CHILD MARRIAGE

Analysis of education interventions to address child marriage in
RAJASTHAN

Authors

Reena Mithal
Managing Partner
Sankhya Capital LLC

Sector Experts

Shobhita Rajagopal
Associate Professor
IDS Jaipur

This work has been produced as a part of the Rajasthan Priorities project under the larger, India Consensus project.

This project is undertaken in partnership with Tata Trusts.

TATA TRUSTS

Cost-benefit analysis of education interventions to address child marriage in Rajasthan

Rajasthan Priorities
An India Consensus Prioritization Project

Reena V. Mithal, PhD

Managing Partner

Sankhya Capital LLC

Working paper as of 21 March, 2018

Academic Abstract

The objective of this paper is to address the problem of child marriage in India – specifically in Rajasthan. Despite a significant rise in the median age of marriage for boys and girls, India continues to demonstrate among the highest prevalence of child marriage in the world, accounting for over 40% of global child marriages. Rajasthan is in the bottom quartile of the states across the country with data from the most recent National Family Health Survey (NFHS-4 2015/16) showing that 35.4% of women between the ages of 20-24 were still married before age 18. The paper argues that the most effective policy interventions to reduce child marriage are based on the economic empowerment of the girl child through secondary education and vocational training, qualifying her for employment and the creation of a sustainable income stream. Building economic value for women creates behavior change with a multiplier effect. A cost-benefit analysis of four policy interventions – bicycle transfers, conditional cash payments for secondary school attendance, the construction and maintenance of girls' toilets in secondary schools and an 18-month vocational training programs – shows significantly positive Benefit-Cost Ratios (BCRs) with benefits coming from both economic value derived from future employment and income opportunities, and social value resulting from a reduction in domestic violence, improvement in maternal and child health and lower rates of fertility.

Policy Abstract

The Problem

Child marriage as defined by India's Child Marriage Prohibition Act 2006 is the marriage of girls below 18 years of age and marriage of boys below 21 years of age. Although efforts to reduce child marriage in India by the government and private sector have sharply accelerated over the past two decades, raising the median age of marriage of both girls and boys to over 18, the country still accounts for close to 40% of the world's child marriages with one in five girls married before the age of 15 (Dasra, 2014).

Data from India's most recent National Family Health Survey[1] (NFHS-4 2015/16) shows that while child marriage overall has declined substantially over the last ten years, an average of 26.8% of women between the ages of 20-24 were still married before age 18 (relative to 47.4% a decade earlier). In Rajasthan, the numbers fell from 65.2% to 35.4% over this period, but it still remains in the bottom quartile of states across India.

Existing Initiatives

The Indian government's extensive efforts to address child marriage reflect the severity of the problem given the size of the population and diversity across communities. Numerous schemes have been launched – mostly in the last 10-15 years – with a focus on girls but some also targeted at boys and families at the central and state levels. The impact of the programs has not been evaluated consistently and data from various sources suggests, predictably, that success has been a function of local political support, community advocacy and underlying social norms.

Jha et al. (2016) presents a comprehensive list of programs across India, identifying central and state initiatives. While the absence of agency and autonomy of girls is overwhelming and

---

[1] National Family Health Survey–4 2015/16 conducted by the International Institute for Population Sciences on behalf of the Ministry of Health and Family Welfare, Government of India. Figures quoted in Young Lives and NCPCR (2017).

common across all states, programs have emphasized several approaches to address this issue and are categorized by the "drivers of change" listed below :

- Conditional transfer programs directly incentivizing delayed marriage, including cash transfers and education subsidies.
- Programs emphasizing safe, affordable and quality secondary education.
- Empowerment programs for women, girls, men and boys.
- Agenda building, public awareness and advocacy efforts.
- Legal measures and enforcement of existing laws.

The fundamental lessons drawn from the survey of initiatives are the need to strengthen government schemes so that existing policies can be scaled effectively, and the recognition that scaling requires the engagement of local agencies along with external and independent monitoring. For instance, as a national initiative, the Rajiv Gandhi Scheme for the Empowerment of Adolescent Girls (SABLA) has had some success across states, but consistent scaling remains a challenge, particularly given the large numbers of girls involved. Jha et al. (2016) emphasize differences in strategy based on region, suggesting the importance of **decentralization along with collective action**.

For instance, despite the strong link of child marriage with poverty, Jha et al. (2016) point out that when the overall prevalence of child marriage declines, higher wealth groups in some states continue to practice it due to social norms. Their analysis of district level data[2] in Rajasthan shows that for Ganganagar district, where the rate of child marriage is only at 30%, the rate for the richest quintile of the population was 62%. Even targeted state level programs can only attack deeply entrenched systems through differentiation at the local level.

In Rajasthan, the *Sahyog Yojana, Apni Beti Yojana, Samuhik Vivah* and Construction Worker Daughter Marriage Support scheme are in effect, but again there is no consistent data evaluation. In March 2017, the Rajasthan state government, in partnership with UNFPA and UNICEF was the first state to launch a strategic district level action plan - "Sajha Abhiyan - Bal Vivaah Mukt Rajasthan" for the prevention of child marriage[3]. The objectives include changing the legal and policy environment, increasing access to safe and quality health services, building

---

[2] ICRW and UNICEF: "District-level study on child marriage in India." 2015.
[3] Times of India, March 6, 2017.

avenues for economic development and livelihoods, empowering adolescent girls and boys with life skills, and developing a data management system to track child marriage. The government also announced the intention to develop district level plans, which are essential for decentralization. If this initiative can be implemented with specific policy interventions, budget allocation and an emphasis on sustainable impact, Rajasthan could become a blueprint for other states going forward.

This paper argues that the most effective policy interventions to reduce child marriage are based on the economic empowerment of the girl child, through secondary education and vocational training that qualifies her for employment, creating the possibility for her to develop a sustainable income stream. Building economic value for women creates behavior changes with a multiplier effect. First, for women that access these opportunities and can change their lives, and second, through the creation of role models that influence behavior at a broader social level.

The BCR analysis presented below indicates significantly positive BCRs for each intervention – bicycle transfers and the provision of girls' toilets include the school subsidy and therefore eliminate the constraint of both the cost of education and another significant barrier on the demand side. The analysis highlights the incremental value of transportation and sanitation (assuming education costs are covered) in addressing significant challenges relating to girls' attendance of secondary school.

Intervention 1: Conditional bicycle transfers for secondary school girls

Overview

- Bicycle Transfers to all eligible secondary school girls age 14 in the first year of the intervention.
- The intervention will be implemented for 687,301 girls (14 year old girls in Rajasthan according to Census 2011) by the state government
- Education stipend (school subsidy) is also provided to all eligible girls for four years.

Implementation Considerations

- The intervention will be implemented for four years with the same cohort of girls. The costs and benefits are calculated over four years, taking into account the present value of wages over a longer period i.e. the beneficiary's working life span.
- The risks of the intervention include fraud associated with school registration, early withdrawal without notification, undocumented absenteeism, loss or damage of bicycles.

Costs and Benefits

For each intervention, baseline data from the 2011 census and government surveys (NSS 71) at the state level are used to calculate the total number of girls eligible for the intervention i.e. potential beneficiaries. The projected number of beneficiaries relative to the number of girls that receive the intervention is calculated based on data from academic studies, evaluating the impact of similar interventions already implemented in other Indian states or countries with comparable demographics and social structures. The Census provides the number of girls age 14 in each state. NSS 71's survey shows that in Rajasthan 39.2% of girls age 14-15 are enrolled in secondary school and that 22.2% of girls age 16-17 are enrolled in higher secondary school.

The next step is to calculate the projected number of beneficiaries of the intervention. Using Muralidharan and Prakash (2016)'s calculation for bicycle transfers in Bihar, the number of girls in school increases to 52% after the first year of the intervention (see results for the next three years in the discussion of social costs Section 1.2.1). The first year enrolment boost is 32% of the current female net enrolment rate [4], second year is 18% followed by 12% for the third year and 6% for the final year, adjusted by appropriate dropout rates derived from DISE.

---

[4] Also from Muralidharan and Prakash (2016). In the third year of secondary school we use the 12% that passed the higher secondary school certificate exam from Muralidharan and Prakash, and in the fourth year we assume a 6% pass rate.

Costs

The cost of the intervention is the sum of three categories of costs. The first is the cost of the bicycle multiplied by the *number of girls that enroll in school due to the intervention*, i.e. the product of Rs. 3850 (current market price of bicycles) and 52% of eligible girls enrolled in the first year post-intervention. The second is the cost of secondary education *per additional girl enrolled in school following the intervention* which is Rs. 6315 (from NSS 71) multiplied by the 12.5% of girls in the state added to the cohort of girls in school. For this pool of additional girls we also add the opportunity cost of being at school (measured in terms of lost wages)[5]. It is Rs. 7548 drawn from the Labour and Employment Survey 2015-16 and is the average annual wage of a girl that has completed the previous level of education adjusted for labour force participation rate and unemployment. The sum total is Rs. 3731 for the first year. In the subsequent three years of the intervention, the bicyle cost is not incurred (since it is a one time purchase), though the opportunity costs of education increase for those that continue schooling. The total cost of the intervention for one cohort of 14 year old girls over four years is Rs 365 crore (at a 5% discount rate), of which 38% represents the cost of the bicycles.

Benefits

The total benefits of the intervention are the sum of the direct benefit and the social benefits from reduced child marriage. The direct benefit is also the sum of three components. The first part is the discounted value of higher future wages resulting from the increase in education attainment due to the intervention. The income stream varies based on the education level completed by the girl; where the income stream is adjusted by the distribution of girls by terminating school year. Added to this is the value of the bicycle (which is a cost of the intervention but also a transfer in kind to the beneficiary) multiplied by the number of girls who receive the bicycle (this is the same number as in the cost calculation above). The third component is the cost savings of Rs 792 per girl on alternative forms of public transportation (derived from NSS 71) multiplied by the girls receiving the intervention. The total direct benefit is Rs 602 crore, 62% of which represents higher lifetime wages from further secondary education.

---

[5] Lost wages are measured in terms of average annual wage for girls (completed primary school).

Given the relationship between further secondary education and child marriage, it is estimated this intervention will avoid 8178 early marriages for this cohort. Social (early marriage avoided) benefits described in Section 1.2.1 are calculated at Rs 1043 crore. The total benefits from the intervention are therefore Rs 1654 crore.

Intervention 2: Conditional cash transfer for secondary school girls

Overview

- Provision of a cash transfer, equivalent to 9.3% of average consumption, conditional on secondary school enrolment for all girls eligible for secondary school
- According to Census 2011, one cohort of 14 year old girls in Rajasthan is 687,301 girls

Implementation Considerations

- The intervention will be implemented for all four years of secondary school. For the purposes of the analysis, we calculate the costs and benefits over four years, from the perspective of a cohort of 14 year old girls about to enter the first year of secondary school.
- The risks of the intervention include fraud associated with school registration, early withdrawal without notification, undocumented absenteeism.

Costs and Benefits

The baseline numbers are the same as in the bicycle transfer intervention discussed above and are derived from Census 2011 and NSS 71, which drive the calculation of the number of girls eligible for the intervention. Fiszbien and Shady (2009) summarize the results of numerous studies on the impact of CCTs on the enrolment of girls (specifically) and girls and boys in secondary school, finding a positive impact across the board, and although there is no specific analysis of India, we use average data for Bangladesh, Cambodia and Pakistan[6]. The analysis shows an average of 18.9% increase in enrollment in secondary education schools as a result of a targeted CCT. Increasing the baseline enrollment by 18.9% each year and reducing the total by an assumed dropout rate from DISE, provides the total number of girls benefiting from

---

[6] Underlying studies are Khandker et al. (2003) for Bangladesh, Filmer and Shady (2008) for Cambodia, and Chaudhury and Parajuli (2008) for Pakistan. All studies report statistically significant coefficients in percentage point terms.

the intervention on an annual basis – this amounts to 46.6% of eligible girls in the first year, 45.6% in the second year, 25.5% in the third year and 25.3% in the last year of secondary school.

Costs

In the first year, the cost of the cash transfer is Rs 7521 and is applied to all girls entering school each year. For girls who are compelled to enter school because of the intervention we also add the cost of education (Rs. 6315) and the opportunity cost of foregone earnings (Rs 7548). For subsequent years, the cost numbers are adjusted by different levels of incremental enrolment in school, and different opportunity costs, as in the bicycle transfer case. The total cost of the intervention over four years is Rs 951 crore (at a 5% discount rate).

