# Impact of British Colonial Gender Reform on Early Female Marriages and Gender Gap in Education: Evidence from Child Marriage Abolition Act, 1929*

Sutanuka Roy † Eddy H.F. Tam ‡

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**Abstract**

The British colonial government set the minimum age at first marriage for females as 14 years in British India in 1929. It was not implemented until 1930, six months after its announcement. Using the princely states as a control group, we employ a difference-in-differences strategy to estimate the causal impact of the abolition of female child marriage below the age of 14. Analyzing historical census data from 1911 to 1981, we find an anticipation effect: female child marriages increased in 1931 but declined sharply in the post-independence period. In the affected regions, underage female marriages declined and female educational attainment increased in the long term.

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†Research School of Economics, Australian National University, sutanuka.roy@anu.edu.au
‡King's Business School, King's College London, eddy.tam@kcl.ac.uk

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## 1 Introduction

About 12 million girls are married in childhood each year (UNICEF, 2017). Marital status has been identified as an important determinant of female labor force participation (Heckman and Macurdy, 1980; Angrist and Evans, 1998; Goldin and Katz, 2002; Stevenson, 2008). Child marriage, a critical human rights issue in itself, has been shown to negatively affect female socio-economic status and human capital accumulation (Jensen and Thornton, 2003; Field and Ambrus, 2008; Dahl, 2010; Vogl, 2013). This has prompted most countries around the globe to enact various legislations prohibiting the practice of child marriage. Yet little is known about the short-run causal response and the long-term evolution of impacts of child marriage reforms.

In this paper, we examine child marriage in colonial India, where universal marriage and early marriage for females was a social norm (Gupta, 2014). The average age of marriage for women in colonial India was 12.7 years (Dyson, 2018), with substantial within-region variations in female child marriages.[1] The variations in marriage market outcomes and gender biases in colonial India are shown to be persistent (Gupta, 2014). In this study, we examine whether the British legal reform that raised the age at first marriage had both a short-term and a persistent impact on female outcomes.

Marriage laws that raise the age at first marriage could be a useful policy tool to improve economic outcomes for women. However, a priori, it is unclear how individuals would react to legal policy changes regarding marriage because it is likely to be related to other preexisting cultural practices and institutions. Empirical evidence on the impact of post-colonial age-of-marriage laws varies by context and institution (Bharadwaj, 2015; McGavock, 2021; Bellés-Obrero and Lombardi, 2023; Garcia-Hombrados, 2022) and could have unintended consequences (Bharadwaj, 2015).

[1]Table A.1 presents the regional variations in the share of married females aged 5–10 years in 1921, using census data. These shares measure the proportion of females between the ages of 5 and 10 years who were or have been married.

Our analysis focuses on the Child Marriage Restraint Act (1929), known as the Sarda Act, which set the minimum legal age at first marriage at 14 years for females in British India.[2] The law was announced six months before its enforcement. The 1931 census report for India noted a large increase in child marriages in the census year and speculated that the rise in marriages was a preemptive measure to circumvent the law. It mentioned that "it was this interval between the date when the Act was passed and the date on which it came into force which was largely responsible for the enormous increase in the numbers of those married below the age of ten years" (Child Marriage Restraint Act, 1930; Census of India, 1931)[3].[4] Anecdotal evidence shows that reaction to the announcement of the policy was so extreme that some high caste girls married lower caste men and men with disabilities (Gupta, 2014).

We use two key features of the Sarda Act to provide a systematic empirical analysis of its anticipation effect and to evaluate its implementation. First, the act was announced on September 28, 1929, but was enforced six months later, on April 1, 1930. Second, the law only applied to British India. After the Great Rebellion in 1857, the British divided its territories in India into two types of states: British India and the princely states. While the laws of British India were established by the British Parliament, the courts of the princely states existed under the authority of their respective rulers (Interpretation Act, 1889).

We employ a difference-in-differences strategy to estimate the short-run effect of the law abolishing child marriage in British India districts, using historical census marriage data by district, age, and gender from 1911 to 1931, with districts in princely states as the control group. Overall, we find that the proportion of females married at age 5–10 years increased following the announcement of the Sarda Act by 20%-29% in British India relative to the princely states (in 1911-1921, there were about 104 married girls out of 1,000 girls in the age group of 5–10 years). The results are robust to controlling for population changes, region-specific trends, alternative methods of clustering and differential trends between districts with a large or small population size. Further, using migration data from 1921 to 1931, we find that the effect is unlikely to have been driven by households sorting according to their marriage norms in response to the Sarda Act. The coefficient estimate of the Sarda Act can be biased if British India and princely states have differential pre-trends in economic opportunities. Drawing on Fenske et al. (2022b), we use the literacy rate of boys aged 10-15 as a proxy for economic opportunities and find no differences in literacy rates of boys aged 10-15 in 1911-1921 between British India and princely states. To rule out the additional possibility of omitted variable bias, we provide evidence of null effects of the Sarda Act on the population of ages 40-60, an outcome that is less likely to be impacted by child marriage prohibition law in the short run. We find that the proportion of

[2]The act was the first British law to make child marriage in India illegal, following other social reforms, such as the Bengal Sati Regulation (1829), the Hindu Widow Remarriage Act (1856), and the Age of Consent Law (1891), etc; See Appendix B for further details.

[3]Census of India, 1931 Vol. 1, Part 1, pp. 229—230

[4]British officials cross-referenced the census records with records on marriage registration, commonly maintained by Christians and Muslims in British India. Hindus did not customarily register marriages, but the marriage pattern of those of other religions for whom it was the norm to maintain registration records, such as Christians, followed the marriage pattern among Hindus (Krishnan, 1977). The British census reports found a significant increase in marriage registrations in the months preceding the date on which the law would come into force. We do not interpret this report as a causal evidence of the anticipation effect of the law.

females married at age 15–20 increased by 3-5% in 1931 in British India relative to the princely states, suggesting that the observed rise in marriages for girls aged 5-10 and 10-15 does not represent an entire shift away from marriage for older girls in the age group of 15-20.

If households anticipated strong enforcement of the law and had been deterred from violating it, the child marriage of girls should have declined sharply after the passage of the law. We use historical data from the Census of India between 1911 and 1981 – covering both colonial and post-colonial India – to construct district-level panel data on marital status in the population by age and gender and to estimate the implementation effect of the Sarda Act. We measure female child marriage for the 10-15 age group, as this is the age range for which comparable marital data are available across colonial (1911-1931) and post-colonial years (1961-1981) are available.[5] We find that the Sarda Act reduced the proportion of females married at the age of 10-15 by 51% in the 1961–1981 period, relative to the level in 1921. The results are robust to controlling for long-term population changes. This result is in line with the suggestive findings of Hatekar et al. (2007), who uses genealogical data for a sample of women from the State of Maharashtra to provide suggestive evidence of the effectiveness of the Sarda Act.

To understand whether the historical legal reform has further long-term consequences, we compare British India districts with their neighboring princely state districts. We match each British India district with a neighboring princely state district that has the closest baseline demographics at the pre-intervention period, including the prevalence of female marriage at a young age. For each group of matched neighboring British India districts and princely states, we compare the post-independence gender differential in human capital investment between regions formerly under British India and in princely states in pre-independence India.[6] This allows us to control for differences in cultural practices and social institutions.

We then test for within-pair differences between the regions that were formerly British India and princely states, using independent nationally representative data collected in India after the 1990s: the District Information System for Education (DISE) and the District Level Household and Facility Survey (DLHS). We find that in districts that were formerly under British India, the mean age of marriage is higher by 0.36 years, compared with the districts that were in princely states. We also find that there are 3.54 more girls enrolled in school per 100 boys enrolled for class 7 (approx. 13 years old) in British India districts than those in former princely state districts. These results show the persistent effects of the historical colonial legal reforms on gender norms. Next, we use decennial censuses for the period 1911-2011 to show the long-run evolution of female marriages in the age group of 10-15 between British India and princely states.

There could be many potential mechanisms underlying the persistent impact of child marriage prohibition laws. Motivated by the recent literature on the transmission of social norms from mothers to children (Asadullah and Wahhaj, 2019; Farré and Vella, 2013), we examine the potential intergenerational transmission mechanisms of the age of first marriage. We find that

[5] See Section 5.1 for a detailed explanation.

[6] See Section 6.2 for details on the matching procedures.

mothers' age at first marriage is positively associated with their daughters' age at first marriage, using National Family and Health Survey (NFHS) data. The positive correlation in the age of marriage between a mother and her daughter may represent transmissions of norms similar to Farré and Vella (2013), which finds that a mother's attitudes affect those of her daughter. The correlation in the age of marriage is also consistent with the findings in Asadullah and Wahhaj (2019) that show that early marriages are associated with preferences for gender-biased resource allocation and traditional gender roles. Alternatively, the age at marriage is also associated with fertility changes (Corno et al., 2020), which can have an impact on the social norms of the next generation (Vogl and Freese, 2020). Further, Yount et al. (2016) show that early marriage is a significant risk factor in intimate partner violence. It could be that mothers who marry early have less bargaining or negotiating power in patriarchal households and, as a consequence, have less scope to invest in their daughters.

The short- versus medium-/long-run effect contrast establishes that the Sarda Act had an impact. In particular, when government policies force social change on some parts of society, the affected group often responds by taking actions to undermine the new policy, sometimes resulting in a backlash. The short-run results provide evidence of that behavior, and yet the medium/long-run results show that the colonial government succeeded in changing practice and possibly the norms underpinning it. The results highlight the importance of very long-run follow-up in studying interventions that promote social change.

This paper contributes to several strands of literature. We add to the literature on the impact of policies aimed at reducing child marriages that have focused on modern age-of-marriage laws (Bharadwaj, 2015; McGavock, 2021; Garcia-Hombrados, 2022; Bellés-Obrero and Lombardi, 2023). Using historical records, we complement this literature by providing a long-run follow-up of the short-run impacts of marriage laws. McGavock (2021) finds an increase in the legal age of marriage delays the age of marriage for females, particularly in regions with a higher preexisting prevalence of child marriages. Similarly, we find areas with an immediate perverse response to the Sarda Act had lower child marriages over time. Bellés-Obrero and Lombardi (2023) shows the age-of-marriage laws resulted in substituting formal for informal unions. In our study setting, marriage was an important social and religious institution (Carroll, 1983). Therefore, delaying female age at marriage had persistent impacts on child marriages.

Our findings suggest that considering historical institutions may be relevant to policy discussions about gender issues. Iyer (2010) shows direct British rule caused lower levels of access to schools, health centers, and roads in post-colonial India. We show that gender reforms in direct British rule positively impacted female marriage outcomes and literacy. Our work is closely related to the literature that examines gender differences in colonial India (Gupta, 2014; Fenske et al., 2022a,b). It broadly contributes to the literature that examines the long-term impact of historical economic (Nunn, 2008; Nunn and Wantchekon, 2011; Alesina et al., 2013; Carranza, 2014) and political institutions (Alesina and Fuchs-Schündeln, 2007; Grosfeld and Zhuravskaya, 2015; Becker et al., 2016; Campa and Serafinelli, 2019) on culture and social norms. In particular, this paper builds on the literature on the legacy of colonization policies (Acemoglu et al.,

2001; Banerjee and Iyer, 2005; Dell, 2010; Wantchekon et al., 2015; Lowes et al., 2017; Grosjean and Khattar, 2019; Dell and Olken, 2020; Baranov et al., 2023). Most studies of colonial institutions focus on their effect on economic outcomes and social norms. In contrast, we study the impact of a colonial social policy intervention and it's interactions with preexisting traditional practices on gender norms and outcomes. Our paper is aligned to Farré et al. (2023), which shows public policy can have long-term effects on gender norms.

The findings in the paper also relate to the growing number of studies that highlight the importance of culture for policy (Schoellman and Tertilt, 2006; Alesina et al., 2015; Ashraf et al., 2020; Bau, 2021) and the implications of gender-related social practices (Tertilt, 2005, 2006; Croson and Gneezy, 2009; Fernandez and Fogli, 2009; Alesina et al., 2013; Anderson and Bidner, 2015; Corno and Voena, 2016; Jayachandran and Pande, 2017; Corno et al., 2020). It also contributes to studies on the evolution of culture across generations (Abramitzky et al., 2016; Giuliano and Nunn, 2020). Finally, our suggestive evidence on intergenerational transmission is aligned with the literature demonstrating that early marriage is associated with worse education and health outcomes for the resulting children, which in turn determine those daughters' age at first marriage (Vogl, 2013; Sekhri and Debnath, 2014; Chari et al., 2017). It also relates to Fernandez and Fogli (2009) that finds that ancestral gender attitudes affect women's labor force participation and fertility behavior. Fernández et al. (2004) finds mothers' participation in the labor force impacts the labor force participation of their son's wives.

## 2 Historical overview

The British first arrived in India in the early 1600s through a trading company called the East India Company (Banerjee and Iyer, 2005). It was not until 1757 that the British had their first military conquest within the present day area of India, Pakistan and Bangladesh (Banerjee and Iyer, 2005). The East India Company had experimented with a number of political arrangements to maximize its own commercial profits and minimize administrative liabilities (Iyer, 2010). Some states were brought directly under its control, and some states entered into political and commercial treaties. This experiment came to an end with the Great Revolution of 1857, when the British government took control (Iyer, 2010).

Following the revolution, the British government divided its territories into British India and princely (or native) states, according to the Interpretation Act of 1889. While British India was governed directly through the Governors-General, the princely states were the independent kingdoms of Indian kings who accepted British suzerainty. These states were overseen by the Viceroy or the Governors-General, who was the chief administrator in India and the monarch's representative. The legal framework clearly delineated dominion from suzerainty, with British India's laws deriving from the British Parliament and the legislative authority extending to both the central and local governments. In contrast, the princely states maintained their judicial systems under the authority of their respective rulers (Interpretation Act, 1889). Although indirect control was exerted over the princely states, the rulers of those regions were not passive figures. The indigenous rulers had their own customs and laws, which they insisted on preserving

(Ramusack, 2003).

Prior to British governance, Indian territories adhered to a variety of religious laws for personal matters such as marriage, maintenance, succession, and legitimacy. These included the Dayabhaga and Mitakshara laws for Hindus, the literary traditions of Ithna Ashari and Hanafi for Muslims, and several customary laws for tribal communities (Carroll, 1983). The British, upon assuming control, promised not to interfere with these personal laws (Carroll, 1983). However, they retained the right to intervene using statutory laws that could override these laws in personal matters, leading to the imposition of social reforms at the Governors-General's discretion (see Appendix B for details).

## 2.1 Child Marriage Restraint Act, 1929 (Sarda Act)

In early 20th-century India, child marriage was deeply embedded within the societal fabric, with young girls often married off at an early age, leading to significant challenges in their adaptation to new family roles and customs (Mukherjee, 2006; Bagchi, 1993). Recognizing the need for reform, Hai Sahib M. Har Bilas Sarda introduced a bill in the Legislative Assembly on February 1, 1927,[7] aiming to eradicate child widowhood and address the detrimental effects of early marriages on children's health and well-being (Srinivasa Aiyar, 1930). Facing significant objections from orthodox sections of Indian society (Hatekar, 2007), the bill was sent to the Select Committee, which was tasked with revising it to better reflect and accommodate prevailing public opinions. The committee made two important changes: it made the bill applicable to all classes and communities in British India and declared the solemnization of "child marriage" a punishable offense (Srinivasa Aiyar, 1930).

The enactment of the Child Marriage Restraint Act 1929 (Sarda Act) on September 28, 1929 set the legal marriage age at first marriage at 14 for girls and 18 for boys (Srinivasa Aiyar, 1930).[8] It came into effect six months later on 1 April 1930, and it applied to all of British India. The law imposed a fine of Rs 1,000 and imprisonment for up to one month for those facilitating such marriages. Under Section 108 (a) of the Indian Penal Code, any citizen of British India aiding in the contract of a child marriage within British India and beyond could be prosecuted (Srinivasa Aiyar, 1930). Therefore, citizens of British India could not avoid the law by migrating to the princely states.

The law would have an impact under several conditions. First, if marriage was just a formality and cohabitation was a substitute for marriage, then marriage laws may not have an impact on economic outcomes. Second, female child marriages would need to be prevalent below the

[7]The British colonial government in India was headed by the viceroy and appointed members of his council. Each of the 11 provinces in British India had its own governor, who was assisted by a provincial legislative council of appointed officials. A small fraction of Indian local elites were also appointed but were restricted to consulting. The Indian Council Act 1909 allowed 135 Indians to be elected to both the imperial council and the provincial legislative councils. However, the governor was not responsible for these elected Indian members, who were restricted to an advisory role. For details, see www.parliament.uk.

[8]In 1872, before the Sarda Act (1931), a group called Brahmo Samaj led by Raja Ram Mohan Roy abolished the marriage of girls below 14 years of age under legislation entitled the Native Marriage Act. However, this only applied to the members of that group.

age of 14 among at least some parts of society for the Act to be binding. Third, the population would need to expect that the law would be implemented on the ground.

