

A Sweet Burden?
The Effect of The Bride Price on Parents' Health

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Abstract

The bride price, as an informal institution originated from traditional culture, is pervasive in many areas of the developing world in a form of payment from the family of the groom to that of the bride at marriage. We study the effects of bride price on parents' health in China. Using information on bride price payment and various health measures from the China Health and Retirement Longitudinal Study (CHARLS), combined with a control function approach, we find that the bride price significantly reduces self-reported health among the grooms' parents. The deterioration in health is associated with declines in both physical and mental health. The reductions are most prominent among younger, less-educated, lower-income parents living in rural areas. Mechanism analysis suggests the negative health outcomes are driven by higher debts and lower fitness expenditures caused by bride price payments.

Keywords: bride price, parents' health, intergenerational exploitation

JEL Classification: I10, J12, D65, K40

1. Introduction

Marriages are associated with the distribution of property within and across families in most societies. Of various forms of marriage transfers, the bride price is one of the most pervasive in many areas of the developing world (Anderson, 2007; Cherlin & Chamrathirong, 1988). The institution of bride price specifies that the husband must provide a substantial amount of money or property to the bride's family before they can be married. The payments can be substantial enough to have impacts on the welfare of the couple and their natal families, thus generating significant social and economic implications.

In this paper, we investigate the effect of bride price on parents' health outcomes in China. The practice of bride price has been one of the most important marriage customs since ancient China. In recent years, the bride price exceeds the average annual income among urban populations, with the amount reaching three times the average income level in rural areas (Figure 1). Thus, the payment of the bride price is expected to generate a sharp decline in wealth of the groom's family, which can be linked to deterioration of health conditions (Fichera & Gathergood, 2016; Michaud & van Soest, 2008; Schwandt, 2018). This study aims at uncovering the causal effect of the bride price on parents' health. We further try to identify possible channels

through which the marriage transfers cause the observed change in parents' health status.

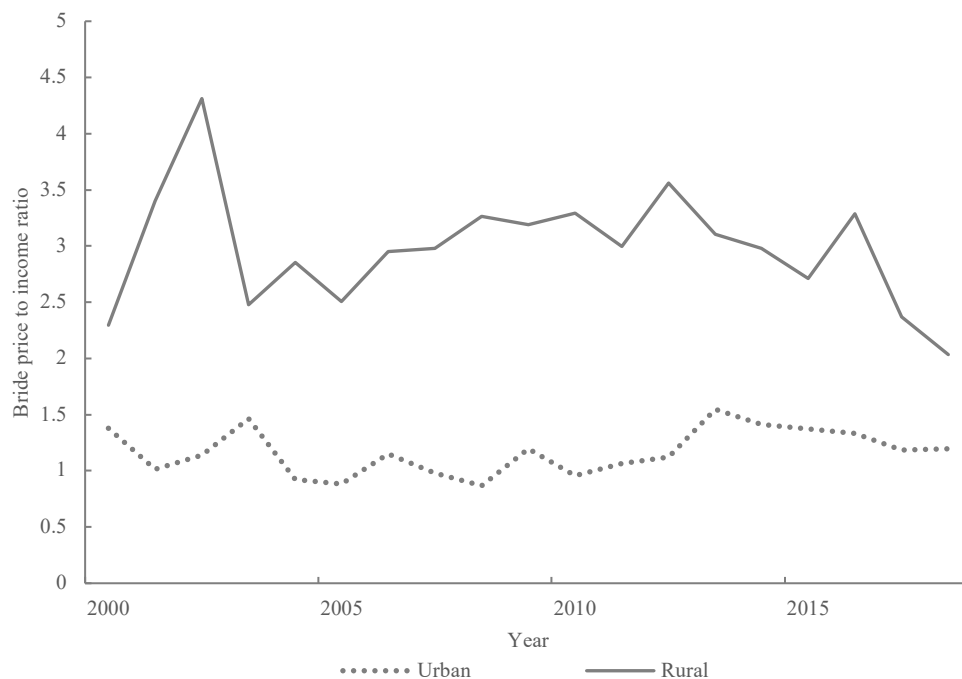


Figure 1 The ratio of bride price to per capita income in urban and rural areas¹

Using data from the China Health and Retirement Longitudinal Study (CHARLS), we analyze the causal effect of the bride price on parents' health with an instrumental variable approach. Endogeneity arises for two reasons. First, reverse causality presents because health also affects income generation, which makes the bride price more affordable among healthier parents. Second, omitted variable bias is a concern as we don't observe factors that would simultaneously affect the bride price and parents' health. To address these potential threats in identification, we construct an instrumental variable using the number of Confucian academies at the city level during the Ming and Qing dynasties. The number of Confucian academies is a measure of the local Confucian culture atmosphere, which is negatively correlated with the amount of the bride price but has no direct impact on health. Results from the control function estimation show a decrease in the log odds of a better self-reported health status caused by higher bride price. The negative impact of bride price is consistent for both physical and mental health outcomes. Higher bride price expenditures are found to decrease the capabilities of completing daily living activities and increase the risk of depression among the grooms' parents. Heterogeneity analysis suggests this impact is most prominent among younger, less-educated, lower-income parents living in rural areas.

