Delayed Gratification and Parental Decision-Making:
Investigating the Impact of Poverty on Child Marriage in India

Karan Bains

Faculty Advisor: Professor Jessica W. Reyes

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ABSTRACT

Child marriage has negative health effects and limits future opportunities available to children, potentially trapping them in a cycle of poverty. While a large body of literature studies the impact of parental decision-making on child welfare in general, this paper applies such thinking to female child marriage in India. I first develop a model of parental decision-making under which poverty constraints lead parents to make suboptimal choices such as marrying their daughters prematurely. I then test this model empirically, estimating a two-stage least squares regression to determine the causal impact of poverty on child marriage. Following Chin and Prakash (2011), I estimate the effect of affirmative action policies on poverty in India. I then use this exogenous variation in poverty to identify the relationship between current poverty and future child marriage outcomes. This analysis is conducted using state-year data for India over the period 1960-2000 from Besley and Burgess (2000), with retrospective child marriage variables constructed from the 2005-06 National Family Health Survey in India. I find that poverty has a significant positive effect on the incidence and depth of child marriage, a result which proves robust to different time periods, data sets, and specifications. More concretely, a one percentage point decrease in current poverty incidence leads to a one percentage point decrease in lifetime child marriage rates. This implies that declines in poverty between the 1960s and 1990s can explain approximately 4/5 of the 22 percentage point decline in child marriage in India over that time. In addition, culture (as measured by Hindu population share) is not a significant predictor of child marriage. Lastly, I find support for the luxury axiom – while changes in poverty significantly affect child marriage, changes in the poverty gap do not. In sum, these results provide empirical support for my model of parental decision-making and suggest that poverty alleviation has strong intergenerational effects through the channel of delaying marriage.

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I. Introduction

Although distant from most of the developed world, child marriage is a serious issue for millions across the globe. Defined as marriage under the age of 18, child marriage severely limits the opportunities available to the affected individuals, most of whom are girls. Aside from the human rights violations inherent in the practice, it also leads to severe health issues, including increased risks during childbirth and psychological problems (Nour 2009). As such, child marriage is a fundamentally intergenerational problem with substantial, lingering repercussions.

Child marriage is most pervasive in India, which has 24 million child brides, or 40% of the 60 million worldwide (Sinha 2013). Over ten percent of Indian girls are currently child brides, while over 47% of Indian women aged 20-24 in 2005 were married as children.[1] While several other countries rival or even eclipse India's proportion of child brides, the caste system, the institution of arranged marriage, the widespread poverty, and several other factors make India a unique and important setting to study.

This paper explores the link between poverty and child marriage in the Indian context. The central question considered here is whether alleviating poverty can curb child marriage by expanding the budget constraints of poor families and widening their perspective beyond immediate financial and social considerations. I use state-year data from India over the period 1960-2000 to analyze this issue, focusing on female child marriage, which is much more pervasive and harmful throughout the world than the marriage of young boys. Throughout the rest of this paper, 'child marriage' will refer to female child marriage.

Although poverty and child marriage are strongly correlated, the relationship between the two cannot be interpreted as causal, as they are codetermined in myriad ways. Indeed, child

[1] Total Indian girl population comes from 2011 Census of India. Data from 2005 is from NFHS-3(see Section V).

marriage is often cited as a factor which perpetuates the cycle of poverty – the very use of the term 'cycle' indicates the unclear nature of the causality in the relationship.[2] In addition, poverty is correlated with several other factors which may explain child marriage, such as the population shares of low castes. To solve this problem, I use an instrumental variables (IV) strategy to identify the causal impact of poverty on child marriage. Building on Chin and Prakash (2011), I use political affirmative action policies for India's lowest castes as a source of exogenous variation in poverty. I then use these predicted poverty rates to analyze the effects of poverty on child marriage. My results show that a one percentage point decrease in poverty incidence leads to a 0.94 percentage point decrease in the incidence of child marriage. This finding supports a causal relationship between poverty and child marriage and suggests that the benefits of poverty alleviation may be amplified by the alleviation of child marriage.

This paper builds on a growing body of literature on political reservations in India. In an oft-cited study in this area, Pande (2003) shows that political reservations have a redistributive effect towards the lowest castes and increase low caste political influence. Chin and Prakash (2011) build on Pande's work and find that political reservations for Scheduled Tribes (ST), arguably the most disadvantaged caste group, have a significant negative effect on net poverty across the entire Indian population. This paper applies Chin and Prakash's findings to the child marriage context, using their results to identify the intergenerational effects of poverty alleviation in the form of child marriage.

In addition, this paper adds to the literature on child welfare by analyzing the impact of family resources on decisions regarding children. Employing ideas from behavioral economics, I develop a parental decision-making model of child marriage which shows how poverty alters the way parents discount the future and explains the implications for daughters.

[2] "Child Brides, Stolen Lives." NOW. PBS.

The condition of poverty can affect a wide variety of decisions regarding child welfare, such as education, child labor, and child marriage. Several behavioral economists, most notably Sendhil Mullainathan, have laid out conceptual models for the psychological factors in this decision, while others have found empirical support for such frameworks.

This paper extends the poverty and child welfare literature by using increased political representation due to reservations to study the child marriage outcome rather than child labor or education. In addition, one of this paper's main aims is to investigate the relative importance of poverty and cultural beliefs in determining child marriage. To my knowledge, no previous work brings the study of affirmative action, culture, and child welfare together in this manner.

The rest of the paper is organized as follows: Section II develops a simple model of parental-decision making in the context of child marriage. Section III provides background on child marriage in India, the caste system, and the legislative history of Indian political reservations. Section IV outlines my identification strategy, Section V describes the data used in the analysis, and Section VI presents and discusses the main results. Finally, Section VII includes additional findings and extensions, and Section VIII concludes.

II. Theoretical Model of Parental Decision-Making

The foundation for the model of parental decision-making presented in this section is the classic microeconomic framework – maximizing utility given a budget constraint. However, my analysis also rests on the assumption of parental altruism, which has strong support from biological and sociological perspectives. Becker (1981) laid the foundation for parental altruism from an economic standpoint by incorporating the welfare of other family members into an individual's utility function.[3] Since then, it has been a common aspect of

[3] Becker (1974) also developed the notion of social income, which adds the characteristics and welfare of an individual's social environment to his/her own personal income.

many economic models.[4] I use Becker's insight to modify the basic individual utility maximization problem into the following Cobb-Douglas single-period utility function:

$$U_{p0} = C_{p0} D_0^{\varphi} S_0^{\alpha} \tag{1}$$

For simplicity, I model parents as one decision-making entity.[5] Parental utility in the current period (U_{p0}) incorporates parental consumption (C_{p0}) and the utility of the children in the family. Here, I simplify by using the utilities of one daughter (D) and one son (S), which are incorporated into U_{p0} with the exponents φ for the daughter and α for the son. Both φ and α are less than one in order to weight child utility less heavily than C_{p0}. Given the extensive body of literature on patriarchal social norms in India, I also set $\varphi < \alpha$.

I extend this model in in Eq. 2 to allow parents to maximize their *lifetime* utility given the constraint of their lifetime income stream $I_0, I_1, I_2, \ldots I_T$ over the periods $t = 0, 1, 2, \ldots T$. Eq. 2 adds several components to the overall utility function using a modified version of the quasi-hyperbolic (β-δ) discounting proposed by Laibson (1997):

$$\begin{aligned} \boldsymbol{U} = {} & (C_{p0} D_0^{\varphi} S_0^{\alpha}) \\ & + \beta \sum_{t=1}^{M} \delta^t \, (C_{pt} D_t^{\varphi} S_t^{\alpha}) \\ & + \beta \sum_{t=M+1}^{T} \delta^t \, (C_{pt} D_t^{(1-\sigma)\varphi} S_t^{(1+\sigma)\alpha}) \end{aligned} \tag{2}$$

Here, U_{p0} remains from the single-period model. I separate future periods into two portions based on the daughter's year of marriage (M): future periods until the daughter's marriage are $t = 1, 2, \ldots M$, while future periods after the daughter is married are $t = M+1, M+2, \ldots T$.

[4] For example, Bhalotra (2004) shows that adults in rural Pakistan cannot increase their consumption or leisure without doing the same for their children. Bhaskar and Gupta (2012) also support the idea of parental altruism, finding strong income effects on the supply of child labor in nineteenth century America.

[5] This assumption is plausible given the relatively patriarchal culture of India.

The standard discount factor δ^t is applied to all future periods $t = 1, 2, \ldots T$ ($0 < \delta < 1$). In addition, utility in each future period is multiplied by β, a parameter between zero and one which models the time inconsistency of preferences. If $\beta = 1$, then preferences are time-consistent, but if $\beta < 1$, then preferences are time-inconsistent and weight the current period more heavily than future periods. In a standard quasi-hyperbolic model, $\beta \approx ½$.

In order to more accurately depict the conditions of child marriage studied in this paper, I add an additional parameter σ to the parental utility function in the periods after the daughter's marriage. While setting $\varphi < \alpha$ models the subordination of daughters in all periods, I set $\sigma > 0$ because parents care even less about daughters relative to sons after daughters are married. In particular, the norm of patrilocal exogamy, or relocation to the husband's household after marriage, leaves the bride's family without much incentive to invest in her human capital. Even absent this phenomenon, many women do not participate in the labor force at all, rendering their potentially high wage returns to education irrelevant (Jensen 2010).[6] This gender inequality increases under impoverished conditions, when parents are especially likely to allocate their limited resources to sons, who are seen as a more reliable long-term investment.

Parents would ideally maximize utility given their lifetime income stream, a behavior that would lead them to consider not only their own future consumption needs, but also the utility of their children in all periods $t = 1, 2, \ldots T$. This would theoretically lead to fewer suboptimal long-term behaviors, such as child marriage, which forgo future benefits for immediate utility. However, the combination of a binding poverty constraint and shortsightedness alters the utility maximizing model from one of lifetime consumption and

[6] The underinvestment in girls occurs despite a large body of evidence showing that the returns to female education are greater than the returns to education for males.

utility smoothing to a less optimal decision-making process which may not properly consider the potentially large future benefits of investment in children, especially girls.[7] More concretely, parents who are subject to a strict liquidity constraint and only have access to I_0 in period 0 will have low values of β. A traditional notion of shortsightedness in which the current period is especially important relative to future periods as a whole also results in low β values. Additionally, a conception of shortsightedness which further increases utility in any future period n relative to utility in period $n+1$ could lead to low δ values. Both poverty constraints and shortsightedness can lead to higher values of σ, as parents under both these conditions will further devalue the post-marriage outcomes of their daughters relative to their sons. In this model, the parameters φ and α are unaffected by poverty.

There is a large body of literature to support the relationship between poverty and shortsighted decision-making. Banerjee and Duflo (2006) study the consumption patterns of impoverished individuals across 13 countries and find that even those making less than one dollar a day spend disproportionately on alcohol, tobacco, and festivals rather than additional calories due to a vulnerability for temptation spending. On a conceptual level, Becker (2013) finds that wealth leads to more patience and presumably more optimal consumption smoothing over time.[8] Mullainathan (2004) also discusses the issue of poverty and patience at length, highlighting the temporal inconsistency of time preference in decisions regarding children. He suggests that the daily struggles of a life in poverty exacerbate the quasi-hyperbolic discounting present in this model, making it more difficult for poor parents to credibly commit to beneficial long-term behaviors such as educating their children. Bhaskar and Gupta (2012) find empirical support for this argument and claim that poverty constraints, not selfishness, drive parents to

[7] Education may help individuals in poverty avoid such suboptimal behavior. For example, Bauer and Chytilova (2009) find that education leads to less discounting in poor Ugandan villagers.
[8] Lawrance (1991) corroborates this by showing that the poor have lower discount factors than the wealthy.

put their children to work. Spears (2010) corroborates this notion with evidence from rural India, showing that poverty depletes self-control and leads to shortsightedness.

With this framework in mind, parents in impoverished conditions are more likely to marry a daughter at a young age due to the low future returns on investment in a daughter, the lifted burden of raising a daughter to adulthood, and the additional incentives for early marriage in the Indian dowry system.[9] If children are considered family assets in a rational child marriage decision, the value of daughters declines rapidly with age, especially if they never enter the labor force as adults. Thus, marrying daughters prematurely allows poor parents to borrow from the future at the expense of D_t. This relaxes the immediate poverty constraint and allows parents to focus on C_{pt} and S_t, the two largest contributors to parental utility. However, if the poverty constraint can be relaxed in other ways, my model implies that inherently altruistic parents may be better able to account for future benefits in decisions regarding all their children; at the same time, alleviating the poverty constraint could help to increase β and decrease σ, which would also promote consideration of future benefits for daughters.

The focus on poverty constraints as a modifier of parental behavior is closely related to the luxury axiom. In the context of child labor, the luxury axiom states that families who feel they cannot afford to waste potential income will put children to work, regardless of the opportunity cost. On the other hand, families who can afford to forgo child labor will do so, even if the lost income would improve the family's well-being. While the evidence supporting the luxury axiom in the context of child labor is extensive,[10] this is the first paper to my

[9] While prohibited by law, in practice a bride's family often pays a dowry in India. The price of this dowry increases for older girls, providing yet another incentive to marry young (Caldwell 1983).

[10] Edmonds and Schady (2009) find that poor Ecuadorian families receiving cash transfers follow the luxury axiom. Kambhampati and Rajan (2005) also find support for the luxury axiom in India, where increases in parental wages decrease child work. In addition, Filmer and Schady (2006) show that scholarship programs expand household resources, leading to increased school enrollment and attendance for impoverished Cambodian girls.

knowledge to test its applicability in the child marriage decision.[11]

Finally, this model also incorporates the temporal separation between the child marriage decision and the actual child marriage. In a social equilibrium with a norm of child marriage, parents often make the expectation of child marriage clear to children far before the marriage itself, restricting their future opportunity before they even become adolescents. For example, consider Maheshwari, a graduate of Shanti Bhavan Children's Project, a non-governmental organization in the state of Tamil Nadu which gives promising children from severely underprivileged backgrounds an avenue out of poverty and expands the opportunities available to them. She describes life in these poor villages by saying:

> If I hadn't gone to Shanti Bhavan, I would've been married; I'm already 18 years old, I would have [already] had children, and my life would have been the same as any other village girl, always waking up in the morning, cooking, looking after children. My family would have been the same – no improvement. (Magho 2014)

This poverty-sustaining equilibrium has an impact on the lives of children before the actual marriage itself. As such, my model of parental decision-making makes poverty in the years *before* the child marriage the relevant factor in the child marriage decision rather than poverty in the year of the marriage. In other words, parents will consider their current constraints when they decide the future marriage outcomes of their current children; the lifetime child marriage rates I lay out in Section V capture this phenomenon. Brooks-Gunn and Duncan (1997) and Duncan et al (1998) find empirical support for this assumption, showing that economic conditions in *early* childhood have the greatest impact on child outcomes.

