the cost of marrying a woman of given quality; specifically, bride kidnapping enables the young man's family to marry a woman who of quality c at cost $c - \Delta c$.

For simplicity, but also plausibly, the kidnapping discount Δc is treated as a fixed value within a local community. First, inter-class bride kidnapping is unlikely. A high "discount value" of Δc, which means the young man plans to kidnap a girl from family that is far richer and powerful than his own family, will make the bride abduction almost impossible to succeed. The young woman's family will have both incentive and ability to deter the kidnapping from a success by either calling the police or forcing the man's family to return their daughter – quite likely without returning the *kalym* brought with the "apology." Moreover, both the previous literature and cross-tabs from LiK 2016 indicate that men from lower SES families are more likely to marry via *ala kachuu* (Kleinbach and Salimjanova, 2007). Sexually assaulting a young woman of higher social status is a poor idea, and the young woman herself is most unlikely to agree to marriage, so that the kidnapping has little chance of being successful – and there are many potentially negative consequences.

A negative income elasticity of demand for *ala kachuu* appears in our model as an implication of the constant discount benefit. The benefit from kidnapping (the *toi* plus *kalym* discount) constitutes a smaller portion of indirect utility of families that are wealthier, since $\frac{\Delta c}{c}$ diminishes as c increases. We require $\Delta c \geq 1$ so that $\ln \Delta c \geq 0$. Indeed, bride kidnapping seems likely to tarnish a family's reputation rather than to polish it, so that Δc is likely to decline with income and hence wedding expenses; at a minimum, it will rise less rapidly than total wedding costs.

If bride kidnapping is socially accepted, it offers the third option to the groom's family: to abduct a bride and marry at $t = 1$. The family will benefit from a lower wedding cost while suffering from reputation loss. In this case, the groom's family's problem can be written as

$$\max_{y_1,y_2,y_3,c,q,s_1,s_2} u(y_1) + \delta[u(y_2) + \beta v(1,qc)] + \delta^2[u(y_3) + \beta v(1,qc)] + k \ln \frac{c}{\Delta c}$$

$$\begin{gathered} s.t.\ \ I = s_1 + c - \Delta c + \pi_y y_1 \\ s.t.\ I + rs_1 = s_2 + \pi_y y_2 + \pi q \\ s.t.\ I + rs_2 = \pi_y y_3 \end{gathered} \tag{7}$$

Notice the first budget constraint can be rewritten as $I + \Delta c = s_1 + c + \pi_y y_1$. That is, the effect of bride kidnapping is to increase the groom's family's disposable income in the first period. As shown below, this

shadow income will be distributed between general consumption and the actual paid *toi* cost. Meanwhile, although unlikely, we must consider the possibility of $\Delta c > c$. This could happen if the bride's family transfers wealth to the groom's family to ensure the quality of her life after marriage. Any wealth brought by the bride functions similarly as the additional disposable income, and can be incorporated in Δc. The solution to the utility maximization problem (7) is:

$$\begin{aligned} U_{kidnap} = {} & [1 + k + (1 + 2\alpha\beta)(\delta + \delta^2)] \ln y_1^k \\ & + (\delta + 2\delta^2) \ln r\delta + \alpha\beta(\delta + \delta^2)[\ln \frac{\alpha\beta(\delta + \delta^2) r\pi_y}{\pi} + \ln(\alpha\beta(\delta + \delta^2) + k)\pi_y \\ & + k \ln[(\alpha\beta(\delta + \delta^2) + k)\, \pi_y] - k \ln \Delta c \end{aligned} \tag{8}$$

where

$$y_1^k = \frac{\left(1 + \frac{1}{r} + \frac{1}{r^2}\right) I + \Delta c}{\pi_y [1 + k + (1 + 2\alpha\beta)(\delta + \delta^2)]}.$$

Compared with the situation in which bride kidnapping is not allowed, the possibility of abduction has two impacts on the marriage decision. First, it is clear that $y_1^k > y_1^m$, then $U_{\text{kidnap}} > U_{marry}$ if social reputation were not taken into consideration, *i.e.*, if $k = 0$. Second, an additional loss in social reputation will negate part or all of the benefit from incurring a lower wedding cost. The groom's family has to trade-off between the two contradictory effects if it plans a bride kidnapping. The net effect of a bride kidnapping, as denoted by $\Delta U_k = U_{marry} - U_{kidnap}$, depends on the value of Δc and income level I:

$$\begin{aligned} \Delta U_k = U_{marry} - U_{kidnap} &= [1 + k + (1 + 2\alpha\beta)(\delta + \delta^2)]\left(\ln y_1^m - \ln y_1^k\right) + k \ln \Delta c \\ &= [1 + k + (1 + 2\alpha\beta)(\delta + \delta^2)] \ln \frac{\left(1 + \frac{1}{r} + \frac{1}{r^2}\right) I}{\left(1 + \frac{1}{r} + \frac{1}{r^2}\right) I + \Delta c} + k \ln \Delta c. \end{aligned} \tag{9}$$

As the first term is negative and the second term is positive, *ala kachuu* can be either a wise or a poor decision from the perspective of the groom and his family. Notice that $\Delta U_k < 0$ when $\Delta c = 1$, which is the minimum possible cost to the family's reputation. Depending on the derivative, it is possible that either $\Delta U_k < 0$ holds for all $\Delta c > 1$, which means bride kidnapping is always rational; or ΔU_k changes non-monotonically with Δc. Consider the derivative

$$\begin{aligned} \frac{\partial \Delta U_k}{\partial \Delta c} &= \frac{k}{\Delta c} - \frac{[1 + k + (1 + 2\alpha\beta)(\delta + \delta^2)]}{\left(1 + \frac{1}{r} + \frac{1}{r^2}\right) I + \Delta c} \\ &= \frac{\left(1 + \frac{1}{r} + \frac{1}{r^2}\right) kI - [1 + (1 + 2\alpha\beta)(\delta + \delta^2)]\Delta c}{\Delta c \left(1 + \frac{1}{r} + \frac{1}{r^2}\right) I + (\Delta c)^2}. \end{aligned} \tag{10}$$

It equals zero when

$$\Delta c = \Delta c^* = \frac{(1 + \frac{1}{r} + \frac{1}{r^2}) kI}{1 + (1 + 2\alpha\beta)(\delta + \delta^2)} \tag{11}$$

and is smaller than zero when $\Delta c > \Delta c^*$. In other words, given the family's income level I, if the reputational concern k is small enough so that

$$k < k^* = \frac{1 + (1 + 2\alpha\beta)(\delta + \delta^2)}{(1 + \frac{1}{r} + \frac{1}{r^2})I}, \tag{12}$$

then $\Delta c^* < 1$ and the derivative $\frac{\partial \Delta U_k}{\partial \Delta c} < 0$ holds for all $\Delta c \geq 1$, which implies that ΔU_k is always smaller than zero.

If $\Delta c^* > 1$, the sign of (10) is not invariably negative. In this case, ΔU_k is increasing in Δc in the range $[1, \Delta c^*]$ and decreasing in Δc when $\Delta c > \Delta c^*$, so ΔU_k reaches its maximum value at $\Delta c = \Delta c^*$. However, it is possible that this maximum value is smaller than zero, implying that bride kidnapping is always better than a normal marriage. To show this, notice that the maximum of ΔU_k takes the form:

$$\Delta U_k^* = [1 + k + (1 + 2\alpha\beta)(\delta + \delta^2)] \ln \frac{1 + (1 + 2\alpha\beta)(\delta + \delta^2)}{1 + k + (1 + 2\alpha\beta)(\delta + \delta^2)} + k \ln \Delta c^*, \tag{13}$$

where we only require $\Delta c^* > 1$. Since the first term is negative, if Δc^* is only a little bit greater than 1, it is possible that $\Delta U_k^* < 0$. If the maximum value is greater than zero, then there will be a range of Δc with which bride kidnapping causes more reputational loss than actual benefit. Intuitively, given the family's income I and the wedding cost discount level Δc, so long as the reputational concern is strong enough, bride kidnapping will not be the correct choice. Formally, to show the existence of such a range, we need to prove that the maximum value can be greater than zero. Lemma 1 gives the proof of these results.

LEMMA 1. As long as the reputational concern k is strong enough, there exists a range of Δc in which bride kidnapping is not the rational choice.

Proof. See Appendix A.