We further examine the possible mechanisms through which the bride price expenditure can affect parents' health. First, parents who cannot afford the bride price may resort to borrowing to finance the payment (Saha, 2017). It is also documented that the financial stress caused by increased debts is associated

¹ The income refers to the per capita disposable income of residents. Data are obtained from the China Health and Retirement Longitudinal Study (CHARLS) and the National Bureau of Statistics. Before 2013, the measure of income level of rural residents was different, and it was the per capita net income of rural residents.

with declines in mental health (McInerney et al., 2013). Using the personal debt information available in CHARLS data, we find that the bride price has a significantly positive impact on debts owed by the groom's parents, which supports the link between bride price payments and worse health outcomes. Second, the payment of the bride price can be substantial enough to crowd out health investment, which leads to deteriorating health. Measuring fitness expenditures as the sum of spending on fitness and nutrition in the past year, we find paying higher bride price lowers fitness expenditures.

Our contributions to existing literature are trifold. First, we document the enduring impact of traditional culture on human capital. By investigating the impact on parental health, we extend current knowledge of marriage transfers to an understudied aspect. Second, we identify a special form of intergenerational exploitation where younger generations can jeopardize the well-being of their predecessors whereas past literature has focused on intergenerational exploitation in the reverse direction (Mulkeen, 2021). Third, this paper also contributes to literature on intergenerational wealth transmission. We emphasize the role marriage transfers play in household wealth dynamics among Chinese households, thus highlighting a non-negligible part in future research on household finance in the Chinese context.

The remainder of this paper proceeds as follows. The second section introduces the background and previous literature on bride price in China. Section 3 describes the data source, followed by a discussion of empirical methods in Section 4. In Section 5 we present results and robustness checks. Section 6 discusses heterogeneity and possible mechanisms. The last section summarizes our findings, provides policy implications, and discusses future research.

2. Background

In this section, we describe the background on the bride price in China and review related literature investigating the impact of the bride price and research on the determinants of elderly health status.

2.1. The bride price in China

Payment at the time of marriage existed across different cultures at different times. Among 1167 pre-industrial societies investigated by Murdock (1967), marriage payments existed in two-thirds of these regions. Marriage transfers still present widely in developing countries in East Asia, Southeast Asia, and sub-Saharan Africa, such as: China, Thailand, Indonesia, Zambia, Uganda, etc. (Anderson, 2007; Cherlin & Chamrathirong, 1988; Goody, 1973; Corno et al., 2020; Ashraf et al., 2020). Overall, this marriage market institution is more likely to emerge in areas where polygamy has historically or currently existed (Grossbard, 1978; Tertilt, 2005). Depending on the direction of payment, such transfers can be categorized into bride price, which is the transfer from the groom's family to that of the bride's, and dowry, referring to the transfer from the bride's side to the groom's side. In the traditional patrilineal societies, women usually live with the groom's family after marriage. In exchange for the bride's right to participate in labor and reproduce, the groom needs to pay a certain amount of money to the bride's parents as compensation for raising her and investing in her human capital (Freedman, 1966; Zhang & Chan, 1999). For the right to cultivate part of the

bride's family's land, grooms in rural areas may pay more than in urban areas (Cherlin & Chamratrithirong, 1988).

In China, the custom of bride price can be traced back to the Western Zhou Dynasty (Jiang & Sánchez-Barricarte, 2012). It is a wedding etiquette in which the groom presents property to the bride when they get married. However, with evolving economic circumstances, the bride price changed from a symbolic etiquette to a currency transfer in the marriage market. After enactment of the reform and opening-up policy, the amount of bride price continued to rise, and the practice of marriage transfers intensified (Zhang, 2000). In rural areas with substantial female outflow and unbalanced gender ratio, people incur higher bride price expenditures in the marriage market than urban population (Lei & Zhao, 2019). It is also documented that the amount of bride price is relatively constant across families of different income levels in rural China (Zhang, 2000).

2.2. The impacts of the bride price

2.2.1. Bride price and women's welfare

Studies have been focused on the impact of betrothal gifts on women's welfare. Becker (1981) argues that if women with appropriate human capital accumulation can obtain a sufficiently high capital price in the marriage market, the presence of bride price would induce parents to make better human capital investment in their daughters. Ashraf et al. (2020) focus on the school attendance of girls in different regions of Indonesia, and found that the better women are educated, the more betrothal gifts they receive. And women in areas where the bride price is more prevalent tend to be better educated than those in other areas.

However, bride price is also linked to adverse effects on women's welfare. Corno et al. (2020) find that when parents experienced negative income shock induced by bad weather, they tended to let their daughters marry earlier to smooth consumption. Villages with higher average amounts of betrothal payment were more likely to have child marriages. In traditional Chinese society, parents of poor families would force their daughters to marry early to fund their son's bride price, or even sell their daughters as slaves for money (Engel, 1984). Wendo (2004) points out that in sub-Saharan Africa, women are traded as "commodities". They have no right to reject polygamy, and they are more vulnerable to reproductive diseases. Women who want to divorce may suffer resistance from their parents for fear of not being able to return the bride price. Meanwhile, Lowes and Nunn (2017) confirm that the requirement to return betrothal gifts upon divorce would reduce the wife's happiness.

2.2.2. Bride price and parents' welfare

For parents, marriage payments pose a threat to their retirement decision. Chen and Tong (2021) point out that under traditional ideology, helping children get married and establish a new family is regarded as the obligation and responsibility of parents. If a son remains single for years, parents will be under enormous social pressure and at a higher risk of depression. The groom's parents usually bear most of the wedding expenses, including the bride price, wedding ceremony, and so on. While parents can derive moral satisfaction from their selfless giving and contribution to their children (Hoffman et al., 1978), the economic

pressure of marriage payments may force them to reduce consumption or increase labor supply (Bai et al., 2022), even engage in high-risk, high-intensity, long-hour jobs and take on debt. These financial pressures on parents will not be relieved until the son gets married (Tao et al., 2021).