This paper aims to test several facets of the model presented above. The main analysis implicitly tests the assumption that poverty constrains parental altruism in the context of child marriage – if poverty is a significant predictor of child marriage, this theory gains credence, as

[11]For more on the theory behind the luxury axiom, see Fan (2011).

selfish or culturally driven parents would continue to practice child marriage for its economic or cultural benefits even after escaping poverty. I conduct further analysis on the relative importance of poverty and culture (as captured by Hindu population shares) in determining child marriage in Section VII.D. I also test the temporal assumptions outlined above in Section VII.A, specifically the hypothesis that parental decisions on child marriage are made before the year of the marriage itself. Finally, I test whether child marriage decisions follow the luxury axiom in Section VII.B, also exploring whether the poverty line approximates the critical income threshold for halting child marriage.

III. Background

Before detailing the empirical strategy of this paper, it is important to provide an overview of the Indian context in which this analysis is situated. In this section, I will expand on the sociocultural and legislative aspects of child marriage in India. I will also add relevant information on caste and caste-based affirmative action in India, both of which are important components of my identification strategy.

A. Child Marriage in the Indian Context

1. Sociocultural Factors

The prevalence of child marriage in India is due to a combination of several sociocultural factors in addition to the economic reasons detailed in Section II. First, there are longstanding religious pressures to marry daughters off early. Parts of ancient Hindu scripture sanction the practice of child marriage, indicating that girls should be married before the time of their first menstruation (Agarwala 1957).[12] As the overwhelming majority of Indians are Hindus, it is not surprising that child marriage has been commonplace in India for centuries.

[12] This is not to suggest that *all* Hindu texts urge adherents towards child marriage. In fact, the presence of adult marriages in the Vedas is interpreted as a tacit encouragement of adult marriage by some Hindus, in direct contrast to the Smriti texts which call for pre-puberty marriage (see Forbes 1979).

Before its decline in the twentieth century, the practice reached its peak in the early 1800s (Forbes 1979).[13] In addition, there has traditionally been a significant social stigma to unmarried daughters, which is stronger in more affluent families (Esteve-Volart 2009). Throughout India, parents consider the social benefits of marriage a bond between not only the two individuals involved, but their entire familial networks as well (Nour 2009). This potential to increase a family's social standing through marriage also pressures parents to find a groom as early as possible.

2. Legislative History

Although child marriage certainly persists in India, the Indian government has made several steps to curb the practice in the last century. The age of consent was increased from 10 to 12 in the Indian Penal Code in 1891, but the major victory for reformers came in 1929, when the Child Marriage Restraint Act, or 'Sarda' Act, raised the minimum age of marriage to 14 for girls and 16 for boys (Forbes 1979). While enforcement of this legislation was far from perfect, it worked in conjunction with shifting cultural norms to increase the average age of marriage in India (Hatekar et al 2007). Twenty-six years later, the Hindu Marriage Act of 1955 further raised the age of marriage to 15 for females and 18 for males, and the female minimum age was raised again to 16 in the following years. Finally, the Sarda Act was amended in 1978 to raise the age of marriage once again, this time to 18 for girls and 21 for boys, a policy which still stands today (Forbes 1979).[14,15] However, the law has proved difficult to enforce effectively, as child marriages often occur hidden from authorities. While child marriage has

[13] However, in the mid-to-late 1800s, reformers began to fight against this practice. Women began to write about the suffocating aspects of Hindu marriage as early as the 1860s, focusing on the pain of patrilocality and the dearth of education and worldly knowledge caused by early marriage (Sarkar 1992).
[14] The Sarda Act does not apply to the state of Jammu & Kashmir.
[15] While additional protection for minors was added in 2006, when the Prohibition of Child Marriage Act reinforced several weaknesses in the Sarda Act, the legal ages of marriage were not changed.

decreased over the past half century, many view the legislative changes as a symbolic gesture of disapproval rather than a mandate for total abolition of the practice (Forbes 1979).

B. Caste System

The social institution of caste, which separates Indian society into several stratified groups, is strongly associated with Hinduism, as Hindu teachings of predetermined paths through life (*dharma*) and the notion of *karma* reinforce the separate and decidedly unequal situations ascribed to the various castes (Galanter 1984).[16]

The Hindu caste system separates society into four classes (*varnas)*.[17] However, the two most disadvantaged categories lay beyond this system of classification: the Scheduled Castes (known as Dalits, a politicized term for 'untouchable') and Scheduled Tribes (Adivasis). Despite these rigid categorizations, each *varna* is heterogeneous and includes a multitude of self-contained subcastes. *Varnas* are accorded different privileges and status, but the Scheduled Castes (SCs) and Scheduled Tribes (STs) are universally considered the most underprivileged of the caste groups. While the caste system is inherently restrictive, the discrimination towards SC/STs, who are considered impure and polluted at their core, is particularly stark. Restrictions on marriage, mobility, employment, public facilities, and many other forms of degradation and segregation have been associated with these groups (Galanter 1984, Shah 2008).

Although the Indian Constitution formally banned these explicit forms of caste discrimination in 1950,[18] the vestiges of this longstanding stratification remain relevant. SC/STs continue to have fewer educational opportunities, less consumption expenditure on

[16] The pervasiveness of caste throughout Hindu-dominated India has also led to other religions adopting some form of the system, as even converts to other religions maintain caste hierarchies.
[17] These *varnas* are: Brahmins (priests, scholars), Kshatriyas (rulers, soldiers), Vaishyas (merchants, farmers), and Sudras (servants, menial class).

essentials like healthcare and nutrition, and limited social connections and access to emergency services (Desai 2011, Jalali 1993). For example, only 9% of the female SC/ST population completed secondary education in a 2005 survey, less than half the rate of the remaining population (20%).[19] The poverty rate among SC/STs is 30%, almost twice as high as the rest of India (16%), and over half of the rural SC/STs were below the poverty line as late as the 1990s.[20] In addition, the infant mortality rate for SC/STs is just over twice as high as the rate for the rest of India, suggesting health issues which may arise from child marriage and other factors (Howard and Prakash 2011).

C. History of Reservations in India

To combat the myriad disadvantages faced by the SCs and STs, the Indian Constitution instituted reservations in state assemblies as part of an extensive system of positive discrimination in politics, government jobs, and education. While reservations were first included in the Indian Constitution when it went into effect in 1950, their inclusion was the result of a decades-long fight on behalf of SC/STs during the British colonial era.[21,22]

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[18] In 1950, the Indian Constitution also created the Other Backward Classes category (OBCs) for depressed classes who were higher in social status than the SC/STs. However, the term remained ambiguous and controversial. In 1980, the Mandal Commission, tasked with identifying the OBCs in India, placed 54.4% of the population in the OBC category, making it representative of the 'middle peasant' caste groups more than the most disadvantaged (Bayly 1999, Galanter 1978). This decision was met with protest, and continues to ignite arguments today.

[19] From NFHS-3 2005 survey data. See Section V for details.

[20] India Human Development Survey (IHDS) 2005 survey data.

[21] The origins of this system date back to the late nineteenth century, when anti-Brahmin movements pushed for reservations in education and public service in south India and the British colonial government established schools reserved for untouchables (Weisskopf 2004, Jaffrelot 2003). The movement spread further in the twentieth century – the Princely State of Mysore (now Karnataka) instituted these reservations for all backward communities in 1921, defining 'backward' as non-Brahmin (Weisskopf 2004, Bayly 1999). In fact, the British continued to extend the reservation system for minorities until Indian independence in 1947.

[22] Indian leaders and minority advocates themselves were divided on the issue of reservations. Most notably, Mahatma Gandhi voiced strong opposition to the idea of institutionalized reservations, which contrasted sharply with his idea of a unified Indian community that fully integrated the 'Harijans' (his term for untouchables) into all aspects of society. India's first prime minister, Jawaharlal Nehru, also had ideological problems with reservations. Dr. BR Ambedkar, considered the leading advocate for the untouchable community, continually clashed with Gandhi on this issue. The two compromised on a system of reservations under British rule in 1932 (the Poona Pact); however, after independence, Ambedkar's fervent belief in reservations eventually led to an expansion of reservations written into the Indian Constitution, which Ambedkar helped to draft (Weisskopf 2004, Zelliot 1972).

More specifically, Article 16(4) of the Constitution explicitly provides for reservations for underrepresented backward classes, and Article 46 identifies the promotion of educational and economic interests of SC/STs as a special government directive. In addition, Article 330 includes SC/ST reservations in the lower house of Parliament (Lok Sabha). However, Article 332, which legislates for SC/ST reservations in state assemblies, is the focus of this paper (Rao 2009).[23] It mandates that states reserve seats for SC/STs in equal proportion to the population shares of each group. In the 1961 census, the total SC/ST population was nearly 100 million (21% of the Indian population), while the 2001 census numbered the SC/ST population at 250 million (24% of the total population). Given this stability in SC/ST population shares over this time span, the total proportion of reserved seats in India has also remained stable at 21-23%.[24]

Chin and Prakash (2011) take advantage of the exogenous variation in these state assembly reservations to estimate the effects of affirmative action on poverty. While reservations are based on SC/ST population shares, the actual implementation of reservations occurs with a time lag. Thus, Chin and Prakash control for SC/ST current and census population shares and use the remaining variation in reservations to obtain plausibly exogenous poverty estimates. These effects are *not* from the additional employment the reservations provide to SC/STs, as the number of seats reserved is an insignificant portion of the SC/ST population. Rather, they show the effect of greater resource allocation towards SC/STs and the impact of reservations in signaling greater economic opportunity for these disadvantaged

[23] This collection of policies was originally intended to last for only ten years, but has been renewed every decade since reservations were first instituted. As with many affirmative action policies, several aspects of these policies have been met with intense controversy. In particular, the OBC reservations suggested by the Mandal Commission in 1980 and implemented in the early 1990s ignited waves of protest and cynicism. Critics have denounced these policies as political maneuvers that encourage wasteful rent-seeking, and many have suggested that they may not be effectively promoting the welfare of the truly disadvantaged (Osborne 2001, Kumar 1992, Economist 2006, Robles and Krishna 2012). However, SC/ST reservations have not received a harsh backlash and have much stronger support than their OBC counterparts.

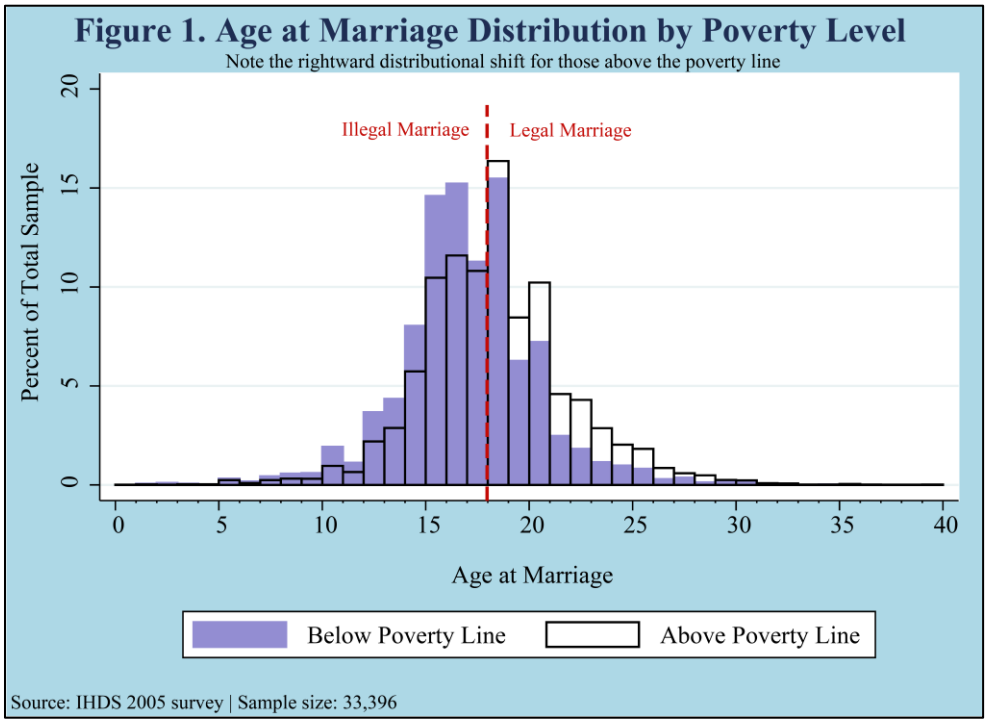
[24] For example, in 1962, there were 642 total reserved seats of 2978 possible state assembly positions in my sample states (22%), and in 1998, the states in my sample had 776 reserved seats of 3487 total seats (also 22%).

groups (Pande 2003). I use these estimates to assess the impact of poverty on child marriage in my second stage.

IV. Identification Strategy

While poverty and child marriage are strongly associated, identifying a causal relationship between the two is very difficult. Figure 1 illustrates this association, showing that the age at marriage distribution is higher for those above the poverty line relative to those below it. The central question, then, is whether this distributional shift of marriage age indicates a causal relationship between poverty and child marriage. Isolating the causal effect of poverty on child marriage is an unresolved empirical issue with important policy implications: if poverty does play a causal role in perpetuating child marriage, then the positive effects of poverty alleviation extend beyond the immediate transfer of resources and opportunity.