Benefits

The economic benefit of the intervention is the present value of higher wages in adulthood based on increased eduation attainment from the intervention. We add the cash transfer comprising the school subsidy to the benefits since it is a real economic windfall for the girl's family. The total direct benefit from the intervention is Rs 1543 crore (5% discount).

It is estimated the intervention will avoid 9620 child marriages for this cohort, which has benefits of INR 1152 crore (5% discount). Total benefits from the intervention are therefore Rs 2695 crore.

Intervention 3: Provision and Maintenance of Girls' Toilets in Secondary Schools

Overview

- Provision of new toilets for girls in all eligible secondary schools across the state; maintenance and updating of existing toilets in schools.
- The 2016 ASER State of Education report identifies 21% of secondary schools without a separate girls toilet, with a girls toilet but locked or unusable or without any toilet at all. These 5993 schools are the target of the intervention.

Implementation Considerations

- The toilets will have to be constructed before the official start date of the intervention from when school enrolment is measured.

- Updating of existing toilets will have to be completed at the same time.

- Ongoing maintenance of all toilets will have to supervised.

- Changing social norms to enforce use of toilets and prevention of male use of girls' toilets is a risk

Costs and Benefits

Aduika (2016) reports that the construction of a girls-only toilet for cohorts analyzed across India increased upper primary school (6th-8th grade) female enrolment by 11%. We calculate the increase in school enrolment in Rajasthan following the intervention, finding that the baseline rate of secondary school enrolment of 39.2% increases to 40%. For upper secondary toilet construction increases the baseline rate of enrolment of 22.2% to 22.6%. We assume each toilet, properly maintained will last for twenty years, and so the costs and benefits presented below represent the costs for this many cohorts of school attendees affected by the intervention.

Costs

The costs are divided into two categories, the first of which are direct individual-level costs: the cost of secondary school and the opportunity cost of being in school. These are exactly the same as in the bicycle transfer and CCT interventions described above but are adjusted by different proportions of girls based on the impact of the toilet construction on marginal school enrolment reported in the previous paragraph.

The second category of cost is the cost of toilet construction and maintenance, and in cases where toilets already exist and have to be repaired, the incremental cost of repairing. We use data from ASER 2016 to estimate the number of toilets that need to be constructed or updated – the data provides a detailed distribution of toilets in schools across the state for single-sex and unisex toilets, and toilets that are unused or locked. The cost of construction of a toilet is derived from *Swacch Bharat: Swacch Vidyalaya*, is Rs. 3.55 lakhs including washrooms, we infer that the cost of construction of a girls' only toilet is Rs. 1.3 lakhs, and that the updating of existing toilets for use by girls is Rs. 60,000 also sourced from *Swacch Bharat: Swacch*

Vidyalaya. The total cost of toilets then is the number of schools that require toilets (construction, only for girls or updating) multiplied by the cost in each of these three categories.

The total 20 year cost of the intervention is Rs 1138 crore (5% discount). Approximately 10% of this is the upfront investment cost of building or repairing toilets, while the rest represents ongoing toilet maintenance as well as opportunity and education costs from the new girls going to school as a result of a toilet being present.

Benefits

As with the previous interventions, the primary benefit is the higher wages resulting from increased education attainment brought about by the intervention. We calculate this for the twenty year life of each toilet and adjust for expected growth in real incomes. This is Rs 2373 crore (5% discount).

The intervention has a modest effect on early marriage at any point in time, reducing prevalence by 0.5%. However, because the effect lasts twenty years, the absolute impact of toilet construction is substantial even after adjusting for a natural downward trend in early marriage. The benefits of avoided early marriage are INR 2315 crore and therefore the total benefits of the intervention are Rs 4688 crore.

Intervention 4: Vocational Training (tailoring) for 1MM girls age 16 and above

Overview

- Vocational training and skill development programs for eligible (age 16 and above) girls in the state – start program with tailoring.
- The intervention covers 1,000,000 girls and will be implemented by the state government over a period of 18 months

Implementation Considerations

- Choice of vocational training program should be limited to one or two verticals: recommended vertical to start is tailoring.

- Choice of the cohort of 1MM girls: what are the criteria? Considerations of location, income level, family structure, prior and current education level etc.
- Counseling regarding future employment opportunities can be included in the program including advice on self-employment. The intervention does not include job placement.

Costs and Benefits

Costs

The proposed intervention is a vocational training program for 1 million girls across the state. Eligibility is not derived from school enrolment data as girls attending school can also participate in the program. Girls with no secondary school education are eligible as long as they are 16 years old or more. The costs and economic benefits of the program are from Maitra and Mani (2017). The cost of the program per girl is Rs. 1910 for 18 months.

Benefits

For the calculation of benefits, we focus on the increase in wages. Based on the evidence in Maitra and Mani (2017), the future stream of wages rises by 32% as a consequence of the training. The assumption is that the wage premium benefit will last for ten years. The value of this benefit for the 1m women targeted by the intervention is Rs 3234 crore.

Five percent of the 1m girls in the intervention will be below the age of 18, and this will have a small effect on the prevalence of early marriage, reducing early marriages by 0.04 percentage points (259 early marriages avoided). This has benefits of 29 crore for total benefits of Rs 3263 crore.

BCR Table

Summary Table: Rajasthan

Interventions	Benefit	Cost	BCR	Quality of Evidence
Bicycle Transfer	1,645	365	4.5	Medium
Conditional Cash Transfer	2,695	951	2.8	Medium
Provision of Girls' Toilets	4,688	1,138	4.1	Medium
Vocational Training	3,263	677	4.8	Limited

Notes: All figures assume a 5% discount rate; benefits and costs are in crores of INR.
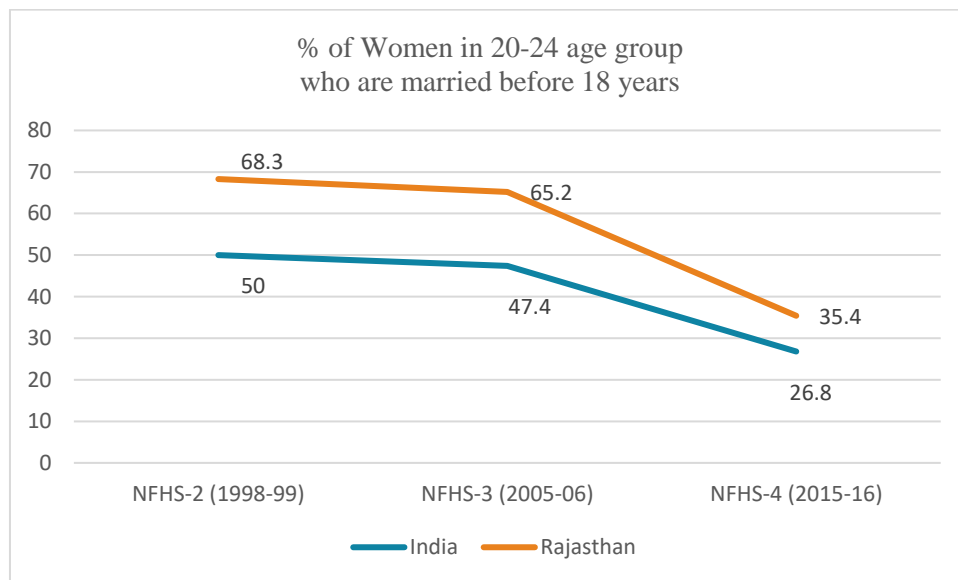
1. Introduction

That the economic and human development costs of gender gaps has far-reaching implications, ranging from deepening poverty, human rights violations including violence against women, maternal and child health issues, child marriage and sex selection, is indisputable and well-understood. Policy makers and academics have historically addressed gender inequality from a variety of perspectives. Changing legal structures including guaranteeing property rights for women, enhancing their political representation, the alteration of marriage and inheritance laws, and the emphasis on primary education for girls as a basic human right have had a vital role in the effort to achieve gender parity. However, given the challenges around the enforcement of existing laws, particularly in the context of established social norms even in the most economically advanced countries, changing laws is an essential but relatively passive step from a policy standpoint. For laws to be truly effective, cultural biases and longstanding behavioral patterns that perpetuate gender discrimination have to change, and in recent years, a more targeted emphasis on women empowerment has received global support.

The 2030 Agenda for Sustainable Development recognized that while Gender Equality remained a primary goal (No. 5) on a standalone basis, the objective of inclusive and sustainable development could only be successful if women were fully integrated into all aspects of the paradigm. The United Nations Secretary General convened a High Level Panel (HLP) in March 2016 on Women's Economic Empowerment, with its first report explicitly stating that "the economic empowerment of women - to succeed and advance economically and to make and act on economic decisions – is a cornerstone of the sustainable devleopment goals (SDGs)".

Child marriage is a substantial barrier to social and economic development in India, denying the child his/her basic right to good health, education, nutrition and freedom. Not only does marrying early have a negative impact on the physical, emotional and psychological development of children but also makes girls especially more vulnerable to abuse, violence and exploitation. Women who marry before the age of 18 years suffer from higher maternal morbidity and mortality than women who marry after 18 years of age. Further, the rate of

increased stunting, mortality and morbidity in infants born to these mothers is also higher (Chari et al, 2017).

The percentage of women in the age group 18-24 years who were married before the age of 18 years is a significant pointer to the prevalence of child marriage. Over the last three decades as seen in the graph below, this percentage has almost halved at the national level. Rajasthan has also shown progress in reducing the number of child marriages over the same period, but the percentage is still significantly higher as compared to all India figures.

Source: http://rchiips.org/NFHS-2,3,4.

The issue of child marriage is a complex and multilayered one with roots in the societal inequalities that persist due to class, caste, socio-economic background and gender. Child marriage can be seen as both a symptom and a consequence of these inequalities. The critical drivers therefore include the perceived value of a girl child (very low in traditional patriarchal societies) and conventional customs and social practices. Poverty is also another key driver as the economic costs related to raising girls, especially in financially vulnerable and rural households push families to consider child marriage. Dowry demands and the cost of higher education also add to the problem. Issues of safety and security especially in the adolescent age group, and the lack of access to quality education and vocational opportunities are other major contributors to families opting for marrying off their girls early.

In this paper, the proposed interventions are designed to economically empower women at risk for early marriage. The calculation of benefit-cost ratios (BCRs) for each show that the benefits can range from directly creating income and lowering child marriage, to improving women's health, decreasing maternal and child mortality, combating domestic violence, creating inter-generational effects through future empowerment of girls, and developing confidence and negotiating power through the option value of building an independent asset base.

India's Child Marriage Prohibition Act (2006) set up a legal framework that allows child marriages to be declared void and calls for Officers to be appointed at the state level to assist in enforcement. However, such marriages have to be reported before any action can be taken, and deep-seated social norms supporting child marriage continue to create significant challenges, which vary by state and region. The table below shows the percentage of ever married women by age comparing the state of Rajasthan to the national average as per Census, 2011. The total percentage of ever married women below the age of 18 in Rajasthan is 42.6 % as compared to 30% in overall India.

Age at marriage	% of ever married persons - Females	
	INDIA	RAJASTHAN
All ages	100	100
Less than 10	2.31	3.78
10-11	1.01	2.64
12-13	2.27	4.71
14-15	8.28	11.89
16-17	16.34	19.61
18-19	30.86	31.25
20-21	18.45	14.65
22-23	7.14	4.19
24-25	4.34	1.88
26-27	1.71	0.61
28-29	0.99	0.32
30-31	0.57	0.16
32-33	0.19	0.05
34 +	0.29	0.09
Age Not Stated	5.24	4.19

Source:https://data.gov.in/resources/ever-married-and-currently-married-population-age-marriage-and-duration-marriage-2011

Numerous recent studies lay out current data on child marriage in India, including Das Gupta et al. (2008), Dasra (2014), Jha et al. (2016), Sama Research Group's Dataspeak (2016), and Young Lives and NCPCR (2017). The data shows clear patterns in the prevalence of child marriage while rarely establishing the direction of causality. Correlations are repeatedly reinforced across all these studies, and regression analysis results occcasionally indicate causality.

- There is a strong correlation between poverty and child marriage – (the exception is in states where child marriage is associated with caste in some districts and it is then highest among richer, high caste girls)[7]

- Child marriage is more common in rural areas than in urban centres, with Dasra (2008) reporting that girls in rural areas are almost twice as likely to be child brides than those in urban centers.[8]

- Girls with a secondary school education or higher are much less likely to marry early than those with primary education or less.[9]

- Although less stark due to the increase in primary school education across India, the gender gap in basic literacy and primary school education are also associated with child marriage.