However, driven by egoism, some brides and grooms disregard filial. They not only collude to demand high-value betrothal gifts from the grooms' parents when they marry, making the bride price a means of intergenerational exploitation, but also intend to avoid paying debts owed by parents for marriage payments, which seriously endangers the parents' retirement and livelihood (Yan, 2003).

2.2.3. The broader impact of bride price

The bride price is associated with negative externalities. High bride prices crowd out parents' consumption and lead to chronic poverty. With rising bride prices, families with sons will lower consumption to increase savings for bride price to increase competitiveness of their son in the marriage market (Wei & Zhang, 2011; Du & Wei, 2013). In addition, Brown et al. (2011) find that as status competition intensifies, families of poor grooms spend more on weddings, which traps families into chronic poverty. It is also found that high bride price drives criminal activities such as women trafficking and theft of betrothal gifts (Hudson & den Boer, 2004; Jiang & Sánchez-Barricarte, 2012; Cameron et al., 2019).

2.3. The factors affecting parents' health

Extensive research has been conducted on the factors affecting the health of middle-aged and elderly people. Individual characteristics including age, gender, marital status, illness, lifestyle, education, income, can be important determinants of health status in older age. Most scholars agreed that older women are more likely to suffer from poorer health than older men (Yu et al., 1989; Andersen-Ranberg et al., 1999). Although physical function gradually deteriorates with age (Krause & Jay, 1994), Ferraro (1980) and Cheng et al. (2007) show that the elderly have a higher self-evaluation of their health status than the middle-aged. Tosi & van den Broek (2020) focus on the data from the United Kingdom Household Longitudinal Study and find that the divorce behavior of the elderly can cause fluctuations in their mental health. Galenkamp et al. (2013) claim that self-reported health is associated with chronic disease and physical functioning and state that people with chronic diseases and declined function are prone to have poor self-reported health. Marmot (2002) considers that income level determines material living conditions and social participation and believes that it has a close causal relationship with health status. Cutler & Lleras-Muney (2010) use UK and US datasets and shows that educated people had healthier lifestyles (no smoking, no alcohol, etc.) and safer living conditions. Based on CHARLS data, Liao et al. (2020) find that Internet use can promote mental health and reduce the risk of depression among the elderly.

There is also evidence that children's behavioral characteristics also affect parents' health status. Yahirun (2017) studies the relationship between children's education and parents' mid- and long-term health, and finds that children's education can prolong parents' lifespan and reduce their mortality in the long run. Ma (2019) explores the causal effects of children's education on various health indicators of parents. The results shows that children's years of education are associated with higher self-reported health score, better

cognitive function, and improved depression symptoms among parents. Teerawichitchainan et al. (2015) use data from Southeast Asian countries and find that parents living with their children could effectively improve their mental health. Böhme et al. (2015) analyze the effect of children's migration on parents' self-reported health, body mass index, and other health indicators. Their results suggest that children's international migration could increase financial support for parents and make them improve their diet, thus improving parents' health.

This paper contributes to literature by linking marriage market institutions to parental health. Past studies provide rich evidence of the impacts the bride prices have on women's welfare. There have also been discussions about the financial stress imposed on parents associated with the bride price. We extend the literature on marriage transfer by examining a margin that is unexplored and quantifying the causal impact of marriage transfers on parents' health outcomes. Being a kind of human capital itself, health is also an input to producing other forms of human capital. The bride price, as an *informal institution* originated from traditional culture, imposes harmful impact on parental health, which will in turn lower income generation in older age. Our results suggest that the bride price serves as a special means of intergenerational exploitation and extend the knowledge on this topic where past studies mainly focus on the case where the older generations take advantage of their successors.

On the other hand, we contribute to empirical research on the determinants of parental health. Our findings are in line with the predictions drawn from past research that the bride price worsens health conditions. Although our examination mainly focuses on the health outcomes, we also make an important point that marriage transfer constitutes a large lump sum expenditure leading to a significant drop in wealth, which is missing from the current life cycle consumption and saving model. We emphasize that it is necessary to incorporate marriage payments in future theoretical research on the wealth dynamics, especially in the Chinese context.

3. Methods and Data

In this section, we introduce the data we use in our empirical analysis, describe the endogeneity problem, provide descriptive statistics, and present first-stage relationship between the number of Confucian academies and bride price.

3.1. Empirical model

To study the impact of the bride price expenditures on the parental health, we begin with our baseline analysis by estimating the following empirical model:

$$Health_{ij} = \beta_0 + \beta_1 \ln Bride_{ij} + \theta X_{ij} + r_j + \varepsilon_{ij} \quad (1)$$

where i represents the individual, j represents the city where the individual is located. $Health_{ij}$ represents the discrete reported health score of individual i in city j . $\ln Bride_{ij}$ is the logarithm of the sum of the bride

price expenditure made for his/her sons' marriages². X_{ij} represents a series of control variables, including individual-level control variables and household-level control variables. r_j is region fixed effect³. ε_{ij} is the random error term.

The above empirical model is subject to endogeneity concerns for two reasons. Firstly, there may be omitted variable bias although we control for many observable confounding factors. The amount of the bride price is affected by local economic condition, customs, social ethos, and other factors, which are difficult to measure and are not reflected in the model. In addition, the economic income and wealth status of the family are also important factors that affect the amount of the bride price. We don't observe family income and wealth at the time of marriage, which will also lead to omitted variable bias. Secondly, there is also the threat of reverse causation. Healthy parents may have a higher ability to accumulate wealth, so they can pay for a higher level of the bride price. On the contrary, parents who are sick and weak may bear long-term medical expenses and cannot afford the high cost of betrothal gifts.