A basic ordinary least squares (OLS) regression of child marriage on poverty would not yield consistent estimates of poverty's causal effect on child marriage, as poor households also



have many other characteristics which perpetuate child marriage. Eq. 3 represents a preliminary adjustment to the baseline model to control for several of these omitted variables:

$$CM_{st} = \beta Poverty_{st} + \rho Hindu_{st} + \lambda W_{st} + \alpha_s + \varphi_t + \varepsilon_{st} \quad (3)$$

CM_{st} denotes the child marriage rate in state s in year t, $Poverty_{st}$ represents the poverty headcount rate, and ε_{st} is the error term of the model. The coefficient of interest is β, the effect of poverty on child marriage rates. I add W_{st} as a vector of controls which includes SC/ST population shares, state income in the previous year, rural population share, total population, population density, and an election year dummy. In addition, $Hindu_{st}$ controls for the share of Hindus in each state-year; as outlined in Section II, Hinduism is closely associated with child marriage in India, and it is possible that religious and cultural beliefs stemming from Hinduism drive the child marriage decision more than poverty. State fixed effects (α_s) account for any persistent state-specific differences which affect child marriage, while year fixed effects (φ_t) control for nation-wide changes which affected all states in the same manner.

However, the estimation of Eq. 3 is still possibly problematic for several reasons. First, there may be reverse causality between poverty and child marriage. In addition, poverty is likely collinear with the controls in the vector W_{st}. Finally, there may also be omitted variables bias in Eq. 3. To solve these problems, I employ a two-stage least squares (2SLS) method which uses minority political reservations in Indian state assemblies as an instrument which provides plausibly exogenous variation in poverty that is orthogonal to other state characteristics.

Chin and Prakash (2011) use political reservations for scheduled castes and scheduled tribes to identify the impact of minority political representation on poverty across the entire population. My first stage regression replicates their results. Since these reservations are

allotted based on the proportion of SCs/STs in the most recent census, current population share and reservation share are *not* identical. In addition, most of the reservations do not go into place immediately following new census data, as the Delimitation Commission of India must meet to adjust the reservation figures after the census is released. After this adjustment, new reservations go into place in the next election, allowing for variation between reservation shares and census population shares. Chin and Prakash use this distinction between reservation shares, current population shares, and census population shares to isolate the effect of reservations on poverty.[25] Their full OLS specification, which I use for my first stage, is:

$$Poverty_{st} = \gamma Minority\ Rep_{st} + \delta_1 Current\ Pop_{st} + \delta_2 Census\ Pop_{st} + \lambda W_{st} + \alpha_s + \varphi_t + \varepsilon_{st} \quad (4)$$

State and year fixed effects are denoted by α_s and φ_t, respectively. $Minority\ Rep_{st}$ is the share of seats held by SCs/STs in the state assembly, $Current\ Pop_{st}$ is the SC/ST population share, and $Census\ Pop_{st}$ is the share of the SC/ST population in the most recent census.[26]

Chin and Prakash find a robust, significant, and negative relationship between political reservation for STs and poverty across the general population.[27] Since they estimate the *net* effects of affirmative action on poverty, rather than the effects on only the targeted groups, I use their predicted poverty figures in my second stage specification (Eq. 5) to estimate the effect of increased opportunity and more focused resource allocation for the poor on child marriage across the whole population. The full second stage specification is as follows:

$$CM_{st} = \beta PovEst_{st} + \delta_1 Current\ Pop_{st} + \delta_2 Census\ Pop_{st} + \lambda W_{st} + \rho Hindu_{st} + \alpha_s + \varphi_t + \varepsilon_{st} \quad (5)$$

This specification includes the predicted poverty instrument ($PovEst_{st}$), all first-stage controls (W_{st}), a Hindu population share control ($Hindu_{st}$), and state and year fixed effects (α_s and φ_t).

[25] For more detail on this identification strategy, see Chin and Prakash (2011), Section 3.
[26] I use the Pande (2003) census population control. For details, see Pande's Data Appendix.
[27] The authors hypothesize that the effect was significant for STs and not SCs due to the greater isolation of STs, which alleviates some of the targeting difficulties in transfers to ST communities.

Standard errors are clustered by state in both stages due to potential serial correlation.[28]

This 2SLS strategy will appropriately estimate the casual impact of poverty on child marriage as long as my instrument is valid and exogenous. If the predicted poverty measures I use to instrument for poverty were uncorrelated with poverty, the first stage would fail. In this case, the two are clearly highly correlated, so IV1 is satisfied. In addition, if these predicted poverty measures are *not* exogenous in my second stage (in other words, if they are correlated with ε_{st} in Eq. 5), then the endogeneity problem is not solved. However, since these predicted poverty measures are based on variation in political reservation independent of SC/ST population shares, this instrument is exogenous as long as the lags in reservation implementation are not correlated with any other controls in Eq. 5. Given the unlikelihood of such a correlation, Eq. 5 will yield plausibly exogenous and consistent estimates of the effect of poverty on child marriage if it does not suffer from further omitted variables bias. However, this identification strategy assumes that the effect of reservations on child marriage operates solely through the channel of poverty, a potentially problematic assumption.[29]

V. Data

Although I would ideally use individual-level data to test the individual parental decision-making model outlined in Section II, I use state-year data for several reasons. First, my source of exogenous variation in poverty comes from changes in *statewide* poverty rates due to SC/ST reservations. In addition, establishing causality using individual-level data would be difficult. Rather, as Pande explains, analyzing state-level data is the proper analytic method for research on Indian policy, since states in India have large and disparate populations, a great

[28] Chin and Prakash also cluster standard errors by state for the same reason, citing Bertrand et al (2004).
[29] Reservations could affect health via more targeted health expenditures for the poor, which might affect child marriage. Reservations could also affect child marriage through the channel of education. While I believe that poverty is the dominant channel, I leave confirmation of this hypothesis to future research.

deal of autonomy from the federal government, and the ability to allocate resources through state policy.

My state-level dataset includes information on poverty, SC/ST reservations, and state demographics for 16 major states in India over the years 1960-2000.[30] While India is currently comprised of 28 states, those in the sample make up roughly 97% of the country's population in each census between 1961 and 1991.[31] These data are similar to those employed by Pande (2003) and Chin and Prakash (2011).[32] I add Hindu population share controls and child marriage rates using retroactive child marriage reports from the third round of the National Family Health Survey (NFHS-3) in India, which took place in 2005-06. The following subsections lay out the various parts of the dataset used in my analysis.

A. Reservations and SC/ST Population Shares

Political reservation data are obtained from reports on state elections provided by the Election Commission of India. Standardized reports are available for each state election from 1951-present, and include the number of constituencies which reserved seats for SCs/STs. The share of seats reserved for SCs is simply the number of SC reserved seats divided by the total seats in the state; an identical method is used to find ST reservation shares.

The population measures central to the identification strategy of Chin and Prakash (2011) come from decennial Indian census data spanning the years 1951-2001. The SC and ST census population share controls use the SC/ST shares from the previous census. SC and ST

[30] States included: Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. Unlike other Indian states, these states have maintained their borders during the sample years, giving them a consistent area over the sample time period. The sole exception is due to the Punjab Reorganization Act of 1966, which split the state of Punjab into smaller, present-day Punjab and the state of Haryana (Prakash 1956).

[31] The formation of the state of Telangana from part of Andhra Pradesh was passed by the Lok Sabha in February 2014. When Telangana is officially granted statehood, it will be the 29th state of India.

[32] The dataset was first compiled by Ozler et al (1996) and updated and reformatted by Besley and Burgess (2000).

current population share controls use linear interpolation to estimate the state population between census years, following Pande (2003).

B. Poverty

Poverty data from 1960-2000 were obtained from the Economic Organization and Policy Programme (EOPP) at the London School of Economics. Besley and Burgess (2000) created this dataset by reformatting data compiled by Ozler et al (1996), who define poverty measures based on 25 rounds of the National Sample Survey (NSS). The poverty line used (2400 daily calories per capita in rural areas and 2100 in urban areas) follows the Planning Commission of India's poverty criteria.[33] Data are available on poverty headcount, the poverty gap, and the squared poverty gap for rural and urban areas.[34] I use poverty headcount for my main analysis.

C. Child Marriage Measures

1. Data Sources

Child marriage variables come from the National Family Health Survey (NFHS-3) in India, which took place in 2005-06. The NFHS-3 data is representative at the national and state levels, and is publicly available through the Demographic and Health Surveys (DHS) program. I use survey data on a sample of 124,385 women aged 15-49. Slightly over 75% of these are ever-married women. Nearly half are the wife of the household head (47%), while many are the household head's daughter (25%), daughter-in-law (14%), or the household head themselves (6%). The median age of the sample is 28 years.

[33] These low caloric figures indicate that those under the poverty line are in extreme states of deprivation. The Indian Government itself has acknowledged that these could be described as starvation lines rather than poverty lines (Planning Commission of India). Thus, those classified as poor under these criteria are certainly constrained by their economic status, as my model assumes.

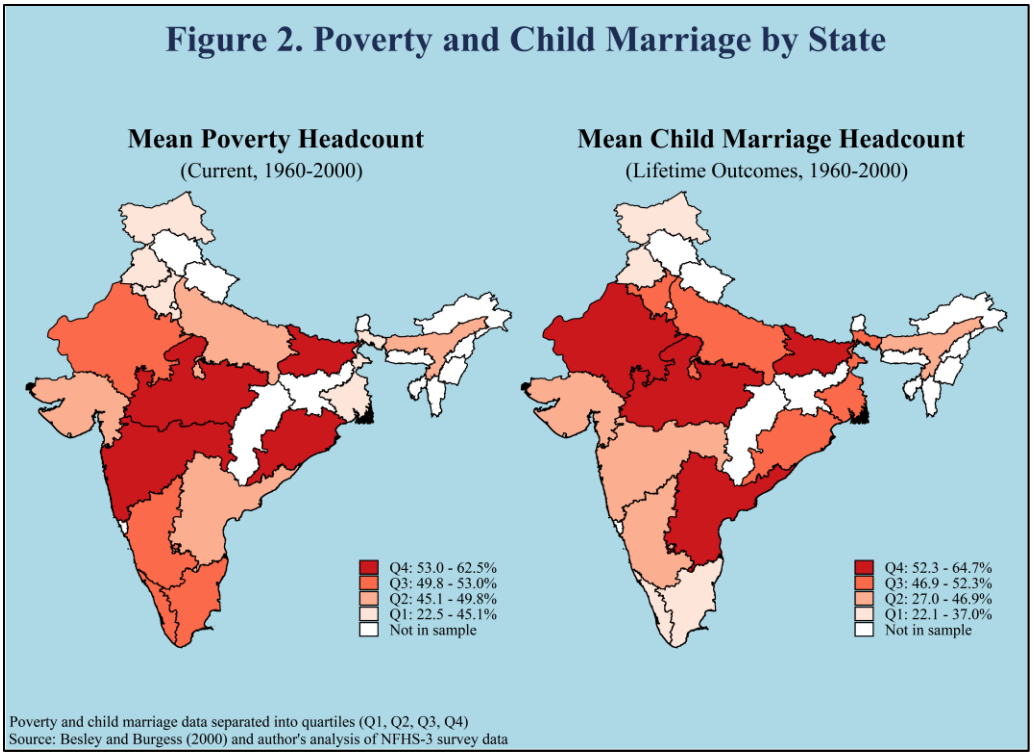
[34] Poverty gap and squared poverty gap data are not available after 1994. Poverty headcount data are unavailable for 1993, 1998, and 1999.

As a robustness check, I also use data from the first round of the NFHS surveys (NFHS-1), which took place in 1992-93.[35] NFHS-1 provides a good opportunity to test the robustness of my results. It was run by the same organizations which subsequently conducted NFHS-2 and NFHS-3, and consequently any systematic errors in survey implementation and data collection are likely similar. However, as the first round of NFHS, NFHS-1 was likely prone to more error than subsequent versions. In addition, it decreases my sample size by removing all observations in years after 1990. As a result, NFHS-3 is more appropriate to use for the main analysis.

2. Child Marriage Variable Construction

In order to compute child marriage figures, I define child marriage as marriage below 18 years of age; by extension, I define a child as an individual from 1-17 years old. The headcount rate of child marriage is calculated by dividing the number of individuals who were children in a given year and ended up in a child marriage by the total number of children in that year. In other words, it defines the proportion of children in a given year that were eventually married as children.[36] This adjustment is intended to represent the lifetime child marriage outcomes of the current child population. It also accounts for the temporal differences between the parental child marriage decision and the actual child marriage, which are an integral part of the model in Section II. Essentially, it makes Eq. 5 a test of the effects of current poverty on current children's present and future marriage outcomes. As Figure 2 illustrates, this lifetime measure of child marriage is highly correlated with poverty on the state level. I also explore a pair of child marriage headcount rates which only account for current marriages in Section VII.

[35] This sample is composed of 73,951 ever-married women aged 13-49. Of these women, 58% are the household head's wife, 21% are the head's daughter-in-law, and 4% are the household head. The median age is 30 years.
[36] For example, it counts a girl who was 10 years old in 1980 as a child marriage in 1980, even if her marriage did not take place until 1982, when she was 12.