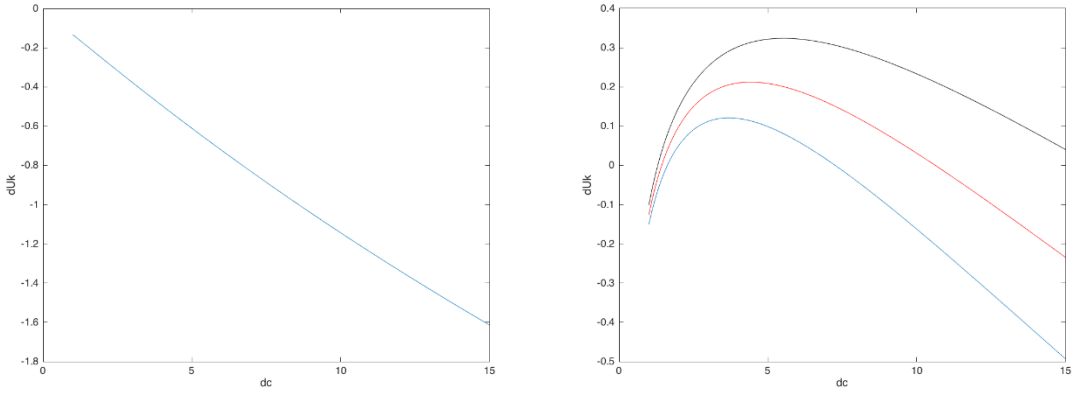
Lemma 1 shows that so long as the family's reputational concern is strong enough, for a range of wedding cost discounts Δc, they will not implement bride kidnapping. Indeed, we have an even stronger result: given family income level I and wedding cost discount Δc, so long as this reputational concern is strong enough, the family will not abduct a bride.

LEMMA 2. Given a family's income level I and socially determined wedding cost discount Δc, there exists k such that $\Delta U_k > 0$.

Proof. See Appendix B.

Figure 2 graphs the relationship between utility gains from kidnapping and Δc. Figure 2(a) is the case in which the reputational effect is small: *i.e.*, $k < k^*$ so that $\Delta c^* < 1$. Abduction will always yield higher utility than marrying through a normal channel in this situation. Figure 2(b) shows the case where there is a range of Δc over which abduction is undesirable. In Figure 2(b), curves to the northeast represent families with higher

income/wealth levels. It shows that, given Δc, the incentive to marry conventionally (without abduction) is increasing in the family's wealth. We can simply prove it by noting that ΔU_k is increasing in I. A richer family is less likely to abduct a bride because the utility from paying a lower wedding cost constitutes only a small portion of its total utility while the cost to reputation rises with c. Therefore, even if bride kidnapping does lower wedding cost, not all families will choose this option. Not surprisingly, families that are burdened with financial stress and (probably hence) care less about their reputation should favor bride kidnapping.



(a) $k < k^*$ (b) $k > k^*$ and $\Delta U_k^* > 0$

Figure 2
The effect of Δc on utility gains from bride abduction

It is also noteworthy that the possibility of bride kidnapping has asymmetric impact on the elder and younger generations' decision in the groom's household. Caring more about the utility from offspring, the elder generation will benefit more from an early marriage than will the younger generation, given a fixed reputation cost, as $\frac{\partial \Delta U_k}{\partial \beta} < 0$. Therefore, the elder generation not only has an incentive to force their sons to marry early, but also is more likely to initiate bride kidnapping as a means to achieve the target. We summarize these observations as Proposition 2.

PROPOSITION 2 The groom's family's incentive to implement bride kidnapping is:

(1) Decreasing in the family's level of concern about its social reputation k and income level I;
(2) Increasing in the amount of wedding cost discount Δc, when $k < k^*$. If social reputation is not or is barely a concern for the groom's family bride kidnapping always will be preferred;
(3) First decreasing then increasing in the amount of reduced wedding cost Δc, when $k < k^*$; *i.e.*, if the family is concerned with its reputation. As long as Δc is large enough, bride kidnapping will be always worthwhile;
(4) Increasing in the utility weight from having offspring, β.

V.2. Three options

If bride kidnapping is socially accepted, a prospective groom's family will have three options when comes to a marriage: either through normal channels (love or arranged marriage) when the young man first comes of age, early marriage via bride abduction, or delayed marriage through normal channels after a spell working

abroad and earning extra income. Compared with the situation where there is no bride kidnapping, implementing bride abduction can either move the curve in Figure 1 upward or downward. Higher period 1 disposable income ΔI from working abroad induces the younger generation to postpone their marriages, while the effect of a higher discount Δc is not monotone. The three options are shown together in Figure 3. The best option can be any of them, depending on the values of Δc and ΔI.

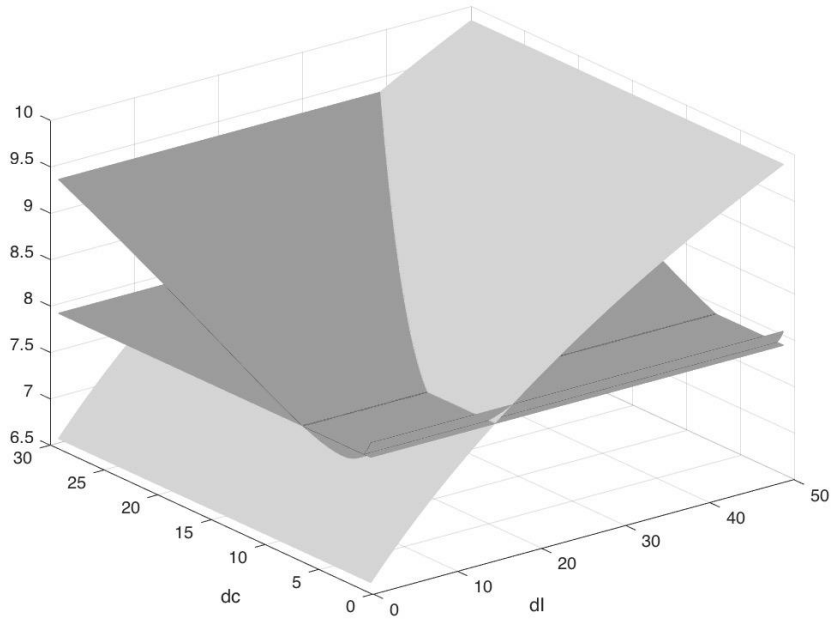


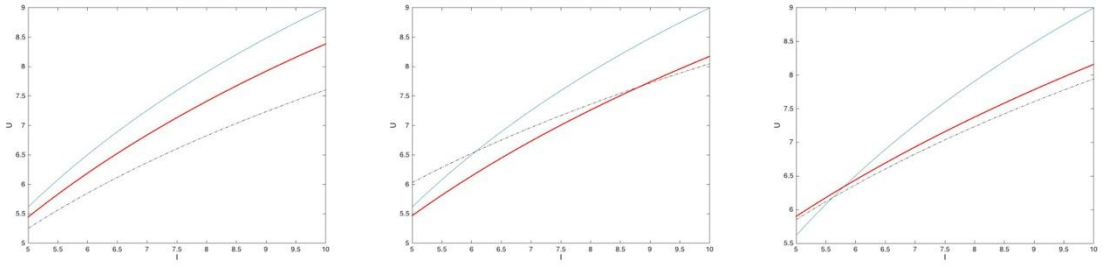
Figure 3
Utility from Three Marriage Options in Wealth (*I*) and Bride Quality (*c*) Space ($k > k^*$)

In Figure 3, which is the case when $k > k^*$, the dark plane is the base case of marrying a bride through a normal channel at $t = 1$, so it does not vary with Δc and ΔI. The light curved surface represents the decision to marry at $t = 2$ after working abroad for a period; the dark curved surface is the case of kidnapping a bride for marriage. From this figure, we can find the best strategy in different situations. First, conventional marriage without working abroad is the best option if the working opportunity is not that lucrative and bride kidnapping does not lower *toi* plus *kalym* costs too much. Second, postponing the marriage becomes the best option when working abroad can bring the family enough fortune to marry a better wife. Third, bride kidnapping is the optimal choice if working abroad has only a moderate effect on family wealth while abduction lowers wedding costs significantly. Finally, if social reputation is not a concern, namely, k is small enough, then marrying conventionally will never be the best choice.

Bride kidnapping also has another social impact in a broad sense. In Figure 3, in regions where the dark curved plane is above the light curved plane; *i.e.*, bride kidnapping brings more utility than working aboard, those people who would have chosen to work first and gotten married at $t = 2$ now will choose bride kidnapping and get married at $t = 1$. Bride kidnapping thus allows a greater proportion of young men to marry early. Since those who marry at $t = 2$ are older than those who marry at $t = 1$, bride kidnapping as a social institution increases the supply of grooms who are peers of brides in each period and narrows the average age

gap between the groom and the bride. Brides need not marry a man who can afford the *kalym* but is far older than her. This is not a bad thing for those young women and men who wish to marry their peers – and also makes the welfare impacts of kidnapping (in principle) ambiguous.

It is also easy to graphically explore the effect of family wealth *I* on marriage type and timing, given exogenous values for Russian work opportunity ΔI and the socially determined wedding cost discount Δc. We have already seen that, given ΔI and Δc, the prospective groom's incentive to work abroad or marry via *ala kachuu* is decreasing in the family's income level. Thus, at some wealth level, marrying through a normal channel is the best choice. But for an arbitrary I, it is not easy to tell which is the best strategy. When the family's income level is relatively low, the best strategy can be any of the three possibilities, as shown in Figure 4.