To address the endogeneity concerns, we employ an instrumental variable approach exploiting the historical geographical variation in Confucianism. In China, Confucian culture is one of the most far-reaching traditional cultures, which advocates kinship, attaches great importance to filial piety, and forms moral constraints on the selfish behaviors of children such as defaulting or avoiding supporting their parents (Chen et al., 2019). After the political, social, and religious revolution in China, the virtue of respect for one's parents and elders fell into decline. People are less willing to take on the responsibility of old-age care even after fully claiming the wealth accumulated by their parents, which breaks the balance of intergenerational relationships and constitutes intergenerational exploitation (Yan, 2003). The more severe the intergenerational exploitation is, the higher bride price sons demand from their parents. As such, it is expected that in areas where Confucian culture has a greater influence, the traditional filial piety imposes stronger moral constraints on intergenerational exploitation, and the grooms' parents pay less for betrothal gifts. Meanwhile, according to the marriage payment theory (Freedman, 1966), the groom pays the bride price to the bride's parents as monetary compensation for the daughter's departure from the family and as a discounted compensation for future pension expenses. In areas where Confucianism prevails, daughters still abide by moral norms and assume the responsibility of supporting their parents after they get married. As a result, the bride's parents can obtain long-term and continuous financial support from their daughter, and do not need to ask the groom's family for a high betrothal gift as one-time compensation upon marriage. In addition, marriage is a contract between the bride and the groom, and the bride price can provide credit guarantee for it. With the increasing complexity of economic interests, the sense of trust gradually decreases, which may easily lead to non-fulfillment of marriage contracts. However, the Confucian culture advocates honesty and compliance, mutual respect, and mutual trust, which can restrain breach of contract and reduce the necessity of bride price as marriage credit guarantees. To sum up, it is expected that the more prevailing

² This paper is based on cross sectional data of CHARLS (2018). Parents' health refers to their health status in the year interviewed, and the bride price expenditure of sons is the sum of all betrothal spending adjusted to the interviewed year by CPI index, which will be explained in detail later.

³ Cities in the sample are grouped into seven regions based on their geographic locations, namely northwest, Northeast, North, central, East, South and southwest (excluding Hong Kong, Macao and Taiwan).

the Confucian culture is, the less the bride price will be paid.

In addition, Confucian traditional culture is a kind of ideology, which is not directly related to the parents' health. Therefore, it is reasonable to use Confucian cultural influence as the instrumental variable of bride price. Referring to Chen et al. (2020), the number of Confucian academies during the Ming-Qing period can be used to measure the local prevalence of Confucian culture⁴.

We adopt a control function method and obtain a two-step estimator that exploits the partially linear structure of the model. The first step consists of estimation of the residuals of the first stage regression where the endogenous bride price is regressed on the number of Confucian academies as well as a full set of control variables. The second step is the estimation of equation (1) with the first-stage residual included as an additional explanatory variable. Given the ordered categorical dependent variable, we employ the ordered logit regression in our second step.

3.2. CHARLS data

This paper uses data from the China Health and Retirement Longitudinal Study (CHARLS). The database collects high-quality micro-data on the family and personal information of middle-aged and elderly people aged 45 and above in China. Information collected in the survey includes demographic characteristics, employment and pension, household income and expenditure, evaluation of health function, healthcare utilization, and insurance participation. CHARLS interviewed a stratified random sample of population in 28 provinces, 150 counties, and 450 communities or villages. Households are tracked every other year from the baseline survey in 2011. We use information from the latest wave of the survey in 2018. We restrict the sample to individuals aged between 45 and 85. We further exclude samples from 12 cities where there is no information on the number of Confucian academies during the Ming and Qing Dynasty. Observations with missing information on our key variables are dropped. Our sample finally includes cross-section information on 15611 individuals.

3.3 Bride price expenditures

We observe bride price expenditures at the household level. For households with multiple sons, there are multiple records of bride price payments made for each son. CHARLS has detailed information about the year each son got married, the expenses related to betrothal gifts, and the cost of housing. Since the wedding house is also a form of the betrothal gift, and usually takes up a large proportion of the marriage payment, it is incorporated into the calculation of bride price. Since the year of marriage can be different from the year of interview, we account for inflation in the bride price expenditures by standardizing expenditures at the price level of 2018 according to the provincial CPI index. If the sons in the family are young and unmarried, the amount of bride price borne by parents is deemed to be 0. Since we are interested in household level expenditures in bride price, we use the sum of the adjusted bride price paid for all sons in the family as our independent variable.

⁴ In this paper, the number of Ming-Qing jinshi is also used to measure the Confucian cultural atmosphere at the city level. With this IV, regression results are still significant (relevant data comes from CFCN database of CNRDS platform).

3.4 Outcome variables

Our key outcome variable is the health status of the parents. In accordance with previous literature, we use self-reported health score as the indicator of health status (Giles & Mu, 2007; Huang et al., 2016). Self-reported health reflects the individual's comprehensive evaluation of his body conditions. We extract this information from responses to the CHARLS survey question "What do you think of your health". The responses range from a 1 to 5 scale with 1: terrible; 2: poor; 3: fair; 3: good; 5: excellent. Higher health score corresponds to better health status.