- Other facilities including primary health care, day-care centers for working women, *anganwadi* or community centers with support services, safe roads and transportation for access to health and educational facilities are also associated with lower child marriage rates.[10]

- Higher maternal and child mortality, poorer maternal health outcomes, an increase in domestic violence, and reduced decision-making power for women are all associated with child marriage.

- Sex selection is more likely to result when mothers are below the age of 18.

---

[7] Jha et al. (2016) report results of an ICRW and UNICEF study at the district level (2015), which breaks down prevalence of child marriage by wealth quintiles.

[8] The rural-urban divide varies across states with complex implications. Jha et al. (2016) shows the rural-urban spread declining with age and raises the question of whether migration to urban areas is a solution.

[9] Das Gupta et al. (2008) reports the results of logistic regression analysis showing that education, specially at the secondary school level is found to be a key predictor of the age of marriage.

[10] Focused studies establishing the direction of a relationship between these factors and child marriage have not been conducted consistently, although it is widely accepted that they encourage families to delay marriage.

Given the greater vulnerability of adolescent girls to domestic violence and forced sex, younger pregnant women, have less ability to combat the widespread social bias in favor of boys. Anecdotal evidence and research studies have demonstrated that social biases are closely linked to the economic value of boys versus girls in developing societies. Census 2011 data reported by UNFPA on sex selection indicates that for children aged 0-6 years old, there were 7.1million more boys than girls compared with a 6 million gap following the 2001 census. The overall sex ratio of girls per 1000 boys (ages 0-6 years) declined from 945 in 1991 to 927 in 2001 and further to 914 in 2011. Estimates from demographers have indicated that by 2030, about one-third of males in India could be single at age 50 based on current data and projections.

The fundamental lessons drawn from the survey of initiatives already in place in India are the the need to strengthen government schemes so that existing policies can be scaled effectively, and the recognition that scaling requires the engagement of local agencies along with external and independent monitoring. For instance, as national initiatives, SABLA (or the Rajiv Gandhi Scheme for the Empowerment of Adolescent Girls) and Kishori Shakti Yojana (KSY) are two very important community based schemes, sponsored by the central government which focus on adolescent girls. The schemes objectives are to not only provide vocational skills to girls belonging to the adolescent age group but also awareness on health and nutrition aspects, improve their literacy and thereby aim to postpone marriage. The Rajiv Gandhi Scheme for the Empowerment of Adolescent Girls (SABLA) has had some success across states, but consistent scaling remains a challenge, particularly given the large numbers of girls involved. Jha et al. (2016) emphasize differences in strategy based on region, suggesting the importance of **decentralization along with collective action**.

The Modi government introduced the *Beti Bachao Beti Padhao Yojana* (BBBPY - Save the girl child, Educate the girl child) in January 2015, soon after its ascent to power, focusing on multi-sector action in 100 districts across India. The recently announced Economic Survey (2018) states that the scheme which aims to promote survival, protection and education of girl child has been approved for expansion to cover all 640 districts in the country[11]. However, a recent

---

[11] http://mofapp.nic.in:8080/economicsurvey/

Parliament Standing Committee on Human Resource Development which assessed the scheme pointed out that of a total amount of Rs 43 crore that was set aside for BBBP in the fiscal year 2016-2017, only a mere Rs 5 crore was utilised so far.

The program also includes a nationwide scheme: *Sukanya Samridhhi Account* (Girl Child Prosperity Account), which offers families with girls the option to open bank and post office savings accounts with above market rates of interest and a tax benefit on an annual contribution until their daughters turn 18. The accounts mature 21 years after opening and early withdrawal of 50% of the value is permitted at 18 only if used for higher education. While it is too early to assess impact, over 7.6 million accounts were opened within six months of the scheme's announcement.

In Rajasthan, the *Sahyog Yojana, Apni Beti Yojana, Samuhik Vivah* and Construction Worker Daughter Marriage Support scheme are in effect, but again there is no consistent data evaluation. In March 2017, the Rajasthan state government, in partnership with UNFPA and UNICEF was the first state to launch a strategic district level action plan - "Sajha Abhiyan – Bal Vivaah Mukt Rajasthan" for the prevention of child marriage[12]. The objectives include changing the legal and policy environment, increasing access to safe and quality health services, building avenues for economic development and livelihoods, empowering adolescent girls and boys with life skills, and developing a data management system to track child marriage. The government also announced the intention to develop district level plans, which are essential for decentralization. If this initiative can be implemented with specific policy interventions, budget allocation and an emphasis on sustainable impact, Rajasthan could become a blueprint for other states going forward.

1.1 Literature Review

The extensive literature on interventions to reduce child marriage for girls has focused on two broad groups of policies. The **first group is conditional** (and technically includes unconditional) **transfers employed explicitly to incentivize families to delay marriage of girls to the legally**

---

[12] Times of India, March 6, 2017.

permitted age. Conditional (cash or non-cash[13]) transfers have been widely used based on the assumption that families view girls as an economic cost - either directly due to future dowry payments or indirectly through the opportunity cost of supporting unmarried girls who do not generate income. The use of unconditional transfers is not common – a widely-cited exception is a a program in Malawi where analysis by Baird et al. (2011) highlights the benefit of unconditional transfers.[14] However, there have been substantially greater interventions with conditional transfers in a wider context and this paper will focus on those.

The **second group consists of conditional transfers related to education, and training and support programs that empower girls** to take decisions to protect themselves and increase their ability to negotiate with families, while simultaneously making them economic agents that contribute to family income levels. School stipends, uniform payments, transportation subsidies and other programs where conditional transfers can incentivize girls to attend school or training programs are part of the of this group, and the cost of the cash transfers are added to the cost of the education or training intervention in the calculation of BCRs.

Malhotra et al. (2011), Field et al. (2016), Kalamar et al. (2016), Clots-Figueras (2014) and Buchmann et al. (2017) review a range of interventions where policies are either directly or indirectly intended to reduce child marriage in various countries across South Asia and Africa. Given the lack of available data and short histories, the authors of these papers have no option but to compare effects across countries and regions, notwithstanding the cultural and economic divergences that play a significant role in determining impact. Broadly speaking, conditional transfer programs and women empowerment programs including education and training appear to have had a positive impact on child marriage – but with varying success. Few interventions focus solely on reducing child marriage; policies to increase years of schooling and develop the capacity of adolescent girls as a pathway to delaying marriage are more common.

---

[13] Non-cash transfers are gaining traction as cash transfers – even with the desired effect – are at the risk of threat or graft and have subsequently been used as dowry payment. Buchmann et al. (2017) evaluate the impact of cooking oil subsidies as an incentive to postpone girls' marriage in Bangladesh.
[14] The analysis shows that in Malawi, the effect of conditionality (i.e. attending school) was low, and that small *un*conditional cash transfers had the benefit of delaying marriage *and* improving schooling rates on a group of girls with a high propensity to drop out of school.

Kalamar et al. (2016) find that of the interventions they surveyed, the most successful were geographically diverse, ranging from Colombia and Mexico to Zimbabwe. Other widely cited studies include a voucher program for private education in Colombia (Angrist et al. 2006) which resulted in delaying marriage and increasing years of schooling for youth. Bandeira et al. (2010) evaluate a life skills and vocational training program for girls in Uganda, noting that it led to a decrease in child marriage and cohabitation.

In a study on strategies to reduce child marriage in Bangladesh, Field et al. (2016) conduct a cost-benefit analysis of six existing inteventions in Africa, Latin America and South Asia. They conclude that in Bangladesh, providing direct financial incentives are the most cost-effective way to avert underage marriage as programs conditional on education may not reach the most marginal out-of-school girls. This finding contradicts other studies including those referenced above where programs conditional on education have had signficant impact. Similarly, there are inconsistent results in the area of women empowerment. In contrast to Bandeira et al's (2010) study of women empowerment in Uganda cited above, Buchmann et al. (2017), in their study on Bangladesh find that a six-month female empowerment program did not affect child marriage or teenage child-bearing, although it was associated with retention of girls in schools.

For this paper on India, two programs in Bangladesh that have been hailed as successful models of conditional transfers with a positive impact directly on child marriage and girls' education are particularly relevent. The Female Secondary School Assistance Program (FSSAP) provided a monthly stipend to secondary school girls conditional on school attendance and performance, as well as remaining unmarried until 18[15]. Hong and Starr's (2012) analysis of the FSSAP concludes that it kept girls in school longer and delayed their age of marriage, also improving female labor force participation rates. The Bangladesh Oil Incentive program provided a cooking oil subsidy to families in Bangladesh that delayed marriage for girls. Buchmann et al. (2017) find a favorable effect on child marriage (reduced rates for girls below 18), teenage childbearing (reduced for girls below 20), and school enrolment (more girls in secondary school).

---

[15] The FSSAP was introduced in 1994, four years after a free tuition policy launched by the Bangladeshi government for female students in Grades 6-8.

The Apni Beti Apna Dhan (ABAD: Our Daughter, Our Wealth) program in India did not produce the same positive long-term benefits. It is a case study on how program success is a function of the underlying social structure that can vary by region, state and even district. Introduced by the Government of Haryana in 1994, it offered families with newborn girls an immediate cash award and a long-term savings bond payable on the daughter's 18th birthday plus an education bonus.[16] Sinha and Yoong's (2009) analysis of the program with limited data was inconclusive as the first cohort of eligible participants were not yet at legal marriageable age.[17] However, Nanda et al.'s (2016) evaluation comes after the first age cohort turned 18 in 2012. The results show that the percentage of women age 20-24 married before 18 declined significantly from 57% in 1992-93 to 41% in 2005-06 and that the pace of decline was faster than the average of all states. However, the proportion of girls marrying during their 18th year was much higher (59%) for beneficiaries than for non-beneficiaries (46%) and beneficiary families saw the cash transfer as a way to cover marriage and dowry expenses.[18] While education levels went up, survey results indicated that education was considered an attribute to enhance marriageability rather than income and employability.

Despite the high level of patriarchy in Haryana the differences in impact between APAD and the Bangladesh programs are telling. Circumstances vary across beneficiaries and groups, as well as time periods, and there are independent factors at work. For financial incentives to have more than an immediate and short-term benefit, the position of women and girls in the underlying social structure needs to change on a permanent basis[19]. Existing women empowement programs focusing on building self-confidence, creating safe spaces for communication and advocacy, and providing social protection are essential. However, even these initiatives have limited impact given that they do not provide a framework that changes the balance between men and women. Only when women have access to economic opportunities that make delaying marriage a truly viable alternative, can empowerment become a reality.

[16] Cash transfers are delayed for 18 years and there is a sex selection component to the incentive structure.
[17] This study found some positive effects on post-natal investment in girls' healthcare, and that girls already in school were more likely to continue.
[18] About half the beneficiary families used the cash for marriage related expenses, causing ABAD to be viewed as a *Kanyadan* (Gift of a maiden – from the bride's household to the groom's family) program.
[19] This is evident in Nanda et al.'s (2016) evaluation of APAD in Haryana.

From a longer-term perspective, economically empowered women can become leaders in their communities, creating sustainable outcomes for social change. Research has shown that the presence of female political leaders in parts of rural India has a beneficial impact on sex selection patterns [20], empowering the average woman (not only the leader) to change behavior, presumably with support from male partners and family members.

Sustainability requires that society changes its perception of the value of daughters versus sons and that the attitude towards the girl child changes even before birth. The social value of sons is intertwined with economic preferences, particularly in poor households. Rosenblum (2016) analyzes the private economic benefit of sons versus daughters, and while the value of sons is mulitdimensional and not always consistent, he finds that a first-born son brings the economic benefit of higher income and assets to families. [21] He points out that economic incentives provide a plausible explanation for sex-selection induced abortions in India. The value of boys is not simply a perception, it is a reality due to the greater opportunities they are provided for education, employment and livelihood generation.

Therefore, an underlying shift in balance between women and men requires women to be equally capable of generating economic value for themselves and their families. **Economic value generates empowerment and is driven primarily by education.** Dasra (2008) reports that girls in India with no education are six times more likely to get married as minors than those with 10 years of more education. Given that the Indian government has already mandated the provision of free (and compulsory) primary education across the country[22], the focus for state governments must be secondary education. Secondary education is a necessity for employment in the formal sector, and further benefits for income generation accrue from vocational training.