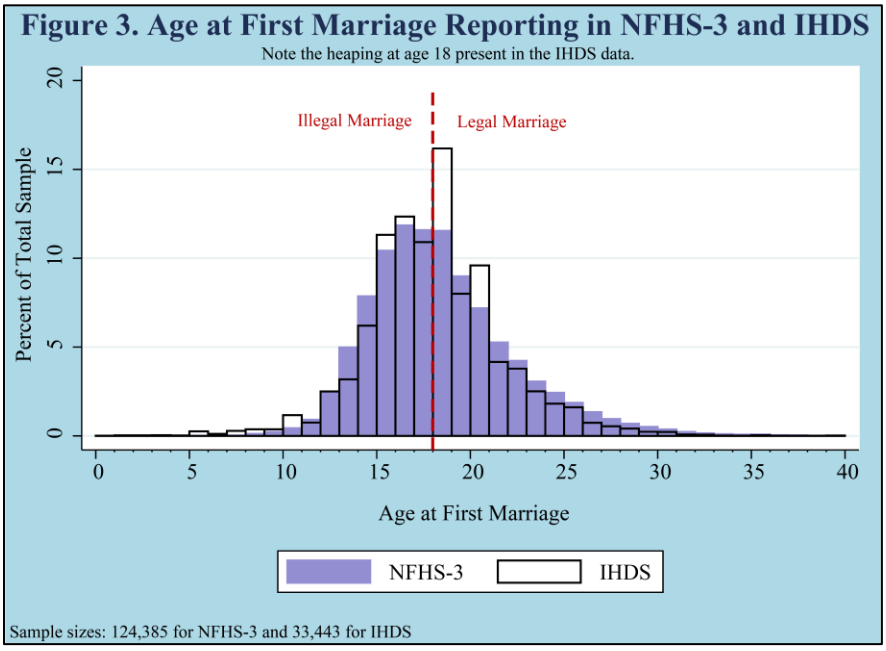


In order to analyze the changes in child marriage on multiple levels, I also calculated the child marriage gap and squared child marriage gap developed by Nguyen and Wodon (2012). The child marriage gap, which they characterize as the 'depth' of child marriage, is the mean percentage by which the population falls short of the legal age of marriage, with those married above 18 given a distance of zero from the legal marriage age.[37] The squared child marriage gap, or the 'severity' of child marriage, is a modification of the child marriage gap which places more emphasis on those married at very young ages. Both these measures are calculated using the lifetime child marriage outcomes of current children.

The retroactive nature of the age reporting in the NFHS surveys raises some measurement concerns. For example, respondents often heap age reporting at numbers which end in zero or five, such as 30, 35, or 40. In addition, reporting the age of first marriage is prone to multiple sources of error. The illegal nature of child marriage may pressure respondents who underwent

[37] Child marriage gap = $\frac{1}{n}\sum_{i=1}^{q}\frac{18-y_i}{18}$, where q girls are married under the age of 18 at age y_i out of n total girls.

child marriage to falsely report marriage ages above 18; however, this phenomenon is much more pronounced when surveying current children whose child marriages are actively breaking the law.[38] In any case, NFHS data proves less prone to the bias surrounding the legality of marriage than other surveys. Figure 3 compares the distribution of age at first marriage of NFHS-3 with data from the 2005 India Human Development Survey (IHDS), a project of similar size and scope. While the IHDS distribution clusters at 18 years old, indicating that many respondents may have altered their ages at first marriage to conform to the law, the NFHS-3 data is more normally distributed. Detailed analyses of reporting bias in DHS data confirm the validity of the age at marriage reports; while DHS data in general does show indications of age heaping, there is little evidence that such behavior affects age at marriage reporting (Pullum 2006).[39]



[38] Since the NFHS reports are retroactive, there are few real consequences for reporting illegal ages of first marriage.

[39] NFHS-3 age at first marriage data is also relatively precise compared to its DHS counterparts in Africa; while only 29% of respondents in Ghana were able to give a year and month of first marriage, all 93,724 ever-married women in the female sample of NFHS-3 were able to provide this information (Foote et al 1993).

Despite this reassurance, all age at first marriage data in India is susceptible to recall error. In addition, many married children in India continue to live with their families until *gauna*, or the transfer of a girl to her husband's household, usually after puberty. While the physical harm of child marriage does not occur until the gauna, the restriction of opportunity and the cycle of poverty take hold at marriage, so those respondents who report their age of gauna rather than their age at marriage cause additional measurement error.[40]

D. Controls

Most of the controls used in my analysis follow Chin and Prakash (2011). I control for state income in the previous year by using the log of real per capita net state domestic product (NSDP), which was taken from Besley and Burgess (2000) dataset.[41,42] Controls for total population and rural population share also come from this dataset. A dummy variable for election years is compiled using the Election Commission of India state election reports. Lastly, population density is calculated by dividing the total population of the state in the most recent census by the state's land area in square kilometers.[43] The land area information for this variable comes from the 2001 census.[44] Finally, Hindu population share controls come from NFHS-3. These retroactive shares are computed by dividing the number of Hindu girls under 18 in a given year by the total number of girls in that year.

[40] However, the lifetime child marriage measures I calculate help to mitigate this problem; as long as the gauna does not take place after 18, reporting the age of gauna will not change an individual's child marriage status. This protects the lifetime child marriage headcount, but does not apply for the child marriage gap measures.
[41] Besley and Burgess compiled this dataset (available on the EOPP website) from data provided by the Planning Commission of the Indian government.
[42] EOPP population figures were used to convert NSDP into a per capita measure, and the urban CPI data provided in the dataset was used to deflate the nominal NSDP figures.
[43] This method follows Chin and Prakash (2011).
[44] Since the states in this sample maintained consistent borders over the sample period, the 2001 state area is valid for all years in the sample. The only exception is Punjab in the years before 1967. Punjab was split into modern day Punjab and the new state of Haryana in 1966. The previous size of Punjab (1956-1966) was roughly 120,735 sq. km.

E. Data Summary

A comparison of the first-stage variables used in my estimation of Eq. 4 to the descriptive statistics in Chin and Prakash can be found in Table 1. A complete summary of all the variables used in this analysis is available in Table 2. While the 1960-2000 time period for 16 states corresponds to a maximum of 656 state-year observations, only 627 remain in my dataset.[45] Moreover, state income data is available for 610 state-years, so the full first-stage specification is run with this set of observations. Table 2 also shows that both child marriage

Table 1. First-Stage Descriptive Statistics Comparision

I match Chin and Prakash's number of observations on all variables other than state income. All variables are within 10% of the mean of Chin and Prakash's dataset, and some are identical.

Descriptive Statistics Comparison						
Variable	Observations		Mean		Standard Deviation	
	Chin	Bains	Chin	Bains	Chin	Bains
Poverty Outcomes (%):						
Headcount ratio (rural)	627	582	48.28	49.13	14.75	14.54
Headcount ratio (urban)	627	582	39.97	40.99	13.9	13.65
Headcount ratio (total)	627	582	46.47	47.36	13.93	13.69
Poverty gap index (rural)	537	522	14.60	14.72	6.22	6.23
Poverty gap index (urban)	537	522	12.22	12.33	5.63	5.63
Squared poverty gap index (rural)	537	522	5.87	5.93	3.18	3.19
Squared poverty gap index (urban)	537	522	4.86	4.91	2.83	2.84
Minority political reservations (%):						
SC share reserved	627	627	14.12	14.14	5.36	5.47
ST share reserved	627	627	7.43	7.45	7.72	7.78
Minority population share controls (%):						
SC census population share	627	627	14.56	13.7	5.54	5.47
ST census population share	627	627	7.59	6.82	7.54	7.23
SC current population share	627	627	14.65	14.59	5.6	5.92
ST current population share	627	627	7.56	7.23	7.48	7.35
Other controls:						
Log of state income per capita last year	616	610	6.98	6.96	0.39	0.38
Election dummy	627	627	0.23	0.23	0.42	0.42
Population Density (per square km)	627	627	261	287	170	203
Rural population share (%)	627	627	77.96	77.96	8.14	8.14
Total Population (millions)	627	627	43.0	42.8	28.7	28.6

Notes: The differences in number of observations in the poverty outcome data between Chin and I is due to the years 1993, 1998, and 1999, for which I was unable to fill in the data Chin et al used. Chin indicates that this data may have been obtained via personal communication with another author.

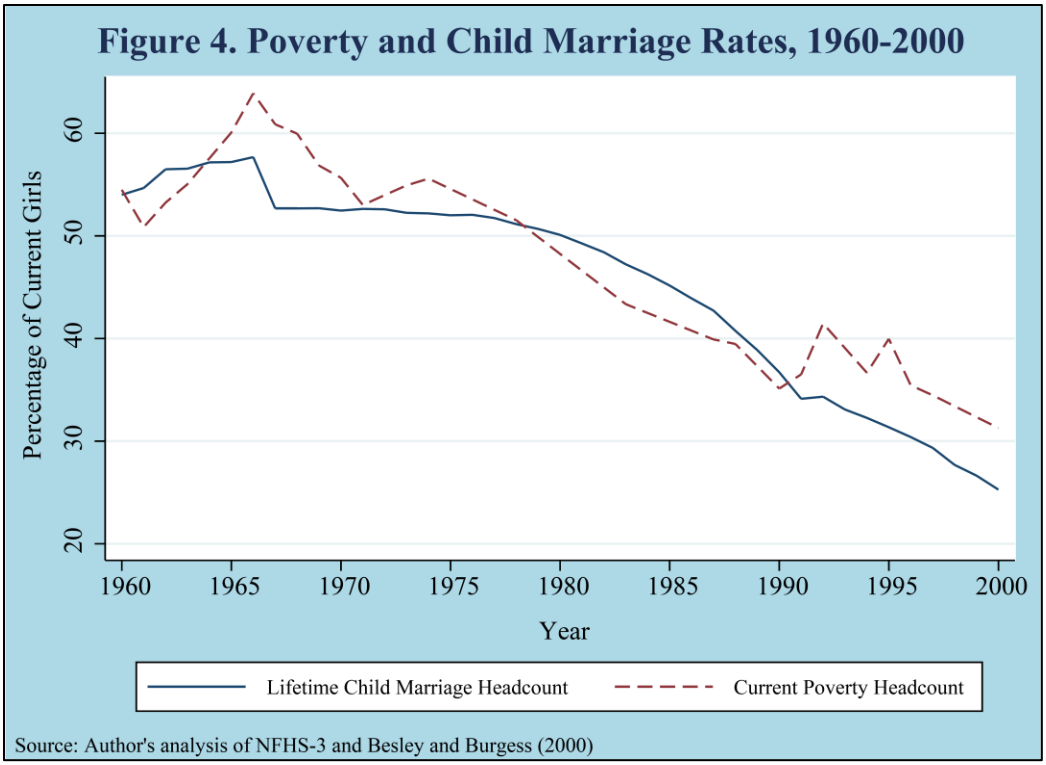
[45] The 29 observations lost are: Punjab and Haryana, which do not enter the dataset until 1967, after the Punjab Reorganization Act of 1966. Election data is available for Gujarat, Maharashtra, and Jammu & Kashmir from 1962, and these states enter the data set then. Lastly, poverty data is unavailable for Jammu & Kashmir after 1991.

and poverty have decreased with time: the mean lifetime child marriage rate and total poverty headcount in the1960s were 53% and 55%, respectively, but declined to 31% and 36% by the 1990s. Figure 4 depicts the comovement of both child marriage and poverty over time.

Table 2. Descriptive Statistics

	Total Sample		1960-1969		1990-2000	
Variable	Mean	(St. Dev)	Mean	(St. Dev)	Mean	(St. Dev)
Poverty Outcomes (%):						
Headcount ratio (rural)	49.13	(14.54)	57.13	(12.21)	38.66	(12.62)
Headcount ratio (urban)	40.99	(13.65)	49.51	(12.23)	28.63	(10.79)
Headcount ratio (total)	47.36	(13.69)	55.49	(11.21)	36.35	(11.39)
Poverty gap index (rural)	14.72	(6.23)	18.07	(6.30)	9.63	(4.07)
Poverty gap index (urban)	12.33	(5.63)	15.49	(6.03)	7.63	(3.69)
Poverty gap index (total)	14.18	(5.88)	17.46	(5.91)	9.16	(3.65)
Squared poverty gap index (rural)	5.93	(3.19)	7.73	(3.50)	3.37	(1.75)
Squared poverty gap index (urban)	4.91	(2.84)	6.49	(3.18)	2.66	(1.54)
Squared poverty gap index (total)	5.70	(3.01)	7.42	(3.27)	3.20	(1.54)
Lifetime Child Marriage Outcomes (%):						
Headcount ratio (rural)	53.31	(17.17)	61.13	(13.76)	39.20	(13.91)
Headcount ratio (urban)	35.35	(13.40)	44.23	(11.48)	21.40	(6.19)
Headcount ratio (total)	44.94	(14.76)	53.07	(11.84)	31.07	(10.09)
Total headcount ratio (poor)	49.79	(14.49)	53.40	(13.13)	32.80	(9.66)
Total headcount ratio (rich)	39.04	(12.82)	52.61	(9.84)	27.46	(10.11)
Child marriage gap index (rural)	9.19	(3.69)	10.77	(3.28)	6.42	(2.75)
Child marriage gap index (urban)	5.65	(2.60)	7.28	(2.45)	3.13	(1.08)
Child marriage gap index (total)	7.50	(2.97)	9.04	(2.56)	4.90	(1.89)
Squared child marriage gap index (rural)	2.09	(1.02)	2.51	(0.99)	1.38	(0.68)
Squared child marriage gap index (urban)	1.22	(0.68)	1.60	(0.67)	0.62	(0.25)
Squared child marriage gap index (total)	1.67	(0.79)	2.05	(0.73)	1.02	(0.45)
Minority political reservations (%):						
SC share reserved	14.14	(5.47)	13.71	(5.80)	14.63	(5.40)
ST share reserved	7.45	(7.78)	8.00	(8.20)	7.64	(7.75)
Minority population share controls (%):						
SC census population share	13.70	(5.47)	12.69	(5.45)	14.20	(5.50)
ST census population share	6.82	(7.23)	6.73	(7.08)	7.08	(7.29)
SC current population share	14.59	(5.92)	13.44	(5.02)	15.97	(5.92)
ST current population share	7.23	(7.35)	7.41	(7.45)	7.75	(7.35)
Other controls:						
Log of state income per capita last year	6.96	(0.38)	6.70	(0.21)	7.32	(0.35)
Election dummy	0.23	(0.42)	0.25	(0.43)	0.23	(0.42)
Population Density (per square km)	287	(203)	196	(144)	388	(235)
Rural population share (%)	77.96	(8.14)	82.22	(7.07)	74.03	(8.44)
Total Population (millions)	42.80	(28.6)	31.10	(18.2)	57.6	(34.6)
Hindu share of population (%)	76.90	(16.14)	79.13	(14.95)	76.46	(15.05)
Hindu population share (%) - high CM areas	84.23	(6.95)	85.25	(6.37)	80.82	(8.06)
Hindu population share (%) - low CM areas	69.55	(19.14)	73.01	(18.26)	71.37	(19.24)

Notes: Child marriage headcount ratio is the proportion of current girls who end up in a child marriage. Child marriage gap is the mean percentage by which the population falls short of the legal age of marriage. Poor child marriage headcount ratio counts observations in the given decade above the mean total poverty headcount. Rich child marriage headcount counts those below the mean total poverty headcount. Similarly, the high CM Hindu population share counts observations above the mean total child marriage headcount ratio. Poverty gap and sq. poverty gap data are not available after 1994. Poverty headcount data is not available for 1993, 1998, and 1999.