3.5 Control variables

We control for predetermined variables that are likely to impact parents' health. They are classified into three categories – individual characters, household characteristics, and region fixed effects. Rich demographic information is available in CHARLS. We control for individual demographic characteristics such as age, gender, ethnicity, marital status, and education of the respondent. We are also able to incorporate other individual characteristics that directly link to health status, which include reported life satisfaction, physical activities in the past month, drinking or smoking in the past year. Household level characteristics are per capita annual household income⁵, and the number of children living with parents. More importantly we control for dowry expenditure to isolate the health effect of specific marriage transfers of bride price. Hukou status indicating residency in urban or rural areas is also added to the model to account for systematic differences in the medical system. To control for the differences in economic development and geographic environment across different regions, we include region dummies in the regressions.

3.6 Summary statistics

Table 1 summarizes the descriptive statistics of each variable. The sample consists of 15611 respondents, of whom 47% are male. The average age is 61 years old. 87% are married. Only 34% of them have completed middle school education. The vast majority are Han Chinese. And the average per capita household income is 17887 yuan. The average self-reported health score was 3.058, which stands for a fair health status. The average bride price (including the cost of the wedding house) paid is about 39933 yuan. The fact that average bride price more than doubles the per capita annual income of the household emphasizes the economic burden caused by the bride price. The standard deviation of bride price is about 118.598 with the maximum exceeding five million yuan, indicating large variations in bride price spending across households. The average value of the dowry expenditure (including the cost of the wedding house) is about 10,512 yuan, which is lower than the average level of the bride price. The average satisfaction with life is 3.242, which is a moderate level of satisfaction. More than half of the parents have participated in social activities in the past month and exercised in daily sports for more than half an hour, and nearly half of the parents have the habit of smoking and drinking in the past year. From the perspective of household characteristic variables, the average number of children living with parents in a family is 0.515, which implies that many parents do not

⁵ Per capita annual household income = Total annual household income/ The number of household members. The total annual household income includes the salary and transfer income of the respondents and other household members, agricultural income, self-employed or private enterprises income, household public transfer income, etc.

live with their children. In addition, the standard deviation of Confucian academies, the instrumental variable, is relatively large, indicating that the influence of Confucian culture in different regions is greatly different.

[Table 1 here]

3.7 First stage

We estimate the magnitude of the first-stage relationship between the city-level number of Confucian academies and the amount of the bride price and test the relevance assumption for a valid instrument variable by estimating the following regression equation

$$\ln Bride_{ij} = \beta_0 + \beta_1 \ln Academies_j + \theta X_{ij} + r_j + \varepsilon_{ij} \quad (2)$$

where $\ln Academies$ is the log of one plus the number of Confucian academies at the city level.

[Table 2 here]

Table 2 shows the results from ordinary least square estimation of the first stage equation. Column (1) presents the baseline relationship between the number of Confucian academies and the level of bride price without controlling for other confounding factors. We find that 1% increase in the number of Confucian academies is associated with 0.164% decrease in the amount of the bride price. Evaluated at the mean values, this is interpreted as a 66 yuan decrease in the bride price for 4 more local Confucian academies on average. The effect is significant at the 1% significance level. We add individual characteristics, household characteristics, and region fixed effects in column (2) to (4) sequentially. These factors are found to explain limited variations in the bride price. And the first stage relationship between the number of historical local Confucian academies and the amount of bride price paid is consistently negative and significant.

4. Results

4.1 Baseline results

Table 3 reports the causal effect of the bride price on the health of parents from the two-stage control function approach. Column (1) reports the estimates of the most parsimonious model where no extra confounding factors are controlled for. It shows a significant negative relationship between the bride price and health score with a coefficient of -0.272. This implies that if the bride price goes up by 1%, the odds ratio of reporting a higher health score will decrease to 0.9973 times of the original odds ratio. After controlling for individual characteristics, column (2) shows a lower estimate of the impact, indicating that individual characteristics explain some of the variations in self-reported health status. Further adding in household level characteristics, we find similar and still significant negative impact on the health score. After accounting for individual, household level differences and region fixed effects, 1% increase in the bride price lowers the log odds ratio of reporting a higher health score by 0.00267, which is approximately still 0.9973 times of the original odd ratio of reporting a higher health score. This suggests household characteristics and individual characteristics can only explain a limited part of the decline in self-reported health. In all specifications, the plug-in first stage error is significant at the 5% level, confirming that the bride price is endogenous. The F-statistics of the first stages with control variables indicate there is no presence of weak

instrument.

[Table 3 here]

4.2 Robustness

We check the robustness of our results by looking at different health measures. We also investigate if the effect is sensitive to alternative definitions of sample. All results presented in this section are derived from estimation of the two-stage control function approach of equation (1).

Since self-reported health is subjective and is subject to justification bias (Disney et al., 2006; McGarry, 2004), we use objective health measures as a robustness check in this section. We adopt two indices of self-care ability to measure physical health – Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL). ADL measures the ability to complete basic self-care tasks developed as young children. These tasks include walking, dressing, eating, bathing, toileting, and transferring. Survey respondents were asked if they have difficulty with completing these tasks. IADL refers to activities that require more complex thinking and organizational skills. They include shopping and preparing for meals, housecleaning, communication, managing medication, managing transportation, and managing financial accounts. ADL and IADL are measured as the number of activities respondents can complete independently out of the six activities in each category. We categorized respondents as ADL disabled or IADL disabled if they reported needing help in performing any of the six activities respectively (Zhang et al. 2017).

We also investigate the impact on mental health. Specifically, we focus on depression among respondents. In our data, depression is evaluated based on the 10 psychological questions from the CHARLS Depression Scale (CES-D). Each question was scored on a 0-3 scale, with 3 points for feeling upset most of the time, and 0 points for feeling hopeful most of the time. The degree of depression is measured as the total score out of the ten questions. A higher score stands for a higher degree of depression and worse mental health status. Following Liao et al (2020), we use a cutoff score of 10 to define being at risk of depression.