1.2 Social Costs of Child Marriage

The correlation between child marriage and maternal health and child mortality, domestic violence, excessive fertility, sex selection and other gender-based discrimination has been
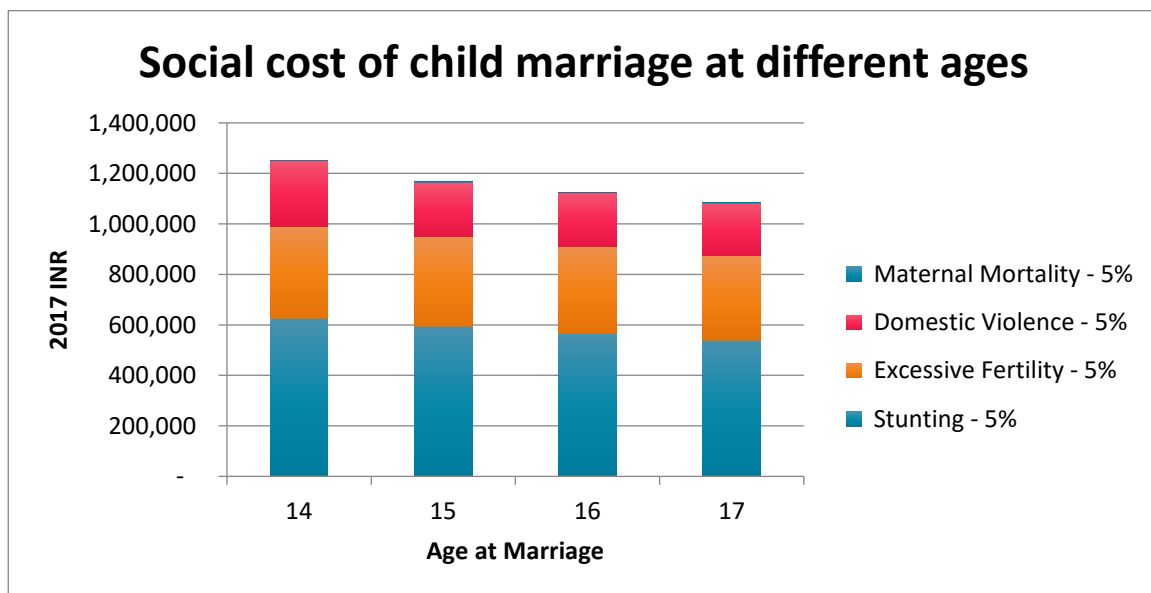
---

[20] Kalsi (2017) discusses changes in attitudes towards women and girls in districts in India where *Panchayats* have female leaders.
[21] The paper also reports a diminishing return to sons and evaluates the impact of birth order effects.
[22] Right To Education Act (August 2009) enacted by India's Parliament.

extensively documented. The decline in key social and health related challenges are considered benefits of the interventions in this paper and quantified as such in the cost-benefit analysis. In this section we describe how we have calculated the social costs of child marriage. We have esimated this from the perspective of a cohort of 14 year old girls, about to enter secondary school. Even within the early marriage bracket of 14-17, later marriages are less costly than early marriages. This is because earlier marriages tend to be inherently more costly for the girl and society. For example, the odds of experiencing domestic violence are 1.57 if married before 15, but slightly less at 1.47 if married between 15-17, relative to someone married at 18+ (Kidman, 2016). Secondly, being married later has lower cost due to the slight dampening effect of discounting. The figure below summarises the costs of a single marriage at each age relative to a counterfactual of being married at age 18 (at a 5% discount rate).

Figure 1: Social cost of a child marriage at different ages

Source: calculations made by the author

Excessive fertility

Child marriage has been associated with increased fertility, which has numerous implications. At the outset, the welfare costs of more children at the macroeconomic level is reduced GDP per capita as is reported in the literature on family planning. Higher population growth also requires governments to spend more on public education, health and other services, reducing overall welfare, particularly in poorer countries. Further, the complexities around higher

fertility are reflected in reproductive health. Raj et al. (2009) show a wide range of increased fertility effects in India, adjusted for maternal characteristics. These include repeat rapid childbirth, multiple unwanted pregnancies, pregnancy termination and sterilization. Child brides are particularly susceptible to these situations due to a dearth of knowledge and education on family planning, higher likelihood of succumbing to family pressure and lack of family support. Wodon et al. (2017) show that for South Asian countries (not including India) fertility is 13% higher for women marrying early, controlling for maternal characteristics.

Using the finding from Wodon et al., eliminating child marriage in the state for a given cohort of 14 year old girls would reduce the number of annual births for this cohort by 4.6%. Assuming that one age cohort of women will contribute roughly 6% to all births in a year, this implies a reduction of about 6300 births annually while this cohort is of reproductive age. We estimate the welfare benefit from this reduction as an increase in GDP per capita for the rest of the population for the first 15 years after the birth is avoided. The calculation assumes projected GDP would remain the same, it is simply distributed over fewer people. The choice of 15 years is motivated by the fact that children do not contribute significantly to economic output before 15 years of age, so it is unlikely that their absence would affect total GDP significantly. Beyond 15 years, of course they may contribute substantially, but given the person is not born, the net effect on *GDP per capita* is neutral. This leads to modest increases in GDP per capita for the population, averaging Rs 1035 crore per year (undiscounted). The net effect for each child marriage avoided at age 14 is Rs. 368,000, discounted at 5%.

Higher frequency of domestic violence

The relationship between child marriage and domestic violence, specifically intimate partner violence (IPV) has been extensively documented. Although Wodon et. al. (2017)'s global synthesis report on the economic impact of child marriage shows a statistically significant relationship between child marriage and IPV, the results is based on data from 11 African countries, Nepal and Pakistan, with no data from India. Kidman (2016) reports findings from surveys conducated in 34 countries: overall physical and sexual IPV directed against women married at less than18 was higher (29%) than for those married at over 18 years (20%). Girls married before 15 have increased odds of 1.57 of experiencing IPV relative to those married at

18+. For girls married between ages of 15-17 the odds of experiencing IPV are 1.47 relative to those married at 18+. These results are adjusted for maternal characteristics.

To estimate increased prevalence of domestic violence arising from early marriage, we begin with reported lifetime prevalence rates from NFHS IV. In Rajasthan this number is 25% of women. A review of the domestic violence literature in India suggests that 41% of women experience it in their lifetime and 30% have done so in the past year (Kalokhe et al, 2017). So the relationship of incidence to prevalence is 30/41, allowing us to calculate that 18% of women are likely to have experienced violence in any given year in Rajasthan. Using the odds ratios from Kidman (2017), applied against this figure suggests that early marriage results in lifetime annual incidence of IPV of 26%, for those married at 14, and 25% for those married at ages 15-17. Finally the review from Kalokhe et al, 2017 suggests that many women who experience IPV do not experience one episode per year, but instead have multiple episodes (Koenig et al, 2006, Ackerson and Subramaniam, 2008; Solomon et al, 2009). Given the heterogeneity in papers reviewed regarding methods, type of violence examined and populations studied it is difficult to infer a representative figure for the 'average' woman experiencing IPV. One study with quantitative data regarding frequency of episodes (as opposed to merely prevalence or incidence) from a reasonably representative sample is Solomon et al (2009). They survey 1,974 married women in low-income communities in Chennai, Tamil Nadu and find that 65% of women experienced 5 or more episodes of IPV in the last 3 months, 24% experienced 1-5 episodes in the last three months, and the rest experience only one episode in that time frame. Based on these figures a naïve estimate of annual episodes, conditional on being exposed to IPV is 16.2 per year. However, the same study also indicated a 99% lifetime prevalence rate of domestic violence exposure, significantly higher than the current India and Rajasthan rate. As an approximation, we assume the average woman who is subject to domestic violence experiences them half as frequently as the sample studied in Solomon et al. (2009), or roughly 8 episodes per year.

From these figures we can determine that the average number of domestic violence episodes per woman (including those who do and do not experience IPV) per year in Rajasthan is 1.5, but for those married at age 14 it is 2.1, and for those married between 15-17 it is 2.0.

The cost per episode of IPV is based on: i) the embedded risk of death from each episode, ii) the economic cost of lost wages and productivity iii) the inherent pain and suffering of violence. For calculating the embedded risk of death, we take the number of deaths for women aged 15 and above, attributable to interpersonal violence from Global Burden of Disease, India (2016). In Rajasthan this is 257 deaths per year, and corresponds to a death rate of 25 per 100,000 episodes of domestic violence. Using standard valuation methods of mortality in *Rajasthan Priorities*, the cost of the embedded risk of death is approximately Rs 1357 per episode in 2017 (when valuing years of life lost at a 5% discount rate).

With respect to lost productivity, each episode is assumed to lead to 5.5 days of lost time (Duvvury et al, 2013). We value this lost time at 100% of female wage rate of Rs 337 per day for those participating in the labour force and working, and 50% of the female wage rate for remaining women. Labour force participation rates vary over a woman's life and when this cohort reaches 18 years of age, the average productivity cost from each episode of domestic violence is estimated at Rs 1160.

For the cost of inherent pain and suffering unfortunately, there is limited evidence to guide the valuation of non-fatal health risks in general (see Robinson and Hammitt, 2018 for an overview). As a plausible estimate, we assume this to be (at least) as large as the average productivity cost from each episode of intimate partner violence.

Using these costs per episode and noting the increased frequency of intimate partner violence from being married early, we estimate the social costs of each marriage at age 14 from domestic violence at Rs 259,000.

Stunting and child health

Given the fertility effects of child marriage, the greater number of children born to these mothers also suffer adverse health consequences due to lack of maternal health and education. Child mortality is at one end of the spectrum but Raj et. al. (2010) show that while women marrying before 18 in India have greater unadjusted odds of child mortality, this is not significant when adjusted for maternal characteristics. Wodon et al. (2017) also show insignificant effects on child mortality for other South Asian countries.

However, from a children's health perspective, stunting stands out as signficant effect as children born to child brides are at risk of delayed physical development due to lack of nutrition. Raj et al. (2010) estimate an odds ratio of 1.22 adjusted for maternal characteristics in stunting due to early marriage. Wodon et al. (2017) also report a higher risk of stunting of 6.3 percentage points on average for children born to mothers below the age of 18 in the countries they included in their research.

The baseline rate of stunting is 39.1% in Rajasthan (NHFS IV). Using Raj et al's (2010) odds ratio of 1.22 implies that child marriage increases stutning by 4.8 percentage points to a total of 43.9%. Given the fertility differences noted above, early marriage leads to women having 0.26 more stunted children on average over their lifetime. Hoddinott et al. (2016) suggest that consumption declined by 66% as a result of stunting – we use this number to adjust the baseline rate of consumption across the state (drawn from government projections) due to the increase in stunting. A time series of the change in consumption can be projected forward based on consumption estimates for the state, and the present value of the adjusted consumption series is the social cost of stunting. A marriage at age 14 leads to approximately Rs 624,000 in social costs due to increased stunting.

Maternal mortality

Higher rates of maternal mortality (MMR) are also commonly associated with child marriage. Nove et al. (2014) suggests that women giving birth at younger ages (15-19) pooled across a wide range of countries have a greater chance of dying in childbirth. About one-fifth of Indian girls have already given birth before the age of 18,[23]. However, the results from Nove et al. (2014) do not hold for India, which is among a small group of countries where MMR increases with age. While maternal mortality will be higher among women who marry early simply because of having more children, this effect is trivially small in India and treated as such in the cost-benefit analysis below.

---

[23] Dasra (2014) states that the transition from girl to mother (in India) usually occurs within a year or two of the girl's marriage.

1.2.1 Determining the Social Benefit of Avoiding Child Marriage from the Interventions

The calculations of social benefits are identical across all four interventions and as discussed above, result from a lower fertility rates, a lower incidence of domestic violence (IPV) and a lower incidence of stunting in children. We start with the fact that in Rajasthan, 39.2% of girls age 14 are enrolled in the first year of secondary school prior to the intervention and for upper secondary the baseline rate of enrolment is 22.2% (data from NSS – 71st round).