In the Hindu community, marriage was held as a religious sacrament (Carroll, 1983). Orthodox Hindus believed that a marriage should be immediately consummated after a girl's first menstruation through a ceremony of conception (the Garbhadhan) (Carroll, 1983), signifying that puberty was a natural indicator of her readiness for marriage and childbirth. Similarly, the Muslim community practiced child marriage, with marriage norms governed by customary laws (Carroll, 1983). Given the significant social and religious importance of marriage, British rulers initially hesitated to introduce reform laws (Mukherjee, 2006).[9] However, by 1929, a shift in perspective led the British to support the bill advocating for the abolition of child marriage, largely due to the efforts of a home member, Sir James Crerar, who played a pivotal role in securing the majority needed in the Assembly for the Sarda Act's passage (Mukherjee, 2006).

Female child marriage was widespread in India. The 1921 census shows regional variation in married shares for females aged 5–10 years (see Table A.1). The prevalence of girl child marriages in India was based on several economic rationales, in addition to pre-existing traditional norms. The Indian marriage institution is patrilocal (Vogl, 2013). After a daughter is married, she has no economic responsibility for her natal family. It is a social custom that a father does not accept money from his daughters. Therefore, the family may not have an incentive to invest in daughters (UNICEF, 2011). Dowries have long been a custom in India. The price of a dowry is positively correlated with the age of the bride (UNFPA, 2006). Additionally, the emphasis on within-caste marriages reduced the perceived risk of not finding suitable matches if marriages were not delayed (UNICEF, 2011), further reinforcing the practice. Moreover, significant societal pressures existed to marry daughters early to protect family honor and ensure chastity (Mukherjee, 2006; Mathur et al., 2018).

For the Sarda Act to be effective, the native population would have to expect that the law would be enforced. The census reports that the natives expected the Sarda Act to be enforced and hence responded to the announcement of the law by rushing to get their daughters married to bypass the law. A case in point was when the Nasik court intervened to prevent the marriage of a 10-year-old Brahmin girl to a differently abled groom, a case brought about by the girl's neighbor. The girl's father defended his case of the marriage, stating that the impending Sarda Act conflicted with the *Shastras*, suggesting it was against their religious doctrine to keep his daughter unmarried past the age of 14.

The earliest report on the increase in child marriages under the age of 10 in anticipation of the Sarda Act of 1929 was made available in Chapter VI of Census of India, Vol. I- India, 1931, authored by J.H. Hutton. In Chapter VI, Civil Condition Section 97, focusing on infant marriage, Hutton highlighted the large increase in child marriages, particularly among children under the age of 10, between the Sarda Act's passage (28th September 1929) and its enforcement (30th

[9]India Office observations on marriage legislation in July 1929 stated that "the position of an alien Government vis-a-vis attempts at legislative reform of social abuses which invariably have religious sanctions behind them, has been notoriously difficult in view of pledges of religious neutrality and of non-interference with religious practice" (Mukherjee, 2006).

April 1930). Notably, in the months immediately following the act's announcement, districts such as Hugli, Bankura, Dinajpur, Nadia, Dacca, and Chittagong observed a substantial increase in child marriages among both Hindus and Muslims. For instance, in Backargunj, an average of 305 minor Muslim marriages were registered monthly between 1921 and 1929. However, from January to April in 1930, the marriages of underage children were 419 in January, 1,320 in February, 8,782 in March, and 4,452 in April. In Bankura, child marriages were reported to be taking place at the rate of 1000 a day on religious days in February; in Dinajpur district, 10,000 marriages were reported between the middle of January and the middle of March. A similar increase in the number of children married was reported in Allahabad, Bihar, Tamil Nadu, Assam, Bombay Presidencies, and Upper Sind Frontier districts (now in Pakistan) towards the end of March 1930. One of the examples cited in the report includes the Madura district in south India, where 200 lawyers got their children between the ages of 6 and 10 married between March 12th and 15th in 1930. The increase in child marriages in Gujrat, particularly Baroda (princely state), was partly attributed to caste-based religious factors. For example, for the Kadvi Kumbi community in Gujrat, marriages are solemnized "when the goddess speaks", an event determined at the Umia Mata temple at Unjha. Such occasions were known to occur once in 12 years. The total population of Kadvi Kumbi was 269,348 in census year 1921, and in 1931, there were 219,161 in Baroda State alone.

The census report also sheds light on the role of money lenders in exacerbating the situation by spreading rumors that the act would lead to a 14-year prohibition on marriages, thereby incentivizing families to arrange marriages hastily. This rush led to several legal complications, including marriages conducted without parental consent for marriages or misrepresentation of the parties' caste, resulting in numerous criminal cases.

To raise awareness about the Sarda Act and its implications, pamphlets written in different vernaculars were distributed across towns and villages (Kalaivani, 2015). According to the Census of India (Vol-I), the act's potential success relied on the active involvement of private citizens and public reform associations in reporting cases of underage marriages. The first conviction under the Sarda Act, 1929, occurred in Lahore (currently in Pakistan) in 1930. By February 1931, the census documented 33 prosecutions. In many cases, injunctions were served with the effort of public reform associations and private individuals (Census of India, 1931 Vol-I). The report also noted that in rural villages, where the presence of public reform associations was minimal, the frequency of reporting and prosecuting child marriages was correspondingly low. Nevertheless, there were instances where penalties were imposed on those violating the act, including in remote villages such as Noakhali (presently in Bangladesh) in Bengal and against village heads, known as *munsiffs* in the Madras presidency, suggesting that the law was more than symbolic in its reach and impact.

Women's support organizations played an instrumental role in spreading awareness about child marriage and advocating for the enforcement of the Sarda Act (Raman, 2009; Mukherjee, 2006). The combined efforts of the All-India Women's Conference (AIWC), the Women's Indian Association, and the National Council of Women in India were pivotal in pressuring politicians to support the bill. Their persistent advocacy was a key factor in having prominent figures

like Gandhi publicly denounce the practice of child marriage in his speeches (Raman, 2009; Mukherjee, 2006). These organizations were significant in their nationwide campaign to educate communities about child marriage reforms and in taking legal against violations of the Sarda Act (Basu and Ray, 1990; Venkatraman, 2018). A notable example of this activism was when Assam *Mahila Samiti* issued a legal notice to a prospective groom named Durgeshwar Bujarbarua for planning a marriage in violation of the act between February and March 1934 (Census of India, 1931).

## 2.2 Marriage Reforms in Princely States

In contrast to British India, there were very few marriage reforms in the princely states (Ramusack, 2003). Mysore in 1894 abolished the marriage of girls below the age of 8 years, as well as marriage of girls under 16 years of age to men older than 50 years (Ramusack, 2003). In the face of widespread discontent among the masses, the Mysore Princely State implemented this reform largely by occasionally prosecuting powerless lower caste members (Ramusack, 2003). According to Census Report (1931, Vol.1), the Baroda government introduced the Infant Marriage Prevention Act in 1904, which set the minimum marriage age at 12 for girls, though the Kadva Kunbis community was exempted until 1922. In 1930, this exemption was removed, and the law was amended to void all marriages involving boys under 8 and girls under 6. Furthermore, anyone involved in facilitating marriages of boys under 16 for and girls under 14 faced penalties, including imprisonment and fines.

Jammu and Kashmir also enacted child marriage laws in 1930 that are in conformity with Sarda Act (1929) (Census Report, 1931, Vol.1). Following the precedent set by the Sarda Act in British India, Mysore State passed a bill in 1931 that allowed marriages of girls aged 12 under certain conditions (Census Report, 1931, Vol.1). In the State of Idar, an act was proposed that would prohibit the marriage of girls under 14 and boys under 18, with an additional clause that men over 45 years could not marry women less than half their age (Census Report, 1931, Vol.1).

## 2.3 Integration of Princely States

In May 1946, the memorandum concerning State Treaties and Paramountcy was issued, announcing the termination of all political arrangements between the States and the British Crown (Sharma, 1967; Khanam, 2016; Singh, 2007; Furber, 1951). Following the Indian Independence Act of 1947, 514 out of 565 princely states were integrated into the Government of India. In the years that followed, other princely states, including Hyderabad, Junagadh, and Kashmir, were integrated into the Government of India through diplomatic and military strategies (Sharma, 1967; Khanam, 2016; Singh, 2007; Furber, 1951)

India was subsequently divided into three different types of states. In Part A, states were merged with contiguous provinces and ceded "full and exclusive authority, jurisdiction and powers for and in relation to the governance" to the Dominion of India (Sharma, 1967; Khanam,

2016; Singh, 2007; Furber, 1951). Part B states were grouped into separate administrative units and annexed in three stages: 1) in July and August 1947, the princes had to accede to the Government of India in relation to defense, foreign affairs, and communications; 2) in 1948–1949, further delegation of power occurred; and in 1949–1950, there was full integration, whereby the states had to accept the Constitution of India as the constitution of their own. Part C states were directly administered by the central administration of the Indian government (Sharma, 1967; Khanam, 2016; Singh, 2007; Furber, 1951). The States Reorganization Act of 1956 further reorganized these states along linguistic lines, and the Seventh Amendment of the Constitution (1956) unified all princely states and former British India under a single administrative and legal system (Sharma, 1967; Khanam, 2016; Singh, 2007; Furber, 1951).

## 2.4 Marriage Reforms in Post-independent India

After independence, the Sarda Act was first amended to raise the age of marriage for girls to 15 in 1949, and later, in 1978, it raised the legal age at first marriage for girls to 18 years, applicable across all throughout India. (Mahmood, 1980; Mukherjee, 2006; Tandon, 2010). Despite these changes, the post-independent amendments had no significant impact on the age at first marriage for girls (Bharadwaj, 2015). One possible explanation for the null effect of these post-colonial reforms is that local enforcers, who were elected and possibly embedded in their local cultural practices, were responsible for their implementation. Besley and Coate (2003) establish, theoretically and empirically, that elected officials are likely to be more aligned with voter preferences compared to appointed officials. Therefore, the elected local officials' cultural marriage practices possibly reflected that of the local population. Anecdotal evidence suggests that some elected officials openly supported child marriages, exemplified by incidents involving legislative assembly members in Jharkhand (Murty, 2019) and Agar town (Pandey, 2019). This suggests that while state capacity may have increased in post-colonial India, the political will of natives to challenge traditional local norms evolved more slowly. In the case of post-independent India, even if underage marriages are reported to the police, there might be no action taken if higher authorities, such as elected officials, believed in its practice.

In contrast, the colonial government, operating under British principles, employed predominately British and European civil and police services, holding values distinct from native Indian customs (Compton, 1967; Potter, 1973; Campion, 2003). By the early 20th century, the British police force was dealing with widespread nationalist agitation and began bolstering armed reserves to quell communal or political conflict. The reserves increased from a few hundred in the 1890s to 3,000 in 1929 (Arnold, 1976). Additionally, a Presidency General Reserve of 600 men was created to support local police. There was also a visible presence of Europeans in the police; for example, the Madras presidency appointed Europeans as police subordinates. One of the rationales was "to be a friendly white face when Europeans visited a police station" (Arnold, 1976). In the case of the colonial judiciary, beliefs about gender reform proved critical in the

appointment of Indian judges.[10]

## 3 Conceptual Framework

A priori, it is not clear whether a marriage law raising the minimum female age at first marriage would have the desired impact. Parents might be willing to pay the penalty cost for violation of the law and have their daughters married below the legal age. It is also not obvious whether the effects of such legal reforms can persist through generations: peoples' reactions to the marriage law might be short-lived, and the age of first marriage might return to the level that existed before the legal reform if enforcement weakens over time. In other words, it may be difficult to change social norms via legal reform. Therefore, the impact of the marriage law remains an empirical question.

We first test for the effect of the law on the behavior of the affected Indian native population. If the preferred age of marriage for girls in some households was below 14 years in early 20th century colonial India, those with daughters younger than 14 years around the time of the announcement might respond by having their daughters married earlier than planned. Conversely, the announcement of the law might have little or no impact on households in which the parents preferred their daughters to be married above the age of 14 years. Census data on marital status for 1921 shows that around 10% of girls in the age group of 5–10 years were reported to be married (see Table A.1), implying that a sizeable proportion of the population in the age group would be affected by the legal marital reform.

The degree of response of those who reacted might also depend on the perceived extent of enforcement: if households believed that the law would be credibly enforced six months later, the announcement of the law would increase the likelihood of a girl being married before its enforcement, relative to when households did not expect such a law to be implemented by the British administration. In our context, the fact that the enforcer of the law was a foreign colonizer, rather than an elected local representative might have led households to expect strict implementation because the cost of enforcement for the implementer was lower than it would have been for an elected (local) government. Our difference-in-differences model estimates the effect of the early announcement of the law on the likelihood of girls in the age group 5-10 years getting married when households *perceived* strong enforcement of the law on the ground.

Our medium-term difference-in-differences estimate tests for the impact of the law on the age of marriage around 30 years after the implementation of the law. If the law had a persistent effect on the age of marriage of girls- for example by changing the social norms around marriage in the impacted regions, then girls' age at first marriage should rise above the pre-intervention levels.

[10] A case in point is the appointment of the first Indian permanent judge of the court, Nanabhai Haridas. There were several reasons why alternative candidates with similar credentials as Haridas did not succeed: their orthodox views, support for infant marriage, and opposition to widow remarriage. As Chandrachud (2015) notes, "the candidates who were subsequently appointed to the Bombay High Court in the 19th and early 20th centuries—Telang, Ranade, and Chandavarkar—were all liberal Hindus who pursued an agenda of social reform."

A legal reform can have a significant impact on economic outcomes if it persists over time. If the introduction of a minimum legal age of marriage forces societies to marry girls at a later age, then a higher age at first marriage could become the new norm and be accepted as such by subsequent generations. Marriage norm is a cultural variable and is likely to evolve slowly. While marriage practices can also be affected by economic trends over time, economic incentives for women are likely to be weak in Indian society where womens' market labour is not highly valued (Mathur et al., 2018) and men control access to resources (Sagade, 2005). We seek to understand the long-term impact of the legal reform on gender outcomes, and if this can be explained by intergenerational transmission of norms. For this, we first examine whether variation in underage marriages in modern India can be explained by historical institutions having different marriage laws, comparing neighboring districts that are similar in pre-intervention demographic characteristics and female child married shares to control for the market environment, ethnicity, and regional cultural practices. We, then, test for correlation between the ages at first marriage of mothers and daughters to examine the channel of intergenerational transmission of marriage norms. The patrilocal marriage institution in India, where child brides are taught and are expected to abide by the domestic customs and beliefs of their marital homes is almost like an alternative value education system (Bagchi, 1993). It is possible that mothers who marry early assimilate the early marriage norm and pass it on to the next generation. Further, early marriage is associated with worse education and health outcomes (Vogl, 2013; Sekhri and Storeygard, 2014; Chari et al., 2017), which in turn determine age at first marriage of daughters.[11]

It has been shown that former princely states have higher levels of access to health centers, schools and roads compared to former British districts (Iyer, 2010). Table A.2 compares economic variables between British India and princely states in the 2000s. We see that princely states have a higher income per capita compared to British India. Therefore, princely states might be expected to have more market opportunities compared to British India, which might encourage more girls in princely states districts to go to school. However, in our following analysis, we show that British India performs better in terms of gender outcomes than do the princely states. We hypothesize that the difference in human capital investment by gender between the princely states and British India is caused by legal gender reforms introduced by the British colonizers in British India.

# 4 Short Run Analysis

## 4.1 Data

Our main source of information identifying the administrative divisions of British India and the princely states is the Administrative Atlas of India, Census of India (2011), which includes information on whether each district in the census was a part of British India or a princely state.

[11] Wahhaj (2018) shows in an overlapping generation model that, information asymmetry about marriage partners may generate a negative relationship between age and perceived quality of brides, resulting in an environment in which marriage of girls at a young age could persist through generations. This implies that a policy shock that increases the opportunity costs of early marriage could contribute to delay in female marriage. This is consistent with our hypothesis about the long term effect of the legal reform. Further, the mechanism is complementary to the within-household transmission mechanism that we test empirically.

As the landscape of British India and the princely states was mostly settled by 1857, we define a district as being in British India according to the Administrative Atlas of India; otherwise, it is defined as a princely state. We supplement the definition with Baden-Powell (1892), which includes a detailed map of the divisions between areas in British India and the princely states as well as the year of acquisition for each district. The geographical distribution is presented in Figure 1.

To study the marriage pattern and the impact of the Sarda Act in 1929, we digitize data from the Census of India regarding the population and marital status by gender at the district level for 1911-1931, which covers the large majority of British India and the princely states. We collect data for the age groups of 5-10, 10-15 and 15-20 years. This includes information on the number of married, widowed, and total population in each age group by gender for each district. The census data are available at 10-year intervals for 1911, 1921, and 1931. Child marriage rates in 1901-1931 are discussed by historians and statisticians alike (Agarwala, 1962; Malaker, 1973), and the rise in child marriage rates in 1931 is well documented by historians and the British Census statisticians. Furthermore, marriage data from the Indian Census are used in the work of economists and historians to gain a deeper understanding of gender bias in marriage patterns in colonial India (Gupta, 2014; Fenske et al., 2022a). British had a system to accurately collect data every ten years from 1881 onwards. The data collection process was improved in 1901 (See Fenske et al. (2022a) for more details on data collection of colonial censuses).