Furthermore, child marriage rates are higher in poor state-years than rich ones –the mean lifetime child marriage rate over the total sample differs by over 10% between rich and poor observations. In addition, all measures of poverty and child marriage are higher in rural areas than urban areas; the mean child marriage headcount is nearly 20 percentage points higher in the rural portion of the sample than the urban portion. The increase in state income, population density, rural population share, and total population by decade illustrates the economic emergence of India in the latter half of the twentieth century and corroborates the decrease in overall poverty measures. SC/ST reservations and population shares increase only slightly during the sample period. Lastly, Hindu population shares do not change with time. However, the Hindu population share is almost 15% higher in state-year observations with high child marriage rates as opposed to those with less child marriage, which confirms the need to test whether Hinduism's effect on child marriage is causal or merely a correlation.

VI. Results

A. First Stage Results

To estimate Eq. 5, I will first use predicted poverty *headcount* as my instrumental variable. I use the headcount measure of poverty in my main results for a few reasons. First, it is the most recognizable and accessible poverty measure of the three in my data. Indeed, while Chin and Prakash study the poverty gap and squared poverty gap in addition to the poverty headcount, they devote the most attention to the headcount measure in their paper. In addition, I am interested in the effect of reducing the *incidence* of poverty on lifetime child marriage outcomes, in part to examine whether the luxury axiom is applicable to the child marriage decision and whether the poverty line is the appropriate threshold above which child marriage is seen as a 'luxury'.

The results of my first-stage regression replicating Chin and Prakash's empirical model are presented in Table 3. Columns 1-3 represent separate OLS regressions run with rural poverty headcount as the dependent variable, and additional controls are added in each column. ST reservations have a significant negative effect on rural poverty across all three specifications, while SC reservations do not. Columns 4-6 and 7-9 are structured in the same fashion for urban and total poverty headcount, respectively. Just as in Chin and Prakash's findings, the results of the total sample are driven by the rural portion of the sample: ST reservations have a significant negative effect over the total sample, while they do not have an impact on the urban sample. The results of my model do not match Chin and Prakash exactly, but they show very similar point estimates of roughly equal precision, particularly for the ST reservation coefficient of interest. For example, Column 9 shows that a one percentage point increase in ST reservations leads to a 0.98 percentage point decrease in poverty incidence; as a

Table 3. First Stage Results

These results closely match those of Chin and Prakash, especially with respect to ST share reserved, the coefficient of interest.

	Poverty Headcount								
	Rural			Urban			Total		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
SC share reserved	-0.504	-0.712	-0.380	-0.399**	-0.378	-0.157	-0.475	-0.639	-0.310
	(0.554)	(0.435)	(0.377)	(0.171)	(0.268)	(0.194)	(0.474)	(0.414)	(0.300)
ST share reserved	-1.431***	-1.452***	-1.178**	-0.579*	-0.470	-0.006	-1.293***	-1.270***	-0.975**
	(0.422)	(0.348)	(0.442)	(0.287)	(0.297)	(0.372)	(0.391)	(0.329)	(0.405)
SC census pop share		0.844	0.564		-0.083	-0.180		0.671	0.407
		(0.630)	(0.577)		(0.494)	(0.362)		(0.611)	(0.500)
ST census pop share		0.427	0.458		-0.018	-0.083		0.316	0.341
		(0.473)	(0.598)		(0.211)	(0.215)		(0.431)	(0.525)
SC current pop share		-1.546**	-1.360*		0.393	0.643		-1.072**	-0.907
		(0.602)	(0.631)		(0.587)	(0.604)		(0.481)	(0.535)
ST current pop share		0.477	0.51		-0.537	-0.704		0.211	0.261
		(0.794)	(0.531)		(0.344)	(0.424)		(0.653)	(0.431)
State income last year			-0.079			-0.036			-0.073
			(0.064)			(0.031)			(0.055)
Population density			0.000			0.000			0.000
			(0.000)			(0.000)			(0.000)
Election year dummy			0.007			0.005			0.007
			(0.006)			(0.005)			(0.005)
Rural population share			0.961			0.879			0.989
			(0.898)			(0.717)			(0.730)
Total population			0.000			0.000			0.000
			(0.000)			(0.000)			(0.000)
State and year fixed effects	X	X	X	X	X	X	X	X	X
Observations	582	582	565	582	582	565	582	582	565
R-squared	0.82	0.835	0.849	0.900	0.902	0.914	0.858	0.867	0.883

Notes: Standard errors clustered by state are in parentheses. * p<0.10, ** p<0.05, *** p<0.01. "SC(ST) Census Pop Share" is the SC(ST) share of the state population according to Pande (2003) methodology. "SC(ST) Current Pop Share" is the SC(ST) share of the state population measured in the current year.

comparison, Chin and Prakash find that a one percentage point increase in ST reservation results in a 1.11 percentage point decrease in poverty incidence. Both estimates are significant at the 5% level.[46] As Chin and Prakash discuss at length, this result provides evidence that the policy of reservations reduces poverty incidence over the entire Indian population. As a result, I am able to use the predicted poverty headcount which results from this model as the independent variable of interest in my second stage. I will use the predicted poverty incidence from Column 3 to instrument for rural poverty, from Column 6 for urban poverty, and from

[46] Given the validity of my data gathering process and construction, as evidenced in Table 1, I am confident that any differences arise from minor divergences in data choices as opposed to systematic errors which might obscure the nature of Chin and Prakash's work.

Column 9 for total poverty.

B. Main Results: Child Marriage Headcount

In the second stage model, I run separate OLS regressions using all three measures of child marriage proposed by Nguyen and Wodon to estimate the incidence, depth, and severity of child marriage. Table 4 presents the effects of predicted poverty incidence on the child marriage headcount rate. Columns 1-4 display the results for rural child marriage headcount. Column 1 shows the baseline OLS regression of child marriage on poverty, Column 2 adds state and year fixed effects, Column 3 adds the controls from the first stage, and Column 4 estimates the full Eq. 5 specification. Columns 5-8 and 9-12 display results in the same manner for urban and total child marriage headcount, respectively.

I find a significant positive effect of poverty incidence on lifetime child marriage rates in both the rural and total sample – the coefficients of poverty incidence in Columns 4 and 12 are 0.828 and 0.939, respectively, and both are significant at the 1% level.[47,48] This suggests that a one percentage point decrease in total poverty incidence would lead to nearly a full percentage point decrease in the lifetime child marriage headcount of current children.[49] The elasticity of child marriage with respect to poverty is 0.97 at the mean of the sample. This finding provides evidence that moving parents out of poverty protects girls from child marriage. For example, the predicted total poverty headcount in Tamil Nadu fell by 13 percentage points between 1975 and 1985; these results imply that this change in poverty would be associated with a 12.6 percentage point reduction in lifetime child marriage outcomes

[47] It is not surprising that the results of the total sample are driven by the rural results, as India remains a predominantly agricultural country despite its rapid technological and industrial growth in the latter half of the twentieth century; the mean rural population share in the sample spanning 1960-2000 is 78% (Table 2).
[48] The insignificance of the urban sample may be due to the instrument's weakness in urban areas.
[49] Regressing total child marriage headcount on total poverty incidence (instead of the predicted total poverty incidence from the first stage) results in a coefficient of 0.548 for total poverty incidence (significant at the 1% level). If this endogenous total poverty incidence is substituted into Eq. 5, its coefficient is 0.012 and is insignificant. When compared to my IV estimates, this indicates downward-biased OLS coefficients.

Table 4. Main Results: Effect of Poverty Incidence on Child Marriage Headcount Rate

	Child Marriage Headcount											
	Rural				Urban				Total			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Predicted poverty incidence	0.731***	-0.049	0.863***	0.828***	0.571***	-0.893***	-0.686	-0.203	0.669***	-0.222	0.996***	0.939***
	(0.104)	(0.222)	(0.205)	(0.210)	(0.123)	(0.265)	(1.556)	(1.615)	(0.126)	(0.185)	(0.196)	(0.207)
SC census pop share			-0.511	-0.461			-0.374	-0.205			-0.317	-0.251
			(0.467)	(0.493)			(0.614)	(0.635)			(0.389)	(0.415)
ST census pop share			0.274*	0.300*			-0.217	-0.153			0.084	0.117
			(0.151)	(0.141)			(0.206)	(0.183)			(0.140)	(0.124)
SC current pop share			1.492*	1.513*			0.866	0.643			1.326***	1.367***
			(0.735)	(0.754)			(1.250)	(1.224)			(0.398)	(0.410)
ST current pop share			0.558	0.489			-0.040	0.181			0.570**	0.467**
			(0.405)	(0.397)			(1.046)	(1.082)			(0.213)	(0.191)
State income last year			0.042	0.035			0.012	0.024			0.075**	0.066**
			(0.032)	(0.032)			(0.075)	(0.079)			(0.027)	(0.024)
Population density			0.000***	0.000***			0.000	0.000			0.000***	0.000***
			(0.000)	(0.000)			(0.000)	(0.000)			(0.000)	(0.000)
Election year dummy			-0.007***	-0.006***			0.001	-0.001			-0.008***	-0.008**
			(0.002)	(0.002)			(0.008)	(0.008)			(0.002)	(0.002)
Rural population share			-0.794*	-0.819*			-0.027	-0.557			-1.220***	-1.241***
			(0.425)	(0.397)			(1.377)	(1.396)			(0.393)	(0.322)
Total population			-0.000***	-0.000***			-0.000	-0.000			-0.000***	-0.000***
			(0.000)	(0.000)			(0.000)	(0.000)			(0.000)	(0.000)
Hindu share				-0.260				-0.416				-0.352
				(0.213)				(0.389)				(0.256)
Constant	0.181***				0.125***				0.139***			
	(0.053)				(0.037)				(0.055)			
State and year fixed effects		X	X	X		X	X	X		X	X	X
Observations	610	610	610	610	610	610	610	610	610	610	610	610
R-squared	0.343	0.972	0.982	0.983	0.339	0.955	0.962	0.963	0.364	0.97	0.981	0.982

Notes: Standard errors clustered by state are in parentheses. * p<0.10, ** p<0.05, *** p<0.01. "SC(ST) Census Pop Share" is the SC(ST) share of the state population according to Pande (2003) methodology. "SC(ST) Current Pop Share" is the SC(ST) share of the state population measures in the current year.

for girls in 1985 relative to girls in 1975. More generally, the 25 percentage point decrease in total predicted poverty in India from 1969-1999 predicts over 90% of the 26 percentage point drop in child marriage over this time period.

This is an important result for several reasons. It provides an empirical basis for the model of parental decision-making developed in Section II, finding evidence that poverty acts as a binding constraint on parents and pressures them into suboptimal behaviors like child marriage. As these results show, parents respond to the loosening or even removal of the poverty constraint by acting in the best interests of their daughters. In addition, these findings quantify an important intergenerational effect of poverty alleviation. Given that delaying the marriage of current girls results in higher educational attainment, lower health risks, and more agency in household decisions, this result implies that reducing poverty can transform the lives of girls at risk for child marriage.[50,51]

Furthermore, Hindu share of the population is insignificant throughout Table 4, suggesting that poverty, not cultural and religious traditions, drives child marriage. In fact, the point estimates of the Hindu population share are negative across every specification, providing weak evidence that modern Hinduism may decrease the incidence of child marriage.

C. Results: Child Marriage Gaps

I now extend this analysis of child marriage by employing the child marriage gap and squared child marriage gap as measures of child marriage. As explained in Section V, the child marriage gap is an index that accounts for the mean distance between age of marriage in the

[50] Field and Ambrus (2009) find that delaying marriage has a positive impact on female education in Bangladesh. For each year that marriage is delayed for girls from 11-16 years of age, they find that educational attainment increases by 0.22 years and adult literacy increases by 4.1 percentage points.

[51] Not only do mothers under 18 face a much higher risk of death during childbirth, but their children face a 60% higher risk of child mortality than babies born to mothers over 18 (UNICEF 2012). In addition, child brides are irrevocably changed by their early experiences with intimacy and relationships, and they are much more likely to accept domestic abuse as justifiable behavior (Jensen and Thornton 2003).

population and the legal marriage age. The squared child marriage gap is a modification which weights extremely young marriage ages even more heavily. The impact of poverty incidence on the depth of child marriage (as captured by the child marriage gap) and the severity of child marriage (as captured by the squared child marriage gap) over the total sample is shown in Table 5. The child marriage gap is the dependent variable in Columns 1-4, while the squared child marriage gap is the dependent variable in Columns 5-8.