Each intervention induces a change in baseline rate of female enrolment across secondary and upper secondary. When bicycle transfers are introduced, we use Murlidharan and Prakash (2016)'s results to estimate that the first year's enrolment increases to 52%, followed by 46% in the second year, 25% in the third year and 24% in the final year of secondary school. This allows us to calculate the number of girls that finish school in each year. School enrolment changes by varying degrees due to the specific intervention. The conditional cash transfer increases enrolment to 46.6% in the first year, 45.6% in the second year, 25.5% in the third year and 25.3% in the final year (based on results from Fiszbien and Shady (2009)). Similarly for the intervention for girls' toilets, the enrolment percentages are 40.1%, 40%, 22.6% and 22.6% based on results from the study by Akuida (2016). Vocational education represents a special case since it is not targeted at girls entering secondary education. We assume that for a large-scale vocational education program targeting 1 million women of all ages, 5% of these will be girls aged 16 or 17 which roughly mimics the existing distribution of all vocationally qualified women in the state. This translates into 1.8% increase in net enrolment for girls aged 16 and 17.

Table 1: Effect of interventions on net enrolment rate

Intervention	Net enrolment rate for Secondary I (age = 14)	Net enrolment rate for Secondary II (age = 15)	Net enrolment rate for Upper Secondary I (age = 16)	Net enrolment rate for Upper Secondary I (age = 17)	Source
Baseline	39%	39%	22%	22%	NSS 71
Bicycle transfers	52%	46%	25%	24%	Muralidharan and Prakash (2017)
Conditional cash transfer for secondary school attendance	47%	46%	26%	25%	Fiszbien and Shady (2009)
Female toilet construction and repair	40%	40%	23%	23%	Adukia (2016)
Vocational education for girls aged 16+	na	na	1.8% of girls in the cohort enrolled	1.8% of girls in the cohort enrolled	Labour and Unemployment Survey (2015)

The second step is to estimate the association between increased education attainment and child marriage. Wodon et al (2017) report that for an average of selected countries, one year of education reduces the rate of child marriage by 12%. The underlying level of child marriage is 35% in Rajasthan (NFHS-4). We assume an equally distributed hazard rate of 8.9% over each of the four years of each intervention constructed on this baseline.

We further assume that a girl going to school cannot be married in that year and calculate the post-intervention likelihood of child marriage conditioned on the new profile of education attainment from the intervention and using the Wodon et al (2017) relationship. This gives an adjusted distribution where we estimate a new profile of child marriage for girls across the four years (see Table 2).

Table 2: Effect of interventions on child marriage

Intervention	% of girls married at age 14	% of girls married at age 15	% of girls married at age 16	% of girls married at age 17	Early marriage rate
Baseline	8.9%	8.9%	8.9%	8.9%	35.4%
Bicycle transfers	7.7%	8.3%	8.9%	9.2%	34.2%
Conditional cash transfer for secondary school attendance	8.2%	8.3%	8.7%	8.8%	34.0%
Female toilet construction and repair	8.8%	8.8%	8.8%	8.8%	35.2%
Vocational education for 16+	8.9%	8.9%	8.8%	8.8%	35.4%

We note that as a result of the interventions, the rate of child marriage declines at the outset, but for the bicycle transfers intervention is also bunched up towards the end of the secondary school cycle, with the highest rate of marriage in the last year of secondary school. This expected given that the intervention has the effect of both reducing and delaying marriage as more girls attend school and we assume that girls in school are not married.

The benefits of avoided child marriage are estimated by adjusting this post-intervention distribution of early marriage by changes aginst the costs of early marriage by different ages. The three major social costs are discounted at 3%, 5% and 8% respectively and then added (a cost for maternal mortality calculated similarly is also included but is negligible) for an estimate of total social benefits for each intervention.

2. Conditional bicycle transfers for secondary school girls

2.1 Description of intervention

- Bicycle Transfers to all eligible secondary school girls age 14 in the first year of the intervention.
- The intervention will be implemented for 687,301 girls (14 year old girls in Rajasthan according to Census 2011) by the state government
- The intervention will be implemented for four years with the same cohort of girls. The costs and benefits are calculated over four years, taking into account the present value of wages over a longer period i.e. the beneficiary's working life span.
- The risks of the intervention include fraud associated with school registration, early withdrawal without notification, undocumented absenteeism, lying about loss of bicycle

2.2 Data

The data is sourced from national and state government research and statistics including the following: Census 2011, National Sample Survey (NSS) 71st round – January-June 2014 surveys on education, the Annual Status of Education Report (ASER) – 2016 and District Information System for Education (DISE) reports.

2.3 Literature Review

The bicycle transfer program in the Indian state of Bihar received accolades for its success in increasing secondary school enrolment of girls. Muralidharan and Prakash (2016)'s study of the impact of the program is based on a large representative household survey. They find that being in a cohort that was exposed to the bicycle program increased girls' secondary school enrolment by 32%, with 18% of girls appearing for the higher-level secondary school certificate examination and 12% passing the exam. In addition, the paper finds that enrollment increased more from villages furthest away from the school, implying that the availability of safe and free transportation was a driving factor.

2.4 Calculation of Costs and Benefits

For each intervention, baseline data from the 2011 census and government surveys (NSS 71) at the state level are used to calculate the total number of girls eligible for the intervention i.e. potential beneficiaries. The projected number of beneficiaries relative to the number of girls that receive the intervention is calculated based on data from academic studies, evaluating the impact of similar interventions already implemented in other Indian states or countries with comparable demographics and social structures.[24] The Census provides the number of girls age 14 in each state. NSS 71's survey shows that in Rajasthan 39.2% of girls age 14-15 are enrolled in secondary school and that 22.2% of girls age 16-17 are enrolled in higher secondary school.

The next step is to calculate the projected number of beneficiaries of the intervention. Using Muralidharan and Prakash (2016)'s calculation, the number girls in school increases to 52% after the first year of the intervention (see results for the next three years in the discussion of social costs Section 1.2.1). The first year enrolment is 32% of the remaining eligible girls[25], second year is 18% followed by 12% for the third year and 6% for the final year, adjusted by appropriate dropout rates derived from DISE.

---

[24] For instance Muralidharan and Prakash estimate that bicycle transfers in Bihar xxxxx
[25] Also from Muralidharan and Prakash (2016). In the third year of secondary school we use the 12% that passed the higher secondary school certificate exam from Muralidharan and Prakash, and in the fourth year we assume a 6% pass rate.

Costs

The cost of the intervention is the sum of three categories of costs. The first is the cost of the bicycle multiplied by the *number of girls that enroll in school due to the intervention*, i.e. the product of Rs. 3850 (current market price of bicycles) and 52% of eligible girls enrolled in the first year post-intervention. The second is the cost of secondary education *per additional girl enrolled in school following the intervention* which is Rs. 6315 (from NSS 71) multiplied by the 12.5% of girls in the state added to the cohort of girls in school. For this pool of additional girls we also add the opportunity cost of being at school (measured in terms of lost wages)[26]. It is Rs. 7548 drawn from the Labour and Employment Survey 2015-16 and is the average annual wage of a girl that has completed the previous level of education adjusted for labour force participation rate and unemployment. The sum total is Rs. 3731 for the first year. In the subsequent three years of the intervention, the bicyle cost is not incurred (since it is a one time purchase), though the opportunity costs of education increase for those that continue schooling. The total cost of the intervention for one cohort of 14 year old girls over four years is Rs 365 crore (at a 5% discount rate), of which 38% represents the cost of the bicycles.

Benefits

The total benefits of the intervention are the sum of the direct benefit and the social benefits from reduced child marriage. The direct benefit is also the sum of three components. The first part is the discounted value of higher future wages resulting from the increase in education attainment due to the intervention. The income stream varies based on the education level completed by the girl; where the income stream is adjusted by the distribution of girls by terminating school year. Added to this is the value of the bicycle (which is a cost of the intervention but also a transfer in kind to the beneficiary) multiplied by the number of girls who receive the bicycle (this is the same number as in the cost calculation above). The third component is the cost savings of Rs 792 per girl on alternative forms of public transportation (derived from NSS 71) multiplied by the girls receiving the intervention. The total direct benefit is Rs 602 crore, 62% of which represents higher lifetime wages from further secondary education.

---

[26] Lost wages are measured in terms of average annual wage for girls (completed primary school).

Given the relationship between further secondary education and child marriage, it is estimated this intervention will avoid 8178 early marriages for this cohort. Social (early marriage avoided) benefits described in Section 1.2.1 are calculated at Rs 1043 crore. The total benefits from the intervention are therefore Rs 1645 crore.

2.5 Assessment of Quality of Evidence and Sensitivity Analysis

The impact of the intervention on child marriage is from Muralidharan and Prakash (2016)'s study of bicycle transfers in Bihar. While contextual difference are driven by differences in social and educational characteritstics, both states have high levels of child marriage and the use of a study based in India has significant value. The underlying data is from reliable government statistics. However, despite these positive elements, the quality of evidence is "Medium" given that there are no other relevant studies from which evidence can be drawn.

The sensitivity analysis using 3%, 5% and 8% discount rates is primarily driven by the change in benefits as the cost of the bicyle is very small and is a one-time initial expense.

3. Conditional cash transfer for secondary school girls

3.1 Description of intervention

- Cash transfer conditional on secondary school enrolment for all eligible girls age 14 in the first year of the intervention.
- The intervention will be implemented for 687,301 girls (14 year old girls in Rajasthan according to Census 2011) by the state government
- The intervention will be implemented for four years with the same cohort of girls. The costs and benefits are calculated over four years, taking into account the present value of wages over a longer period i.e. the beneficiary's working life span.
- The risks of the intervention include fraud associated with school registration, early withdrawal without notification and undocumented absenteeism.

3.2 Data

The data is sourced from national and state government research and statistics including the following: Census 2011, National Sample Survey (NSS) 71st round – January-June 2014 surveys on education, the Annual Status of Education Report (ASER) – 2016 and District Information System for Education (DISE) reports.

3.3 Literature Review

Fiszbien and Shady (2009) performs an exhaustive analysis of conditional cash transfers (CCTs) focused on education and health benefits across a wide range of countries, concluding that despite the controversy over CCTs overall, there are clearly poverty alleviation and welfare benefits from targeted interventions. Their study evaluates motivations for CCTs including paternalism, principle-agent issues around information imperfections and market failures including the failure of credit and insurance markets in poor segments of the population. These issues are valid across developing countries despite large variations. However, the objective in this instance is not to measure consumption effects or broader welfare improvement across the population but is targeted at increasing the rate of secondary education for girls, regardless of the effects on labor participation and other economic activities that might actually reduce income in the short-term.

3.4 Calculation of Costs and Benefits

The cash transfer is to be provided monthly to all 14-year old girls eligible for secondary school. The baseline numbers are the same as in the bicycle transfer intervention discussed above and are derived from Census 2011 and NSS 71, which drive the calculation of the number of girls eligible for the intervention. Fiszbien and Shady (2009) summarize the results of numerous studies on the impact of CCTs on the enrolment of girls (specifically) and girls and boys in secondary school, finding a positive impact across the board, and although there is no specific analysis of India, we use average data for Bangladesh, Cambodia and Pakistan[27]. The analysis shows an average of 18.9% (in percentage points) increase in enrollment in secondary education schools as a result of a targeted CCT. Increasing the baseline enrollment by 18.9%

---

[27] Underlying studies are Khandker et al. (2003) for Bangladesh, Filmer and Shady (2008) for Cambodia, and Chaudhury and Parajuli (2008) for Pakistan. All studies report statistically significant coefficients in percentage t.

each year and reducing the total by an assumed dropout rate from DISE, provides the total number of girls benefiting from the intervention on an annual basis - this amounts to 47% of eligible girls in the first year, 46% in the second year, 26% in the third year and 25% in the last year of secondary school.

Costs

In the first year, the cost of the cash transfer is Rs 7521 and is applied to all girls entering school each year. For girls who are compelled to enter school because of the intervention we also add the cost of education (Rs. 6315) and the opportunity cost of foregone earnings (Rs 7548). For subsequent years, the cost numbers are adjusted by different levels of incremental enrolment in school, and different opportunity costs, as in the bicycle transfer case. The total cost of the intervention over four years is Rs 951 crore (at a 5% discount rate).

Benefits

The economic benefit of the intervention is the present value of higher wages in adulthood based on increased eduation attainment from the intervention. We add the cash transfer comprising the school subsidy to the benefits since it is a real economic windfall for the girl's family. The total direct benefit from the intervention is Rs 1543 crore (5% discount).

It is estimated the intervention will avoid 9620 child marriages for this cohort, which has benefits of INR 1152 crore (5% discount). Total benefits from the intervention are therefore Rs 2695 crore.

3.5 Assessment of Quality of Evidence and Sensitivity Analysis

The quantitative impact of the intervention is primarily drawn from Fiszbien and Shady (2009), which includes an evaluation of numerous studies on CCTs for education across the world, creating sufficient depth in the quality of evidence. Given that there is no direct study based on data from India, the quality of evidence is rated "medium". Sensitivity analysis does not produce significant insights and differences in scenarios are predictable due to discounting.