We mainly focus our analysis on data from 1911 to 1931, as these were available for most of British Indian and princely state districts and have consistent definitions of variables across years. Our data for 1911-1931 cover districts in Assam, Baroda, Bengal, Bihar and Orissa, Bombay, Central Provinces, Gwalior, Hyderabad, Madras, Punjab, Rajputana, Central India Agency (CIA), and United Provinces.

### 4.2 Empirical Strategy

We argue that British legal reforms affected the marriage behavior of natives in British India by abolishing their traditional marriage customs. To show the impact of the British legal reform on the behavior of the natives, we begin by studying the effects of the Sarda Act, the child marriage abolition law introduced in 1929-1930. Figure A.1 plots the percentage of married children in the age groups of 5-10 and 10-15 years from 1911 to 1931 for the whole of India, by gender. The marriage pattern was stable from 1911 to 1921, while in 1931 the proportion of marriages increased dramatically for all young age groups, particularly among females. This is most likely due to the anticipation effect during the six months between the Acts' announcement and implementation (Census of India 1931).

To identify the short-run effect of the the Sarda Act, we use a difference-in-differences strategy to estimate the impact of the Sarda Act in 1931. We exploit the fact that the Sarda Act was only applicable to British Indian districts and use the princely states as the control group. We compare the level of child marriage in 1931 between districts of British India and princely states, and with baseline differences in 1911-1921, before the announcement and introduction of the Sarda Act. The Sarda Act was announced on September 28, 1929 and only implemented in

April 1930. Therefore, using census data from 1911, 1921, and 1931 and estimating the change in 1931, our estimate possibly mostly captures the announcement effect of the Sarda Act on the outcome of interest.

We measure the effect of the Sarda Act on the level of child marriage among females in the age group of 5-10 years, in terms of the proportion of females married among the group. In addition, we estimate the specification with the log married share as the outcome, which captures the effect of the Sarda Act relative to the baseline married share of the female population.[12] We use the census data to measure child marriage at age 5-10 years by constructing the share of married females using the formula, $m_{it} = \frac{married_{it}+widowed_{it}}{total_{it}}$, where $married_{it}$ is the number of married females aged 5–10 years in district $i$ in year $t$, $widowed_{it}$ is the number of widowed females aged 5–10 years in district $i$ in year $t$, and $total_{it}$ is the total number of females aged 5–10 years in district $i$ in year $t$. Therefore, $m_{it}$ measures the proportion of females between the ages of 5 and 10 years who are or have been married.

We then estimate the following equation

$$y_{it} = \beta BI_i \times 1931 + \mu_i + \gamma_t + \eta X_{it} + \epsilon_{it} \tag{1}$$

where the outcome variable $y_{it}$ is the (log) rate of child marriage among girls aged 5-10 years ($ln\ m_{it}$), or the level of child marriage rate among girls aged 5-10 years ($m_{it}$) in district $i$ in year $t$; 1931 is an indicator for the year 1931; $BI_i$ is an indicator for district $i$ being part of British India, $\mu_i$ is a district fixed effect; $\gamma_t$ is a year fixed effect, and $\epsilon_{it}$ is an error term. $X_{it}$ are district-level controls, including (log) total population at the age of 10-15 years. We cluster the standard errors at the district level.

As robustness checks, we implement several alternative empirical strategies to establish the "rush to beat-the-policy" effect by the natives. First, we analyze marriage rate among girls aged 5-10 years ($m_{it}$) as outcome variable. Second, we augment our differences-in-differences specification with province-specific time trends to control for unobserved changes in each historical province (there are 13 provinces in our estimation sample);[13] for example, demographic trends or changes in cultural practices. Third, large and small districts may have different socio-economic conditions. While we control for this with district fixed effects, as a robustness check, we further interact the initial population (log, age 10-15 years) in 1911 with the time trend to control for differential trends that are correlated with the initial population size.

### 4.3 Results

Panel (a) of Table 1 reports the estimate of equation (1), where we estimate the short-run effect of the Sarda Act. Column (1) reports the estimate for equation (1); we find that the effect

[12] With log rate of child marriages as outcome, we estimate the effect of the Sarda Act on the child marriage rate as a percentage change in child marriages relative to the baseline rate, which may be a more appropriate measure given the heterogeneous levels of child marriage rates, as shown in Table A.1. In particular, $\beta$ in equation (1) estimates the effect of the Sarda Act in percentage terms.

[13] This includes Assam, Baroda, Bengal, Bihar and Orissa, Bombay, CIA, Central Province, Gwalior, Hyderabad, Madras, Punjab, Rajputana, and UP.

generated an increase in the child marriage rate in British India in 1931 by 20% compared with the baseline level,[14] using the princely states as our control group. Panel (b) of Table 1 shows that the short run effect of the Sarda Act on the level of child marriage rate of girls aged 5-10 years is 0.0153 percentage points, which is a 15.3 percent increase from the mean (mean marriage rate in 1921=0.10).

We further examine the robustness of the results in Table 1. British India districts and the princely states may have different unobserved trends; for example, they may be located in different geographical regions in India that have different social or cultural changes over time. We therefore control for historical province-specific[15] trends in column (2) of panel (a) of Table 1. We find that the short run effect of the Sarda Act remains robust to this specification, whereby the point estimate is strikingly similar to that in column (1) of Table 1, while the standard error of the estimate becomes larger.

Further, British India districts and the princely states may have different economic trends - for example, some districts with a large initial population might have experienced economic booms, which may confound our estimates. Therefore, we control for (log) population in 1911 $\times$ year trend in column (3). In panel (a), the estimate of the impact on the log marriage rate shows that, after controlling for population-specific trends, British India experienced a 29.1% increase in the child marriage rate, suggesting that any unobserved factor that correlates with the population trend is likely to drive our previous results downward. The coefficient for the level of marriage in Panel (b) remains at a similar magnitude upon inclusion of population-specific trends, although it is imprecise. When we further control for both the (log) population $\times$ year trend and the province-specific trends in column (4), the point estimate is robust and statistically significant. This suggests that our estimate of the anticipation effect of the Sarda Act is not driven by unobserved differences between the British district and the princely state districts. If there are limited migration and marriages across districts, any shocks to marriage behaviour across districts may have limited spatial correlation. Nevertheless, to account for the possibility of correlation of random shocks to marriage behaviour between nearby districts, we cluster the standard errors at province level as a robustness check.[16]

Figure 2 panel (a) plots the the proportion of female married at aged 5-10 for British India districts and princely states for 1911-1931. It suggests that British India districts and princely

[14]In the case of the (log) proportion of married girls at 5-10 years of age shown in Table 1, our estimate measures a change in the marriage rate among girls aged 5–10 years as a percentage of the baseline level. This addresses the heterogeneity of the marriage rate for girls aged 5–10 years across regions. While each district may have a different baseline marriage rate for girls aged 5–10 years, the response post the announcement of the Sarda Act is in proportion to the extent of average level of child marriage in 1911-1921. Jayachandran et al. (2010) examines the impact of modern medicine on maternal mortality, using log mortality rate as outcome variable following a similar logic.

[15]To clarify, provinces retain the internal autonomy of the princely states; however, foreign policies of the provinces are controlled by the British.

[16]We have a small number of provinces in the sample that vary in size, which may bias standard errors in clustering.(MacKinnon et al., 2017; MacKinnon and Webb, 2017; Djogbenou et al., 2019). We address this concern by showing robustness to wild-bootstrap clustering at the province level (MacKinnon et al., 2017; MacKinnon and Webb, 2017; Djogbenou et al., 2019). In Appendix Table-A.4, we find that the results on percent change in marriage rate are robust to clustering at the province level using the wild-bootstrap cluster method.

states have trends in the outcome that are parallel to each other before the Sarda Act. We confirm this formally by testing for the parallel trend assumption. In Table 2, we test for the parallel trend assumption on whether the British India districts and princely states have different trends in the outcome before the reform, using 1911-1921 data and a specification with interaction of $BI$ and an indicator for year 1921. The estimates suggest there is no differential trend before the reform.

Overall, we find that the proportion of females married at age 5–10 years increased after the announcement of the Sarda Act by 20-29% in British India relative to the princely states. This is a significant increase, since the underlying share of females married in this age group was high in 1921, when 100 in 1,000 girls were or had been married at age 5–10 years.

#### 4.3.1 Misreporting of Age

In Appendix C, we examine the issue of potential misreporting of age and how it may relate to childrens' marital status. If households are more likely to misreport the age of married children, this may cause a measurement error in our specification that is correlated with the treatment variable. To rule out misreporting of the age group, we conduct checks of the age structure by comparing the number of females reported to be aged 5–10 and 10–15 years in each district and estimate whether this is correlated with the treatment variable for the announcement effect. We find no evidence that the announcement changed the reported age structure of the census; hence, age misreporting does not confound the interpretation of our estimate.

#### 4.3.2 Balance Test for Outcome Correlated with Differential trends

British India and princely states may have differential opportunities for skilled employment, urbanization, and income that correlate with the Sarda Act. Guided by Chaudhary and Fenske (2020) that show that an increase in public investments in the form of extension of rail network caused a demand-driven rise in education, particularly for boys between 1881-1921 in India, we use literacy rates for boys as proxies for differential economic opportunities between princely states and British India. We digitize literacy data for boys aged 10-15 from 1911 to 1921 and find no differences in literacy for boys between British India and Princely states. The results are presented in Appendix Table-A.5.

#### 4.3.3 Heterogeneity by Presence of Christian Missionaries

The 1931 census reports cited religious norms as one of the key reasons the natives married their daughters below 14. The increase in marriages in ages 5-10 as a response to anticipation of the enforcement of the child marriage prohibition law could be less in districts with religious norms that are associated with better female outcomes.

Calvi et al. (2022) find that Protestant missions in colonial India are associated with higher female literacy and age at first marriage. If a higher presence of Protestant missionaries is a proxy

for a social norm of higher age at marriage for females on average, then we would expect higher compliance with the Sarda Act in districts with a higher presence of Protestant missions. We use data on Protestant missionaries from World Atlas of Christian Missions (Dennis et al., 1911) to test for heterogeneity in the short-run effect of the larger presence of Protestant missions. We then define a district-level indicator indicating the number of missionaries in a district is above the median, $MI_i$, and estimate the following equation for the short-run effect.

$$y_{it} = \beta_1 BI_i \times 1931 \times MI_i + \beta_2 BI_i \times 1931 + \beta_3 MI_i \times 1931 + \mu_i + \gamma_t + \eta X_{it} + \epsilon_{it} \qquad (2)$$

The coefficient of $\beta_1$ represents how the Sarda Act effect differs between districts with a greater presence of Christian missionaries than districts with a lower presence of Christian missionaries. In Appendix Table-A.6, we show that in British India, the Sarda Act reduced the marriage of girls between 5 and 10 in 1931 for districts with a larger presence of Protestant missionaries, suggesting no perverse anticipation effect and higher compliance with the law. While the impact of the Sarda Act in 1931, which measures both the anticipation and implementation effect, in districts with a lower presence of Protestant missions is between 37-48 percent increase in female marriages in ages 5-10, districts with a larger presence of Protestant missions has -2.3 to -5.3 percent (sum of the $BI \times Year1931$ and $BI \times Year1931 \times HighMissions$ coefficients) decrease in female marriages in ages 5-10.

#### 4.3.4 Placebo test older cohorts demographics

To further examine whether the short-run impact of the Sarda Act is not biased by omitted variables correlated with the timing of the Act, we test for null effects on outcome variables that are less likely to be impacted by the Sarda Act and a change in marriage age of females, while measured consistently across both British India districts and princely states.

We therefore test for null effects of the Sarda Act on population changes in age group 40-60. This is because the Sarda Act and the resulting change in the marriage age of females is less likely to affect the total population of older cohorts in the very short run. On the other hand, any sudden economic shocks, e.g., disasters or famine, may likely affect the population in older cohorts. Due to a lack of data availability in consistent age ranges in the census, we cannot measure the impact by smaller age ranges for these older cohorts.

In Appendix Table-A.7, we find no statistically significant effect of the Sarda Act on the population in ages 40-60, supporting that the increase in female marriages observed in ages 5-10 in 1931 in British India is likely not due to other omitted factors.

### 4.4 Effects of Sex-ratio

An imbalance in the sex ratio due to differential mortality or sex-selective abortion may affect the age of marriage. Bergstrom and Lam (1991) show that changes in sex ratios in the marriage

market can be equilibrated through changes in the age at marriage. Typically, the scarcity of males at marriageable age in the marriage market would cause higher age at marriage for females. We examine heterogeneity in response to the Sarda Act by female share in the population aged 5-10. We estimate the specification similar to that of equation (2), except that we examine the heterogeneity by an indicator of $HighFemaleShare_i$ that represents the share of females among all population aged 5-10 in the year 1921 of a district, is above the median of all districts. In Appendix Table-A.8, we do not find any differential impact of the Sarda Act in British India districts by share of females aged 5-10.

#### 4.4.1 Effects of Female Marriage: Age 15-20

Appendix Table A.9 presents the short-run treatment effects for females aged 15-20. The increase in the married females at this age range suggests that the increase in marriages in ages 5-10 and 10-15 was not solely due to shifting between the age of marriage from 15-20 to a lower age group, in which one would expect null effect in the percentage of married at 15-20.

#### 4.4.2 Effects of Male Marriage: Age 15-20

The effect of the Sarda Act in 1931, which increased marriages of females in the age group of 5-10 and 10-15, will also affect the marriages of boys; for example, it may increase the marriage rate of boys. Agarwala (1957) reports that the average age of marriage for boys in 1921-1931 was 18.44. To examine the effects of the change in the age at marriage for females on the marriage of boys aged 15-20, we then estimate equation (1) where the outcome variable is the marriage rate of boys in ages 15-20. In Appendix Table-A.10, we do not find an effect on the marriage rate of boys aged 15-20. It is likely that girls are getting married to older men.

#### 4.4.3 Effects of Female Literacy

Early female marriage has been shown to result in lower female schooling attainment (Field and Ambrus, 2008). Therefore, laws that affect the age of marriage for females are expected to impact human capital accumulation outcomes for females. Due to differences in age groupings in the literacy data in the Indian census across the years 1911-1931, we cannot estimate an immediate effect of the Sarda Act on the female literacy rates in the age group of 5-10. Alternatively, we test for the short-run effect of the Sarda Act on female literacy rates in the age group of 10-15, as depicted in Table A.11. We do not find a statistically significant effect of the Sarda Act on literacy rates in ages 10-15. The coefficient estimates are imprecise, which could be due to an overall low level of literacy rate for females for the period of time - the average literacy rate of females aged 10-15 was 2.3% in 1921.

### 4.5 Short-run Effects including Pakistan and Bangaldesh in colonial sample

We digitized the marriage data for districts in present-day Bangladesh and Pakistan from the Census of India 1911-1931 to estimate the short-run effect of the Sarda Act on a broader

colonial sample. Appendix Table-A.12 presents the summary statistics of the share of females married aged 5-10 in Pakistan and Bangladesh districts in colonial India for the period 1911-1921. We observe that the share of married females is higher in the provinces of Assam and Bengal (provinces with British India districts) than in the provinces of North-West Frontier and Punjab.

In Appendix Table-A.13, we find that the coefficient estimate of the treatment effect on the log proportion of females married in ages 5-10 ranges between $0.26 - 0.33$, very similar in magnitude to the coefficient estimate in our main sample that includes only territories of present-day India. The estimates are statistically significant at 1 percent level, robust to controlling for population and province trends. The coefficient estimate of the share of females married in ages 5-10 is 0.02, statistically significant at a 10 percent level, similar to the findings in our main sample.

For the post-independence analysis, such as medium-run and long-run effects, we prefer to use a within-country variation approach, excluding territories in present-day Pakistan and Bangladesh. This is because the history of political trajectory in Pakistan and Bangladesh consists of periodic bureaucratic and military coups and attempts at democratization that are very distinct from the relatively stable political trajectory of India (Tudor, 2013; Oldenburg, 2010; Riaz, 2016). The inclusion of Pakistan and Bangladesh for post-independent analysis will make it difficult to associate causal interpretation to the persistent impact of the Sarda Act, for there may be many time-varying political factors impacting social norms that are correlated with British India status in Pakistan and Bangladesh that could explain the divergence in marriage patterns between the formerly British India districts and princely states.

# 5 Medium Run Implementation Effects

## 5.1 Data

We digitize data from the Census of India from 1961 to 1981 to study the medium-run implementation effect. We collect data on the population and marital status for each gender for the age group 10-15 years. This is because to analyze the medium-run effect in the post-independence period, we link census data between 1911 and 1931 with census data of 1961-1981.[17] The age interval for data on female marital status for the younger age group in the census data for the period 1961-1981 is different from that for the period 1911-1931. Census data on the marital status of young girls during the period 1961-1981 are grouped together in the age interval of 0-9 years, i.e., marital status data for females aged 5-10 years are not available for the period 1961-1981. Therefore, we use the share of girls married in ages 10-15 years, which is available in the census data from 1911-1981, as a consistent outcome measure to examine the medium run effect of the Sarda Act. We, therefore, have a panel dataset at district level that spans 1911-1931 and 1961-1981 in 10-year intervals (see Table A.3 for summary statistics for each year and by province).