The findings in Table 5 show a significant, positive impact of poverty incidence on both the child marriage gap and squared child marriage gap. A one percentage point reduction in

Table 5. Effect of Poverty Incidence on Child Marriage Gaps

	Child Marriage Gap				Squared Child Marriage Gap			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Predicted poverty incidence	0.124***	-0.034	0.234***	0.239***	0.029***	-0.005	0.069***	0.074***
	(0.023)	(0.041)	(0.045)	(0.051)	(0.005)	(0.012)	(0.014)	(0.017)
SC census pop share			-0.061	-0.066			-0.014	-0.020
			(0.091)	(0.087)			(0.028)	(0.024)
ST census pop share			0.019	0.017			0.009	0.006
			(0.031)	(0.029)			(0.010)	(0.010)
SC current pop share			0.264**	0.261**			0.069*	0.065*
			(0.103)	(0.102)			(0.034)	(0.033)
ST current pop share			0.057	0.065*			0.004	0.013
			(0.037)	(0.036)			(0.015)	(0.015)
State income last year			0.010	0.011			0.001	0.002
			(0.008)	(0.007)			(0.003)	(0.002)
Population density			0.000***	0.000**			0.000**	0.000*
			(0.000)	(0.000)			(0.000)	(0.000)
Election year dummy			-0.002***	-0.002***			-0.001***	--0.001***
			(0.000)	(0.000)			(0.000)	(0.000)
Rural population share			-0.343***	-0.341***			-0.111***	-0.109***
			(0.085)	(0.086)			(0.029)	(0.029)
Total population			-0.000***	-0.000***			-0.000**	-0.000**
			(0.000)	(0.000)			(0.000)	(0.000)
Hindu share				0.027				0.029
				(0.095)				(0.035)
Constant	0.017*				0.003			
	(0.010)				(0.002)			
State and year fixed effects		X	X	X		X	X	X
Observations	610	610	610	610	610	610	610	610
R-squared	0.310	0.954	0.964	0.964	0.236	0.923	0.935	0.938

Notes: Standard errors clustered by state are in parentheses. * p<0.10, ** p<0.05, *** p<0.01. "SC(ST) Census Pop Share" is the SC(ST) share of the state population according to Pande (2005) methodology. "SC(ST) Current Pop Share" is the SC(ST) share of the state population measures in the current year.

total poverty incidence would cause a 0.24 percentage point decrease in the lifetime child marriage gap of current children and a 0.07 percentage point reduction in the lifetime squared child marriage gap. Both results are significant at the 1% level.[52] The elasticities of the child marriage gap and squared child marriage gap with respect to poverty are 1.5 and 2.0, respectively. This is strong evidence that poverty alleviation not only reduces the incidence of child marriage, but also increases the age of marriage for those children who are still married under 18. While shrinking these gaps may not provide as much opportunity and mobility as reducing child marriage altogether, bringing girls closer to the legal age of marriage has even more important health benefits than reducing child marriage at the margin.[53] In addition, Hindu population share does not have a significant effect on either the child marriage gap or squared child marriage gap.

D. Summary: Poverty and Child Marriage

The above analysis finds that poverty does indeed have a causal impact on lifetime child marriage outcomes. Poverty alleviation yields reductions not only in the incidence of child marriage, but also in its depth and severity. This distinction is crucial, as causing a girl's marriage age to jump from 14 to 16 may be even more beneficial than the equivalent jump from 17 to 19 due to the plethora of health problems related to sexual behavior and marriage in adolescent girls (as described in Section II). However, the child marriage headcount rate would only capture the latter jump. As such, the significant positive effect of poverty incidence on both child marriage gaps provides strong evidence that the impact of poverty alleviation on child marriage does not only help girls near the margin.

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[52] While Table 5 does not display separate rural/urban columns, the significance of poverty coefficients over the total sample is driven by the significance in the rural sample (just as in the main results).

[53] Children aged 14 and below have been found too young for transitions into sexual and marital relationships based on physiological, mental, and legal criteria. Those aged 15-17 often fail to meet the criteria as well, but not to the extent that younger children do (Dixon-Mueller 2008).

As a whole, these findings also lend support to the luxury axiom in the context of child marriage. Since alleviating poverty is a form of bolstering household income, and the incidence of poverty has a significant, positive impact on child marriage, this result suggests that parents may place the critical wage for abandoning child marriage near the poverty line. Interestingly, my instrument represents poverty alleviation from increased political representation, a less tangible transfer than others that have been used to support the luxury axiom.

Another important result of this analysis is that poverty is a more important determinant of child marriage than cultural and religious practices, at least as measured herein. Although Hindu scripture is associated with the caste system and child marriage, I find that the share of Hindu population is not a significant determinant of child marriage.

Finally, these results also raise the possibility of child marriage reduction as a multiplier for the benefits of poverty alleviation programs; while increasing opportunity for minority groups (via reservations, in this case) can decrease current poverty, it also has intergenerational effects such as child marriage reduction that can help to break the cycle of poverty.

My findings prove consistent with Chin and Prakash, as well as Pande (2003). These papers find significant effects of minority reservations on minority spending and poverty alleviation, and suggest that minorities elected to state assemblies do have enough influence to change state policies. Both papers also find significant effects in rural areas, while the impact of reservations in urban areas is less clear. My extension to their analysis gives even more weight to the potential benefits of minority inclusion in state assemblies, as the poverty reduction caused by increased opportunity for minorities extends into the next generation.

VII. Additional Findings and Extensions

A. Testing the Parental Decision-Making Model

These results provide strong evidence that current poverty affects the lifetime child marriage outcomes of current children. If a family is moved out of poverty in a given year, say 1978, the girls in that family are significantly more likely to reach adulthood before being married. However, these lifetime outcomes are distinct from current child marriage rates. By counting future child marriages of current children as part of the child marriage headcount, the lifetime measures I use improve on the commonly used measures by taking the timeline of the child marriage decision into account.

However, analysis of current child marriage rates can still prove useful in testing the validity of the assumptions outlined in my parental decision-making model. For this purpose, I use two alternate measures of the child marriage headcount. The first, which I call "Current Child Marriage Headcount," ('Current CM') is the total number of children that are in child marriages as of the current year divided by the total number of children in that year. This differs from the lifetime headcount measure in my main model because it excludes from the numerator current children who will eventually experience a child marriage in later years but who have not as of the current year. Secondly, I use "Child Marriage Headcount This Year," ('CM This Year') which divides the number of children who undergo child marriages in the current year by the total number of children in that year. 'CM This Year' captures only the marriages which occur *in* a given year. Both these alternate measures are more appropriate for analyzing the annual characteristics of child marriage, while the lifetime measure more accurately depicts the long-term outcomes of girls susceptible to child marriage.

To test the temporal assumptions in my model, I run Eq. 5 (including the full set of controls and fixed effects) on the total sample using 'Current CM' and 'CM This Year' as measures of current child marriage in addition to the lifetime measure used in my main results.[54] These results are presented in Table 6. Each panel represents regressions using a different CM measure as a dependent variable: Panel A uses the lifetime measure, Panel B uses 'Current CM', and Panel C uses 'CM This Year'. Column 1 shows the effects of current poverty and current Hindu share on current CM. In Panels B and C, current poverty is an insignificant predictor of current child marriage, unlike the main result replicated in Panel A.

Table 6. Effects of Poverty on Several Measures of Child Marriage

	Child Marriage Measures			
	Current	1 Yr Lag	2 Yr Lag	3 Yr Lag
	(1)	(2)	(3)	(4)
Panel A: Lifetime CM Outcomes				
Predicted poverty incidence	0.939***	0.304*	0.139**	0.111
	(0.207)	(0.143)	(0.048)	(0.053)
Hindu share	-0.352	-0.216	-0.102*	-0.073
	(0.256)	(0.146)	(0.050)	(0.043)
Observations	610	596	595	594
Panel B: Current CM				
Predicted poverty incidence	0.085	0.050**	0.051**	0.049**
	(0.093)	(0.022)	(0.022)	(0.020)
Hindu share	0.169**	0.019	0.013	0.013
	(0.073)	(0.022)	(0.021)	(0.019)
Observations	487	486	485	484
Panel C: CM This Year				
Predicted poverty incidence	0.035	0.023***	0.024***	0.018***
	(0.033)	(0.006)	(0.006)	(0.005)
Hindu share	0.026	0.006	0.004	0.005
	(0.022)	(0.006)	(0.006)	(0.004)
Observations	487	486	485	484

Notes: Standard errors clustered by state are in parentheses. * p<0.10, ** p<0.05, *** p<0.01. All regressions model the full specification of Eq. 5 on the total sample. Each panel uses a different dependent variable. Panel A displays the main results using lifetime CM outcomes as the dependent variable. Panel B uses CM Headcount, which only accounts for marriages that have already taken place. Panel C uses a more restrictive dependent variable, CM This Year, which measures the proportion of current children who underwent a child marriage in the current year. Column 1 reports coefficients of poverty incidence and Hindu share in the current year. The rest of the columns sequentially introduce lags. Column 2 lags both poverty and Hindu share by 1 year, Column 3 lags both by 2 years, and Column 4 lags both by 3 years. Panels B and C restrict the sample to 1970-2000.

[54] In the 'Current CM' and 'CM This Year' regressions, the sample is restricted to the years 1970-2000 due to very few actual marriages among survey respondents in the 1960s.

However, my model of parental decision-making on child marriage emphasizes that the child marriage decision is *not* generally made in the same year of the marriage. Therefore, current poverty and current Hindu share are not the appropriate independent variables; rather, *lagged* poverty and demographic measures should capture the relationship between poverty, cultural factors, and child marriage more accurately in Panels B and C. Columns 2-4 introduce lagged poverty incidence and lagged Hindu share to replace the current measures: Column 2 lags both variables by one year, Column 3 by two years, and Column 4 by three years. The results in Columns 2-4 fall in line with the assumptions of my model; in both Panels B and C, the coefficients of lagged poverty incidence are significant and similar in size among all three columns, and all three lagged Hindu share variables are insignificant. Not only does this support my assumptions regarding the timeline of the child marriage decision, but it also provides further evidence that poverty plays a more important role than culture in the child marriage decision. Unsurprisingly, these results differ from those in Panel A, which shows a smaller effect of lagged poverty on *lifetime* child marriage relative to the main findings in Table 4. This also follows the intuition of my parental decision-making model: while history of poverty determines *current* child marriage, current poverty determines future marriage outcomes.

Finally, the small point estimates in Panels B and C relative to those in Panel A are not surprising; after all, the effect of poverty on lifetime child marriage outcomes is an aggregated effect of poverty on current child marriage outcomes over several years.

B. Exploring the Luxury Axiom

Despite using three separate measures for both poverty and child marriage, I have thus far focused my analysis on the effects of a single measure of poverty – *poverty incidence*. I now turn to consider *poverty gaps*. While poverty incidence is a useful measure of poverty,

using it as my instrument does omit some information which the poverty gap measures would include. For example, my main results are identified on changes in poverty incidence, or households moving across the poverty line. They do not account for changes in either the depth or severity of poverty. Although I have shown that the poverty headcount is an important determinant of child marriage measures, the poverty gap may be even more central to the child marriage decision if the income threshold for forgoing child marriage is below the poverty line. However, it is unlikely that this threshold lies below the Indian poverty line of 2400 calories per day in rural areas, a low figure which corresponds to a monthly per capita income of 368 rupees ($8.12).[55]

To investigate this question, I model Eq. 5 using all three measures of child marriage as dependent variables in conjunction with all three measures of poverty as the main independent variables. The findings are presented in Table 7. Each coefficient represents a separate regression as indicated by its panel and column. For example, Column 6 of Panel B displays the coefficient of the predicted poverty gap in a specification of Eq. 5 with the child marriage gap as the dependent variable. In all, 27 regressions are represented in the table.

Interestingly, these findings suggest that the luxury axiom is an appropriate framework for the child marriage decision. The coefficients in Panel A, which were first reported in Tables 4-6, show that changing the incidence of poverty has a significant effect on all measures of child marriage. However, Panels B and C do not show the same effect for the poverty gap measures. When the predicted poverty gap is used as an instrument, I find a significant effect of poverty on child marriage headcount in rural areas and in the total sample. The poverty gap also has a significant effect on the child marriage gap measures in rural areas. However, the

[55] The monetary value of the poverty line is found by calculating the cost of basic grains that would fulfill the minimum caloric requirement. The 368 rupee figure is in 2006 rupees, and was converted to dollars using the average rupee-dollar exchange rate in 2006 (Planning Commission of India).

Table 7. Investigating the Applicability of the Luxury Axiom

	Child Marriage Headcount			Child Marriage Gap			Squared Child Marriage Gap		
	Rural (1)	Urban (2)	Total (3)	Rural (4)	Urban (5)	Total (6)	Rural (7)	Urban (8)	Total (9)
Panel A: Predicted poverty incidence	0.828***	-0.203	0.939***	0.245***	-0.210	0.239***	0.081***	-0.076	0.074***
	(0.210)	(1.615)	(0.207)	(0.051)	(0.413)	(0.051)	(0.018)	(0.127)	(0.017)
Panel B: Predicted poverty gap	1.046*	0.264	1.018*	0.297*	0.052	0.248	0.095*	0.007	0.069
	(0.518)	(0.627)	(0.571)	(0.145)	(0.156)	(0.152)	(0.051)	(0.045)	(0.048)
Panel C: Predicted sq. poverty gap	0.325	0.076	0.280	0.067	-0.018	0.038	0.015	-0.016	0.000
	(0.843)	(0.563)	(0.874)	(0.248)	(0.142)	(0.240)	(0.083)	(0.041)	(0.073)

Notes: Standard errors clustered by state are in parentheses. * p<0.10, ** p<0.05, *** p<0.01. Coefficients displayed in each panel-column are from separate regressions of Eq. 5, which includes first-stage controls, a Hindu control, and state and year fixed effects. Columns 1-9 in Panel A display estimates first reported in Tables 4-6. Each regression displayed in the table has 610 observations.

significance of these coefficients in Panel B is only at the 10% level. Furthermore, these significant coefficients only represent four of the nine regressions in Panel B, indicating that the effect of changing the poverty gap is not robust to various child marriage measures and different parts of the sample. The effects displayed in Panel C are insignificant across all columns, suggesting that using the predicted squared poverty gap as an instrument yields no significant effects on child marriage.

Taken in totality, these results provide evidence that moving households across the poverty line changes the child marriage decision, while shifting their position under the poverty line has a smaller or even negligible effect on child marriage. This strongly supports the applicability of the luxury axiom in the context of child marriage. Furthermore, it suggests that the poverty line may actually be a close approximation of the critical wage threshold for the child marriage decision. While moving households closer to the poverty line clearly benefits their standard of living, their child marriage practices do not significantly change until they move across the poverty line.