(a) (b) (c)

Figure 4
Best Marriage Strategies for the Groom's Family as a Function of Wealth, *I.*

In Figure 4, the thin full line represents the utility from marrying young through a normal channel; the thick full line represents the utility from bride kidnapping and the dotted-dash line represents the utility from working abroad and delaying marriage. If the working opportunity is profitable, working abroad first would be the best strategy for low-income families, as in Figure 4(b); if the wedding cost discount is huge, bride kidnapping can be a good choice, as in Figure 4(c); if the extra income from working opportunity and the wedding cost discount are both low, marrying through the normal channel can be the dominant strategy for all I, as in Figure 4(a). That is: if marrying through the normal channel is the best strategy for the poorest family, it is the best strategy for all families. This is a natural result from Proposition 1(a) and Proposition 2(a); briefly speaking, U_m increases faster with I than U_w and U_k. Showing the best strategy for a family as wealth varies has an important implication for their behavior on marriage market: the family makes its decision based on their utility, not the quality of bride. As the income increases, their utility will change continuously, but this is not true for the quality of bride they would marry, as is shown in the next section.

V.3. Comparative statics for the groom's family

So far we have discussed only the impact of bride kidnapping on the marriage decision. However, it also influences the groom's family's other options. First, consider the family's consumption of other goods. The intertemporal utility maximization problem in (3) gives the relationship between consumption in different periods given that $y_1 = \frac{1}{r\delta} y_2 = \frac{1}{(r\delta)^2} y_3$, and this holds in all three situations; meanwhile, (4) gives the value of y_1 when bride kidnapping occurs:

$$y_1^k = \frac{\left(1+\frac{1}{r}+\frac{1}{r^2}\right)I + \Delta c}{\pi_y[1+k+(1+2\alpha\beta)\delta+(1+2\alpha\beta)\delta^2]}.$$

The groom's family increases its consumption in each period as lowered *toi* cost increases disposable income. Suppose the groom will marry a woman of value $\bar{c}$ when bride kidnapping is not allowed. Then, with kidnapping (and assumed convex preferences) he will not marry a bride of value $\bar{c}+\Delta c$ but, due to substitution effects, of value a little bit lower than that level, which equals

$$c_k = [\alpha\beta(\delta+\delta^2)+k]\pi_y y_1^k < [\alpha\beta(\delta+\delta^2)+k]\pi_y y_1^m + \Delta c = \bar{c} + \Delta c. \tag{14}$$

Meanwhile, it can be anticipated that the reduced wedding cost will be used to invest as well in the quality of future children. Thus, the family's benefit from bride kidnapping comes not only from an increase in its consumption, but (in principle – not terribly likely in reality) also from more investment on the child's quality, since

$$q_k = \frac{\alpha\beta(\delta+\delta^2)r\pi_y}{\pi} y_k > \frac{\alpha\beta(\delta+\delta^2)r\pi_y}{\pi} y_m = q_m. \tag{15}$$

On the other hand, if the groom works abroad first, his family will pay a wedding cost of

$$c_w = [k\delta + \alpha\beta\delta^2]r\pi_y y_1^w, \tag{16}$$

where y_1^w is defined in (6). One possible (if again unlikely) situation occurs when working abroad is lucrative enough for the groom to postpone his marriage, but his preferences are such that he would rather spend more of his extra income on the consumption of other commodities to increase his utility rather than on marrying a better wife – for example, buying construction materials for a new, prestigious house. In this case, he will choose to marry a wife of value $c_w < \bar{c}$ even if after he returns home with additional wealth. This could happen if the groom places less weight on the utility from having a child while the extra income earned abroad is fairly low.

Figure 5 demonstrates this idea, where the blue lines represent the younger generation with smaller β and the red lines represent the elder generation which more heavily weights utility from offspring; the full lines are their utilities while dotted lines are reflect their preferences over bride quality. For the certain level of ΔI as denoted by the gray vertical line in Figure 5, both the elder and the younger generation agree to postpone the marriage (two full lines are both below zero); but the younger generation wants to spend more on consumption rather than marrying a better wife (the blue dotted line is above zero), while the elder generation wants him to marry a better wife (the red dotted line is below zero). Besides reflecting the value of grandchildren, these differing preferences are consistent with the observations in Borbieva (2012) and Tuaeva and Becker (2016) that the groom's mother gains more power in the family if she has a daughter-in-law. Even if the elder generation agrees with their child that later marriage is preferred, they will likely require their son to marry a better wife rather than increase consumption of other goods. To some degree, then, the elder generation makes the "right" decision for their son – assuming that the son and parents agree on the components of bride quality.

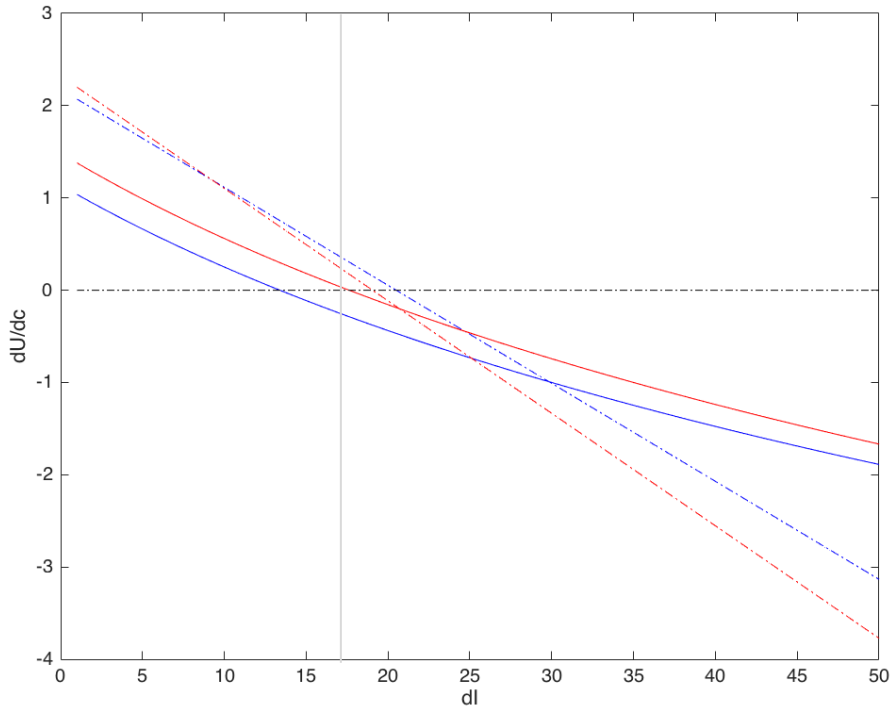


Figure 5
Preferred bride quality from the perspective of the groom and his parents

As suggested above, while utility changes continuously with family's income level, the quality of bride they will choose exhibits a discontinuity: a family with higher income will not necessarily marry a bride with higher quality. Figure 5 shows one side of this result: after working abroad, the groom may wish to marry a wife who has even lower quality than he would have married had he not worked.

The other side of this discontinuity occurs in the comparison between the quality of wife a family would choose through a normal channel and one the family would marry by bride kidnapping. As shown in Figure 4(c), for family with low income, the best strategy is to abduct a bride for marriage; as the family's income level increases, the best strategy changes to marrying through normal channels.

Let us consider the cutoff points. At the cutoff point, we have $\Delta U_k = 0$. If the family would have their son marry through a normal channel, it will choose a bride of quality $c_m = [\alpha\beta(\delta + \delta^2) + k]\pi_y y_1^m$; if the family implements an abduction, it will target on a bride of quality $c_k = [\alpha\beta(\delta + \delta^2) + k]\pi_y y_1^k$. Comparing equation (4) and (8), we know that $y_1^m < y_1^k$, therefore $c_m < c_k$. Since c_k changes continuously with I, we could expect that for a family with income a little lower than the cutoff level, it will still choose a bride of quality higher than c_m. Therefore, a discontinuity emerges in the marriage market where bride kidnapping is allowed; this is due to the discrete reputation cost as soon as an abduction takes place. Figure 6 demonstrates the discontinuity of bride quality with respect to family income level I.