The key explanatory variable in our model is the logarithm of one plus the sum of the bride price spent on all sons' marriages in a family. We observe many zero payments in the CHARLS data. One of the reasons is that the respondent has no children, or their children are unmarried. To explore the intensive margin, we exclude observations with no married child and replicate the control function analysis.

[Table 4 here]

Table 4 reports the results of the robustness checks. The first three columns present outcomes with alternative health measures estimated by the control function approach where the second step involves logit regression. Column (1) to (3) show the effect of the bride price on ADL disability, IADL disability, and depression respectively. The results indicate that bride price significantly increases parents' risk of depression, significantly increases parents' odds of ADL disability and IADL disability at the 1% significance level. Both physical health and mental health decline with the bride price. To sum up, the negative impact of the bride price is consistent across various dimensions of health and wellness, employing both subjective and objective measures. Column (4) of Table 4 confirms a similar pattern as in the main results, where the amount of the bride price has a significant negative impact on the health of parents. This implies that including households with no married child has little impact on our main results.

4.3 Heterogeneity

In this section, we explore how the health effect varies by residence type, age, education, and household income. The results are shown in Table 5.

We examine differential effects on urban and rural residents. The results are shown in Panel A of Table 5. The bride price has no significant effect on the health status of parents living in urban areas but has a significant negative impact on the health status of parents living in rural areas. The reasons can be trifold. On the one hand, urban parents have better access to health services and are in better physical condition than rural parents. On the other hand, the unbalanced sex ratio combined with the outflow of young, unmarried women makes rural areas more prone to "high bride price" (Lei & Zhao, 2019). In addition, it is documented that status concerns and herding behavior make social spending rise sharply in rural China during recent years (Brown et al., 2011). Poor families of grooms expend more for wedding ceremonies as local status competition increases, which loads higher financial pressure on these parents. Therefore, the negative impact of bride price on the health of parents is more prominent among rural families.

The bride price has different health effects on parents of different age. We divide our sample by the age cutoff of 65 years old to define middle-aged parents and older parents. We observe a significant decline in health among middle-aged parents. The elderly parents also experience worse health status, but the decrease is not statistically significant. This could be driven by the fact that middle-aged parents are likely to experience a more recent wealth shock of the bride price payment than older parents. Coupled with higher bride prices in recent years, it is harder for younger parents to recover from the decline in wealth. For the elderly parents, health status declines with the bride price to a small magnitude, and the effect is not statistically significant. This implies the impact of the bride price is not persistent in a longer run as wealth accumulates in the household.

Panel C reports the outcomes for different education levels. It is well documented that education is positively related to health. We define lower-educated and higher-educated groups by whether the respondent attended middle school. Results show that the bride price has a significant negative impact on the health of parents of less-than-middle-school education groups with a 5% significance level. Our estimates show a 1% increase in the bride price decreases the log odds of reporting a higher health score among lower educated parents by 0.00323. Better educated group is less impacted by the payment of the bride price. This pattern is consistent with findings from past literature that link education to better health.

We further explore heterogeneity across different income groups, using a cutoff of per capita household income at 10,000 yuan. We separate our sample into higher income groups and lower income groups. The outcomes are shown in Panel D. For families with higher income, the adverse effect of the bride price is small and not statistically significant. For families with lower income, there is a 0.00501 decline in the log odds of reporting a higher health score for 1% increase in the bride price. And this effect is significantly negative at the 1% significance level. The magnitude of impact is larger than the average effect in the full sample, indicating the overall detected effect is mainly driven by low-income households.

[Table 5 here]

To sum up, the observed drop in parental health caused by the bride price is mainly driven by the impact

on middle-aged, less-educated, lower-income parents living in the rural areas. The F-values suggest the number of Confucian academies is relevant to the amount of the bride price and there is no weak instrument problem in all specifications. And the Durbin-Wu-Hausman tests confirm that the amount of the bride price is endogenous for these households.

4.4 Mechanism

In this section we examine potential mechanisms that could explain the impact of the bride price on health outcomes. We propose two possible channels.

First, a higher level of the bride price increases personal debts. With rapid economic development and unbalanced sex ratio, the bride price has risen sharply in the past decades. This imposes a heavy economic burden to the groom's family. Given that the average bride price paid is three times the average per capita household annual income among rural residents, rural parents probably have to borrow from relatives, friends or financial institutions to finance the marriage payment. The relationship between financial difficulties and psychological well-being has been well established (Bridges & Disney, 2010; Gathergood, 2012; Turunen & Hiilamo, 2014). As such, indebtedness caused by high bride price is expected to cause health to decline.

We formally test whether the bride price leads to debts by extending our main analysis to examine the impact of the bride price on indebtedness. We use the responses to the CHARLS survey question "How much is the total amount of your unpaid loans, personal loans, and credit card debts to measure the parent's personal debt" to determine whether the respondent has any unpaid debt at the time of survey. The outcome variable is a binary variable which takes the value of one if there are any debts and zero otherwise. The result is reported in Column (1) of Table 6. Accounting for the full set of control variables as well as the region fixed effect, a 1% increase in the amount of bride price is found to raise the odds of indebtedness to 1.005 times on average in the full sample.

[Table 6 here]

Second, health investment can represent another channel through which the bride price can impact health. The bride price expenditure can crowd out health investment. According to previous literature, financial support from children can improve the physical fitness of parents by providing them with balanced nutrition and specialized health investments. On the contrary, the sons' bride price is a form of economic exploitation of their parents, leading parents to tighten budget constraints, reduce medical expenditures, and reduce the purchase of health care products and other health investment behaviors.