[17] In Appendix D we describe how we match districts across different census years.

The availability of census data is limited for the census years 1941 and 1951 possibly due to World War II and other political factors (India Office of the Registrar, 1962). The census 1941 data on marriages by gender and age was presented at a restricted scale in the form of sample estimates for many of the provinces. In the 1951 census, the age range for marriage totals by gender was in age groups 5-14 and 15-24, different from all other census years. We use marriage data between 5-10 and 10-15 for the census year 1941 available for Baroda, Bengal, Bombay, Gwalior, Hyderabad, Mysore, Rajputana[18] to provide evidence of the transition immediately following the policy.

## 5.2 Empirical Strategy

For the medium run, our specification uses the log (and level) married share of girls aged 10-15 years (i.e. 10-14.99 years) as the outcome. To estimate the effects of implementation in the medium run, we use our district panel data from 1911 to 1981 matched across census years. We estimate the medium-term effects during 1961-1981 using the following specification:

$$y_{it} = \sigma_1 BI_i \times D_{1931} + \sigma_2 BI_i \times Post_t + \mu_i + \gamma_t + \eta X_{it} + \epsilon_{it} \tag{3}$$

where the outcome variable $y_{it}$ is the (log) rate of child marriage among girls aged 10-15 years ($ln\ m_{it}$), or the level of child marriage rate among girls aged 10-15 years ($m_{it}$) in district $i$ in year $t$. $D_{1931}$ is an indicator for the year 1931, $Post_t$ is an indicator for the years 1961–1981, $BI_i$ is an indicator for the districts forming part of British India, $\mu_i$ is a district fixed effect, $\gamma_t$ is a year fixed effect, $\epsilon_{it}$ is an error term, and $X_{it}$ are district-level controls, including the (log) population of males aged 10-15 years. We cluster the standard errors at the district level.

$\sigma_2$ estimates the medium-run impact of the Sarda Act.[19] We expect $\sigma_2$ to be negative if the Sarda Act had a medium-run implementation effect that lowered the child marriage rate in British India. We also estimate a flexible specification where we replace the $Post_t$ indicator with yearly indicators of 1961, 1971 and 1981 in equation (3). This allow us to estimate the dynamic effects of the impact of the Sarda Act after 31, 41 and 51 years of its implementation.

## 5.3 Results

In Figure 2, we plot the average proportion of married female between 10-15 years by British India and princely states from 1911-1981. There is a clear drop in the share of married female in the age group in 1961-1981 compared to 1911-1921. In particular, there is more decline in married female share in British India than that in princely states.

Table 3 reports the estimate of equation (3). In line with Figure 2, by comparing estimates before and after the implementation of the Sarda Act, we find a significant reduction in the level of child marriage at the age of 10-15 years. We find that in British India, the Sarda Act reduced the proportion of married females aged 10-15 years by 48.8% relative to the baseline level.

[18] The estimates of Madras from the digital Census 1941 pdfs were not legible.

[19] For log proportion of females married in ages 10-15, $\sigma_2$ estimates the treatment effect on British India districts relative to pre-treatment level (mean of 1911-1921).

Column (2) reports the estimate of the level of marriage rate, which remains robust. Overall, Table 3 suggests a significant reduction in child marriage following the implementation of the Sarda Act. In column (1), we find that the estimate of the Sarda Act 1931, which captures the short-run effect for the 10-15 years age group, is statistically significant at 1% level of significance. This is in line with the short-run effect on the marriage of girls aged 5-10 years.

In Appendix Table A.14, we estimate a more flexible form of equation (3) by replacing the *Post* indicator with the yearly effect in 1961, 1971, and 1981. We find that in 1961, the effect of the Sarda Act results in a reduction of roughly 43.3% in the proportion of married females aged 10-15 years relative to the pre-Sarda Act level, and that the estimate becomes larger - 52.4% in 1971 and 59% in 1981- as shown in columns (1) and (2).

In columns (3) and (4) of Appendix Table A.14, we report the estimates using level as the outcome. The estimate for the level effect is significant and is largest for the year 1961; we find that the Sarda Act reduced the proportion of married females at age 10-15 by 5.7 percentage points. For the years 1971-1981, the estimates are negative, which indicates a persistent effect in later years, although the magnitude is smaller and not significant.

In Table 4, we test for the parallel trend assumption on whether the British India districts and princely states have different trends in the outcome before the reform, using 1911-1921 data and a specification with the interaction of $BI$ and an indicator for year 1921. The estimates suggest there is no differential trends in the proportion of female married at 10-15 before the reform.

Our findings suggest an overall reduction in child-marriage after the implementation of the Sarda Act, based on panel data for 1911 to 1981. We find that the Sarda Act reduced the proportion of females married at the age of 10-15 years by 49% in the period 1961–1981, relative to the level in 1921. The pattern remains the same with the level of marriage rates as the outcome.

### 5.4 Heterogeneity within British India by proportion of married females aged 10-15 in 1911

Figure A.3 shows the evolution of the proportion of females married in the age group of 10-15 from 1911-1981 in British India. We compare the trajectory of female marriages in district with a high proportion of females married[20] in the age group of 10-15 in 1911 with that in district with a low proportion of females married in the same age group in 1911. The decline in female child marriages in the regions with high female child marriage in 1911 is higher than that in regions with low female child marriage in 1911. This suggests that child female marriages across regions within British India converges to a lower level over time.

[20]We define districts with high proportion of married females as districts where the proportion of ever-married females in the age group of 10-15 is above the median among British India districts.

## 5.5 Effects in 1941: A subsample analysis

If there are time-varying factors in post-independence India that are correlated with historical British India status, the medium-run analysis could be confounded. To address the potential concern, we analyze the effect of the law in 1941 using limited data available from the 1941 census. We use marriage data consisting of districts from Bengal, Bombay, Gwalior, Hyderabad, and Rajputana to analyze the implementation effects of the Sarda Act.

First, we estimate an extension of the baseline specification of the following

$$y_{it} = \beta_1 BI_i \times D_{1931} + \beta_2 BI_i \times D_{1941} + \mu_i + \gamma_t + \eta X_{it} + \epsilon_{it} \tag{4}$$

for the sample of years 1911-1941. $D_{1931}$ and $D_{1941}$ are indicators for the years 1931 and 1941, respectively, the post-Sarda Act period. $BI$ is the indicator for British India, and the coefficient $\beta$ represents the effect of the Sarda Act in 1931-1941. We exclude Baroda and Mysore from the sample, as they implemented child marriage laws prohibiting female marriage below 14 post Sarda Act in 1930.

In columns (1) and (2) of Appendix Table A.15, we report the estimates of the implementation effects of the Sarda Act with a log of the share of married females as the outcome. In columns (3) and (4) of Appendix Table A.15, we report the levels of the share of females married as the outcome. We find that the implementation of the Sarda Act reduced the share of female marriages in 1941 for ages 5-10 by 80 percent and for ages 10-15 by 38.3 percent compared to the baseline level. The magnitude of the effect is similar to what we observed in 1961 in the full sample. The estimate of the level impact ranges from $-0.09$ to $-0.15$ percentage points. Our results are statistically significant at a 1 percent level and are robust across specifications.

In this selected sample of 75 districts, we do not observe a differential anticipation effect in marriages of girls ages 5-10 in 1931. This could possibly be due to an increase in child marriages post the announcement of the Sarda Act in the princely states of Rajputana and Hyderabad. The census reports in 1931 mention that there were discussions in the Hyderabad Legislative Council about passing a child marriage bill similar to the Sarda Act, supported by the Women's Association for Education Advancement but was opposed by orthodox groups (Census of India, 1931)[21]. Similarly, census reports in 1931 mention that there was a rush to marry children in Rajputana after the announcement of the Sarda Act, even when the law was not applicable to the States (Census of India, 1931)[22]. The treatment effect of the Sarda Act on the marriage rate in British India districts in the age range of 10-15 is negative in this sample.

Next, we leverage the variation generated by further changes in the child marriage laws post-1930 in princely states in our sample to isolate the effect of marriage laws, ruling out any confounding effect from the British India status. In 1930, the Baroda State made marriages under 14 for girls punishable by imprisonment and fines. In 1931, following the Sarda Act of

[21] Census of India, 1931. Vol. XXIII: H E H the Nizam's dominions (Hyderabad State). Part I: Report
[22] Census of India, 1931. Volume XXVII, Rajputana Agency

1929, Mysore State passed a bill that made marriages below the age of 14 illegal but allowed marriages of girls aged 12 under specific conditions.

Therefore, we hypothesize that if there is compliance with the child marriage prohibition law, we would expect the treatment effect of the Sarda Act in 1941 to be smaller in the sample with only Baroda and Mysore as control group, compared to the treatment effect estimated using princely states with no age-of-marriage laws as controls. In Appendix Table A.16, we find no detectable effects on the log share of girls married in the age group of 5-10 and 10-15, shown in column (1) and column (2). The coefficient estimate of the implementation effect of the Sarda Act on the levels of the share of females married in ages 5-10 in British India in 1941 is $-0.053$, which is smaller than the coefficient estimate of the treatment effect using princely states that had not implemented any age-of-marriage laws as control group, presented in Appendix Table A.15. Similarly, the coefficient estimate of the treatment effect in 1941 in British India for ages 10-15 is $-0.120$, smaller than the estimates comparing British India to the princely states that had not implemented any age-of-marriage laws after the Sarda Act.

### 5.6 Medium-run Effects on Female Literacy

We examine medium-run effects on female literacy in response to the Sarda Act. We find an increase in the female literacy rate by 7 percentage points, presented in Appendix Table A.17. This is consistent with our long-run results that follows next.

## 6 Long Run Analysis

### 6.1 Data

We use marriage data for females for the age group 10-15 and 15-20 using decennial census for the period 1911-2011 (excluding the census years 1941 and 1951) to examine the long-term differences in female marriages between formerly British India and princely states. To measure more refinely any differences in age of marriage that may not be captured by the broader age group measure in the census, we also examine the mean age of marriage in 2002–2004 at the district level from the District Level Household and Facility Survey (DLHS Round 3) carried out by the Ministry of Health and Family Welfare of India. The data are available at the district level and include mean age of marriage for women and recorded marriage ceremonies held during the three years preceding the survey, covering 570 districts.[23]

Our measure of human capital investment comes from the District Information System for Education (DISE). The District Information System for Education provides administrative records for enrollment at the school level in India. The data are designed to cover all regions of India in terms of the administrative information for each school in each academic year, including the number of students of each gender enrolled and the number of classrooms in each school. As distinctions between the princely states and British India are mostly at the district level, we

[23]The data are released through DevInfo 6.0 by UNICEF.

aggregate the information at the district level.[24] For the analysis, we aggregate all schools in each district in terms of the number of students enrolled in each class by gender for each year between 2005 and 2013. This gives us estimates of the ratio of male to female students enrolled in each class in each academic year for 433 districts. On average, the schools in India have 9% more boys than girls enrolled in Class 6.[25]In addition, we obtained the district-level GDP per capita from the Planning Commission of the Government of India. The geographical controls include latitude and distance to the coast.[26]

To examine the persistence of the age of marriage, we use data from the second round of National Family Health Survey (NFHS-2), which was conducted in 1998-1999, with 90,303 women between the ages of 15 and 49 years from 26 states.[27]

## 6.2 Empirical Strategy

For the Census data, we combine the marriage data for the census years 1991-2011 with the marriage data for 1911-1931 and 1961-1981 data to form a district-level panel. We then extend the equation (3) to include an additional interaction term of $BI_i$ and $Post(1991-2011)$, where $Post(1991-2011)$ is an indicator for the period 1991 to 2011. The coefficient for the interaction term would estimate the long-term effect of the Sarda Act on female child marriages in formerly British India districts.

To obtain a causal estimate of the long-term impact of a colonial legal reform on outcomes measured in the long term is a challenging task because many post-colonial policies might affect marriage outcomes, thereby confounding the estimation. We adopt the following empirical strategy to control for the confounding effects of post-colonial institutions and policies.

We adopt an empirical strategy where we compare outcomes between matched districts of British India and princely states. Districts can be matched by administrative borders or other geographical characteristics to control for cultural and economic differences. In our data, each British district may have more than one neighboring princely state district. We use pre-treatment covariates and information on administrative borders to find a unique set of matched paired districts. As pre-treatment covariates, we use the share of married females and female population in the age group 5–10 years measured in the pre-intervention year 1911 because districts with similar pre-treatment marriage patterns and female population are likely to have similar marriage practices for younger girls.

Differences between pairs of neighboring districts belonging to the two administrations are scaled in percentage terms, and we calculate a weighted score of differences between the British district and each of its princely state neighbors. Specifically, we calculate $\Delta M_{ij} = |(M_{PS,i} - M_{BP,j})|/M_{BP,j}$ and $\Delta n_{ij} = |(n_{PS,i} - n_{BP,j})|/n_{BP,j}$, where $M_{BP,j}$ and $n_{BP,j}$ are the married

[24]We exclude Karnataka from the analysis in this sample because of the lack of available data at the time of writing.

[25]This is the ratio of raw enrollment. It does not take into account the gender ratio of the population.

[26]Physical distance, not travel distance.

[27]The National Family Health Survey (NFHS) is a large-scale, multi-round survey conducted in a nationally representative sample of India.

rate and female population of the British district $j$ in 1911, respectively, and $M_{PS,i}$ and $n_{PS,i}$ are the married rate (female aged 5-10) and female population (aged 5-15) of a princely state neighboring district $i$ of the district $j$ in 1911. We construct a measure of similarity between the pair of districts $i, j$ by $S_{ij} = 0.5\Delta M_{ij} + 0.5\Delta n_{ij}$. Then, for each British district, we find the neighboring princely state district that has the minimum score $S_{ij}$ to match with the British district (i.e., $\hat{i}(j) = argmin_{i(j)} S_{i(j)}$). If a princely state district is matched with a single British India district, it forms a group of districts with two units. If a princely state district is matched with more than one British India district, we combine the British India districts and the matched princely state district as a single group of districts. Following the procedure, we formed 32 groups of districts based on 56 pairs of matched British India and princely state districts[28]. Our empirical strategy is to identify the impact of the colonial reform on marriage outcomes by comparing, within each group, districts that were historically British India and princely states.

We then estimate the following equation:

$$FMR^{g}_{dbt} = \alpha BI_d + X'_{dt}\xi + \delta_b + \gamma_t + \mu_{dbt} \tag{5}$$

$FMR^{g}_{dbt}$ measures the ratio of female to male students enrolled in grade $g$ in district $d$ of group $b$ in year $t$. $BI_d$ is an indicator for district $d$ in group $b$, which belonged to British India before independence. $\alpha$, the coefficient of interest, captures whether there were systematically more female children enrolled in school in districts that belonged to British India. $\delta_b$ is the group fixed effect, which captures systematic differences between groups, such as gender ratio, unobserved gender bias in social norms, and the provision of schools. $X'_{db}$ are district-level controls, which include the proportion of rural schools in district $d$, the average number of classrooms in schools in district $d$, log GDP per capita (in 2000), latitude, and distance to the coast. We also control for the ratio of female to male students enrolled in class 1 in year $t$, which measures contemporary labor market conditions that affected the enrollment ratio of children in grade 1.[29] $\gamma_t$ is a year fixed effect that controls for yearly variations in gender differences in school enrollment. In additional specification we further control for the group-year fixed effects. $\mu_{dbt}$ is an error term.[30]

To test for the impact of British India's child marriage reform on the female age of marriage in post-colonial India, we use the district-level aggregate of the District Level Household and Facility survey (2002–2004). We estimate the following equation:

$$M_{db} = \sigma BI_{bd} + X'_{bd}\Phi + \kappa_b + \tau_{bd} \tag{6}$$

$M_{db}$ is a continuous measure of the age of marriage in 2002–2004 for district $d$ in group $b$. $\sigma$ is the coefficient of interest, since it indicates whether female marriages occurred at a later age in former British India districts compared with the districts that were formerly under the

[28] The princely state districts are matched with replacement.
[29] The minimum age of class 1 student in India is 6 years.
[30] All standard errors are clustered at the group level.

princely states. $X_{bd}$ are the district-level controls, including latitude, distance to the coast, and log GDP per capita (in 2000). $\kappa_b$ is a group fixed effect that accounts for systematic differences between groups. $\tau_{bd}$ is an error term.

## 6.3 Results

### 6.3.1 Mean age of marriage

In Table 5, we report the causal estimate of the implementation of the Sarda Act in the long run using matched difference-in-differences design, for which we match districts bordering princely states and British provinces using the proportion of married females and female population in the age group 5-10 years in 1911. We find that in the long run the mean age of marriage increases in the British India. Column (1) of Table 5 shows the mean age of marriage rises by 0.45 years in British India after controlling for fixed effects for groups of matched districts. In column (2) of Table 5, we find that the results remain robust after additionally controlling for economic covariates.