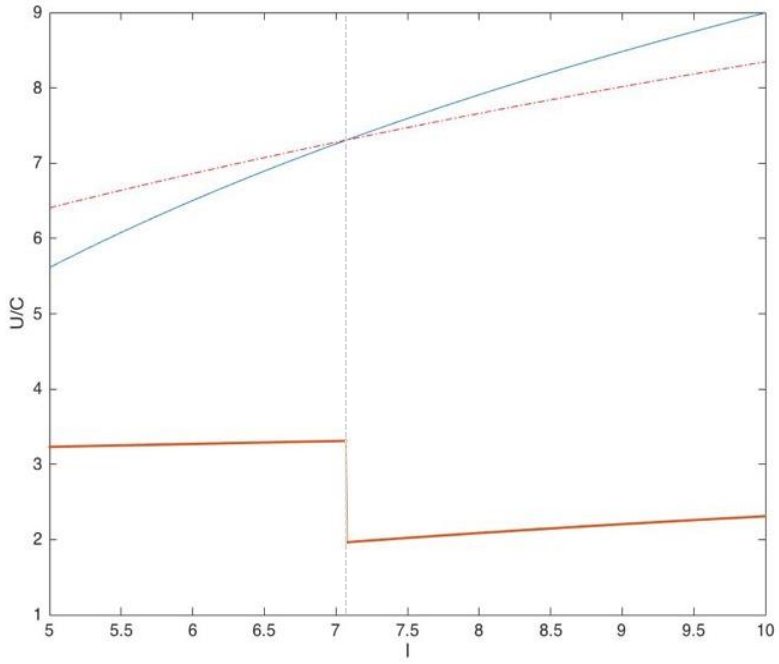


Figure 6
Discontinuity in bride's quality of which grooms would choose

In Figure 6, the full line represents the U_m and the dotted line represents U_k; the broken line below is the quality of bride a family with income I would marry to achieve the maximum utility. Clearly at the cutoff points there is a sudden drop in the quality of bride the groom would choose to marry. In this sense, an assortative Beckerian mating equilibrium cannot be expected in a world with bride kidnapping. This discontinuity has important implications for equilibrium of the marriage market with bride kidnapping, which is discussed in the next section.

VI. EXTENSIONS

VI.1. Marriage Market Equilibrium

In our discussion above, we implicitly regard the marriage market as a market of brides: brides are the suppliers of the commodity 'bride' while grooms demand this commodity. We assume a cluster of markets of brides of different qualities that takes continuous values. In case without bride kidnapping, groom pays a bride price c to marry a bride of quality c, hence the bride price is indeed the price of bride. From (16), the bride price at which a groom is willing to pay is continuous in his (family's) income level I, this suggests a pattern of positive assortative mating in the marriage market: high-income groom marries high-quality bride and low-income groom marries low-quality bride. As suggested by Becker (1981), positive assortative mating is usually the pattern shared by an efficient marriage market. However, we have proved that positive assortative mating will no longer hold in a marriage market with bride kidnapping. Those grooms with low income can marry a bride with higher quality than they could have afforded by kidnapping a bride. Figure 7 demonstrates that a groom with low income but who implements a bride kidnapping and a groom with higher income may demand the

bride of same quality. This will incur an excess demand of brides of qualities in a certain range, and as a result, an excess supply of brides of qualities in another range. Assume grooms' income is normally distributed, and all the other parameters hold the same for the whole society, Figure 7 simulates the demand and supply of brides of different qualities.

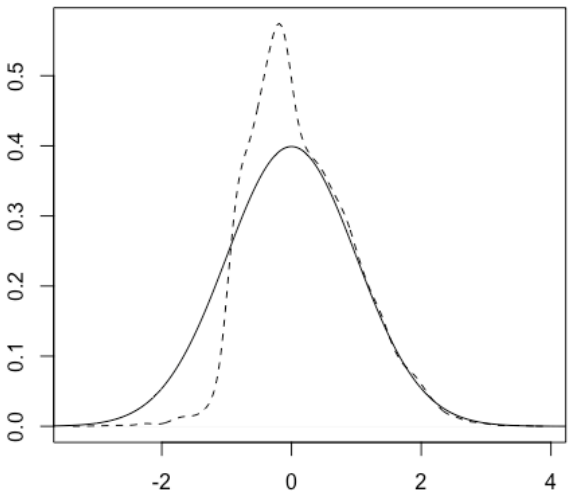


Figure 7
Demand and supply of brides of different qualities.
(The full line is the density function of standard normal distribution that represents the supply of brides of different qualities and the dashed line is the demand of brides of difference qualities in case where bride kidnapping is allowed)

We can observe several interesting facts from Figure 7. First, we know there exists a cutoff point of income where a groom is indifferent between kidnapping a bride and not kidnapping a bride. Denote the quality of bride he would marry if he chooses not to kidnap as $c_m^*(I^*)$ and the quality of bride he would marry if he kidnaps as $c_k^*(I^*)$. From Figure 6, we have $c_m^*(I^*) < c_k^*(I^*)$. However, as his income increases, eventually he would marry a wife with quality higher than $c_k^*(I^*)$. This implies that brides of quality higher $c_k^*(I^*)$ bear no risk of being kidnapping. As we can see in Figure 7, the demand and supply curves overlap if $c > c_k^*(I^*)$. Since we restrain c to be fixed, in other words, so long as the benefit of bride kidnapping decreases in income level, the brides from upper class not only have the power and ability to deter the bride kidnapping from happing, but also suffers lower (or no) risk of being kidnapped. Second, for brides of qualities in the range of $[c_m^*(I^*), c_k^*(I^*)]$, there are excess demand of brides. Anderson (2007) refers this phenomenon that the number of marriageable men and women are imbalanced as 'marriage squeeze'. The excess demand leads to rising bride price. From the perspective of bride or her family, this implies that in an institution where bride kidnapping is socially tolerated, they could receive a higher amount of bride price if she is lucky enough not to be kidnapped. Thus if the probability of being kidnapped is not unbearably high, brides in this middle range could benefit from an institution with bride kidnapping for higher bride price (we will discuss this probability in the next part). This provides a possible explanation for why exposing to the risk of being kidnapped is somewhat rational for some young women and their families. Third, an excess supply of brides of low qualities

happens as a result of excess demand in the middle class. This drives bride price of brides of quality lower than $c_m^*(I^*)$ down. This means that brides of quality in this range will receive less bride price not only because she is kidnapped but also due to the excess supply: girls from the bottom of the society will be the group that suffers most.

But this is not the whole story. Grooms (both who kidnap and do not kidnap) who want to marry a wife of quality in the middle range of $[c_m^*(I^*), c_k^*(I^*)]$ would suffer a loss in their utilities as a result of rising bride price. Specifically, consider the groom who had been indifferent from kidnapping and not kidnapping. The rising bride price is equivalent to a decrease of the groom's actual income, in other words, the first-period budget constraints of groom will change to $I = s_1 + (c + \Delta BP) + \pi_y y_1$ (in case he does not kidnap) and $I = s_1 + (c - \Delta c + \Delta BP) + \pi_y y_1$ (in case he kidnaps). Consequently, U_m and U_k will change in terms of the expression y_m and y_k. Although the utilities in two cases both decreases, the utility of marrying through normal marriage, U_m decreases more fast than U_k[4]. Thus, the groom who had been indifferent between the choices will choose to kidnap. This will change the demand again and lead to the next round of update. Similarly, as the bride price decreases in the bottom class (ΔBP is negative), the best strategy of grooms who wish to marry a bride of quality in this range may change to a normal marriage rather than bride kidnapping.

What could be an equilibrium in the marriage market where bride kidnapping is allowed? Becker (1981) describes the equilibrium of marriage market as a market that maximizes the total output. We have shown that such a market with the pattern of assortative mating is not likely to exist in our settings. Alternative definitions can be borrowed from Tertilt (2002) and Ambrus *et.al.* (2010). Roughly speaking, groom chooses the marriage strategy of either kidnapping or not kidnapping and chooses the quality of wife he would like to marry to maximize his utility; at the equilibrium, bride price makes the demand and supply for bride equal in each market. Is this equilibrium possibly achieved? There are two different situations. First, consider a closed society where working opportunities outside the community do not exist. We know that so long as the quality of bride whom a groom would like to marry is not continuous in his income level, there would be excess demand and supply. In order to make the excess and supply disappear, only two equilibria are possible: either $\Delta c = 0$, which means no one kidnaps, or $\Delta c = \Delta BP$ and everyone kidnaps, but the net effect is as if there is no bride kidnapping. The current trend in Kyrgyzstan seems to the second case. On the one hand, there is only a small proportion of grooms report their incentive for abducting a bride as 'cannot afford the bride price' (Kleinbach, 2005); on the other hand, we witness a rising frequency of bride kidnapping. A possible economic explanation for these two seemingly contradicting observations could be that the institution of bride kidnapping is shifting from an imbalanced situation in which a small proportion of grooms using it to lower the wedding cost like what shows in Figure 7 to a new equilibrium that everyone kidnaps but bride kidnapping only severs as a symbolic practice. That's how bride kidnapping is invented as a tradition.