4. Provision and maintenance of girls' toilets in secondary schools

4.1 Description of intervention

- Provision of toilets for girls in all eligible secondary schools across the state – 5993 schools estimated based on ASER – 2016 and DISE data.
- The intervention should cover all 687,301 girls (14 year old girls in Rajasthan according to Census 2011) and will be implemented by the state government
- One-time construction at eligible sites
- The toilets will have to be constructed before the official start date of the intervention from when school enrolment is measured
- Changing social norms to enforce use of toilets and prevention of male use of girls' toilets is an additional risk

4.2 Data

The data is sourced from national and state government research and statistics including the following: Census 2011, National Sample Survey (NSS) 71st round – January-June 2014 surveys on education, the Annual Status of Education Report (ASER) – 2016 and District Information System for Education (DISE) reports. The data on the cost of toilets is from *Swachh Bharat: Swachh Vidyala,* a Government of India policy paper.

4.3 Literature Review

Numerous studies have pointed out that poor sanitation facilities across developing countries can have an effect on school attendance of girls and boys at all levels. However, as Birdthistle et al. (2011) point out, there is very limited quantitative evidence on the relationship between the lack of toilet facilities and school attendance of girls. The evidence is particularly sparse when related to the impact of separate toilets for girls, as there does not appear to be a sufficient number to form the basis of rigorous studies in most countries. However, in a recent study Aduika (2016) evaluated the impact of a government-sponsored school toilet construction initiative in 2003 on school attendance data from a large sample of schools in

India. She finds that school sanitation (existence of toilets) significantly affects school attendance of pubescent girls, but not surprisingly, primarily in cases where sex-specific toilets are provided. The intervention proposed is particularly timely given the central government's national initiative - *Swachh Bharat: Swachh Vidyalaya* (Clean India: Clean Schools) – to provide universal access to sex-specific toilets in all government schools.

4.4 Calculation of Costs and Benefits

The calculation of eligible girls is as presented for the first two interventions above. Aduika (2016) reports that the construction of a girls-only toilet for cohorts analyzed across India increased upper primary school (6th-8th grade) enrolment by 11%. We calculate the increase in school enrolment in Rajasthan following the intervention, finding that the baseline rate of secondary school enrolment of 39.2% increases to 40.1% in the first year, 40% in the second year, 22.6% in the third year and 22.6% in the final year.

Costs

The costs are divided into two categories, the first of which are direct individual-level costs: the cost of secondary school and the opportunity cost of being in school. These are exactly the same as in the bicycle transfer and CCT interventions described above but are adjusted by different proportions of girls based on the impact of the toilet construction on marginal school enrolment reported in the previous paragraph.

The second category of cost is the cost of toilet construction and maintenance, and in cases where toilets already exist and have to be repaired, the incremental cost of repairing. We use data from ASER 2016 to estimate the number of toilets that need to be constructed or updated – the data provides a detailed distribution of toilets in schools across the state for single-sex and unisex toilets, and toilets that are unused or locked. The cost of construction of a toilet is derived from *Swacch Bharat: Swacch Vidyalaya*, is Rs. 3.55 lakhs including washrooms, we infer that the cost of construction of a girls' only toilet is Rs. 1.3 lakhs, and that the updating of existing toilets for use by girls is Rs. 60,000 also sourced from *Swacch Bharat: Swacch Vidyalaya*. The total cost of toilets then is the number of schools that require toilets (construction, only for girls or updating) multiplied by the cost in each of these three categories.
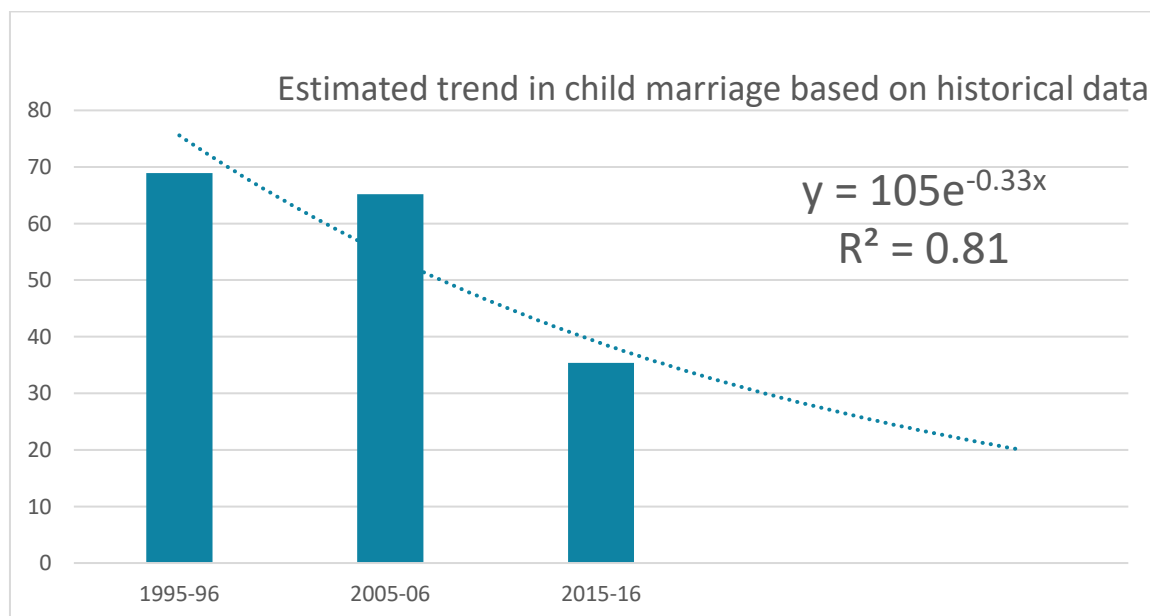
The total 20 year cost of the intervention is Rs 1138 crore (5% discount). Approximately 10% of this is the upfront investment cost of building or repairing toilets, while the rest represents ongoing toilet maintenance as well as opportunity and education costs from the new girls going to school as a result of a toilet being present.

Benefits

As with the previous interventions, the primary benefit is the higher wages resulting from increased education attainment brought about by the intervention. We calculate this for the twenty year life of each toilet and adjust for expected growth in real incomes. This is Rs 2373 crore (5% discount).

The intervention has a modest effect on early marriage at any point in time, reducing prevalence by 0.5%. However, because the effect lasts twenty years, the absolute impact of toilet construction is substantial. For estimating the benefits of child marriage in future years we adjust for a natural decline in the baseline rate of child marriage. This is based on the previous four estimates of child marriage rates during NFHS I-IV and assuming a decreasing exponential function. The estimated function has an R^2 of 0.81.

Figure 2: Historical and predicted rates of child marriage in Rajasthan

Source: NFHS I-IV (1995-1996 is an average of NFHSI and NHFSII, 2005-2006 is based on NFHS III, 2015-2015 based on NFHSIV)

The benefits of avoided early marriage are INR 2315 crore and therefore the total benefits of the intervention are Rs 4688 crore.

4.5 Assessment of Quality of Evidence and Sensitivity Analysis

Aduika (2016) is the primary source of the evidence and although it is widely cited, it is still unpublished. The advantage of a study based in India is significant, although this is partially offset by the lack of any other evidence from other parts of the world. Aduika's study focuses on the impact on upper primary school girls (vs. secondary school girls in the intervention), but given that the emphasis on sanitation is most relevant for all pubescent-age girls in this context, the evidence can be classified as "medium". There is also significant uncertainty across a two-decade landscape of child marriage, income and female enrolment. The BCR sensitivity analysis reflects the front loading of the toilet costs and sizable impact on school enrolment derived over time.

5. Vocational Training

5.1 Description of intervention

- Vocational training and skill development programs for eligible secondary and post-secondary school girls in the state
- The intervention should cover all 1,000,000 girls and will be implemented by the state government over a period of 18 months
- Choice of vocational training program should be limited to one or two verticals: recommended vertical is tailoring.
- Counseling regarding future employment opportunities can be included in the program including advice on self-employment, but cost of counseling is not included in the BCR analysis. The intervention does not include job placement.

5.2 Literature Review

The role of vocational education in developing countries cannot be understated. Given the level of unemployment, the cost of formal secondary education and high drop out rates, governments in numerous countries have been emphasizing skill development and vocational

training at all levels. India's Ministry of Skill Development ad Entrepreneurship[28] introduced the Skill India Mission in 2015 and the government has announced the focus on 40 sectors to develop skilled labour and employment.

Attanasio et al. (2016) analyse the impact of a vocational training program in Colombia through a randomized control trial, showing a sizable benefit on employment and income, particularly for women following the six-month skill development initiative. Cost benefit analysis suggests that the program provides higher value than similar efforts in developed countries. Given that Colombia is a middle-income country, comparisons with India are not ideal, but the similarities are substantial particularly in areas where the formal sector can provide jobs.[29]

While there are no significant studies on the impact of vocational training on early marriage, the assumption is that like secondary education, vocational training will provide girls with economic empowerment and incentivize families to delay their marriage. Maitra and Mani (2017) recently completed a survey-based evaluation of the impact of a vocational training program in stitching and tailoring on women from low-income households in India. They find that six months after the program, women in the training cohort were 6% more likely to be employed, 4% more likely to be self-employed and were able to earn 150% more per month that those in the control group. The results hold after an 18-month period.

5.3 Calculation of Costs and Benefits

Costs

The proposed intervention is a vocational training program for 1 million girls across the state. Eligibility is not derived from school enrolment data as girls attending school can also participate in the program. Girls with no secondary school education are eligible as long as they are 16 years old or more. The costs and economic benefits of the program are from Maitra and Mani (2017). The cost of the program per girl is Rs. 1910 for 18 months.

Benefits

[28] Ministry established by the Modi Government
[29] Indian companies are already using CSR initiatives to set up vocational training facilities near factories in rural areas.

For the calculation of benefits, we focus on the increase in wages. Based on the evidence in Maitra and Mani (2017), the future stream of wages rises by 32% as a consequence of the training. The assumption is that the wage premium benefit will last for ten years. The value of this benefit for the 1m women targeted by the intervention is Rs 3234 crore.

Five percent of the 1m girls in the intervention will be below the age of 18, and this will have a small effect on the prevalence of early marriage, reducing early marriages by 0.04 percentage points (259 early marriages avoided). This has benefits of 29 crore for total benefits of Rs 3263 crore.

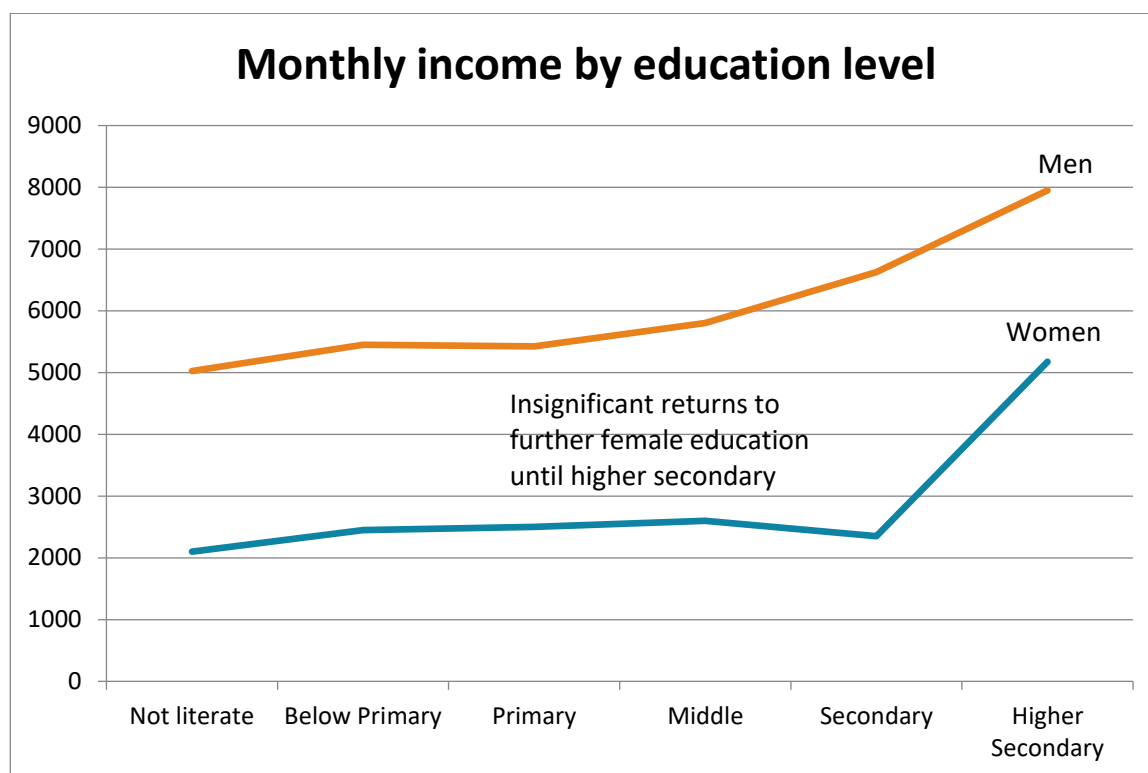## 5.4 Assessment of Quality of Evidence and Sensitivity Analysis

Given the lack of evidence on the impact of vocational training on women's income, empowerment and child marriage, we rate the quality of the evidence as "limited". The sensitivity analysis around benefits only amounts to a change in the discount rate, while costs are assumed to be constant under all scenarios.