This channel is justified by estimating the effect of the bride price on fitness expenditures using the control function approach with logit regression. The outcome of interest is whether the household has any fitness expenditure on fitness exercise, fitness equipment, health care products, etc. in the past year. Expenditure on fitness indicates higher health investment. Column (2) in Table 6 presents these results. We find that the bride price reduces the log odds of health investment as measured by fitness expenditures. The odds of fitness expenditures will decrease to 0.9955 times of the original odds if the bride price is 1% higher. The effect is significant at 10% significance level.

To sum up, our empirical results provide evidence that the bride price causes health to deteriorate by increasing indebtedness and crowding out health investment. The bride price not only causes mental pressure, but also reduces budget for health maintenance. Taken together, health status gets worse after paying a high bride price.

5. Conclusion

The recent rise of the bride price in China has raised increasing concerns about its adverse impact on women, families, and possible spillovers to the entire society. However, one important but missing part is the effect of increasing bride price on the well-being of parents of the newlyweds. In this paper, we use data from the China Health and Retirement Longitudinal Study to investigate the causal impact of the bride price on the health outcomes of parents. To address endogeneity problems caused by omitted variables and reverse causality, we implement the control function method and use the number of Confucian academies during the Ming and Qing Dynasties at the city level as the instrumental variable for the bride price.

The results show that the bride price significantly worsens parental self-reported health status, with individual characteristics, household characteristics, and region fixed effects fully controlled for. This pattern is consistent with alternative measures of physical and mental health. Restricting the sample to households with married children also reveals a significant negative impact on the intensive margin. To explore heterogeneity across various subsamples, we divide our sample by residence type, age, education, and household income. We find less-educated younger parents who earn lower income and live in rural areas are more negatively impacted by the bride price. In addition, we identify two mechanisms that drive this result. First, bride price payment increases personal debts among parents, which imposes mental pressure and leads to depression. Second, the bride price expenditure tightens parents' budget constraints and inhibits health investment. These mechanisms together contribute to the deterioration of parents' health.

This paper aims at emphasizing an understudied intergenerational impact of the bride price. While we examine the impact of the bride price on parents' health in the Chinese context, this pattern could also exist in other parts of the world where such marriage custom exists. Future research pursuing the same research question in different cultural contexts would be complementary to our analysis. With the aging of the population, this study also contributes to our understanding of health dynamics among the elderly, which is of critical public policy concern.

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Table 1. Descriptive statistics

Variables	Observations	Mean	SD	Minimum	Maximum
<i>Health score (1-5)</i>	15611	3.058	1.018	1	5
<i>Bride price (*10³ yuan)</i>	15611	39.933	118.598	0	5131.984
<i>Dowry (*10³ yuan)</i>	15611	10.512	64.535	0	4218.210
<i>Age</i>	15611	61.422	9.441	45	85
<i>Male</i>	15611	0.474	0.499	0	1
<i>Married</i>	15611	0.871	0.335	0	1
<i>Middle school</i>	15611	0.344	0.475	0	1
<i>Han Chinese</i>	15611	0.932	0.252	0	1
<i>Urban</i>	15611	0.252	0.434	0	1
<i>Life satisfaction score (1-5)</i>	15611	3.242	0.795	1	5
<i>Physical activities more than 30 minute in past month</i>	15611	0.859	0.348	0	1
<i>Drinking or smoking last year</i>	15611	0.453	0.498	0	1
<i>Income per capita (*10³ yuan)</i>	15611	17.887	56.880	0	3028
<i>Number of children living with</i>	15611	0.515	0.674	0	5
<i>Number of Confucian academies</i>	15611	429.637	831.454	1	6153

Table 2. The Impact of Number of Confucian Academies on the Bride Price, First Stage OLS

	<i>Ln(Bride price)</i>			
	(1)	(2)	(3)	(4)
<i>Ln(academies)</i>	-0.164*** (0.062)	-0.240*** (0.057)	-0.229*** (0.055)	-0.140** (0.060)
Individual characteristics				
<i>Age</i>		0.120*** (0.006)	0.107*** (0.007)	0.108*** (0.007)
<i>Male</i>		-0.524*** (0.082)	-0.421*** (0.083)	-0.367*** (0.082)
<i>Married</i>		1.366*** (0.142)	1.090*** (0.144)	1.065*** (0.142)
<i>Middle School</i>		0.422*** (0.114)	0.364*** (0.113)	0.173 (0.107)
<i>Han Chinese</i>		1.270*** (0.304)	1.136*** (0.275)	0.651** (0.260)
<i>Urban</i>		-0.385** (0.160)	-0.377** (0.161)	-0.464*** (0.157)
<i>Life satisfaction</i>		0.301*** (0.057)	0.289*** (0.056)	0.251*** (0.053)
<i>Drinking or Smoking</i>		0.159 (0.113)	0.133 (0.114)	0.108 (0.112)
Household characteristics				
<i>Per capita income</i>			-0.001**	-0.002***
<i>Number of children living together</i>			-0.333*** (0.088)	-0.233*** (0.083)
<i>Ln(dowry)</i>			0.084*** (0.015)	0.079*** (0.015)
Region fixed effect				√
N	16025	15909	15611	15611
Adjusted R square	0.0030	0.0517	0.0574	0.0776
F statistic	7.0274	46.5253	41.4017	33.7135

Note: All results are OLS estimates. Robust standard errors adjusted for clustering at the community level are given in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% respectively.