The second situation is when working opportunities outside the community is available. The rising bride price lowers the quality of brides the grooms could have married thus makes both a normal marriage and bride kidnapping less attractive. A proportion of grooms who demand a wife of quality in range $[c_m^*(I^*), c_k^*(I^*)]$ may choose to work abroad and exit the marriage market for a while. As observed in colonial Africa, higher bride price and excess demand of wives lead to outmigration of eligible grooms (Anderson, 2007). In this situation, bride kidnapping could exist in the marriage institution, but there is still excess supply of low-quality wives. They are still the victims of the bride kidnapping.

[4] The proof is in Appendix C.

VI.2 Bride's Family's Problem

Is it a wise choice for the bride's family to protect her absolutely from the risk, or is there any reason to expose her to the risk of being kidnapped? We have shown in the previous section that for bride in the middle class, so long as the probability of being kidnapped is not unbearably high, it may be rational for them to expose themselves to the risk of being kidnapped in order to benefit from the marriage squeeze. What is the range of the probability of being kidnapped in which exposing to the risk of being kidnapped is rational? We now turn to the bride's family's problem.

Formally, in our settings there are types of grooms in the marriage market who wish to marry a bride of the same quality: a groom from a rich family who don't need to accumulate wealth for marrying a wife and would like to get married at his $t = 1$; a groom who has worked abroad for years and prepares to get married at his $t = 2$; and a groom who plans to implement bride kidnapping. For a bride from a middle class, if she is exposed to the risk of being kidnapped, it is likely for her to get married through any of the three channels. Denote the probability of getting married through three ways as p_m, p_w and p_k, respectively. These probabilities are related to demographic features of the society and we assume that marrying through these different channels are mutually independent. It is worth noting that, besides possibly benefiting from the excess supply of grooms, exposing to the risk of being kidnapped provides another way of getting married and thus higher chance of marriage. In Kyrgyz society where pre-marital interaction is discouraged and being married is perceived as necessity in adult life, exposing to risk of being kidnapped reduces the risk of young women to be single lifelong.

Similar to the groom, we consider the bride's utility function as a discounted utility flow of three periods. In order to simplify the discussion, we assume that the bride's family will not make the saving decision for her. This is reasonable because upon marriage the young woman will then become a family member of the groom's family and the saving decisions will be made by the man's family. The bride (and her family) will thus consume all of her income in each period. Suppose the bride has the same utility function as the groom, that is

$$U_1 = u(y_1) + \delta[u(y_2) + \beta v(1, qc)] + \delta^2[u(y_3) + \beta v(1, qc)], \tag{17}$$

if she gets married at her $t = 1$ (which is different from the groom's $t = 1$); and

$$U_2 = u(y_1) + \delta u(y_2) + \delta^2[u(y_3) + \beta v(1, qc)] \tag{18}$$

if she gets married at her $t = 2$. Furthermore, we assume that if she does not get married in the first two periods, she will quit the marriage market. In this unlucky situation, but one that is reflective of the very high degree of age concentration of marriage in Kyrgyzstan, especially among women, her utility would be

$$U_3 = u(y_1) + \delta u(y_2) + \delta^2 u(y_3). \tag{19}$$

Suppose she earns an income of I_b in each period: by assumption we simply have $y_1 = y_2 = y_3 = I_b$. It is obvious that the young woman will have higher utility if gets married early. Exposing herself to the risk of being kidnapped will increase her chance of getting married and thus increases her expected utility; on the other hand, according to our previous discussion, the groom who kidnaps her is likely to come from a family with a financial burden and wishes to lower the wedding cost by bride kidnapping. Since the bride will consume the same amount of normal goods in all situations, the difference is generated in the utility she can enjoy from having her own baby, i.e., from the term $v(1, qc)$ in her utility function. Consider a bride of quality

$\bar{c}$. To her $c = \bar{c}$ is fixed so her utility depends only on q, the investment on children from the groom's family, which in turn depends on their income level I. Apparently, the bride could choose a groom with higher income. We assume the groom's family's decision problem is known to the bride. Then she can infer the groom's family's income level I and thus the potential investment on child q from the way in which he wants to marry. Specifically, if a groom does not kidnap her, he will pay a bride price of $\bar{c} + \Delta BP$; and if the groom kidnaps her, he will pay a bride price of $\bar{c} + \Delta BP - \Delta c$. From (15) and (16), if a groom wants to marry her at his $t = 1$ through a normal marriage, we will have

$$q_m = \frac{\alpha\beta(\delta + \delta^2)r}{\pi[\alpha\beta(\delta + \delta^2) + k]} c_m. \tag{20}$$

Similarly, if someone has worked abroad before proposing to her, his family will invest on the child's quality with

$$q_w = \frac{\alpha\beta\delta^2}{\pi[k\delta + \alpha\beta\delta^2]} c_w. \tag{21}$$

In these two cases, we have $c_m = c_w = \bar{c} + \Delta BP$. If she is kidnapped, however, she knows that the groom who kidnaps her will only pay a bride price of $c_k = \bar{c} + \Delta BP - \Delta c$, so

$$q_k = \frac{\alpha\beta(\delta + \delta^2)r}{\pi[\alpha\beta(\delta + \delta^2) + k]} c_k = \frac{\alpha\beta(\delta + \delta^2)r}{\pi[\alpha\beta(\delta + \delta^2) + k]} (\bar{c} + \Delta BP - \Delta c). \tag{22}$$

Suppose three types of grooms propose to (or kidnap) her simultaneously, who should the bride accept? First, we assume that if she is kidnapped, she will marry the groom who kidnaps her even if others may plan to propose to her, because a young woman who is kidnapped can hardly escape. Second, it is not obvious that if she should accept a groom who wishes to marry her at his $t = 1$ or she should accept a groom who have worked abroad. Intuitively, the man who is capable of paying the same amount of bride price even without working aboard must come from a relatively richer family, meanwhile, he is likely to be younger than a man who has worked for years. The woman therefore should tend to accept the proposal from the young rich man because his family is more likely to invest more on their offspring.

Lemma 3 If a woman is proposed simultaneously by a man who wants to get married at his $t = 1$ and a man who has worked for years and wants to get married at his $t = 2$, she will accept the former's proposal.

Proof. Notice that

$$\frac{q_m}{q_w} = (1 + \delta)r \cdot \frac{\alpha\beta\delta + k}{\alpha\beta(\delta + \delta^2) + k}.$$

The fraction is increasing in k and its minimum is $\frac{1}{1+\delta}$ when $k = 0$. Therefore, $\frac{q_m}{q_w} > (1 + \delta)r \cdot \frac{1}{1+\delta} = r \geq 1$. So $q_m > q_w$ always holds.

Hence, if there are three types of grooms hoping to marry the same woman, the bride will accept wedding proposal in the order $kidnap > marry > work$. Meanwhile, we assume that Δc is large enough so that

$q_k < q_w < q_m$. We now consider the bride's family's problem of whether exposing her to the risk of being kidnapped. If they choose not to be exposed to the risk, there would be five different situations:

Table 7 Situations when the bride does not expose herself to the risk of being kidnapped

Case	Situation	Probability
N1	Getting married to a man at his $t = 1$ at woman's $t = 1$	p_m
N2	Getting married to a man at his $t = 2$ at woman's $t = 1$	$(1 - p_m)p_w$
N3	Getting married to a man at his $t = 1$ at woman's $t = 2$	$(1 - p_m)(1 - p_w)p_m$
N4	Getting married to a man at his $t = 2$ at woman's $t = 2$	$(1 - p_m)^2(1 - p_w)p_w$
N5	Not getting married	$(1 - p_m)^2(1 - p_w)^2$

*'N' stands for 'Not exposed (to the risk of being kidnapped)'

On the other hand, if she chooses to expose herself to risk of being kidnapped, the possible situations are:

Table 8 Situations when the bride exposes herself to the risk of being kidnapped

Case	Situation	Probability
E1	Being kidnapped at $t = 1$	p_k
E2	Getting married to a man at his $t = 1$ at $t = 1$	$(1 - p_k)p_m$
E3	Getting married to a man at his $t = 2$ at $t = 1$	$(1 - p_k)(1 - p_m)p_w$
E4	Being kidnapped at $t = 2$	$(1 - p_k)(1 - p_m)(1 - p_w)p_k$
E5	Getting married to a man at his $t = 1$ at $t = 2$	$(1 - p_k)^2(1 - p_m)(1 - p_w)p_m$
E6	Getting married to a man at his $t = 2$ at $t = 2$	$(1 - p_k)^2(1 - p_m)^2(1 - p_w)p_w$
E7	Not getting married	$(1 - p_k)^2(1 - p_m)^2(1 - p_w)^2$

*'E' stands for 'Exposed (to the risk of being kidnapped)'

For simplicity, we will consider a reduced case in which $p_w = 0$, i.e., an isolated village where working outside the village is impossible (the most likely scenario being that knowledge of Russian language in the village is minimal). With this condition, there will be three situations if the young woman does not expose herself to the risk of being kidnapped and will be five situations if she exposes herself to the risk. Denote her expected utility as EU_N if she (or her family) chooses not to expose to the risk and as EU_E if she exposes herself to the risk. Since she will consume a fixed amount of other commodities in any situation, what matters is only the difference in utility from having a child.