C. Robustness Over Time: Using NFHS-1 Data

A potential concern which could detract from the implications of my main results is

instability of these results over time. Thus, I use NFHS-1 data as a robustness check. Since NFHS-1 was conducted in 1992-93, I limit my sample to the years 1960-1990 rather than 1960-2000, as in my main model. These results, presented in Panel A of Table 8, show that my main findings are indeed robust over time. Columns 4-6 displays the effects of poverty incidence on the headcount index of child marriage in NFHS-1, which are similar in size and precision to the main NFHS-3 estimates replicated in Columns 1-3.[56]

D. Additional Analysis of Hinduism's Role in Child Marriage

Although both the main results and the robustness checks in Table 6 report insignificant effects of Hinduism on the child marriage decision, this issue merits further consideration. As I laid out in Section II, the sanctioning of child marriage in parts of Hindu scripture provides an

Table 8. Robustness Checks Over Time and Hindu Split Sample Analysis

	Child Marriage Headcount					
	NFHS-3: Main Results			NFHS-1: Robustness Check		
	Rural (1)	Urban (2)	Total (3)	Rural (4)	Urban (5)	Total (6)
Panel A: Total sample						
Predicted poverty incidence	0.828***	-0.203	0.939***	1.068***	4.015*	1.277***
	(0.210)	(1.615)	(0.207)	(0.348)	(1.911)	(0.358)
Panel B: Hindu sample						
Predicted poverty incidence	0.954***	-0.294	0.966***	1.303***	3.865	1.489***
	(0.235)	(2.143)	(0.170)	(0.318)	(2.950)	(0.295)
Panel C: Non-Hindu sample						
Predicted poverty incidence	1.002**	0.171	1.129***	0.268	7.613	0.641*
	(0.414)	(2.499)	(0.367)	(0.231)	(4.648)	(0.330)
p-value of Wald test of equality of coefficients (Panels B and C)	0.908	0.886	0.653	0.000	0.465	0.000

Notes : Standard errors clustered by state are in parentheses. * p<0.10, ** p<0.05, *** p<0.01. All regressions in Panel A model the full specification of Eq. 5. Regressions in Panels B and C model Eq. 5 without the Hindu control, as the sample is already split between Hindus and non-Hindus in these panels. Columns 1-3 use the main NFHS-3 (2005-06) dataset for child marriage variables, while Columns 4-6 use NFHS-1 (1992-93) as a robustness check. The Hindu sample is composed of women in the NFHS surveys who listed their religion as Hindu. All other women in either NFHS are in the non-Hindu sample. Regressions in Columns 4-6 have 459 observations - the observations lost in this sample relative to the 610 observations in Columns 1-3 (main results) are due to the smaller time interval used (1960-1990 as opposed to 1960-2000).

[56] Although the main NFHS-3 results are displayed in Columns 1-3 (1960-2000), limiting the NFHS-3 sample years to 1960-1990 to match the NFHS-1 sample has no substantive change on the results; all NFHS-3 coefficients retain similar size and the same significance, while Hindu and non-Hindu coefficients are still not significantly different.

easy story to explain the high prevalence of child marriage in India. India is a predominantly Hindu nation – the mean Hindu population share in my state-year sample is over 77%. As a result, the strong influence of Hinduism's traditional practices may have formed a cultural equilibrium in which child marriage is seen as the norm rather than a suboptimal decision. Strategies to alleviate child marriage will differ enormously if deep-seated cultural beliefs play a larger role than poverty in the child marriage decision.

To determine the extent of the cultural factors in the child marriage decision, I analyzed Hindus from the NFHS-3 and NFHS-1 surveys separately from non-Hindus. The effects of poverty in this split-sample analysis are presented in Panels B and C of Table 8, and include the p-value for a test of equality between the coefficients in both samples. The NFHS-3 analysis in Columns 1-3 indicates that the effects of poverty incidence on child marriage incidence are slightly higher for non-Hindus than for their Hindu counterparts, but the differences in these point estimates are not great enough to deem the effect of poverty different between the samples at any reasonable significance level. This provides strong evidence that poverty, not Hindu culture, drives the child marriage decision, an idea which I will develop further in Section VIII.

However, the NFHS-1 analysis contrasts with the NFHS-3 results. The results in Columns 4-6 indicate that a given poverty reduction is significantly more effective in reducing the incidence of child marriage in the Hindu sample as opposed to the non-Hindu sample. In other words, this suggests that Hindus actually respond to poverty alleviation by decreasing child marriage *more* than the rest of the population. In addition, the difference between the coefficients in the two samples is highly significant, as the p-values in Columns 4 and 6 indicate. While these results could mean that Hindu child marriage behavior changed relative

to the rest of India in the 12 years between NFHS-1 and NFHS-3, such a phenomenon is unlikely. Rather, I interpret the instability of the Hindu coefficient as further evidence that Hindu culture does *not* play a stable, significant role in either promoting or reducing child marriage. This instability stands in marked contrast to the relationship between poverty and child marriage, which is consistent, significant, and robust over time and among all facets of the population (save the urban areas of the country).[57]

Finally, I present a final test of the role of Hinduism in the child marriage decision in Table 9. Column 1 simply reports my main results first presented in Table 4. In Column 2, I add an interaction term between the predicted poverty incidence and the Hindu share of the population. This addition leaves the Hindu share coefficient essentially unchanged, while the coefficient on the interaction term is insignificant for the total sample. This provides additional evidence that poverty does not have a differential effect on child marriage for Hindus relative to the rest of the population.

E. The Sarda Act: Investigating the Efficacy of Child Marriage Legislation

Another potential determinant of child marriage is change in actual legislation surrounding the issue, which is not considered in Eq. 5. As mentioned in Section II, the Sarda Act was amended in 1978, raising the legal age of marriage for girls from 16 to 18. Since my threshold for child marriage is 18 years, child marriage should see a larger decrease given an equal poverty reduction in the years following the Sarda Act amendment. To determine if the law achieved its desired effect, I add a dummy for post-1978 years and interact it with predicted poverty (results presented in Table 9, Column 3). The main effect of the Sarda Act is significant and negative. However, dummies for other years are also similarly significant,

[57] Alternatively, since more child marriage occurs in the Hindu population relative to the minority non-Hindu population, most of the change in child marriage could be coming from Hindus. This could explain the relative insignificance of the coefficients in the NFHS-1 non-Hindu sample.

Table 9. Extensions: Hinduism and the Efficacy of the Sarda Act

	Child Marriage Headcount		
	Main Results	Hindu Interaction	Sarda Act
	(1)	(2)	(3)
Predicted poverty incidence	0.939***	0.989***	0.988***
	(0.207)	(0.265)	(0.223)
Hindu share	-0.352	-0.331	
	(0.256)	(0.289)	
Poverty x Hindu share		-0.070	
		(0.192)	
Sarda Act dummy			-0.299***
			(0.044)
Poverty x Sarda Act			0.024
			(0.058)
Observations	610	610	610

Notes : Standard errors clustered by state are in parentheses. * p<0.10, ** p<0.05, *** p<0.01. Each column reports coefficients from a separate regression of Eq. 5 on the total sample. Column 1 reports the main coefficients first displayed in Table 4. Column 2 adds an interaction term between predicted poverty incidence and Hindu share. Column 3 replaces the Hindu variables in Column 2 with a post-1978 dummyvariable and its interaction with poverty.

rendering the main effect uninformative about the legislative change in 1978. In any case, the insignificance of the interaction term suggests that poverty alleviation would be no more effective in lowering child marriage after the amendment than before it. While many studies highlight the Sarda Act's initial efficacy in reducing marriage under the age of 14 when enacted in 1929, the same effect does not seem to be attributable to the 1978 amendment.

VIII. Discussion

This paper investigates the relationship between poverty and child marriage. My identification strategy utilizes affirmative action policies for low caste minority groups in India as an exogenous source of variation in poverty. This variation in poverty is used in a 2SLS instrumental variables model to test the effects of current poverty on the lifetime child marriage outcomes of current children. I find strong evidence that current poverty sustains child marriage outcomes in current children and thus inflicts intergenerational harm. In addition, poverty in previous years has a causal effect on current child marriage outcomes. Both results support a decision-making model of child marriage in which the decision precedes the actual marriage.

Such a model is also supported by a large body of experiential and anecdotal evidence in India, where impoverished parents often decide to marry daughters as children even before a potential groom is chosen. This behavior is perpetuated by a wide variety of factors, including the prevailing notion that marriage protects the family's image and honor by preserving a young girl's pre-marital virginity and protecting her from rape. While this thinking has slowly dissipated in India as a whole, it remains prevalent in poor areas, especially rural ones. For example, the marriage of Rajani, a five-year-old profiled by *National Geographic* in 2011, was met with admiration by fellow villagers in a poor, rural area of Rajasthan. Although Rajani was young enough to fall asleep at her own wedding ceremony, the perceived protection of her body and her family's honor bestowed by the marriage allowed these poor villagers to shower this occasion with approval (Mathur 2003, Gorney 2011, Nour 2009). Indeed, the 'benefits' of these child marriages have become so ingrained in the mindset of the poor that they do not heed the law which deems these marriages illegal. Instead, these ceremonies are often held late at night to avoid the gaze of authorities; even when authorities get involved, many police officers turn a blind eye for bribes (Hedayat 2011, Gorney 2011). My empirical results also suggest that legislation is relatively ineffective in curbing such behavior.

While these cultural factors help to solidify the child marriage decision, the initial context of poverty appears to be a primary factor behind the decision itself. Many parents who live in this setting regard child marriage as inevitable, as the lack of opportunity available for poor women lowers the perceived opportunity cost of child marriage. In such an equilibrium, cultural factors can *further* entrench the social practice of child marriage, as they certainly have in India. Yet, this paper's findings suggest that while cultural norms may become the face of child marriage, poverty is at the heart of the issue. Poverty alleviation through increased

opportunity for mobility, which I use in the form of poverty changes created by affirmative action programs, can remedy this problem by altering the incentives parents face when making the child marriage decision. If future programs to increase the opportunities available to the poor are successful in alleviating poverty, the world may see more stories like that of 14-year old Roshan Bairwa, another girl from rural Rajasthan who resisted and was allowed to forego a previously arranged child marriage by her parents. The key factor in the parents' decision to give up the planned child marriage was the presence of a free secondary school in the area – an educational channel for poverty alleviation (Hedayat 2011). This example and a multitude of others illustrate the central importance of poverty in the child marriage decision. With increased opportunity for an escape from poverty, the strong social pressures incentivizing child marriage can quickly give way to a new equilibrium which frowns upon the practice.

In today's world, such a shift can take place in one generation. Organizations such as Shanti Bhavan and the Veerni Project take young, promising girls out of their impoverished backgrounds; when the economic pressures of raising the girls are lifted and the opportunity for economic mobility presented to these girls becomes apparent to their families, many of the poorest and most uneducated parents abandon the idea of child marriage. Shilpa Raj, a 2011 graduate of Shanti Bhavan who comes from abject poverty, articulates the paradigm shift caused by economic mobility. She explains the mindset of her family with the following:

> People say your life is your own, that it is what you make of it. But I know how hard it is to transcend family history. My father for one has had very little control of his own future. He was ruled under the tyranny of his father, crushed by the hardship of poverty and the burden of debt. His life was never his own; he and generations before him had led lowly existences that they accepted as both their fate and their karma. The deprivation could not be changed and it was assumed as their fault – what they reaped is what they and those who preceded them had sown. There is no mercy. From childhood my parents knew no other way of being or thinking. . . [They] might have thought in submission, 'We have to live for today. We can't think of tomorrow' (Raj 2014).

However, when she was given a place at Shanti Bhavan, an escape from the confines of poverty which opened up previously unimaginable avenues of opportunity, these same parents who lived in a culture which reinforced child marriage supported her decision to delay marriage and pursue a college education. Increased economic opportunity allowed Shilpa's family to think of tomorrow when it came to their daughter, and this widened perspective proved enough to break through the cultural barriers which perpetuate child marriage.

The findings of this paper both support the vivid anecdotes of individuals like Shilpa who have faced the danger of child marriage and provide an empirical basis for the structural violence argument in this setting. Structural violence, a term popularized by medical anthropologist Paul Farmer, refers to the processes which enable the continuing suffering of the disadvantaged in a society. While structural violence towards India's poor women takes many forms, including a deep-seated patriarchy, this paper explicitly focuses on two of its aspects: poverty, which the World Health Organization has called the world's greatest killer, and the associated lack of mobility for the poor and disadvantaged in India. As my findings suggest, these factors are the driving forces behind negative behaviors which perpetuate the cycle of poverty, specifically child marriage. While culture plays a role in strengthening these negative practices, poverty alleviation can overcome cultural resistance. Farmer strongly supports such a view:

> Systemic studies of extreme suffering suggest that the concept of culture should enjoy only an exceedingly limited role in explaining the distribution of misery. The role of cultural boundary lines in enabling, perpetuating, justifying, and interpreting suffering is subordinate to (though well integrated with) the national and international mechanisms that create and deepen inequalities. 'Culture' does not explain suffering; it may at worst furnish an alibi (Farmer 2003).

While it may prove conceptually difficult to separate 'culture' from the underlying structural inequities which perpetuate child marriage, Farmer argues that placing the blame for structural

problems on culture does little to change the problem.

The structural inequalities faced by the poor in India have been detailed in previous sections, but Indian women face severe structural problems as well. Despite recent progress, India still remains woefully behind global trends toward gender equality. In fact, the World Economic Forum's 2013 Gender Gap report ranked India 124th of 135 countries in equal economic participation and opportunity, and 120th in educational gender equality (WEF 2013). In this context, the results of this paper suggest that programs which increase opportunity for women and the poor can alleviate poverty and, by extension, could result in positive intergenerational effects that could decrease the gender and income gap in India. For example, Lawson (2008) predicts that if India's gender gap in education and employment were cut in half by 2017, India's per capita income could be 10% higher in 2020 than its projected value under the 2008 gender gap; furthermore, if the gender gap were lowered to a quarter of its 2008 level in 2027, the potential boost to per capita income could rise to 13% in 2030. Some of this potential increase would certainly be attributable to a larger number of women reaching adulthood before marriage, and therefore reaching higher levels of education and employment. This example illustrates the potential of poverty alleviation programs, and my results reinforce the importance of reducing structural violence. I find that decreases in poverty can explain over 80% of the 22 percentage point decline in child marriage between the 1960s and 1990s, enabling over 30 million women to escape the structural violence perpetrated by child marriage.[58] This provides strong evidence that poverty reduction from affirmative action for India's lower caste has significant long-term benefits on child marriage outcomes and can play a role in breaking the cycle of poverty which ensnares much of India's population.