### 6.3.2 DISE

In Table 6, we report the results for equation (5) estimated for each class from 4 to 7. Comparing across columns, it is clear that the gender enrollment ratio begins to differ in grades 4, 5, 6 and 7, at which time the decision to attend school is more closely related to a human capital investment decision beyond that of basic literacy. The estimate for class 7 (col. 1) suggests that in British districts, on average 3.54 more girls enrolled in school per 100 enrolled boys compared with the princely state districts. The magnitudes of the coefficients increases with an increase in class grades. This suggests that class 5 is a critical time: if girls drop out of school during this time, they may not return, whereas those that stay in education from this point are about as likely to proceed as boys.

### 6.3.3 Migration as a confounder

If households migrated and sorted into districts by marriage norms in anticipation and reaction to the Sarda Act, this may confound our estimation of the impact of the Sarda Act on the marriage pattern. This form of selection bias is less likely in the Indian context. There are empirical studies to support in-group bias in preferences for marriages (Banerjee et al., 2013; Munshi and Rosenzweig, 2016), which renders migration into societies with different marriage norms less likely. Frequent interaction and close social ties exist within ones' own social group, which provides an extensive income insurance network (Caldwell et al., 1986; Mazzocco and Saini, 2012; Munshi and Rosenzweig, 2016).[31]

We examine the extent of migration in the period of 1921-1931 in British India and the princely states using migration data from the census report that indicates the origin and desti-

[31] Munshi and Rosenzweig (2016) provide evidence regarding the prevalence of *low level* male rural to urban and urban to rural migration in India in comparison with countries of similar size and levels of economic development. It argues that economic benefits derived from income insurance provided by social networks is one of the reasons for males not *permanently* migrating away from their native villages.

nation provinces/states.[32] This allows us to understand the pattern of migration between British India and the princely states. Appendix Table A.18 presents the province/state level summary statistics on migration from 1921-1931.

Appendix Table A.18 suggests that only a limited level of migration occurred for this period of time, in line with the literature regarding post-independence India. In 1921, on average there were about 25 emigrants per 1,000 population for British India, and 68 emigrants per 1,000 population for the princely states. In addition, the level of migration was very stable between 1921 to 1931, for both British India and princely states, suggesting that households were unlikely to have migrated in response to the Sarda Act. The level of emigrants per 1,000 population for British India reduced slightly from 25 to 24 between 1921 and 1931 (see Appendix E for more discussion).

Most importantly, if households migrated and sorted according to their marriage norms in response to the Sarda Act, we would expect to observe a systematic change in the level of emigration from British India to the princely states. About 5.66 emigrants per 1,000 of population migrated to the princely states from the British India in 1921, while in 1931 it remained at almost exactly the same level as 5.9. Therefore, given that the level of migration was low and that we do not observe a systematic change in migration between British India and the princely states, our estimates represent the impact of the Sarda Act on the population in British districts and are unlikely to be driven by the sorting of households between districts.

### 6.4 Long-Run Panel: 1911-2011

Next, we present the evolution of the long-term effects of the Sarda Act using the decennial census for the period 1911-2011. In Figure-3, the treatment effect in terms of percentage change on females married at 10-15 increases until 1981, and is stable for a decade, and shrinks thereafter. Table-7 shows the anticipation effect in 1931 on the marriage of girls aged 10-15, the decline in marriages by 51 percent in the period 1961-1981, and a decline in marriages of girls aged 10-15 in the period 1991-2011 by 26 percent.

## 7 Discussion

There could be many possible mechanisms underlying the persistence of marriage behavior. We discuss one of the potential mechanisms that may play a role in explaining persistence.

### 7.1 Intergenerational Transmission of Age of Marriage

For a female child marriage prevention law to have a long-term effect, change in marriage behavior needs to persist for more than one generation. One way for this to occur is through a change in norms induced by the law. Females positively affected by the legal policy experienced the social norm of marrying at a later age, unlike those who were not affected by the law

[32] In the British India, the majority of population are in districts that belong to British India (83%-100%), while it also includes districts that belong to princely states.

and married at an early age. Asadullah and Wahhaj (2019) show that early marriages are associated with a preference for traditional gender roles and gender-biased resource allocation. Gender-biased values of the mother may get transmitted to daughters. Farré and Vella (2013) show that mothers' attitude towards labor force participation is positively associated with their daughters.

Another possibility is that fertility changes resulting from delays in marriage may lead to persistence in the change in the female marriage age. Women married at a younger age may give birth to more children, increasing the number of siblings in a family.[33] If there is sibling competition in the marriage market (e.g. Vogl (2013) finds that older daughters may marry sooner if they have a younger sister), mothers' age at first marriage may be associated with that of their daughters.

To shed some light on possible channels through which early marriage could be transferred across generations, we focus on mothers' age at first marriage. The literature on the potential economic impacts of marital laws shows that delaying mothers' age of marriage improves education and health outcomes for children (Sekhri and Debnath, 2014; Chari et al., 2017). We add to this literature by providing suggestive evidence that mothers who marry late are also less likely to marry away their minor daughters.

We empirically examine if later age of marriage of mothers is associated with later age of marriage of their daughters. We use data from the National Family Health Survey (NFHS-2, 1998-1999). We analyze subsamples of girls who are between 10 to 18 years old. Our outcome of interest is whether the girl is unmarried at the time of interview. That is, we compare the marriage outcome of girls of the same age whose mothers differ in their age at first marriage, controlling for relevant mother and household level characteristics.[34]

It is customary for girls in India to reside with the husbands' family after marriage. We follow Vogl (2013) by using the indicator variable of co-residency with the natal family as a measure of females not being married. We estimate the following:

$$D_{ij}^{k} = \alpha A_j + \eta_s + \kappa X_j + \psi X_h + \delta_c + \epsilon_{ij} \tag{7}$$

where $D_{ij}^{k}$ is an indicator variable that takes a value of 1 if the daughter $i$ of mother $j$ at age $k$ is unmarried (i.e., lives with her natal family), $A_j$ is the age at first marriage of the mother $j$. Our parameter of interest is $\alpha$, which captures the relationship between mothers' age at first marriage and the probability of their daughters not getting married at a young age. We control for mothers' covariates comprising mothers' age, whether the mother listens to a radio or watches television every week, the total number of children, a dummy variable for whether the mothers' partner ever attended school, and a set of fixed effects for caste, dummy variable for mother belonging to Hindu religion, and education level of the mother ($X_j$). We control for the age of the household head, including the fixed effects of the sex of the household head,

[33] Mensch et al. (1998) suggests that young brides cannot negotiate their sexual activity and are under pressure to bear children but younger mothers may suffer higher child mortality.

[34] The survey covers 90,303 women aged 15-49 years from 26 states.

economic status of the household ($X_h$), and district-rural-urban ($\eta_s$) and year-of-birth fixed effects ($\delta_c$).[35] We estimate this equation for the sample of girls between 10 to 18 years of age (at the time of the interview) to examine the correlation between mothers age at first marriage and the likelihood of daughter marrying under the legal age.

Table 8 provides suggestive evidence of transmission of marriage norms from mothers to daughters. We find that probability that girls 10 to 18 years old are unmarried is positively correlated with the age at first marriage of their mothers. The correlations is statistically significant at 1% level but small in magnitude. The findings suggest that if the mother gets married later, the daughter is also likely to get married at a later age. Although the variations in the sample do not causally identify the channels of intergenerational transmission, our findings suggest that marriage at later age could transmit from mother to daughters, consistent with the evidence in section 5 and 6 that marriage reform in colonial India may influence age of marriage across generations.

### 7.2 Dowry

We argue that it is likely that the colonial child marriage prohibition law possibly changed social attitudes towards more progressive gender norms. However, Sheel (1997) argue that British emphasis on Brahmanical norms caused the persistence of other gender-biased social customs such as the dowry custom, where dowry is seen as a status good. However, Chiplunkar and Weaver (2023) empirically establish that the emergence and evolution of dowry in India is driven by the distribution of groom quality in the process of development and is not caused by social norms such as "Sanskritisation" where dowry is viewed as a status good.

We show that the abolition of child marriages increased the female age of marriage and female literacy over the long term. However, there is no unambiguous link between female literacy and dowry payments. While Beauchamp et al. (2017); Dalmia (2004) find that higher levels of education for women reduce their value in the marriage market, Behrman et al. (1999); Maertens and Chari (2020) find that increase in education of females increases their market value.

## 8 Conclusion

Using historical census data on marriage (1911–1931), we show that there is a perverse effect on female child marriages due to the announcement of the Child Marriage Restraint Act (1929). We interpret the rise in female child marriages between the ages of 5 and 10 years as a response of the natives to avoid being subjected to the law after its implementation. We are not able to examine the immediate effect of the Sarda Act on female literacy rates at the corresponding age group due to limited data availability in the colonial census. We show regions that responded

[35]The education level is reported as no education, primary, secondary or higher. Religion is reported as Hindu, Muslim, Sikh, Christian, Buddhist, Jain, Jewish, Parsi, Sanamahi, and others or no religion. Caste information categories are Scheduled Caste, Scheduled Tribe, Other Backward Caste, or None. The economic status variables are household ownership of radio, television, refrigerator, bicycles, motorcycles, cars, and access to electricity.

to the announcement of the law by getting their younger daughters married early to have more girls attending schools today and fewer girls getting married at a very young age. Furthermore, using various large-scale micro-datasets, we show that two regions that have had different legal reforms in the past behave differently when placed under the same modern institution. If two regions are given the same opportunities in terms of the provision of schools, we argue that the region that has had gender-related legal reforms will have more females exploiting the opportunities.

Our findings support policy intervention that eliminates prejudiced behavior by showing its positive long-term impact. However, for economic growth, it may not be enough for the social planner to provide infrastructure; we also need to change the bottlenecks on the demand side.

## References


Abramitzky, R., Boustan, L. P., and Eriksson, K. (2016). Cultural Assimilation during the Age of Mass Migration. Working Paper 22381, National Bureau of Economic Research.

Acemoglu, D., Johnson, S., and Robinson, J. A. (2001). The Colonial Origins of Comparative Development: An Empirical Investigation. *American economic review*, 91(5):1369–1401.

Agarwala, S. (1957). The age at marriage in india. *Population Index*, pages 96–107.

Agarwala, S. (1962). *Age at Marriage in India*. Kitab Mahal Publishing Ltd.

Alesina, A., Algan, Y., Cahuc, P., and Giuliano, P. (2015). Family Values and the Regulation of Labor. *Journal of the European Economic Association*, 13(4):599–630.

Alesina, A. and Fuchs-Schündeln, N. (2007). Goodbye Lenin (or Not?): The Effect of Communism on People's Preferences. *American Economic Review*, 97(4):1507–1528.

Alesina, A., Giuliano, P., and Nunn, N. (2013). On the Origins of Gender Roles: Women and the Plough. *The Quarterly Journal of Economics*, 128(2):469–530.

Anderson, S. and Bidner, C. (2015). Property Rights over Marital Transfers. *The Quarterly Journal of Economics*, 130(3):1421–1484.

Angrist, J. D. and Evans, W. N. (1998). Children and their Parents' Labor Supply: Evidence from Exogenous Variation in Family Size. *The American Economic Review*, 88(3):450.

Arnold, D. (1976). The Police and Colonial Control in South India. *Social Scientist*, pages 3–16.

Asadullah, M. N. and Wahhaj, Z. (2019). Early marriage, social networks and the transmission of norms. *Economica*, 86(344):801–831.

Ashraf, N., Bau, N., Nunn, N., and Voena, A. (2020). Bride Price and Female Education. *Journal of Political Economy*, 128(2):591–641.

Baden-Powell, B. H. (1892). *The Land Systems of British India, 3 Volumes*. Oxford: Clarendon Press.

Bagchi, J. (1993). Socialising the Girl Child in Colonial Bengal. *Economic and Political Weekly*, pages 2214–2219.

Baines, J. A. (1893). *Census of India, 1891: General Report*. Eyre and Spottiswoode.

Banerjee, A., Duflo, E., Ghatak, M., and Lafortune, J. (2013). Marry for What? Caste and Mate Selection in Modern India. *American Economic Journal: Microeconomics*, 5(2):33–72.

Banerjee, A. and Iyer, L. (2005). History, Institutions, and Economic Performance: The Legacy of Colonial Land Tenure Systems in India. *American economic review*, 95(4):1190–1213.

Baranov, V., De Haas, R., and Grosjean, P. (2023). Men. male-biased sex ratios and masculinity norms: evidence from australia's colonial past. *Journal of Economic Growth*, 28(3):339–396.

Basu, A. and Ray, B. (1990). Women's struggle: A history of the all india women's conference, 1927-1990.

Bau, N. (2021). Can policy change culture? government pension plans and traditional kinship practices. *American Economic Review*, 111(6):1880–1917.

Beauchamp, A., Calvi, R., and Fulford, S. (2017). Terms of engagement: Marriage and migration in india. *Structural Models in Development: Migration, Marriage and the Family. Econometric Society*.

Becker, S. O., Boeckh, K., Hainz, C., and Woessmann, L. (2016). The Empire is Dead, Long Live the Empire! Long-Run Persistence of Trust and Corruption in the Bureaucracy. *The Economic Journal*, 126(590):40–74.

Behrman, J. R., Foster, A. D., Rosenweig, M. R., and Vashishtha, P. (1999). Women's schooling, home teaching, and economic growth. *Journal of political Economy*, 107(4):682–714.

Bellés-Obrero, C. and Lombardi, M. (2023). Will you marry me, later? age-of-marriage laws and child marriage in mexico. *Journal of Human Resources*, 58(1):221–259.

Bergstrom, T. C. and Lam, D. (1991). The two-sex problem and the marriage squeeze in an equilibrium model of marriage markets.

Besley, T. and Coate, S. (2003). Elected versus appointed regulators: Theory and evidence. *Journal of the European Economic Association*, 1(5):1176–1206.

Bharadwaj, P. (2015). Impact of changes in marriage law: Implications for fertility and school enrollment. *Journal of Human Resources*, 50(3):614–654.

Caldwell, J. C., Reddy, P., and Caldwell, P. (1986). Periodic High Risk as a Cause of Fertility Decline in a Changing Rural Environment: Survival Strategies in the 1980-1983 South Indian Drought. *Economic Development and Cultural Change*, 34(4):677–701.

Calvi, R., Hoehn-Velasco, L., and Mantovanelli, F. G. (2022). The protestant legacy: missions, gender, and human capital in india. *Journal of Human Resources*, 57(6):1946–1980.

Campa, P. and Serafinelli, M. (2019). Politico-Economic Regimes and Attitudes: Female Workers under State Socialism. *Review of Economics and Statistics*, 101(2):233–248.

Campion, D. A. (2003). Authority, Accountability and Representation: the United Provinces Police and the Dilemmas of the Colonial Policeman in British India, 1902–39. *Historical Research*, 76(192):217–237.

Carranza, E. (2014). Soil endowments, female labor force participation, and the demographic deficit of women in india. *American Economic Journal: Applied Economics*, 6(4):197–225.

Carroll, L. (1983). Law, Custom, and Statutory Social Reform: the Hindu Widows' Remarriage Act of 1856. *Indian Economic & Social History Review*, 20(4):363–388.

Census of India (1911, 1921, 1931, 1961, 1971, 1981). *Census of India, Age and civil condition.*

Census of India (2011). *Administrative Atlas of India*. Registrar General and Census Commissioner, India.

Chandrachud, A. (2015). *An Independent, Colonial Judiciary: A History of the Bombay High Court during the British Raj, 1862–1947*. Oxford University Press.

Chari, A., Heath, R., Maertens, A., and Fatima, F. (2017). The Causal Effect of Maternal Age at Marriage on Child Wellbeing: Evidence from India. *Journal of Development Economics*, 127:42–55.

Chaudhary, L. and Fenske, J. (2020). Did railways affect literacy? evidence from india.

Chiplunkar, G. and Weaver, J. (2023). Marriage markets and the rise of dowry in india. *Journal of Development Economics*, 164:103115.

Chitnis, V. and Wright, D. (2007). Legacy of Colonialism: Law and Women's Rights in India. *Wash. & Lee L. Rev.*, 64:1315.

Compton, J. M. (1967). Indians and the Indian Civil Service, 1853–1879: A Study in National Agitation and Imperial Embarrassment. *Journal of the Royal Asiatic Society*, 99(2):99–113.

Corno, L., Hildebrandt, N., and Voena, A. (2020). Age of Marriage, Weather Shocks, and the Direction of Marriage Payments. *Econometrica*, 88(3):879–915.

Corno, L. and Voena, A. (2016). Selling daughters: age of marriage, income shocks and the bride price tradition. Technical report, IFS Working Papers.

Croson, R. and Gneezy, U. (2009). Gender Differences in Preferences. *Journal of Economic literature*, 47(2):448–74.

Dahl, G. B. (2010). Early Teen Marriage and Future Poverty. *Demography*, 47(3):689–718.

Dalmia, S. (2004). A hedonic analysis of marriage transactions in india: estimating determinants of dowries and demand for groom characteristics in marriage. *Research in Economics*, 58(3):235–255.

Dell, M. (2010). The Persistent Effects of Peru's Mining Mita. *Econometrica*, 78(6):1863–1903.

Dell, M. and Olken, B. A. (2020). The Development Effects of the Extractive Colonial Economy: The Dutch Cultivation System in Java. *The Review of Economic Studies*, 87(1):164–203.