Our first observation is that the incentive of exposing to risk of being kidnapped increases in the bride's own life quality, represented by $\bar{c}$. As Δc is fixed, it has less impact on the bride's utility as $\frac{\Delta c}{c}$ gets smaller (for notation simplicity, here we denote $c = \bar{c} + \Delta BP$ as the real bride price at which the groom has to pay). In

other words, although the groom who kidnaps her may come from a family with relatively lower income, he still belongs to the same social class as the bride; $c - \Delta c$ would still be a large cost if c is large enough. If she is kidnapped, she will suffer a utility loss proportional to Δc; but if she does not get married, she will suffer a loss proportional to c, which is far larger than the loss of being kidnapped. This is formalized in Lemma 2.

Lemma 4 The bride cares less about the risk of being kidnapped as her "value" as denoted by $\bar{c}$ rises; meanwhile, she is more afraid of being kidnapped as Δc increases.

Proof. Denote $\Delta EU = EU_N - EU_E$. We have

$$\frac{\partial EU_N}{\partial c} = \alpha\beta(\delta + \delta^2)\frac{2}{c} \cdot p_m + \alpha\beta\delta^2\frac{2}{c} \cdot p_m(1 - p_m),$$

$$\frac{\partial EU_E}{\partial c} = \alpha\beta(\delta + \delta^2)\left(\frac{1}{c} + \frac{1}{c - \Delta c}\right) \cdot [p_k + (1 - p_k)p_m]$$
$$+\alpha\beta\delta^2\left(\frac{1}{c} + \frac{1}{c - \Delta c}\right) \cdot [(1 - p_k)(1 - p_m)p_k + (1 - p_k)^2(1 - p_m)p_m].$$

Since

$$\frac{2}{c} < \frac{1}{c} + \frac{1}{c - \Delta c},$$

$$p_m < p_k + (1 - p_k)p_m$$

$$p_m(1 - p_m) < [(1 - p_k)(1 - p_m)p_k + (1 - p_k)^2(1 - p_m)p_m],$$

then

$$\frac{\partial \Delta EU}{\partial c} = \frac{\partial EU_N}{\partial c} - \frac{\partial EU_E}{\partial c} < 0.$$

This proves our first conclusion. It is easy to see that

$$\frac{\partial \Delta EU}{\partial \Delta c} = -\frac{\partial EU_E}{\partial \Delta c} > 0,$$

then proves the second argument.

The question remaining to be answered is how the potential gain and loss vary with the probability of a conventional marriage and the probability of a kidnapped marriage. These probabilities are related to demographic features of the local society. Since those probabilities appears in the expected utility in a quadratic form, it can be anticipated that the influence of the probabilities will not be monotone. Figure 8 shows all possible situations.

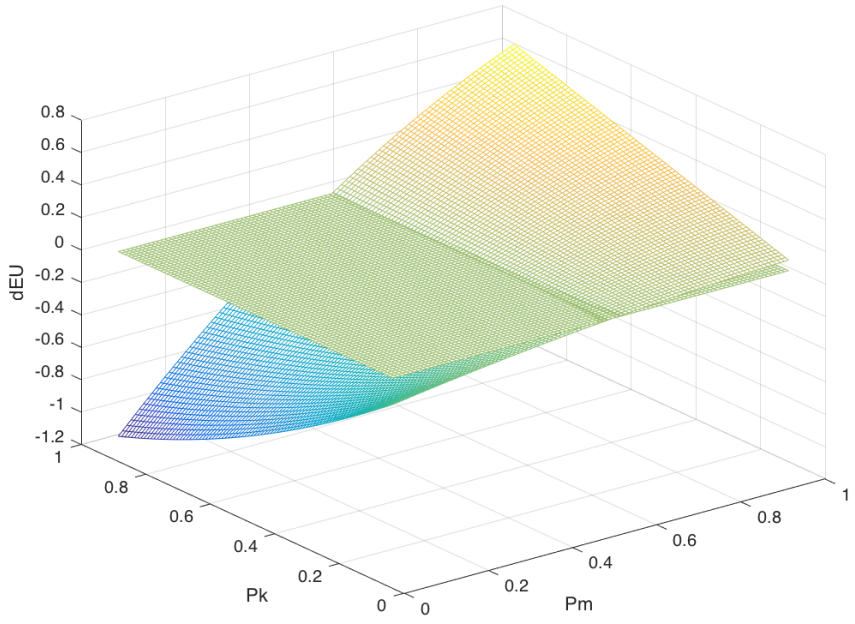


Figure 8
Decision of young woman's exposure to the risk of being kidnapped

In Figure 8, the curved plane represents the value of $\Delta EU = EU_N - EU_E$. The pat of curved plane that is above the base plane means that it is not worthwhile to expose oneself the risk of being kidnapped and *vice-versa*. So long as the probability of a conventional marriage is high enough, exposure to the risk of being kidnapped will never be the right choice. However, if the probability of normal marriage is relatively low, exposing to the risk tends to yield a higher expected utility by improving the chance of entering a marriage. This point helps to explain why bride kidnapping is common among relative dispersed Kyrgyz populations but nonexistent in more densely populated neighboring Uzbek and Tajik ethnic groups. Conservative social attitudes toward pre-marital dating that discourages interaction between young man and woman also contributes to the low probability of a conventional marriage, thus also contributing to making bride kidnapping an attractive option for both prospective grooms and brides.

VI.3. Marriage Types

Although we focus on bride kidnapping, different types marriages coexist in Kyrgyz society, including love marriage, arranged marriage and kidnapped marriage. In our model, if the elder and younger generation both agree to get married at $t = 1$, and if they are rich enough or they care enough about their reputation so that they would not implement bride kidnapping, the marriage can be categorized as an arranged marriage, since the elder generation has the rights to decide who he should marry. On the other hand, bride kidnapping can happen in two cases in our model. First, if the groom's family is relatively poor and cares less about its reputation while they want their son to get married at $t = 1$, they would implement a bride kidnapping. Second, we have proved in Proposition 1 that the elder generation has the incentive to coerce the younger generation for an early marriage and also proved in Proposition 2 that the elder generation is apt to initiate a bride kidnapping for their son to force him to marry. In this case, the elder generation uses bride kidnapping

as a tool to force an early marriage for their son who would prefer working for an initial period. In other words, the younger generation groom wants to marry at $t = 2$ but the elder generation wants him to get married at $t = 1$. But there can be the third type of bride kidnapping, a pseudo-kidnapping which is used as a form of elopement, as addressed in Borbieva (2012). If the elder generation for some reason disapproves the young couple's marriage, the groom and the bride can connive a bride kidnapping to get married. It is straightforward to incorporate this situation into our model.

In our previous discussion, we regard differing preferences between the elder and younger generation as being reflected in their different weights on the utility of having offspring. This is the heterogeneous preference in the same period. Here we consider another type of heterogeneity: idiosyncratic preferences over time. Weighting less on offspring notwithstanding, when the younger generation becomes the elder generation, they will have the same preferences as their parents. The life cycle continues over the generations. Formally, we assume that people will be present-biased between adjacent periods while treat periods far way equally. The parents, as they are older, will make decision for their child as if they are one period prior. This discount structure is very similar to quasi-hyperbolic discounting suggested in Diamond and Köszegi (2003), so we call it intergenerational quasi-hyperbolic discounting. Figure 8 shows the idea.

younger generation				$\gamma\delta$		δ	
elder generation	0	$\gamma\delta$	1	δ	2	δ	3

Figure 9
Intergenerational Quasi-Hyperbolic Discounting

In Figure 9, δ is the discount factor as before, while γ represents the bias towards present. For simplicity, this time we will set equal weights to the utility from child for both the elder and younger generation while applying the intergenerational quasi-hyperbolic discounting. The younger generation's intertemporal utility maximization problem in this case is

$$\max_{y_1,y_2,y_3,c,q,s_1,s_2} u(y_1) + \gamma\delta[u(y_2) + v(1,qc)] + \gamma\delta^2[u(y_3) + v(1,qc)] + k\ln c$$

$$\begin{gathered} s.t.\ \ I = s_1 + c + \pi_y y_1 \\ s.t.\ I + rs_1 = s_2 + \pi_y y_2 + \pi q \\ s.t.\ I + rs_2 = \pi_y y_3 \end{gathered} \tag{23}$$