In a more complete assessment of vocational training, the wage benefit will vary significantly based on the type of training, location of job, sector, prior education level, and other factors. In instances of self-employment, further assumptions on income will be required. Costs will also vary significantly based on the type and length of program.

6. Employment Opportunities: Future path

While the cost-benefits analysis assumes that education and training will lead to employment and higher wages past secondary school, the key question is whether these opportunities exist and how they can be improved. Labour and Employment survey data show that in Rajasthan, income for women appears invariant with education until upper secondary school. For men this effect does not exist and there is a generally positive association between wages and education while girls only see income benefits past this inflection point. As a result, the need to provide support (in the form of employment opportunities) along the path for educated girls to actually benefit from education and training interventions becomes a crucial condition for successful policy implementation.

Figure 3: Monthly income by education level for men and women in Rajasthan

In fact, education and training interventions with employment opportunities could provide a continuum of policies for girls to break traditional economic and social barriers on a long-term basis. The final stage in the continuum can be achieved through the establishment of networks that link women to formal employment opportunities and the provision of loans to incentivize women to start micro-enterprises in local communities. In a study on the impact of labor market opportunities on womens' work and family decisions in India, Jensen (2012) finds that women targeted by an intervention providing 3 years of recruiting services for Business Process Outsourcing (BPO) units were significantly less likely to get married or have children.[30]

An employment option intervention is beyond the scope of this study, but the importance of livelihood generation opportunities cannot be understated. While it can be done directly by the government, a more sustainable approach is through public-private sector partnerships that can potentially create jobs across industries and beyond traditional public sector activities.

---

[30] The study was conducted on randomly selected villages. Women also reported the desire to have fewer children and work more consistently throughout their lives following the intervention.

7. Conclusion

The review of a wide range of policy interventions to address child marriage indicate that conditional transfers targeted at education are among the most effective strategies to reduce the incidence of child marriage in developing countries. In addition, research has also shown that transportation barriers and poor sanitation in schools affect the enrolment of girls in secondary school programs. This paper recommends four specific interventions to reduce child marriage in Rajasthan. They include bicycle transfers, conditional cash transfers (educational subsidy), toilets for girls and vocational training – to create income generating opportunities for girls that can change the dynamics of the gender balance within families and social norms over time.

An analysis of the costs and benefits of each intervention are based on determining eligibility from underlying data included in government statistics. The quantitative impact of the interventions is drawn from academic literature assessing the effect of similar policies implemented either in India or in other countries with a high incidence of child marriage. The costs including the total cost of the intervention and the opportunity cost of being at school or in a training program are calculated for the baseline cohort of eligible girls. Benefits include both the economic benefits in terms of the present value of a long-term income stream and the social and welfare benefits that come from lower levels of fertility and domestic violence, an improvement in children's health and a decline in maternal mortality.

Each of the interventions analyzed independently yield significantly positive BCRs, discounted at 3%, 5% and 8%. Not surprisingly, the direct subsidy for secondary school yields a lower BCR relative to the bicycle transfer and the provision of girls' toilets intervention, both of which have the cost of the education subsidy embedded within their cost structure. The higher BCRs for bicycle transfers are also reflective of the one-time and very low cost of providing a bicycle. For toilet construction, the costs are substantially higher but are also front-loaded at the beginning of the four-year life span of the intervention, with benefits accruing over multiple years.

Compared with Andhra Pradesh, the absolute values of BCRs for the secondary school related interventions in Rajasthan are significantly lower. This is due to the fact that as pointed out above, the wage benefit from education for Rajasthan only appears at the senior secondary

school level – two years after the wage benefit for Andhra Pradesh. The costs of interventions in both states are very similar; large differences in the time series of benefits for all interventions drives the results. The stagnation of wages in Rajasthan over these two years has a sizable impact on the present value of benefits and should be considered when implementing any education related interventions in the state.

Conceptually, the sizable increase in BCRs when either transportation or sanitation facilities are added to the underlying education subsidy reinforces the value of these indirect interventions on the demand side for secondary school enrolment and highlights their incremental value. The vocational training intervention also produces positive results, but micro-level estimates of training costs will need to be included prior to implementation from a state government perspective. Ultimately, the choice of intervention is not simply a function of the BCR as in practical terms it will be dependent on the feasibility of implementation, and the ability to scale across the state.

Summary Table: Rajasthan

Interventions	Discount	Benefit	Cost	BCR	Quality of Evidence
Bicycle Transfer	3%	2,437	368	6.6	Medium
	5%	1,645	365	4.5	
	8%	1,017	360	2.8	
Conditional Cash Transfer	3%	3,869	974	2.2	Medium
	5%	2,695	951	2.8	
	8%	1,785	920	1.2	
Provision of Girls' Toilets	3%	8,961	1,352	6.6	Medium
	5%	4,688	1,138	4.1	
	8%	2,768	905	3.1	
Vocational Training	3%	3,655	677	5.4	Limited
	5%	3,263	677	4.8	
	8%	2,784	677	4.1	

Notes: From analysis conducted based on public data and academic literature review. All costs and benefits in crores of Indian Rupees.

6. References

Ackerson, L. K., & Subramanian, S. V. (2008). Domestic violence and chronic malnutrition among women and children in India. *American Journal of Epidemiology, 167*(10), 1188–1196.

Adukia, A. (2016). Sanitation and Education. *University of Chicago Working Paper.*

Angrist, J., Bettinger, E., and Kremer, M. (2006). Long-term Educational Consequences of Secondary School Vouchers: Evidence from Administrative Records in Colombia. *The American Economic Review* 96(3): pp 847-62.

Annual Status of Education Report (ASER) – 2016. ASER Centre, New Delhi.

Attanasio, O., Kugler, A., and Meghir, C. (2011). Subsidizing Vocational Training for Disadvantaged Youth in Colombia: Evidence from a Randomized Trial. *American Economic Journal: Applied Economics* 3(3): pp. 188-220.

Baird, S., McIntosh, C., and Ozler, B.. (2011). Cash or Condition? Evidence from a Randomized Cash Transfer Program. *Quarterly Journal of Economics* 126(4): pp. 1709-1753.

Bandiera, O., Burgess, R., Goldstein, M., Gulesci, S., Rasul, I., and Sulaiman, M. (2010). Intentions to Participate in Adolescent Training Programs: Evidence from Uganda. *Journal of European Economic Association* 8(2-3): pp. 549-60.

Beaman, L., Duflo, E., Pande, R., and Topalova, P. (2012). Female Leadership Raises Aspirations and Educational Attainment for Girls: A Policy Experiment in India. *Science* 335(6068): pp. 582-586.

Birdthistle, I., Dickson, K., Freeman, M., and Javidi, L. (2011). What Impact Does the Provision of Separate Toilets for Girls at Schools have on their Primary and Secondary School Enrolment, Attendance and Completion: A systematic review of the evidence. London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.

Buchmann, N., Field, E., Glennister, R., Nazneen, S., Pimkina, S., and Sen, I. (2017). Power vs. Money: Alternative Approaches to Reducing Child Marriage in Bangladesh, A Randomized Control Trial. Working Paper.

Duvvury, N., Callan, A., Carney, P., and Raghavendra, S. (2013). Intimate Partner Violence: Economic Costs and Implications for Growth and Development. Gender Equality and Development, Women's Voice Agency and Participation Research Series No. 3, The World Bank.

Chaaban, J., and Cunningham, W. (2011). Measuring the Economic Gain of Investing in Girls: The Girl Effect Dividend. Policy Research Working Paper 5753, The World Bank.

Chaudhury, N., and Parajauli, D. (2008). Conditional Cash Transfers and Female Schooling: The Impact of the Female School Stipend Program in Punjab, Pakistan. *Journal of Applied Economics.*

Clots-Figueras, I., (2014). Benefits and Costs of the Gender Equality Targets for the Post-2015 Development Agenda. Post-2015 Consensus, Copenhagen Consensus Center Working Paper.

Dasra. (2014). Marry Me Later: Preventing Child Marriage and Early Pregnancy in India.

Das Gupta, S., Mukherjee, S., Singh, S., Pande, R., and Basu, S. (2008). Knot Ready: Lessons from India on Delaying Marriage for Girls. International Center for Research on Women.

District Information System for Education (DISE) Publications. National University of Educational Planning and Administration, Government of India.

Field, E., Glennerster, R., Buchmann, N., and Murphy, K. (2016). Benefits and Costs of Reducing the Prevalence of Child Marriage in Bangladesh. Bangladesh Priorities Project, Copenhagen Consensus Center.

Filmer, D., and Shady, N. (2008). Getting Girls Into School: Evidence of a Scholarship Program in Cambodia. *Economic Development and Cultural Change*, 56, pp. 581-617.

Fiszbien, A., and Schady, N. (2009). Conditional Cash Transfers: Reducing Present and Future Poverty. World Bank.

Heath, R., and Mobarak, A.M. (2015). "Manufacturing Growth and the Lives of Bangladeshi Women." *Journal of Development Economics* 115: pp. 1-15.

Hoeffler, A., and Fearon, J. (2014). Conflict and Violence Assessment Paper, Post-2015 Consensus, Copenhagen Consensus Center.

Hong, S., and Starr, L. (2012). Long-Term Impacts of the Free Tuition and Female Stipend Programs on Education Attainment, Age of Marriage and Married Women's Labour Participation in Bangladesh. World Bank Working Paper.

International Center for Research on Women. (2011). Delaying the Marriage for Girls in India: A Formative Research to Design Interventions for Changing Norms.

International Institute for Population Sciences, Ministry of Health and Family Welfare, Government of India. (2017). National Family Health Survey-4 2015/16.

Jacobsen, J., (2011). Gender Inequality - A Key Global Challenge: Reducing Losses due to Gender Inequality. Assessment Paper, Copenhagen Consensus on Human Challenges, Copenhagen Consensus Center.

Jensen, R,. (2012). Do Labor Market Opportunities Affect Young Women's Work and Family Decisions? Experimental Evidence from India. *Quarterly Journal of Economics* 127: pp 753-792.

Jha, J. et al., (2016). Reducing Child Marriage in India: A model to scale up results. Center for Budget and Policy Studies and United Nations Children's Fund, New Delhi.

Jha, P., Kesler, M., Kumar, R., Ram, F., Ram, U., Aleksandrowicz, L., Bassani, D., Chandra, S., and Banthia, J. (2011). Trends in Selective Abortions of Girls in India: Analysis of nationally representative birth histories from 1990 to 2005 and census data from 1991 to 2011. *The Lancet*.

Kalamar, A., Lee-Rife, S., and Hindin, M. (2016). Interventions to Prevent Child Marriage Among Young People in Low- and Middle-Income Countries: A Systematic Review of the Published and Grey Literature. *Journal of Adolescent Health* 59, pp. S16-S21.

Kalsi, P. (2017). Seeing is Believing – Can increasing the number of female leaders reduce sex selection in rural India? *Journal of Development Economics* Vol 126(C), pp. 1-18.

Khandker, S., Pitt, M., and Fuwa, N. (2003). Subsidy to Promote Girls' Secondary Education: The Female Stipend Program in Bangladesh. The World Bank.

Kidman, R. (2017). Child Marriage and Intimate Partner Violence: A Comparative Study of 34 Countries. *International Journal of Epidemiology*, pp. 662-675.