Dennis, J. S., Beach, H. P., Fahs, C. H., and Bartholomew, J. G. (1911). *World atlas of Christian missions: containing a directory of missionary societies, a classified summary of statistics, an index of mission stations, and maps showing the location of mission stations throughout the world*. Student volunteer movement for foreign missions.

Djogbenou, A. A., MacKinnon, J. G., and Nielsen, M. Ø. (2019). Asymptotic Theory and Wild bootstrap Inference with Clustered Errors. *Journal of Econometrics*, 212(2):393–412.

Dyson, T. (2018). *A population history of India: From the first modern people to the present day*. Oxford University Press.

Farré, L., Felfe, C., González, L., and Schneider, P. (2023). Changing gender norms across generations: Evidence from a paternity leave reform.

Farré, L. and Vella, F. (2013). The intergenerational transmission of gender role attitudes and its implications for female labour force participation. *Economica*, 80(318):219–247.

Fenske, J., Gupta, B., and Neumann, C. (2022a). Missing women in colonial india. *CEPR Discussion Paper No. DP17189*.

Fenske, J., Gupta, B., and Yuan, S. (2022b). Demographic shocks and women's labor market participation: evidence from the 1918 influenza pandemic in india. *The Journal of Economic History*, 82(3):875–912.

Fernandez, R. and Fogli, A. (2009). Culture: An Empirical Investigation of Beliefs, Work, and Fertility. *American economic journal: Macroeconomics*, 1(1):146–77.

Fernández, R., Fogli, A., and Olivetti, C. (2004). Mothers and sons: Preference formation and female labor force dynamics. *The Quarterly Journal of Economics*, 119(4):1249–1299.

Field, E. and Ambrus, A. (2008). Early Marriage, Age of Menarche, and Female Schooling Attainment in Bangladesh. *Journal of Political Economy*, 116(5):881–930.

Fisch, J. (2000). Humanitarian Achievement or Administrative Necessity? Lord William Bentinck and the Abolition of Sati in 1829. *Journal of Asian History*, pages 109–134.

Furber, H. (1951). The unification of india, 1947-1951. *Pacific Affairs*, 24(4):352–371.

Garcia-Hombrados, J. (2022). Child marriage and infant mortality: causal evidence from ethiopia. *Journal of Population Economics*, 35(3):1163–1223.

Giuliano, P. and Nunn, N. (2020). Understanding Cultural Persistence and Change. *The Review of Economic Studies*. rdaa074.

Goldin, C. and Katz, L. F. (2002). The Power of the Pill: Oral Contraceptives and Women's Career and Marriage Decisions. *Journal of Political Economy*, 110(4):730–770.

Grey, D. J. (2011). Gender, Religion, and Infanticide in Colonial India, 1870–1906. *Victorian Review*, 37(2):107–120.

Grey, D. J. (2013). Creating the 'Problem Hindu': Sati, Thuggee and Female Infanticide in India, 1800–60. *Gender & History*, 25(3):498–510.

Grosfeld, I. and Zhuravskaya, E. (2015). Cultural vs. Economic Legacies of Empires: Evidence from the Partition of Poland. *Journal of Comparative Economics*, 43(1):55–75.

Grosjean, P. and Khattar, R. (2019). It's raining men! hallelujah? the long-run consequences of male-biased sex ratios. *The Review of Economic Studies*, 86(2):723–754.

Gupta, B. (2014). Where Have All the Brides Gone? Son Preference and Marriage in India over the Twentieth Century. *The Economic History Review*, 67(1):1–24.

Hatekar, N., Mathur, R., and Rege, P. (2007). 'Legislating' Social Change: Strange Case of the Sarda Act. *Economic and Political Weekly*, pages 145–153.

Heckman, J. J. and Macurdy, T. E. (1980). A Life Cycle Model of Female Labour Supply. *The Review of Economic Studies*, 47(1):47–74.

India Office of the Registrar (1962). *Census of India, 1961*, volume 4. Manager of publications.

Iyer, L. (2010). Direct versus Indirect Colonial Rule in India: Long-term Consequences. *The Review of Economics and Statistics*, 92(4):693–713.

Jayachandran, S., Lleras-Muney, A., and Smith, K. V. (2010). Modern medicine and the twentieth century decline in mortality: Evidence on the impact of sulfa drugs. *American Economic Journal: Applied Economics*, 2(2):118–46.

Jayachandran, S. and Pande, R. (2017). Why are Indian Children So Short? the Role of Birth Order and Son Preference. *American Economic Review*, 107(9):2600–2629.

Jensen, R. and Thornton, R. (2003). Early female marriage in the developing world. *Gender & Development*, 11(2):9–19.

Kalaivani, R. (2015). Child marriage restraint act (1929)-a historical review. *International Journal of Humanities and Social Science Invention*, 1:14–18.

Khanam, A. (2016). An historical overview of the accession of princely states. *Journal of Historical Studies*, 2(1):84–103.

Krishnan, P. (1977). Age at Marriage in a Nineteenth Century Indian Parish. In *Annales de démographie historique*, pages 271–284.

Lord William Bentinck (1829). Speech of Lord William Bentinck on the Abolition of Sati.

Lowes, S., Nunn, N., Robinson, J. A., and Weigel, J. L. (2017). The Evolution of Culture and Institutions: Evidence from the Kuba Kingdom. *Econometrica*, 85(4):1065–1091.

MacKinnon, J. G., Nielsen, M. Ø., and Webb, M. D. (2017). Bootstrap and Asymptotic Inference with Multiway Clustering. Queen's Economics Department Working Paper.

MacKinnon, J. G. and Webb, M. D. (2017). Pitfalls when Estimating Treatment Effects Using Clustered Data. Queen's Economics Department Working Paper.

Maertens, A. and Chari, A. (2020). What's your child worth? an analysis of expected dowry payments in rural india. *World Development*, 130:104927.

Mahmood, T. (1980). Marriage-age in india and abroad—a comparative conspectus. *Journal of the Indian Law Institute*, 22(1):38–80.

Malaker, C. (1973). Construction of Nuptiality Tables for the Single Population in India: 1901–1931. *Demography*, 10(4):525–535.

Mathur, S., Greene, M., and Malhotra, A. (2018). *Too Young to Wed: The Lives, Rights, and Health of Young Married Girls*. Washington: International Centre on Research on Women, 2003.

Mazzocco, M. and Saini, S. (2012). Testing Efficient Risk Sharing with Heterogeneous Risk Preferences. *American Economic Review*, 102(1):428–68.

McGavock, T. (2021). Here waits the bride? the effect of ethiopia's child marriage law. *Journal of Development Economics*, 149:102580.

Mensch, B., Bruce, J., and Greene, M. E. (1998). The Uncharted Passage: Girls' Adolescence in the Developing World.

Mukherjee, S. (2006). Using the legislative assembly for social reform: The sarda act of 1929. *South Asia Research*, 26(3):219–233.

Munshi, K. and Rosenzweig, M. (2016). Networks and Misallocation: Insurance, Migration, and the Rural-urban Wage Gap. *American Economic Review*, 106(1):46–98.

Murty, B. V. (2019). Child marriage row: Jharkhand bjp chief refuses to step down. Technical report, Hindustan Times.

Nunn, N. (2008). The Long-Term Effects of Africa's Slave Trades. *The Quarterly Journal of Economics*, 123(1):139–176.

Nunn, N. and Wantchekon, L. (2011). The Slave Trade and the Origins of Mistrust in Africa. *American Economic Review*, 101(7):3221–52.

Oldenburg, P. (2010). *India, Pakistan, and democracy: Solving the puzzle of divergent paths*. Routledge.

Pandey, K. (2019). When politicians endorse child marriage, you have to shout 'beti bachao. Technical report, DownToEarth.

Peers, D. M. (2013). *India Under Colonial Rule: 1700-1885*. Routledge.

Potter, D. C. (1973). Manpower Shortage and the End of Colonialism: The Case of the Indian Civil Service. *Modern Asian Studies*, 7(1):47–73.

Raman, S. A. (2009). *Women in India [2 volumes]: A Social and Cultural History [2 volumes]*. Bloomsbury Publishing USA.

Ramusack, B. N. (2003). *The Indian Princes and their States*. Cambridge University Press.

Riaz, A. (2016). *Bangladesh: A political history since independence*. Bloomsbury Publishing.

Sagade, J. (2005). *Child Marriage in India: Socio-legal and Human Rights Dimensions*. Oxford University Press, USA.

Schoellman, T. and Tertilt, M. (2006). Marriage Laws and Growth in Sub-Saharan Africa. *American Economic Review*, 96(2):295–298.

Sekhri, S. and Debnath, S. (2014). Intergenerational Consequences of Early Age Marriages of Girls: Effect on Children's Human Capital. *The Journal of Development Studies*, 50(12):1670–1686.

Sekhri, S. and Storeygard, A. (2014). Dowry Deaths: Response to Weather Variability in India. *Journal of Development Economics*, 111:212–223.

Sen, S. (2002). The Savage Family: Colonialism and Female Infanticide in Nineteenth-Century India. *Journal of Women's History*, 14(3):53–79.

Sharma, P. K. (1967). Integration of princely states and the reorganization of states in india. *The Indian Journal of Political Science*, 28(4):236–241.

Sheel, R. (1997). Institutionalisation and expansion of dowry system in colonial north india. *Economic and Political Weekly*, pages 1709–1718.

Singh, M. P. (2007). A borderless internal federal space? reorganization of states in india. *India review*, 6(4):233–250.

Srinivasa Aiyar, A. (1930). *Child Marriage Restraint Act (Act XIX of 1929)*. Madras: The Law Publishing Company.

Stevenson, B. (2008). Divorce Law and Women's Labor Supply. *Journal of Empirical Legal Studies*, 5(4):853–873.

Tandon, U. (2010). Under-age marriage in pluralist asia: An analysis of religious and secular laws of south asian countries. *IIUMLJ*, 18:285.

Tertilt, M. (2005). Polygyny, Fertility, and Savings. *Journal of Political Economy*, 113(6):1341–1371.

Tertilt, M. (2006). Polygyny, Women's Rights, and Development. *Journal of the European Economic Association*, 4(2-3):523–530.

Tudor, M. (2013). How india institutionalized democracy and pakistan promoted autocracy. *The Promise of Power: The Origins of Democracy in India and Autocracy in Pakistan*, pages 1–43.

UNFPA (2006). *Ending Child Marriage: A Guide for Global Policy Action*. International Planned Parenthood Federation and United Nations Population Fund. Available at `https://www.unfpa.org/publications/ending-child-marriage-guide-global-policy-action`.

UNICEF (2011). Delaying Marriage for Girls in India: A Formative Research to Design Interventions for Changing Norms. Technical report, International Center for Research on Women Report to UNICEF.

UNICEF (2017). Child marriage is a violation of human rights, but is all too common. Technical report.

Venkatraman, V. (2018). Aiwc and wia: Crusade against the violation of women rights in colonial tamilnadu, 1927-1947. *Available at SSRN 3238815*.

Vogl, T. S. (2013). Marriage Institutions and Sibling Competition: Evidence from South Asia. *The Quarterly Journal of Economics*, 128(3):1017–1072.

Vogl, T. S. and Freese, J. (2020). Differential Fertility Makes Society More Conservative on Family Values. *Proceedings of the National Academy of Sciences*, 117(14):7696–7701.

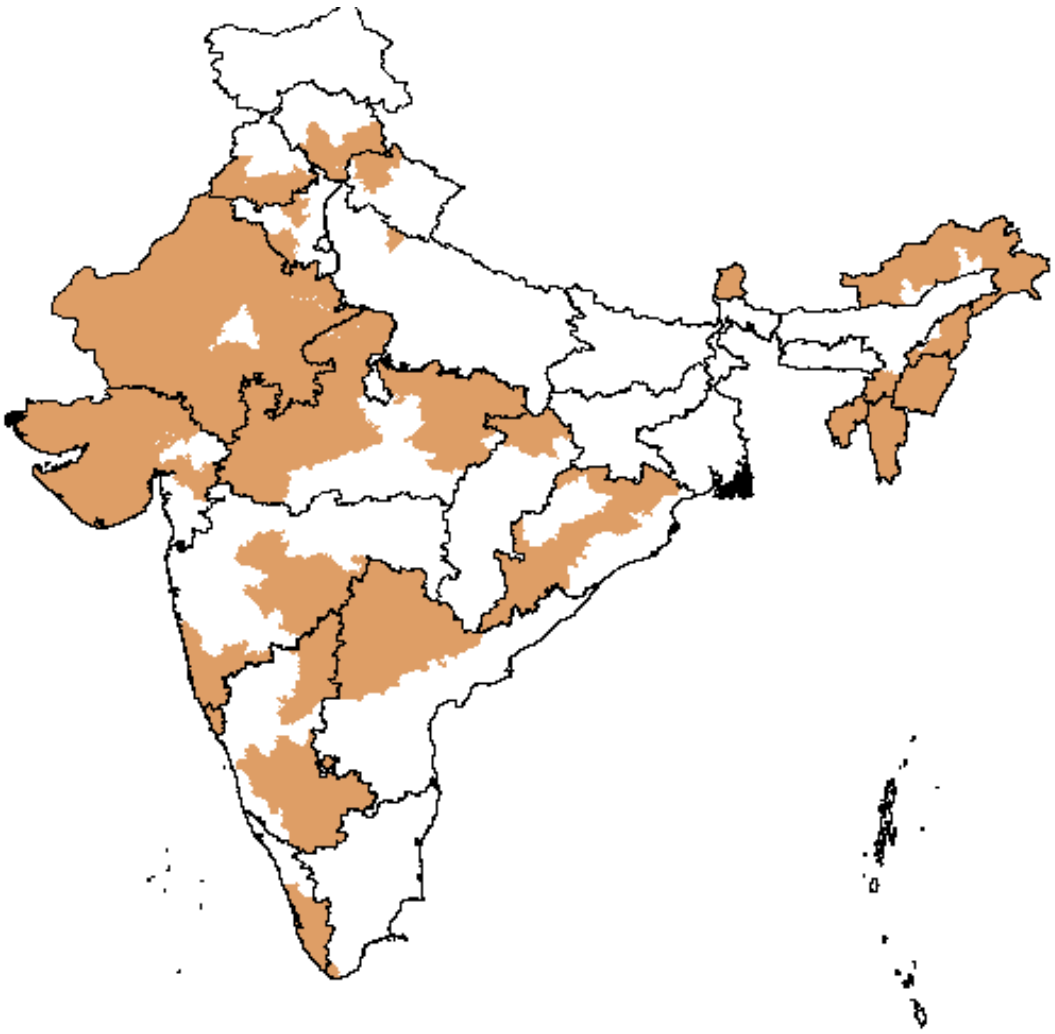
Wahhaj, Z. (2018). An Economic Model of Early Marriage. *Journal of Economic Behavior & Organization*, 152:147–176.

Wantchekon, L., Klašnja, M., and Novta, N. (2015). Education and Human Capital Externalities: Evidence from Colonial Benin. *The Quarterly Journal of Economics*, 130(2):703–757.

Yount, K. M., Crandall, A., Cheong, Y. F., Osypuk, T. L., Bates, L. M., Naved, R. T., and Schuler, S. R. (2016). Child Marriage and Intimate Partner Violence in Rural Bangladesh: A Longitudinal Multilevel Analysis. *Demography*, 53(6):1821–1852.