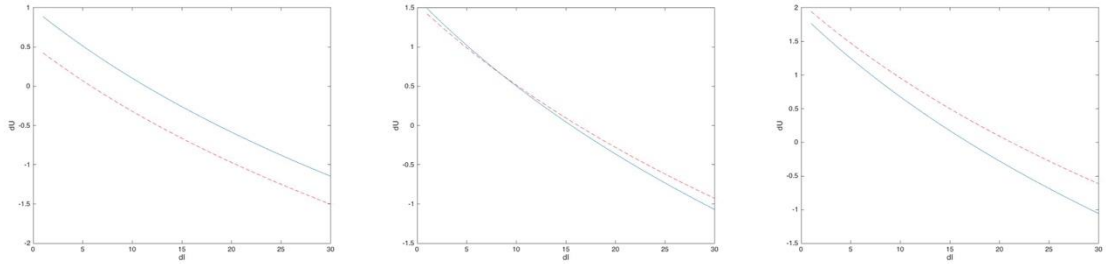
if they choose to marry at $t = 1$ and

$$\max_{y_1,y_2,y_3,c,q,s_1,s_2} u(y_1) + \gamma\delta u(y_2) + \gamma\delta^2[u(y_3) + v(1,qc)] + \gamma\delta k\ln c$$

$$\begin{gathered} s.t.\ \ I = s_1 + \pi_y y_1 \\ s.t.\ I + \Delta I + rs_1 = s_2 + \mathrm{c} + \pi_y y_2 \\ s.t.\ I + rs_2 = \pi_y y_3 + \pi q \end{gathered} \tag{24}$$

if they choose to marry at $t = 2$. $\gamma < 1$ represents the present biasness. These problems will yield similar solutions to (4). The solutions differ from (4) in that the younger generation will be less sensitive to the future utility change including the potential ΔI. Therefore, if the concern of family reputation is strong enough, the

elder generation will hope that their son will work and earn more money so that they can have a better daughter in-law who reflects the wealth and power of the family. They may reject their child's request to marry an ordinary woman who he loves at $t = 1$. The young couple then have an incentive to use collusive bride kidnapping to avoid the elder generation's opposition. Figure 10 shows all possible situations with different level of concern in their family reputation.



(a) $k = 0$ (b) $k = 1$ (c) $k = 1.5$

Figure 10
Working decision under intergenerational quasi-hyperbolic discounting

Similar to Figure 1, the dashed line in Figure 10 represents the difference between the younger generation's utility of marrying at $t = 1$ and $t = 2$, while the full line represents the elder generation. If they do not care about family reputation, the younger generation will be more inclined to working opportunities. If family reputation does matter, however, as in Figure 10(b) and 10(c), the elder generation has an incentive to send their son to work against his will under intergenerational quasi-hyperbolic discounting. They may not agree with their son's desire to marry for love at $t = 1$. Bride kidnapping then becomes the young couple's option to defend their love from parental opposition.

VII. CONCLUSION

The preceding pages provide a set of economic explanations for bride kidnapping in Kyrgyzstan. Our explanation is based on Gary Becker's model of family fertility and consumption decision. In the paper, bride kidnapping is primarily viewed as a way of marrying a woman at lower cost. We have demonstrated that, the elder generation has the incentive to implement a bride kidnapping for their son in order to have grandson and granddaughter earlier, even if this may be against their son's will. This is a necessary condition for bride kidnapping to exist because in Kyrgyz society, especially in rural areas, it is the elder generation who controls the social norm. Thus bride kidnapping must be a rational choice for them. We have also shown the conditions under which bride kidnapping is rational for grooms. In case working opportunities outside the communities is not lucrative or scares, bride kidnapping provides a special marriage institute that allows grooms to marry a better wife without postponing his marriage.

Although bride kidnapping causes mental trauma and miserable life for some young Kyrgyz women, not all brides bear the risk of being kidnapped. Since men with high income would not kidnap a bride for marriage, women from upper class is not likely to be kidnapped – if the bride kidnapping does happen, she and her family would have ability to deter the inter-class marriage from happening. Furthermore, the institution of

bride kidnapping generates excess demand for brides from the middle class, which pushes up the bride price. Brides from middle would therefore possibly benefit from higher bride price, and thus have incentive to partially expose themselves to the risk of being kidnapped. On the contrary, excess supply of brides from the bottom of the society drives down the bride price while brides from the lower class is more likely to be kidnapped. They usually do not have the ability the prevent the bride kidnapping from happening. In Kyrgyzstan, most bride kidnapping occurs in countryside and 92% leads to marriage eventually.

The explanation as why bride kidnapping arose in Kyrgyzstan, but not in many other low-density nomadic societies, and has been preserved to this day, is beyond the scope of this paper. Since cultural tradition may appear as a mutation in some stage of history and will evolve over time, we regard many traditions as sustainable but not inevitable. The history of bride kidnapping is an instance of this kind of cultural tradition. It can be traced back to their nomadic ancestors while was forbidden in Soviet periods and then reemerged in its present form after the collapse of USSR. A cultural tradition, probably a trivial practice at the beginning, can be self-reinforced, as many Kyrgyz young people today become to believe bride kidnapping is their tradition since many people practice it. In our discussion, we provide a possible explanation of why bride kidnaping prevails in the past twenty years while the real income of Kyrgyz people increases from the perspective of marriage market equilibrium. Bride kidnapping seems to transform from a way of lowering wedding cost to a symbolic practice. But this does not mean bride kidnapping is no longer a concern. Non-consensual bride kidnapping causes welfare loss of young women which we have not taken into account in out framework, but it does matter.

Future research of bride kidnapping may adopt a dynamic approach to analyze how bride kidnapping is invented in the past century. In a certain era people adopted this tradition to lower the wedding cost; but this institution persists even after financial concern is not a big issue. This suggests that the evolution of this special marriage institution is somewhat path dependent. Literature on technology and culture diffusion may shed lights on this direction, see David (1985), Ruttan (1997), Mahoney (2000). Also, a two-sided marriage market equilibrium may be preferable if both the groom's family and bride's family's utilities are taken into consideration. In studying the intergenerational conflict of marriage timing, a family bargaining model may be favorable, as in McElroy (1980), Browning, Martin and Chiappori (1998).

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Appendix

A. Proof of Lemma 1

We have $\Delta U_k < 0$ when $\Delta c = 1$; meanwhile, as Δc goes to infinity,

$$\lim_{\Delta c \to \infty} \Delta U_k = \lim_{\Delta c \to \infty} [1 + k + (1 + 2\alpha\beta)(\delta + \delta^2)] \ln \frac{\left(1 + \frac{1}{r} + \frac{1}{r^2}\right) I}{\left(1 + \frac{1}{r} + \frac{1}{r^2}\right) I + \Delta c} + k \ln \Delta c$$

$$= [1 + k + (1 + 2\alpha\beta)(\delta + \delta^2)] \ln \left(1 + \frac{1}{r} + \frac{1}{r^2}\right) I + \lim_{\Delta c \to \infty} \ln \frac{(\Delta c)^k}{\left[\left(1 + \frac{1}{r} + \frac{1}{r^2}\right) I + \Delta c\right]^{[1+k+(1+2\alpha\beta)(\delta+\delta^2)]}}.$$

The first term is a constant, and the second term goes to minus infinity due to the fact that $k < 1 + k + (1 + 2\alpha\beta)(\delta + \delta^2)$, so $\lim_{\Delta c \to \infty} \Delta U_k \to -\infty < 0$. Therefore, if the maximum value of ΔU_k is greater than zero, by Mean Value Theorem, there exists two cross points of ΔU_k and the horizontal axis. To prove ΔU_k^* can be greater than zero as long as k is larger enough, notice the derivative of ΔU_k^* with respect to k:

$$\frac{\partial \Delta U_k^*}{\partial k} = \ln \frac{\left(1 + \frac{1}{r} + \frac{1}{r^2}\right) Ik}{1 + k + (1 + 2\alpha\beta)(\delta + \delta^2)}.$$

Since $\left(1 + \frac{1}{r} + \frac{1}{r^2}\right) I > 1$, this derivative is increasing in k and $\frac{\partial \Delta U_k^*}{\partial k} > 0$ when $\mathrm{k} > \frac{1+(1+2\alpha\beta)(\delta+\delta^2)}{\left(1+\frac{1}{r}+\frac{1}{r^2}\right)I-1}$. Let $\mathrm{k} \to \infty$, we have

$$\begin{aligned}\lim_{k\to\infty} \Delta U_k^* &= \lim_{k\to\infty} [1 + k + (1 + 2\alpha\beta)(\delta + \delta^2)] \ln \frac{1 + (1 + 2\alpha\beta)(\delta + \delta^2)}{1 + k + (1 + 2\alpha\beta)(\delta + \delta^2)} + k \ln \Delta c^* \\ &= [1 + (1 + 2\alpha\beta)(\delta + \delta^2)] \ln[1 + (1 + 2\alpha\beta)(\delta + \delta^2)] + \lim_{k\to\infty} k \ln \left(1 + \frac{1}{r} + \frac{1}{r^2}\right) I \\ &\quad + \lim_{k\to\infty} \ln \frac{k^k}{[1 + k + (1 + 2\alpha\beta)(\delta + \delta^2)]^{1+k+(1+2\alpha\beta)(\delta+\delta^2)}}.\end{aligned}$$

The first term is a constant; the second term goes to infinity; and the third limit

$$\begin{aligned}&\lim_{k\to\infty} \ln \frac{k^k}{[1 + k + (1 + 2\alpha\beta)(\delta + \delta^2)]^{1+k+(1+2\alpha\beta)(\delta+\delta^2)}} \\ &< \lim_{k\to\infty} \frac{k^k}{[1 + k + (1 + 2\alpha\beta)(\delta + \delta^2)]^k} \\ &= \lim_{k\to\infty} \frac{1}{\left[1 + \frac{(1 + 2\alpha\beta)(\delta + \delta^2)}{k}\right]^k} \to e^{-(1+2\alpha\beta)(\delta+\delta^2)}.\end{aligned}$$

Therefore, as $\mathrm{k} \to \infty$,$\Delta U_k^* \to \infty$ as well. The proves the lemma.