Kalohkhe, A., del Rio, C., Dunkle, K., Stephenson, R., Metheny, N., Paranjape, A., Sahay, S, (2017), Domesctic violence against women in India: A systematic review of a decade of quantitative studies, *Global Public Health*, 12(4), pp. 498-513

Koenig, M. A., Stephenson, R., Acharya, R., Barrick, L., Ahmed, S., & Hindin, M. (2010). Domestic violence and early childhood mortality in rural India: Evidence from prospective data. *International Journal of Epidemiology, 39*(3), 825–833.

Maitra, P., and Mani, S. (2017). Learning and Earning: Evidence from a Randomized Evaluation in India. *Labour Economics* 45, pp.116-130.

Malhotra, A., Warner, A., McGonagle, A., and Lee-Rife, S. (2011). Solutions to End Child Marriage: What the Evidence Shows. International Center for Research on Women.

McCollister, K., French, M., and Feng, H. (2010). The Cost of Crime to Society: New Crime-Specific Estimates for Policy and Program Evaluation. Drug Alcohol Dependency, *National Institute of Health – Public Access Author Manuscript,* 108(1-2): pp. 98-109.

Muralidharan, K., and Prakash, N. (2017). Cycling to School: Increasing Secondary School Enrolment for Girls in India. *American Economic Journal: Applied Economics*, American Economic Association, 9(3), pp. 321-350.

Nanda, P., Datta, N., Pradhan, E., Das, P., and Lamba, S. (2016). Making Change with Cash: Impact of a Conditional Cash Transfer Program on Age of Marriage in India. International Center for Research on Women.

National Sample Survey (NSS), 71st Round – (2014) National Sample Survey Office, Ministry of Statistics and Programme Implementation, Government of India.

Nove, A., Matthew, Z., Neal, S., and Camacho, A. (2014). Maternal Mortality in Adolescents Compared with Women of Other Ages: Evidence from 144 Countries. *Lancet Global Health*, 2; pp. e155-164.

OHCHR, UNFPA, UNICEF, UN Women and WHO. (2011). Preventing Gender-biased Sex Selection: An Interagency Statement.

Psacharopoulos, G. (2014). Benefits and Costs of the Education Targets for the Post-2015 Development Agenda. Post 2015 Consensus, Copenhagen Consensus Center Working Paper.

Raj A., McDougal, L., and Jackson E. (2017). Community experiences with Project RISHTA: A youth empowerment program to delay marriage in Jharkhand, India.

Raj, A., Saggurti, N., Balaiah, D., and Silverman, J. (2009). Prevalence of Child Marriage and its Impact on the Fertility and Fertility Control Behaviors of Young Women in India. *Lancet*; 373 (9678): pp. 1883-1889.

Raj, A. (2010). When the Mother is a Child: The Imapct of Child Marriage on the Health and Human Rights of Girls. *Archives of Disease in Childhood*, BMJ, 95, pp. 931-935.

Raj, A,. Saggurti, N., Winter, M., Labonte, A., Decker, M., Balaiah, D., and Silverman, J. (2010). The Effect of Maternal Child Marriage on Morbidity and Mortality of Children Under 5 in India: Cross-Sectional Study of a Nationally Representative Sample. *BMJ*, 340: b4258.

Rashan, A., and Sharaf, M. (2017). Income Inequality and Violence Against Women: Evidence from India. University of Alberta, Faculty of Arts, Department of Economics Working Paper No. 2017-13.

Robison L. A., and Hammitt, J. K. (2018), Valuing Nonfatal Health Risk Reductions in Global Cost-Benefit Analysis, *Guidelines for Benefit-Cost Analysis Project, Working paper no2*, available at https://sites.sph.harvard.edu/bcaguidelines/

Roest, J. (2016). Child Marriage and Early Child Bearing in India: Risk Factors and Policy Implications. Policy Paper 10, Young Lives.

Rosenblum, D. (2017). Estimating the Private Economic Benefits of Sons Versus Daughters in India. *Feminist Economics* Vol 23(1), pp. 77-107.

Sama Resource Group for Women and Health. 2015. "Dataspeak: Early Marriage and Health."

Sarkar, S, Sahoo, S., and Klasen, S. (2017). Employment Transition of Women in India: A Panel Analysis. IZA Institute of Labor Economics Discussion Paper Series, IZA DP No. 11086.

Sinha, N., and Yoong, J. (2009). Long-term Financial Incentives and Investment in Daughters: Evidence from Conditional Cash Transfers in North India. Working Paper WR-667, RAND Labor and Populations Series.

Solomon, S., Subbaraman, R., Solomon, S. S., Srikrishnan, A. K., Johnson, S. C., Vasudevan, C. K., …Celentano, D. D. (2009). Domestic violence and forced sex among the urban poor in South India: Implications for HIV prevention. *Violence Against Women, 15*(7), 753–773.

Swachh Bharat Swachh Vidyalaya: A National Mission. (2014). Handbook, Ministry of Human Resource Development, Government of India.

Warner, A., Stoebenau, K., and Glinski, A. (2014). More Power to Her: How Empowering Girls can Help End Child Marriage. International Center for Research on Women.

Wodon, Q., Male, C., Nayihouba, A., Onagoruwa, A., Savadogo, A., Yedan, A., Edmeades, J., Kes, A., John, N., Murithi, L., Steinhaus, M., and Petroni, S. (2017). Economic Impacts of Child Marriage: Global Synthesis Report, Washington, DC: The World Bank and International Center for Research on Women.

Young Lives and National Commission for the Protection of Child Rights (NCPCR). (2017). A Statistical Analysis of Child Marriage in India Based on Census 2011.

Zaman, A,. (2016). Benefits and Costs of Reducing Child Malnutrition and Early Childbearing Through Girls' Education in Bangladesh. Bangladesh Priorities Project, Copenhagen Consensus Center.

Sector Expert Review

Rajasthan Priorities
An India Consensus Prioritization Project

Shobhita Rajagopal

Associate Professor
IDS Jaipur

The incidence of child marriage is high in the state of Rajasthan. According to recent National Family Health Survey (NFHS-4 2015/16) data 35.4% of women between the ages of 20-24 are still married before age 18 in Rajasthan. The state is in the bottom quartile of the states across the country with reference to child marriage. The Census figures also show wide variations in the districts and about 14 districts have high prevalence of child marriage when compared to state average.

The State Strategy and Action Plan for Prevention of child marriage(2017)[1] drafted by the Government of Rajasthan notes that child marriage is both a symptom and consequence of caste, class, religion and gender inequality in the state. Multiple sets of factors contribute to the prevalence and persistence of child marriage. Various studies have shown that the key drivers of child marriage range from low value of girls, traditional norms and social practices, poverty, safety and security issues and access to schooling especially secondary education and poor quality of education. All these factors combine and put girls disadvantageous position and they are not able negotiate from a position of strength. It is evident that many of the drivers run deep and require sustained and consolidated effort from a range of stakeholders.

The current paper argues that the most effective policy interventions to reduce child marriage are based on the economic empowerment of the girl child through secondary education and vocational training, qualifying her for employment and the creation of a sustainable income stream. It notes that building economic value for women creates behavior change with a multiplier effect.

The cost benefit analysis has focused on four key intervention areas that have a likelihood of impacting child marriage. These include

- **Conditional bicycle transfers for secondary school girls**
  The intervention will be implemented for 687,301 girls (14 year old girls in Rajasthan according to Census 2011) by the state government. It is estimated this intervention will avoid 8178 early marriages for this cohort

---

[1] Government of Rajasthan(2017) State Strategy and Action Plan for Prevention of Child Marriage: Towards creating a child marriage free Rajasthan,, Department of Women and Child Development, Jaipur

- **Conditional cash transfers to secondary school girls**

  The intervention will cover a cohort of 687,301 girls. The intervention will be implemented for all four years of secondary school. It is estimated the intervention will avoid 9620 child marriages for this cohort

- **Provision and maintenance of girls' toilets in secondary school**

  21% schools without girls toilets will be covered. The intervention will also focus on maintenance and updating of existing toilets in schools. A total of 5993 schools are the target of the intervention. It is estimated that the intervention has a modest effect on early marriage at any point in time, reducing prevalence by 0.5%

- **Vocational Training(Tailoring)for 1MM girls 16 years and above**

  Five percent of the 1m girls in the intervention will be below the age of 18, and this will have a small effect on the prevalence of early marriage, reducing early marriages by 0.04 percentage points (259 early marriages avoided).

All the four interventions listed above are seen as influencing cost benefit outcomes leading to a change in early marriage practices and combating norms and beliefs perpetuating child marriage.

Over the past few years one of the State incentives to promote girls education has been distribution of bicycles to enable easy access to schools especially at the secondary level. However, there is little research evidence in Rajasthan to show that provision of bicycles has led to substantial change in girls accessing secondary schools. Anecdotal evidence indicates that often the girls do not use the bicycle to reach the school; or the bicycle is used by a family member. A recent study undertaken by IDS, Jaipur[2] on understanding triggers of young women's empowerment, notes that despite evolving gendered social attitudes, young women were subjected to tremendous gender-based discrimination in the public sphere. The issue of safety and security when schools are located at a distance (especially in the desert districts) often impact parent's enthusiasm to send their girls to schools.

---

[2] Institute of Development Studies(2016) Indians Champions: exploring determinants of Young Womens Empowerment in Rajasthan, Research Report, IDS, Jaipur.

Similarly while conditional cash transfers based on school attendance have been seen as influencing educational outcomes, however there are several in- school issues as quality, lack of women teachers, gender based discrimination which may impact completion rates of girls .

The construction of girls toilets has been a focus of national educational policy for several decades. Currently it is also a focus of the Swacch Bharat Mission and toilets have been constructed in all schools. Recent studies on WASH show that the mere availability of toilets does not ensure regular attendance of girls and may not be a major factor in retaining girls in school. It is common for girls to not attend school during menstruation and maintenance of toilets continues to be a big issue. The author also notes that the cost-benefits accruing from the construction and maintenance of toilets is not extensive.

While tailoring has been proposed for vocational training, it is evident that unless girls acquire skills of high order they tend to lose out in the competitive markets. Also in the current context vocational training in a non-traditional skill may be more effective in empowering girls.

As discussed earlier the issue of child marriage is complex and is a result of economics (keep cost of marriage low by marrying early or with other); control over sexuality of women/girls; lack of access to school sand opportunities. Given the centrality of marriage in the Indian context being married early also perpetuates "the image of a good woman". It is evident that ending child marriage requires identification and understanding of the complex drivers behind child marriage practices in different contexts, with interventions adapted to the local context. This will involve working with the legal system, the police, Panchayati Raj (local self-governance bodies), civil society, religious leaders, as well as the community at large.

The cost benefit analysis of the proposed policy on child marriage should not be based on reductionism and one size fits all concepts but focus on multiple aspects that influence child marriage practices. While economic empowerment is a necessary, it is essential that girls are empowered to voice their concerns and negotiate the world from a position of strength.

Rajasthan is the largest Indian state. It has a diversified economy, with mining, agriculture and tourism. Rajasthan has shown significant progress in improving governance and tackling corruption. However, it continues to face acute social and economic development challenges, and poverty remains widespread. What should local, state and national policymakers, donors, NGOs and businesses focus on first, to improve development and overcome the state's remaining issues? With limited resources and time, it is crucial that priorities are informed by what can be achieved by each rupee spent. To fulfil the state vision of "a healthy, educated, gender sensitive, prosperous and smiling Rajasthan with a well-developed economic infrastructure", Rajasthan needs to focus on the areas where the most can be achieved. It needs to leverage its core competencies to accelerate growth and ensure people achieve higher living standards. Rajasthan Priorities, as part of the larger India Consensus – a partnership between Tata Trusts and the Copenhagen Consensus Center, will work with stakeholders across the state to identify, analyze, and prioritize the best solutions to state challenges. It will commission some of the best economists in India, Rajasthan, and the world to calculate the social, environmental and economic costs and benefits of proposals.

COPENHAGEN CONSENSUS CENTER

Copenhagen Consensus Center is a think tank that investigates and publishes the best policies and investment opportunities based on social good (measured in dollars, but also incorporating e.g. welfare, health and environmental protection) for every dollar spent. The Copenhagen Consensus was conceived to address a fundamental, but overlooked topic in international development: In a world with limited budgets and attention spans, we need to find effective ways to do the most good for the most people. The Copenhagen Consensus works with 300+ of the world's top economists including 7 Nobel Laureates to prioritize solutions to the world's biggest problems, on the basis of data and cost-benefit analysis.