# 9 Figures and Tables

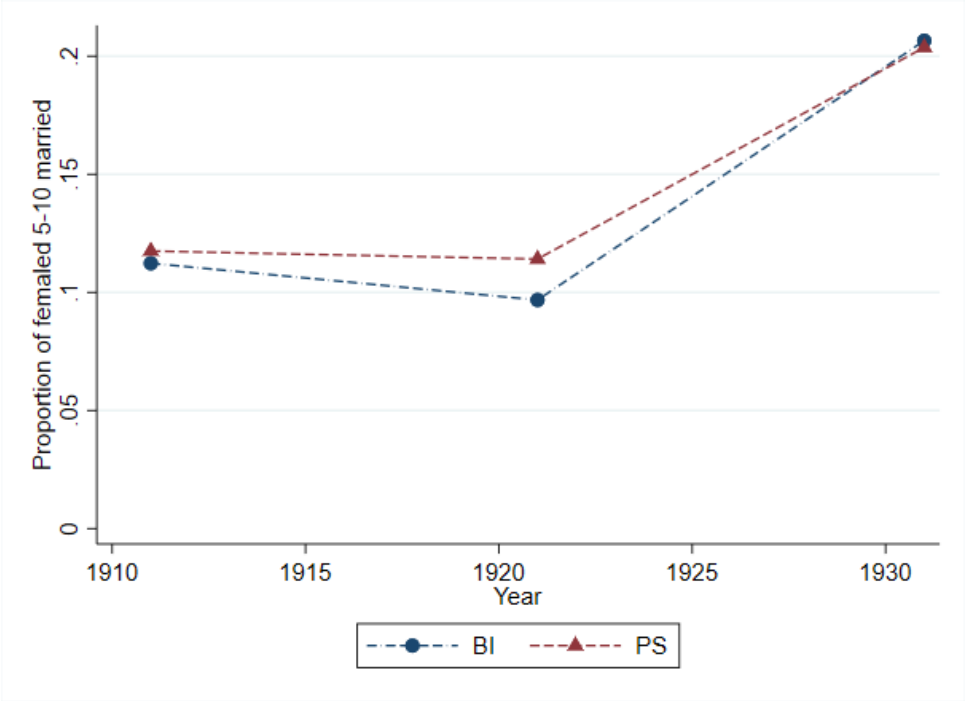
Figure 1: Distribution of Princely States and British Direct Rule Regions



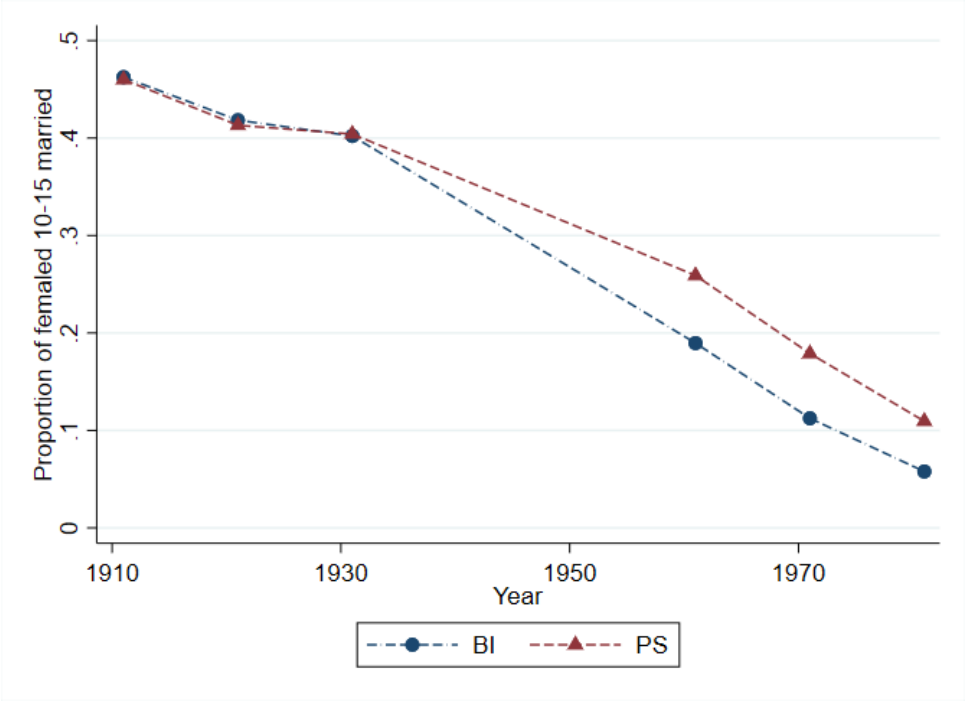
*Note:* The figure plots the geographical distribution of districts formerly belonging to British India and the princely states in India. The shaded parts were districts that belonged to princely states and the white parts are districts that were under British India. The solid line is the state boundary in post-colonial India. Sources: Baden-Powell (1892) and Census of India (2011).

Figure 2: Female Marriage Pattern in 1911-1981, by British India and Princely States

(a) Married proportion 5-10



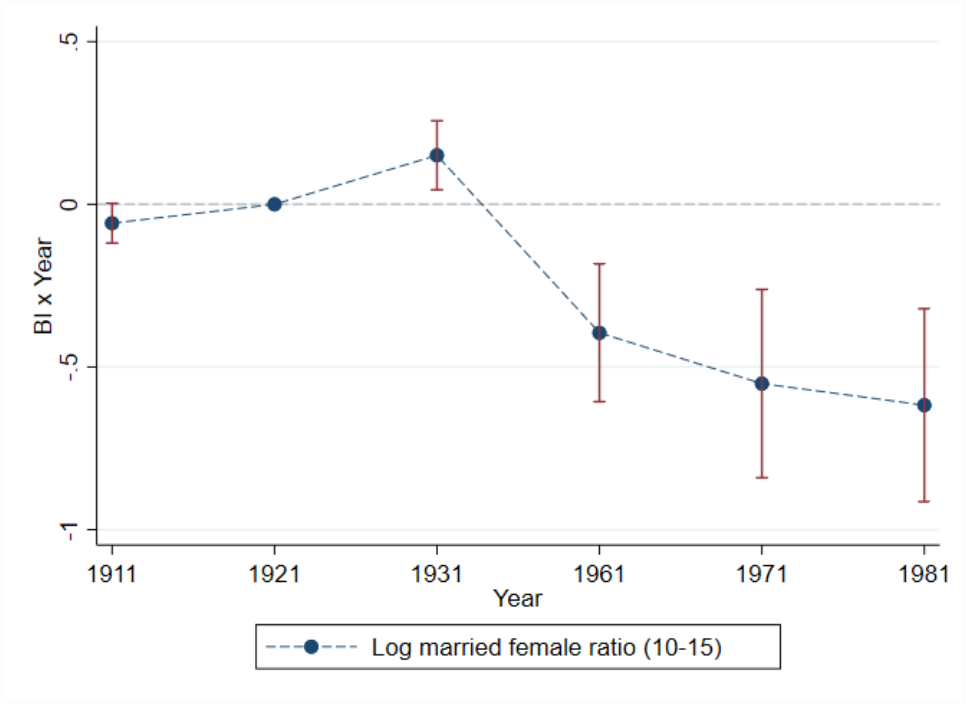

(b) Married proportion 10-15



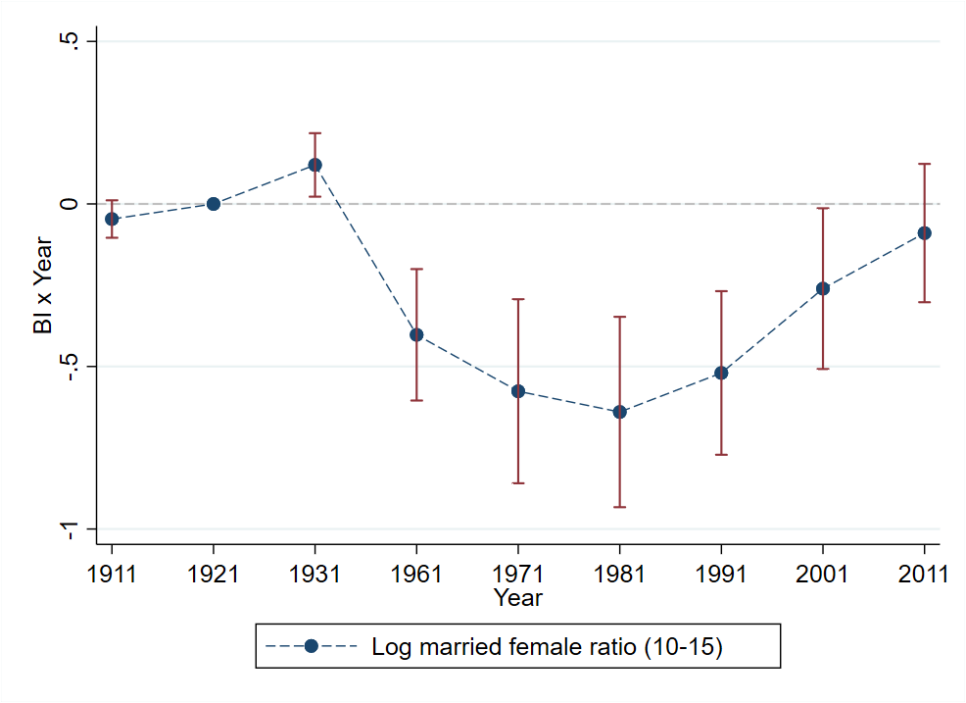

*Note:* The graph plots the proportion of females married in each census year at the district level in our sample. Panel (a) plots the proportion of females married at ages 5-10 years for the period 1911-1931 by British India and princely states in a balanced sample of districts. Panel (b) plots the proportion of females married at ages 10-15 years for the period 1911-1981 for the sample of districts where the districts could be linked between 1931 and 1981 by British India and princely states. The blue lines represent British India, and the red lines are for princely states. Data are from the Census of India 1911-1931 and 1961-1981. We do not find any statistically significant difference in the trends, from 1911-1921, between British India and princely states for the proportion of females married at ages 5-10 years and for females at ages 10-15 years (see Table 2 and 4).

Figure 3: Medium-run and Long run Impact of Sarda Act, 1930

(a) ln - Share of female married 10-15 (Medium run, 1911-1961)




(b) ln - Share of female married 10-15 (Long run, 1911-1981)




*Note:* The figures plot the coefficient $BI \times year_t$ where $BI$ is an indicator for the British India district, and $year_t$ is the year indicator, for equation (3) replacing the $Post_t$ indicator with yearly indicators. Panel (a) uses the data from 1911-1961. The specification is the same as column (1) in Table A.14. Panel (b) uses data from 1911 to 1981. Both specifications exclude 1941 and 1951. The omitted year is 1921.

Table 1: Short-Run Difference-in-Differences

(a) ln Proportion of Female Married 5-10

| | ln Proportion of Female Married 5-10 | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| BI × Year 1931 | 0.200*** | 0.217* | 0.291*** | 0.286** |
| | (0.0741) | (0.118) | (0.0917) | (0.126) |
| Observations | 849 | 849 | 750 | 750 |
| Number of Districts | 337 | 337 | 259 | 259 |
| Year FE | Y | Y | Y | Y |
| District FE | Y | Y | Y | Y |
| Incl. Mysore | N | N | N | N |
| Prov. trend | N | Y | N | Y |
| Ln pop. (1911) x year trend | N | N | Y | Y |

(b) Proportion of Female Married 5-10

| | Proportion of Female Married 5-10 | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| BI × Year 1931 | 0.0153* | 0.0164* | 0.0125 | 0.0187* |
| | (0.00910) | (0.00941) | (0.0112) | (0.0110) |
| Observations | 849 | 849 | 750 | 750 |
| Number of Districts | 337 | 337 | 259 | 259 |
| Year FE | Y | Y | Y | Y |
| District FE | Y | Y | Y | Y |
| Incl. Mysore | N | N | N | N |
| Prov. trend | N | Y | N | Y |
| Ln pop. (1911) x year trend | N | N | Y | Y |

*Note:* The table presents estimates for equation (1) with additional controls. The sample includes panel data at the district level for 1911-1931. The outcome variable is log proportion of females married between 5-10 years of age for panel (a) and in level for panel (b). $BI$ is an indicator for districts under British India. $Year(1931)$ is an indicator for the year 1931. Controls include log total population at age 10-15 years. Column (2) controls for province-specific year trend; column (3) controls for log population (age 10-15 years) in 1911 interacted with year trend; column (4) includes both as controls. Regions are defined according to the historical definition in the Census of India between 1911-1931. The sample includes Assam, Baroda, Bengal, Bihar and Orissa, Bombay, CIA, CP, Gwalior, Hyderabad, Madras, Punjab, Raputana, and UP, excluding Mysore. This also represents the list of historical provinces in the sample. The sample includes districts that are now in India. Standard errors are clustered at the district level. *, **, *** indicate significance at 10%, 5% and 1% level.

Table 2: Short-Run Difference-in-Differences - Test of Parallel Trend

| | ln Share of Married female (%) 5-10 | |
|---|---|---|
| | (1) | (2) |
| BI × Year 1921 | -0.0475 | -0.103 |
| | (0.0744) | (0.0760) |
| Observations | 508 | 508 |
| Number of Districts | 259 | 259 |
| Year FE | Y | Y |
| District FE | Y | Y |
| Ln pop. (1911) x year trend | Y | Y |
| Prov. trend | N | Y |
| | Share of Married female (%) 5-10 | |
| | (1) | (2) |
| BI × Year 1921 | 0.00292 | -0.00861 |
| | (0.00833) | (0.00545) |
| Observations | 508 | 508 |
| Number of Districts | 259 | 259 |
| Year FE | Y | Y |
| District FE | Y | Y |
| Ln pop. (1911) x year trend | Y | Y |
| Prov. trend | N | Y |

*Note:* The table presents estimates for testing the parallel trend assumption for equation (1) - The $Year1931$ dummy is replaced with an indicator for the year 1921, and the sample includes panel data at the district level for 1911-1921. $BI$ is an indicator for districts in British India. $BI \times year1921$ tests whether there is a differential trend between districts in British India and the princely states from 1911 to 1921. The outcome variable is the log proportion of females married at 5-10 years of age. Controls include log total population at age 10-15 years. The provinces are defined according to the historical definition in the Census of India (1911-1931). The sample includes Assam, Baroda, Bengal, Bihar and Orissa, Bombay, CIA, CP, Gwalior, Hyderabad, Madras, Punjab, Ra, and UP, excluding Mysore. Standard errors are clustered at the district level. *, **, *** indicate significance at 10%, 5% and 1% level.

Table 3: Medium-Run Difference-in-Differences

| | ln Share of Female Married 10-15 | Share of Female Married 10-15 |
|---|---|---|
| | (1) | (2) |
| BI × Year 1931 | 0.179*** | 0.0186 |
| | (0.0557) | (0.0119) |
| BI × Post (1961-1981) | -0.488*** | -0.0444** |
| | (0.131) | (0.0225) |
| Observations | 1501 | 1503 |
| Number of Districts | 286 | 286 |
| Year FE | Y | Y |
| District FE | Y | Y |

*Note:* The table presents estimates of equation (3). The sample includes panel data at the district level for 1911-1931 and 1961-1981. The outcome variable is the log proportion of females married in ages 10-15 years for column (1) and in level for column (3). $BI$ is an indicator variable for districts under British India. Year 1931 is an indicator for the year 1931, and $Post(1961-1981)$ is an indicator for the period 1961-1981. Controls include log total population for males at age 10-15 years. The sample includes Assam, Baroda, Bengal, Bihar and Orissa, Bombay, CIA, CP, Hyderabad, Madras, Punjab, Ra, UP and Mysore. Standard errors are clustered at the district level. *, **, *** indicate significance at 10%, 5% and 1% level.

Table 4: Medium-run Difference-in-Differences - Test of Parallel Trend

| | ln Share of Married Female 10-15 | Share of Married Female 10-15 |
|---|---|---|
| | (1) | (2) |
| BI × Year 1921 | 0.0318 | 0.0118 |
| | (0.0222) | (0.00748) |
| Observations | 484 | 484 |
| Number of Districts | 250 | 250 |
| Year FE | Y | Y |
| District FE | Y | Y |

*Note:* The table presents estimates for testing the parallel trend for equation (3), replacing the indicators for 1931, and post, with an indicator for year 1921. $BI \times year(1921)$ tests for whether there is a differential trend between districts in British India and princely states from 1911 to 1921. The sample includes panel data at the district level for 1911-1921. The outcome variables are the log proportion of females married at the age of 10-15 years for column (1) and in level for column (3). Controls include a log male population aged 10-15 years. The sample includes Assam, Baroda, Bengal, Bihar and Orissa, Bombay, CIA, CP, Hyderabad, Madras, Punjab, Ra, UP. and Mysore. The number of districts in the table differs from the sample used in Table 3 because for some districts, data for 1911-1921 are not available. Standard errors are clustered at the district level. *, **, *** indicate significance at 10%, 5% and 1% level.

Table 5: Long-Run Effect - Mean Age of Marriage

| Outcome: | Mean age of marriage | |
|---|---|---|
| | (1) | (2) |
| BP | 0.452* | 0.423* |
| | (0.233) | (0.223) |
| Observations | 67 | 64 |
| Mean | 19.51 | 19.49 |
| Group FE | Y | Y |
| Economic controls | N | Y |

*Note:* The table presents the estimates for equation (6). The outcome, mean age of marriage, is the district level mean age of marriage from DLHS 2002-2004 (from UNICEF DevInfo). *BI* is an indicator for districts formerly in British India. Controls include distance to coast and latitude, column (2) include in addition Ln GDP pc (2000) as control. Robust standard errors are reported in parenthesis. *, **, *** indicate significance at 10%, 5% and 1% level.

Table 6: OLS Regression of Girl / Boy Enrollment Ratio: 2005-2013

| | Outcome: Ratio of girl/boy enrollment | | | |
|---|---|---|---|---|
| | Class 7 | Class 6 | Class 5 | Class 4 |
| | (1) | (2) | (3) | (4) |
| BI | 0.0354** | 0.0322* | 0.0239** | 0.0113 |
| | (0.0158) | (0.0170) | (0.0106) | (0.00895) |
| Controls | Y | Y | Y | Y |
| Group FE | Y | Y | Y | Y |
| Year FE | Y | Y | Y | Y |
| | (1) | (2) | (3) | (4) |
| BI | 0.0302 | 0.0320* | 0.0197 | 0.00376 |
| | (0.0185) | (0.0181) | (0.0119) | (0.0100) |
| Observations | 2272 | 2272 | 2272 | 2272 |
| Controls | Y | Y | Y | Y |
| Group × Year FE | Y | Y | Y | Y |

*Note:* The table presents estimates of equation (5) for class 4-7. The outcome variable is the ratio of number of girls enrolled to the number of boys enrolled in each district, year and class, for the period 2005-2013. $BI$ is an indicator for districts formerly under British India. Additional controls include Class 1 girl-to-boy enrollment ratio, proportion of rural schools, average number of classrooms; latitude and distance to coast; ln GDP per capita is the district level GDP measured in the year 2000. Standard errors are clustered at district level. *, **, *** indicate significance at 10%, 5% and 1% level.