B. Proof of Lemma 2

Let $k \to \infty$ in

$$\Delta U_k = [1 + k + (1 + 2\alpha\beta)(\delta + \delta^2)] \ln \frac{\left(1 + \frac{1}{r} + \frac{1}{r^2}\right) I}{\left(1 + \frac{1}{r} + \frac{1}{r^2}\right) I + \Delta c} + k \ln \Delta c,$$

we have

$$\lim_{k\to\infty}\Delta U_k = [1+(1+2\alpha\beta)(\delta+\delta^2)]\ln\frac{\left(1+\frac{1}{r}+\frac{1}{r^2}\right)I}{\left(1+\frac{1}{r}+\frac{1}{r^2}\right)I+\Delta c}+\lim_{k\to\infty}k\ln\frac{\left(1+\frac{1}{r}+\frac{1}{r^2}\right)I\cdot\Delta c}{\left(1+\frac{1}{r}+\frac{1}{r^2}\right)I+\Delta c}.$$

Because $\frac{\left(1+\frac{1}{r}+\frac{1}{r^2}\right)I\cdot\Delta c}{\left(1+\frac{1}{r}+\frac{1}{r^2}\right)I+\Delta c}>1$, then $\lim_{k\to\infty}\Delta U_k\to\infty$.

C. Proof of the Claim in Section IIIA

With the rising bride price ΔBP, the solution to the two maximization problems remain the same form but differ in the expression of y_1^m and y_1^k, where

$$y_1^m=\frac{\left(1+\frac{1}{r}+\frac{1}{r^2}\right)I-\Delta BP}{\pi_y[1+k+(1+2\alpha\beta)(\delta+\delta^2)]},\qquad y_1^k=\frac{\left(1+\frac{1}{r}+\frac{1}{r^2}\right)I+\square c-\Delta BP}{\pi_y[1+k+(1+2\alpha\beta)(\delta+\delta^2)]}.$$

Therefore,

$$\frac{\partial U_m}{\partial\Delta BP}=\frac{\partial U_m}{\partial y_1^m}\cdot\frac{\partial y_1^m}{\partial\Delta BP}=-\frac{[1+k+(1+2\alpha\beta)(\delta+\delta^2)]}{\left(1+\frac{1}{r}+\frac{1}{r^2}\right)I-\Delta BP},$$
$$\frac{\partial U_k}{\partial\Delta BP}=\frac{\partial U_k}{\partial y_1^k}\cdot\frac{\partial y_1^k}{\partial\Delta BP}=-\frac{[1+k+(1+2\alpha\beta)(\delta+\delta^2)]}{\left(1+\frac{1}{r}+\frac{1}{r^2}\right)I+\square c-\Delta BP}.$$

Clearly, $\left|\frac{\partial U_m}{\partial\Delta BP}\right|>\left|\frac{\partial U_k}{\partial\Delta BP}\right|$. This proves the claim.

Table 1
OLS estimates of alternative stress outcomes

	(1) Dependent variable: Divorce	(2) Dependent variable: Satisfaction with family life
Kidnap	0.108*	0.205
	(0.0586)	*(0.280)*
Divorced		-2.508***
		(0.875)
Kidnap*Divorced		-2.558**
		(1.161)
Age at marriage	0.048	0.009
	(0.057)	*(0.257)*
Age at marriage squared	-0.001	-0.001
	(0.001)	*(0.005)*
Basic education	0.101	0.619
	(0.108)	*(1.144)*
Secondary education	-0.099	-0.008
	(0.108)	*(0.633)*
Technical education	-0.117	0.656
	(0.096)	*(0.652)*
Kyrgyz and Russian	0.044	0.202
	(0.045)	*(0.301)*
Height	0.002	0.013
	(0.002)	*(0.025)*
Constant	-0.674	3.040
	(0.857)	*(5.297)*
District FE	YES	YES
Observations	282	273
R-squared	0.237	0.573

Note: The sample consists of ever-married Kyrgyz women in arranged or kidnapped marriages, who have given birth to at least one child, are of the age group 18-43, do not live in cities, and live below 2500 meters of altitude. Clustered standard errors in brackets.
*** significant at 1%, ** at 5%, * at 10%.
Source: Authors' illustration based on 2011 LiK data.

Table 2
Percentage of husbands and wives giving similar responses to personality questions, by marriage type

I see myself as someone who ...	Love marriage (N=405)	Arranged marriage (N=115)	Kidnapped marriage (N=120)
keeps distance	74.32	80.00	75.00
tends to find fault with others	81.98	80.00	70.83
does a thorough job	83.46	86.96	80.00
is depressed	81.98	86.96	71.67
is curious about many different things	80.99	82.61	74.17
generates a lot of enthusiasm	78.52	87.83	71.67
generally trusts other people	84.44	84.35	75.00
tends to be lazy	80.74	81.74	72.50
is relaxed, handles stress well	80.49	75.65	70.83
is ingenious, a deep thinker	81.98	84.35	75.00
tends to be quiet	71.60	75.65	75.83
can be cold and aloof	76.05	74.78	70.83
is inventive	78.27	82.61	69.17
worries a lot	75.06	73.04	71.67
has an active imagination	79.51	79.13	68.33
is outgoing, sociable	66.42	66.09	67.50
is sometimes rude to others	74.57	69.57	67.50
makes plans and follows through with them	80.99	80.87	73.33
gets nervous easily	76.05	80.87	70.00
values art and esthetic events	77.28	83.48	73.33
has few artistic interests	73.58	74.78	73.33

Source: Authors' illustration based on 2012 LiK data.

Table 3
Stress Indicators: Divorce

	(1)	(2)	(3)
Bride capture	0.078***	0.080***	0.082***
Arranged	.	0.007	.
Mother captured	.	.	0.037*
Interaction	.	.	-0.065*
Observations	2,031	2,031	1,433
R-squared	0.125	0.125	0.154
Mean of dependent	0.064	0.064	0.055

Control variables: age at marriage, current age, educational attainment, number of children, any male children, rural/urban, district fixed effects
Source: Authors' illustration based on 2016 LiK data.

Table 4
Stress Indicators: Satisfaction with Life

	(1)	(2)	(3)
Bride capture	-0.381*	-0.477*	-0.191
Arranged	.	-0.430*	.
Mother captured	.	.	0.0876
Interaction	.	.	-0.181
Observations	1,614	1,614	1,178
R-squared	0.298	0.302	0.335
Mean of dependent	7.047	7.047	7.116

Control variables: age at marriage, current age, educational attainment, number of children, any male children, rural/urban, district fixed effects
Source: Authors' illustration based on 2016 LiK data.

Table 5
Stress Indicators: Satisfaction with Family Life

	(1)	(2)	(3)
Bride capture	-0.465***	-0.505***	-0.610***
Arranged	.	-0.183	.
Mother captured	.	.	-0.342*
Interaction	.	.	0.718**
Observations	1,612	1,612	1,177
R-squared	0.339	0.340	0.360
Mean of dependent	7.871	7.871	7.951

Control variables: age at marriage, current age, educational attainment, number of children, any male children, rural/urban, district fixed effects
Source: Authors' illustration based on 2016 LiK data.

Table 6
Stress Indicators: Depression Severity

	(1)	(2)	(3)
Bride capture	0.627*	0.738**	0.776*
Arranged	.	0.494	.
Mother captured	.	.	0.495*
Interaction	.	.	-0.502
Observations	1,178	1,178	1,178
R-squared	0.338	0.341	0.341
Mean of dependent	2.952	2.952	2.952

Control variables: age at marriage, current age, educational attainment, number of children, any male children, rural/urban, district fixed effects
Source: Authors' illustration based on 2016 LiK data.