[58] The calculation of the 30 million figure uses the population of Indian girls aged 0-19 in the 2011 Census, which is just over 200 million. Even though this figure is higher than the population of Indian females aged 1-17 in the sample years, it provides a reasonable estimate of the number of women affected by poverty alleviation.

References

Agarwala, S. N. "The Age at Marriage in India." *Population Index* 23.2 (1957): 96-107. *JSTOR*. Web. 10 Feb. 2014.

Banerjee, Abhijit V., and Esther Duflo. "The Economic Lives of the Poor." *MIT Dept. of Economics Working Paper No. 06-29* (2006): n. pag. *SSRN*. Web. 4 Apr. 2014.

Barcellos, Silvia Helena, Leandro Carvalho, and Adriana Lleras-Muney. "Child Gender and Parental Investments in India: Are Boys and Girls Treated Differently?" *SOLE Working Paper* (2010): n. pag. *Society of Labor Economists*. Web. 4 Apr. 2014.

Bauer, Michael, and Julie Chytilova. "The Impact of Education on the Subjective Discount Rate in Ugandan Villages." *IZA Discussion Paper No. 4057* (2009): n. pag. *IZA*. Web. 21 Jan. 2014.

Bayly, Susan. *Caste, Society, and Politics in India from the Eighteenth Century to the Modern Age*. Cambridge: Cambridge UP, 1999. Print. Vol. IV of *The New Cambridge History of India*.

Becker, Gary S. "Altruism in the Family and Selfishness in the Market Place." *Economica* 48.189 (1981): 1-15. *JSTOR*. Web. 4 Apr. 2014.

- - -. "A Theory of Social Interactions." *The Journal of Political Economy* 82.6 (1974): 1063-93. *JSTOR*. Web. 4 Apr. 2014.

Becker, Gary S., and Casey B. Mulligan. "The Endogenous Determination of Time Preference." *Quarterly Journal of Economics* 112.3 (1997): 729-58. *JSTOR*. Web. 15 Oct. 2013.

Bekhouche, Yasmina, et al. "The Global Gender Gap Report 2013." *World Economic Forum*: n. pag. Digital file.

Bertrand, Marianne, Esther Duflo, and Sendhil Mullainathan. "How Much Should We Trust Differences-in-Differences Estimates?" *Quarterly Journal of Economics* (2004): n. pag. *Amherst College Library*. Web. 4 Mar. 2014.

Besley, Timothy, and Robin Burgess. "Can Labor Regulation Hurt Economic Performance? Evidence from India." *Quarterly Journal of Economics* 119.1 (2004): 91-134. *Economic Organisation and Public Policy Programme*. Web. 1 Apr. 2014.

- - -. "Land Reform, Poverty Reduction, and Growth: Evidence from India." *Quarterly Journal of Economics* 115.2 (2000): 389-430. *Economic Organisation and Public Policy Programme*. Web. 1 Apr. 2014.

Bhalotra, Sonia. "Parent Altruism, Cash Transfers, and Child Poverty." *University of Bristol Economics Discussion Paper No. 04/562* (2004): 1-34. *University of Bristol Economics Dept*. Web. 5 Apr. 2014.

Bhaskar, V., and Bishnupriya Gupta. "Parental Altruism and Child Labor: Examining the Historical Evidence from the United States." *Cliometrica* 6.3 (2012): 249-66. *SpringerLink*. Web. 4 Apr. 2014.

Brandt, Christen, and Kate Lord, dirs. *Magho*. Composed by Tom Richards. She's the First, 2014. Film.

Brooks-Gunn, Jeanne, and Greg J. Duncan. "The Effects of Poverty on Children." *The Future of Children* 7.2 (1997): 55-71. *JSTOR*. Web. 9 Mar. 2014.

Caldwell, J.C., P.H. Reddy, and Pat Caldwell. "The Causes of Marriage Change in South India." *Population Studies* 37.3 (1983): 343-61. *JSTOR*. Web. 4 Feb. 2014.

"Child Brides: Stolen Lives." *NOW*. PBS. 12 Oct. 2007. *PBS.org*. Web. 29 Mar. 2014.

"Child Marriage." *UNICEF*. UNICEF, 21 Dec. 2012. Web. 30 Mar. 2014.

Chin, Aimee, and Nishith Prakash. "The Redistributive Effects of Political Reservation for Minorities: Evidence from India." *Journal of Development Economics* 96.2 (2011): 265-77. *ScienceDirect*. Web. 11 Dec. 2013.

Gupta, Monica Das. "Selective Discrimination against Female Children in Rural Punjab, India." *Population and Development Review* 13.1 (1987): 77-100. *JSTOR*. Web. 8 Apr. 2014.

Desai, Sonalde, and Amaresh Dubey. "Caste in 21st Century India: Competing Narratives." *Economic and Political Weekly* 46.11 (2011): 40-49. *PubMed*. Web. 11 Feb. 2014.

Dixon-Mueller, Ruth. "How Young Is 'Too Young'? Comparative Perspectives on Adolescent Sexual, Marital, and Reproductive Transitions." *Adolescent Sexual and Reproductive Health* 39.4 (2008): 247-62. *JSTOR*. Web. 2 Mar. 2014.

Duncan, Greg J., et al. "How Much Does Childhood Poverty Affect the Life Chances of Children?" *American Sociological Review* 63.3 (1998): 406-23. *JSTOR*. Web. 9 Mar. 2014.

Edmonds, Eric V., and Norbert Schady. "Poverty Alleviation and Child Labor." *NBER Working Paper No. 15345* (2009): 1-45. *NBER*. Web. 9 Mar. 2014.

"Education and Caste in India: We Have a Few Reservations." *The Economist* 26 May 2006: n. pag. *The Economist*. Web. 1 Apr. 2014.

Esteve-Volart, Berta. "Gender Discrimination and Growth: Theory and Evidence from India." *IMF Working Paper No. 00/84* (2009): n. pag. *SSRN*. Web. 4 Feb. 2014.

Fan, C. Simon. "The Luxury Axiom, the Wealth Paradox, and Child Labor." *Journal of Economic Development* 36.3 (2011): 25-45. *JED*. Web. 28 Mar. 2014.

Farmer, Paul. *Pathologies of Power: Health, Human Rights, and the New War on the Poor*. Berkeley: U of California P, 2003. *Amherst College E-Reserves*. Web. 10 Mar. 2014.

Field, Erica, and Attila Ambrus. "Early Marriage, Age of Menarche, and Female Schooling Attainment in Bangladesh." *Journal of Political Economy* 116.5 (2008): 881-930. *JSTOR*. Web. 29 Nov. 2013.

Filmer, Deon, and Norbert Schady. "Getting Girls into School: Evidence from a Scholarship Program in Cambodia." *World Bank Policy Research Working Paper 3910* (2006): n. pag. *IDEAS*. Web. 1 Apr. 2014.

Foote, Karen A., Kenneth H. Hill, and Linda G. Martin, eds. *Demographic Change in Sub-Saharan Africa*. Washington, DC: National Academies Press, 1993. Print.

Forbes, Geraldine H. "Women and Modernity: The Issue of Child Marriage in India." *Women's Studies International Quarterly* 2.4 (1979): 407-19. *ScienceDirect*. Web. 4 Feb. 2014.

Frisancho Robles, Veronica C., and Kala Krishna. "Affirmative Action in Higher Education in India: Targeting, Catch Up, and Mismatch." *NBER Working Paper 17727* (2012): n. pag. *NBER*. Web. 30 Jan. 2014.

Galanter, Marc. *Competing Equalities: Law and the Backward Classes in India*. Berkeley: U of California P, 1984. Print.

- - -. "Who are the Other Backward Classes? An Introduction to a Constitutional Puzzle." *Economic and Political Weekly* (1978): 1812-28. *Marcgalanter.net*. Web. 29 Jan. 2014.

Gorney, Cynthia. "Too Young to Wed: The Secret World of Child Brides." *National Geographic* June 2011: n. pag. *National Geographic*. Web. 29 Mar. 2014.

Hatekar, Neeraj, Rajni Mathur, and Pallavi Rege. "'Legislating' Social Change: Strange Case of the Sarda Act." *Economic and Political Weekly* 42.2 (2007): 145-53. *JSTOR*. Web. 10 Feb. 2014.

Hedayat, Nel. "What Is It Like to Be a Child Bride?" *BBC.com*. BBC, 3 Oct. 2011. Web. 29 Mar. 2014.

Howard, Larry L., and Nishith Prakash. "Do Employment Quotas Explain the Occupational Choices of Disadvantaged Minorities in India?" *IZA Discussion Paper No. 5894* (2011): n. pag. *SSRN*. Web. 10 Feb. 2014.

Jaffrelot, Christophe. *India's Silent Revolution: The Rise of the Lower Castes in North India*. New York: Columbia UP, 2003. Print.

Jalali, Rita. "Preferential Policies and the Movement of the Disadvantaged: The Case of the Scheduled Castes in India." *Ethnic and Racial Studies* 16.1 (1993): 95-120. *Hampshire College Library*. Web. 31 Jan. 2014.

Jensen, Robert, and Rebecca Thornton. "Early Female Marriage in the Developing World." *Gender and Development* 11.2 (2003): 9-19. *JSTOR*. Web. 3 Feb. 2014.

Jensen, Robert T. "Economic Opportunities and Gender Differences in Human Capital: Experimental Evidence for India." *NBER Working Paper 16021* (2010): 1-33. *NBER*. Web. 17 Oct. 2013.

Kambhampati, Uma S., and Raji Rajan. "Does Child Work Decrease with Parental Income? The Luxury Axiom Revisited in India." *The European Journal of Development Research* 17.4 (2005): 649-80. *Palgrave MacMillan*. Web. 9 Mar. 2014.

Kumar, Dharma. "The Affirmative Action Debate in India." *Asian Survey* 32.3 (1992): 290-302. *JSTOR*. Web. 1 Feb. 2014.

Laibson, David. "Golden Eggs and Hyperbolic Discounting." Quarterly Journal of Economics (1997): 443-77. Amherst College Library. Web. 8 Apr. 2014.

Lawrance, Emily C. "Poverty and the Rate of Time Preference: Evidence from Panel Data." Journal of Political Economy 99.1 (1991): 54-77. JSTOR. Web. 14 Apr. 2014.

Lawson, Sandra. "Women Hold Up Half the Sky." Global Economics Paper No: 164 (2008): n. pag. Goldman Sachs. Web. 7 Apr. 2014.

Mathur, Sanyukta, Margaret Greene, and Anju Malhotra. "Too Young to Wed: The Lives, Rights, and Health of Young Married Girls." *International Center for Research on Women*. N.p., 2003. Web. 4 Feb. 2014.

Mullainathan, Sendhil. "Development Economics through the Lens of Psychology." *World Bank Working Paper* (2004): n. pag. *World Bank*. Web. 4 Apr. 2014.

Nguyen, Minh Cong, and Quentin Wodon. "Measuring Child Marriage." *Economics Bulletin* 32.1 (2012): 398-411. *IDEAS*. Web. 3 Feb. 2014.

Nour, Nawal M. "Child Marriage: A Silent Health and Human Rights Issue." *Reviews in Obstetrics & Gynecology* 2.1 (2009): 51-56. *PubMed*. Web. 20 Nov. 2013.

Osborne, Evan. "Culture, Development, and Government: Reservations in India." *Economic Development and Cultural Change* 49.3 (2001): 659-85. *JSTOR*. Web. 29 Jan. 2014.

Ozler, Berk, Gaurav Datt, and Martin Ravallion. "A Database on Poverty and Growth in India." *Poverty in India Dataset*. World Bank, 1996. Web. 1 Apr. 2014.

Pande, Rohini. "Can Mandated Political Representation Increase Policy Influence for Disadvantaged Minorities? Theory and Evidence from India." *BREAD Working Paper No. 024* (2003): 1-40. *Harvard Kennedy School*. Web. 2 Mar. 2014.

Prakash, Ved. "Punjab-PEPSU Merger." *Economic Weekly* 10 Nov. 1956: 1813-14. *Amherst College Library*. Web. 6 Apr. 2014.

Pullum, Thomas W. "An Assessment of Age and Date Reporting in the DHS Surveys, 1985-2003." *DHS Program*. Demographic and Health Surveys, n.d. Web. 30 Mar. 2014.

Raj, Shilpa. *The Elephant Chaser's Daughter*. N.p.: n.p., 2014. Print.

Rao, Anupama. *The Caste Question: Dalits and the Politics of Modern India*. Berkeley: U of California P, 2009. Print.

Sarkar, Tanika. "The Hindu Wife and the Hindu Nation: Domesticity and Nationalism in Nineteenth Century Bengal." *Studies in History* 8 (1992): 213-35. *Amherst College Library*. Web. 1 Apr. 2014.

Sengupta, Nandita. "The Real-Life Balika-Vadhus." *Times of India*. N.p., 19 Nov. 2009. Web. 29 Mar. 2014.

Shah, Ghanshyam. *Social Backwardness and the Politics of Reservation*. 1991. *Caste and Democratic Politics in India*. Ed. Shah. 3rd ed. New Delhi: Permanent Black, 2008. 388-412. Print.

Sinha, Kounteya. "On World Stage, India Lets Down Its Child Brides." *The Times of India*. The Times of India, 14 Oct. 2013. Web. 30 Mar. 2014.

"Survey for BPL Families." *Planning Commission of India*. N.p., 16 Mar. 2007. Web. 6 Apr. 2014.

The Constitution of India. N.p.: n.p., 1950. Ministry of Law and Justice, Govt. of India. Web. 11 Apr. 2014.

Weisskopf, Thomas E. *Affirmative Action in the United States and India: A Comparative Perspective*. New York: Routledge, 2004. Print.

"Who We Are." *The DHS Program*. Demographic and Health Surveys, n.d. Web. 2 Apr. 2014.

Zelliot, Eleanor. "Gandhi and Ambedkar: A Study in Leadership." 1972. *Caste in History*. Ed. Ishita Banerjee-Dube. New Delhi: Oxford UP, 2008. 197-209. Print.