Table 3. The impact of bride price on reported health score, Control Function with Ordered Logit

	<i>Health Score</i>			
	(1)	(2)	(3)	(4)
<i>Ln(bride price)</i>	-0.272*** (0.099)	-0.228*** (0.058)	-0.233*** (0.059)	-0.267** (0.105)
Individual characteristics				
<i>Age</i>		-0.002 (0.007)	-0.004 (0.006)	0.000 (0.011)
<i>Male</i>		-0.120*** (0.045)	-0.090** (0.042)	-0.075 (0.051)
<i>Married</i>		0.347*** (0.092)	0.283*** (0.081)	0.308*** (0.119)
<i>Middle School</i>		0.441*** (0.044)	0.419*** (0.043)	0.363*** (0.040)
<i>Han Chinese</i>		0.387*** (0.116)	0.346*** (0.108)	0.193* (0.104)
<i>Urban</i>		0.154*** (0.052)	0.121** (0.053)	0.097 (0.071)
<i>Life satisfaction</i>		0.726*** (0.027)	0.728*** (0.028)	0.721*** (0.034)
<i>Physical activity</i>		0.355*** (0.048)	0.329*** (0.048)	0.428*** (0.052)
<i>Drinking or Smoking</i>		0.413*** (0.038)	0.406*** (0.039)	0.391*** (0.040)
Household characteristics				
<i>Per capita income</i>			0.001 (0.001)	0.001 (0.001)
<i>Number of children living together</i>			-0.044 (0.033)	-0.021 (0.036)
<i>Ln(dowry)</i>			0.023*** (0.006)	0.024*** (0.009)
Region fixed effect				√
<i>First-stage error</i>	0.269*** (0.099)	0.230*** (0.058)	0.235*** (0.059)	0.265** (0.105)
N	16025	15909	15611	15611
Pseudo R square	0.0007	0.0484	0.0495	0.0541
DWH p-value	0.0067	0.0001	0.0001	0.0113

Note: All results are the second stage estimation of the control function approach with the number of Confucian academies as the instrumental variable. The first stage regressions are carried out with OLS. Fitted residuals from first stage are incorporated in the second stage ordered logit regression. Robust standard errors adjusted for clustering at the community level are given in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% respectively.

Table 4. The impact of bride price under alternative specifications, Control Function

	Full sample			With married child
	<i>ADL disability</i>	<i>IADL disability</i>	<i>Depression</i>	<i>Health Score</i>
	(1)	(2)	(3)	(4)
<i>Ln(bride price)</i>	0.749*** (0.183)	0.879*** (0.167)	0.530*** (0.124)	-0.231** (0.112)
Individual characteristics	✓	✓	✓	✓
Household characteristics	✓	✓	✓	✓
Region fixed effect	✓	✓	✓	✓
Mean of dependent variable	0.167	0.273	0.367	3.013
N	15617	15617	15497	13601
First-stage F statistic	33.6463	33.6463	33.6470	14.6588
DWH p-value	0.0000	0.0000	0.0000	0.0356

Note: All results are the second stage estimation of the control function approach with the number of Confucian academies as the instrumental variable. The first stage regressions are carried out with OLS. Fitted residuals from first stage are incorporated in the second stage ordered logit regression. Robust standard errors adjusted for clustering at the community level are given in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% respectively.

Table 5. Heterogeneity by residence type, age, education, and household income, Control Function

Samples	Coefficient	Standard error	N	F value of first stage	DWH: p value
Panel A. Residence type					
Urban	0.076	(0.126)	3941	12.7130	0.5530
Rural	-0.399***	(0.130)	11670	28.4826	0.0024
Panel B. Age					
45-64 years old	-0.261***	(0.096)	9733	36.9989	0.0071
65-85 years old	-0.167	(0.140)	5878	15.1517	0.2195
Panel C. Education					
Elementary school and below	-0.323**	(0.140)	10243	25.6220	0.0226
Junior high school and above	-0.187	(0.117)	5368	26.4347	0.1041
Panel D. Household income					
Lower income	-0.501***	(0.149)	7874	23.1395	0.0008
Higher income	-0.016	(0.103)	7737	25.4503	0.8824

Note: All results are the second stage estimation of the control function approach with subsamples. The outcomes are the self-reported health scores. The first stage analysis is carried out with OLS regressions of the logged bride price on the exogenous variables including the logged number of Confucian academies. Fitted residuals from first stage are incorporated in the second stage ordered logit regression. Robust standard errors adjusted for clustering at the community level are given in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% respectively. The F-values of the first stage regressions are reported in Column (5). And the last column reports the p-values from the Durbin-Wu-Hausman test of the endogeneity of the logged bride price.

Table 6. The Mechanism of the Bride Price on the Parental Health

	<i>Debt</i>	<i>Fitness</i>
	(1)	(2)
<i>Ln(bride price)</i>	0.472*** (0.152)	-0.447* (0.254)
Individual Characteristics	√	√
Household Characteristics	√	√
Region fixed effect	√	√
Mean of dependent variable	0.373	0.064
N	15616	15536
First-stage F statistic	33.6489	33.6162
DWH p-value	0.0044	0.0731

Note: All results are the second stage estimation of the control function approach. The first stage analysis is carried out with OLS regressions of the logged bride price on the exogenous variables including the logged number of Confucian academies. Fitted values of the logged bride price from first stage are incorporated in the second stage logit regression. Robust standard errors adjusted for clustering at the community level are given in parentheses. *, **, and *** indicate statistical significance at 10%, 5%, and 1% respectively. The F-values of the first stage regressions as well as the test statistics from the Durbin-Wu-Hausman test of the endogeneity are reported in the last two rows.