Table 7: Long-Run Difference-in-Differences

| | ln Female Married Share 10-15 | Female Married Share 10-15 |
|---|---|---|
| | (1) | (2) |
| BI × Year 1931 | 0.143*** | 0.0114 |
| | (0.0510) | (0.0120) |
| BI × Post (1961-1981) | -0.512*** | -0.0501** |
| | (0.128) | (0.0231) |
| BI × Post (1991-2011) | -0.263** | 0.00255 |
| | (0.109) | (0.0264) |
| Observations | 2140 | 2142 |
| Number of Districts | 286 | 286 |
| Year FE | Y | Y |
| District FE | Y | Y |
| Incl. Mysore | Y | Y |

*Note:* The table presents estimates of equation (3). The sample includes panel data at district level for 1911-1931 and 1961-2011. The outcome variable is the log proportion of females married in ages 10-15 for column (1) and in level for column (3). *BI* is an indicator variable for districts under British India. *SardaAct* is an indicator for the year 1931, and *Post* is an indicator for the period 1961-1981. Controls include log total population for males at age 10-15 years. The sample includes Assam, Baroda, Bengal, Bihar and Orissa, Bombay, CIA, CP, Hyderabad, Madras, Punjab, Ra, UP and Mysore. Standard errors are clustered at district level. *, **, *** indicate significance at 10%, 5% and 1% level.

Table 8: Intergenerational Persistence of Age at Marriage

| | Daughter Unmarried (=1 if yes) |
|---|---|
| | (1) |
| Age at First marriage of Mother | 0.00286*** |
| | (0.000907) |
| Observations | 33,771 |
| Sample Age Group | 10 to 18 years |
| Controls | Y |
| District*Urban/Rural F.E | Y |
| Year of Birth F.E | Y |

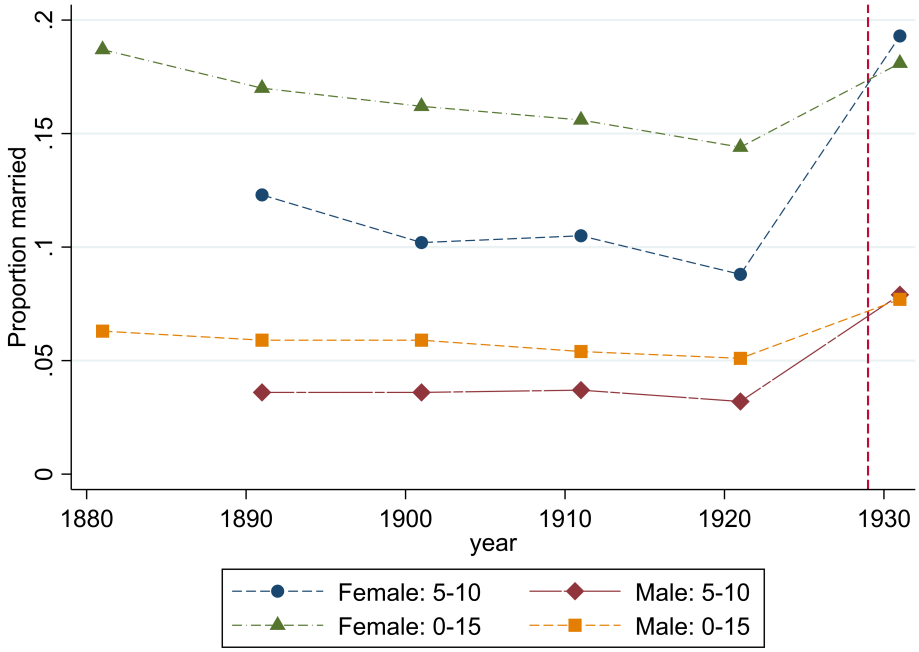
*Note:* The table presents estimates for equation (7) on a sample of girls aged between 10-18 years of age. The controls in the table contain age of the mother, fixed effects for religion, caste, mothers' highest education level, exposure of mothers to outside events such as whether the mother watches television every week, listens to radio every week, whether mothers' partner ever attended school, total children, sex of household head fixed effect, age of household head, household ownership of radio, television, refrigerator, bicycles, motorcycles, cars and access to electricity. The regressions also include a set of district-rural-urban and birth cohort fixed effects. The outcome variable is a dummy variable that takes the value 1 if the daughter at age-group "x" is unmarried at the time of the interview. Standard errors are clustered at district level. *, **, *** indicate significance at 10%, 5% and 1% level.

# Appendix

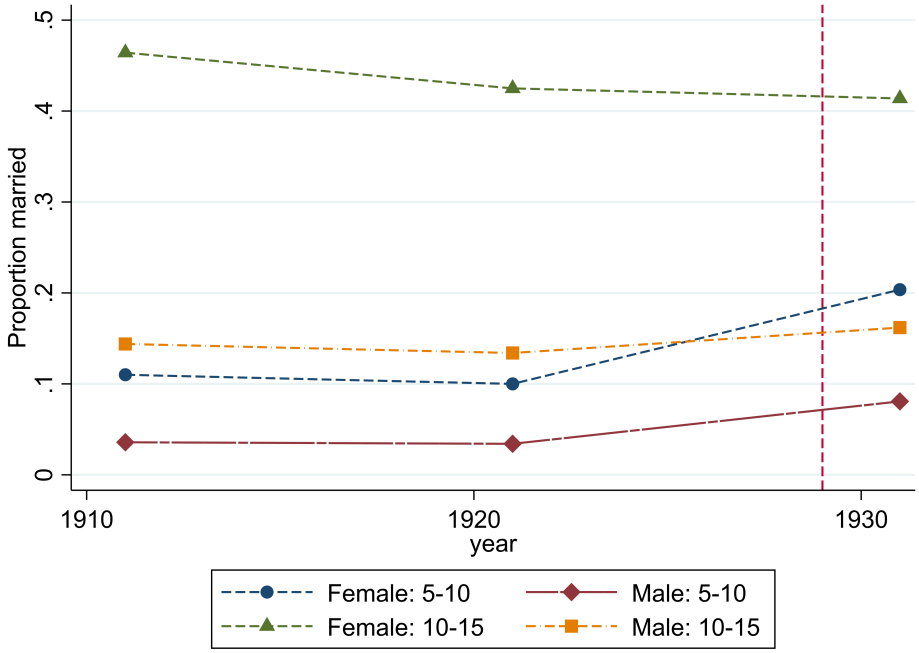
## A Additional Figures and Tables

Figure A.1: Marriage Pattern in 1881-1931: Time Series

(a) National trend



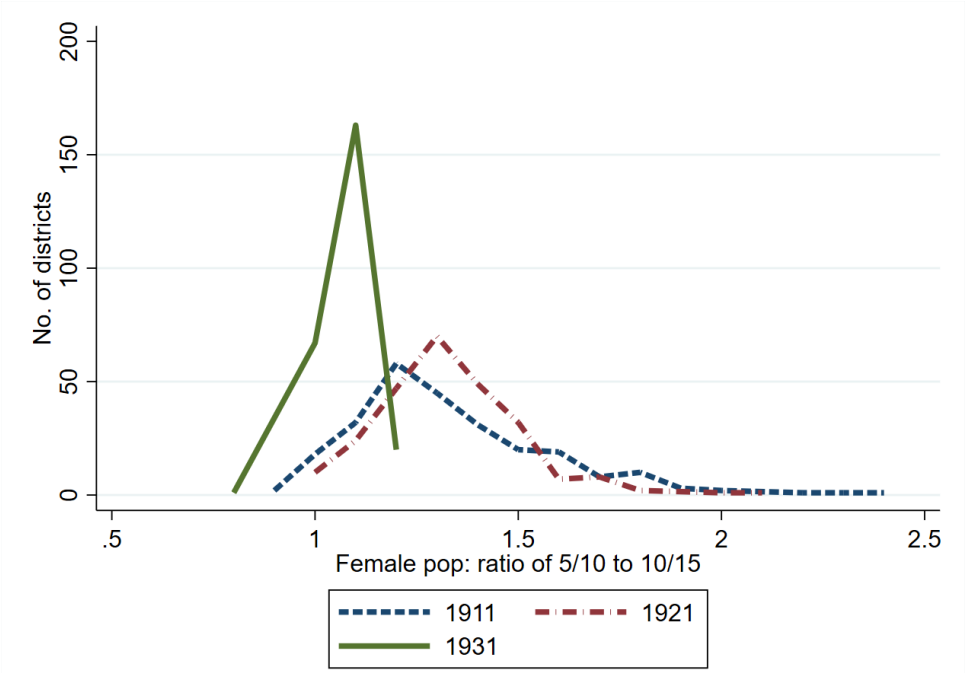

(b) Our sample



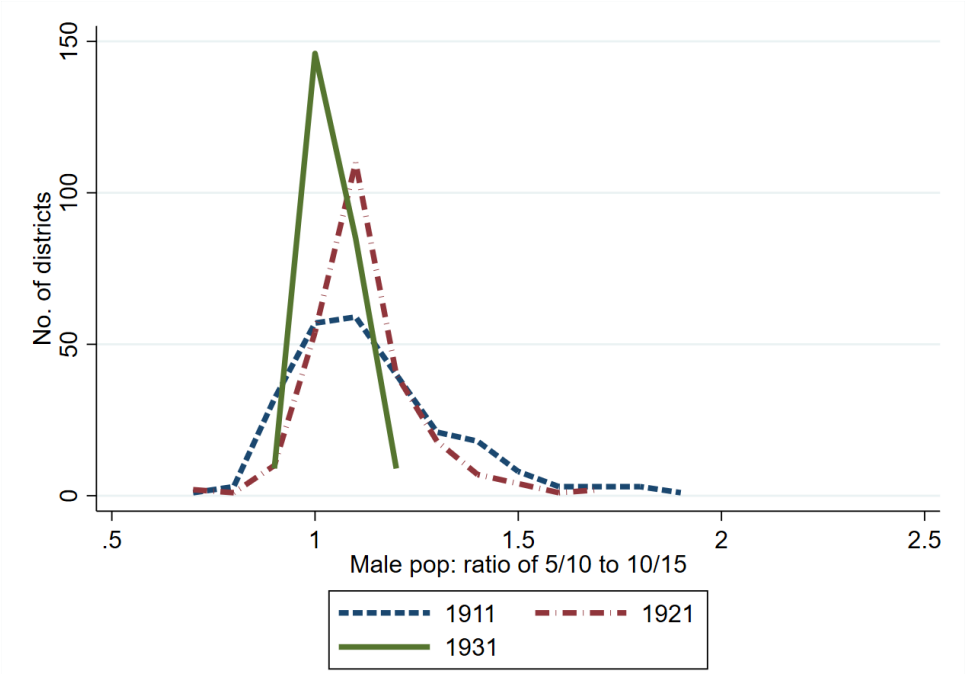

*Note:* The figure plots the proportion of children who are married in India for the period 1881-1931, reported in each census year (i.e., every 10 years), by gender and age group. The proportion of children who are married is calculated using the total number of married children (including both married and widowed), divided by the total number of children in each specific gender and age group. Panel (a) plots the proportion of children who are married aged 5-10 years and 0-15 years for each gender at the national level. Panel (b) plots the average proportion of children who are married at the district level in our sample for each census year and age group, including 5-10 and 10-15 years. Data are from the Census of India (1881-1931).

Figure A.2: Age Structure in Census of India for 1911-1931

(a) Girls



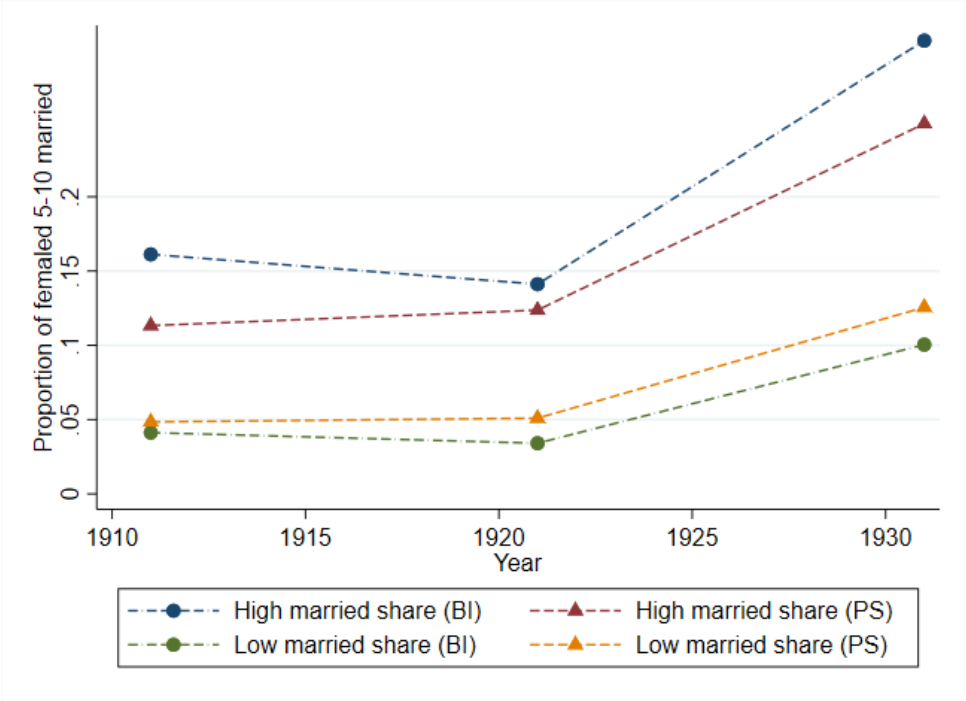

(b) Boys



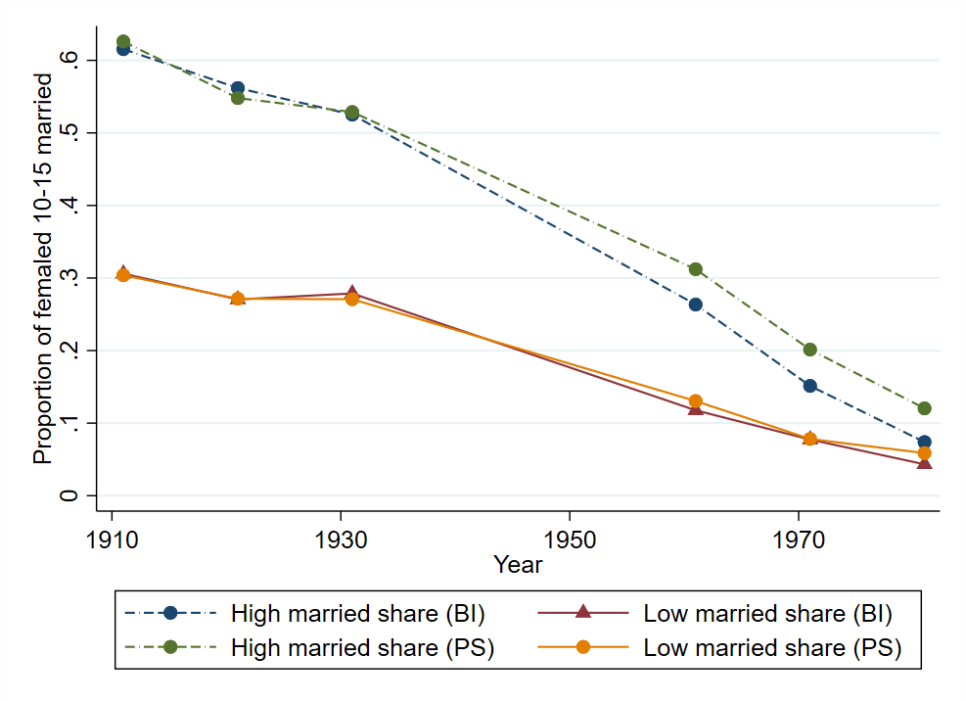

*Note:* The graph plots the distribution of reported age structure at the district level in the Census of India (1911-1931). It plots a histogram for the ratio of 5-10 years old to 10-15 years old in each district by gender. Panel (a) plots a histogram of age structure for girls for each district; Panel (b) plots a histogram of the age structure for boys with the same measure for each district. For each bin indicated on the x-axis, the y-axis indicates the number of districts that have reported age structure that corresponds to that bin.

Figure A.3: Female marriage pattern in 1911-1981 by high versus low year 1911 share of female married in ages 10-15

(a) Female 10-15




(b) Female 5-10




*Note:* The figure plots the proportion of females married in ages 5-10 and 10-15 in each census year at the district level, by districts that has above or below median proportion of married female in 1911 among the British India districts and princely state districts.

Table A.1: Married Share of Females Aged 5-10 Years in 1911 and 1931, by Historical Province

| Married Share: 5-10 female | | | |
|---|---|---|---|
| Year | 1911 | 1921 | 1931 |
| Assam | 0.02 | 0.01 | 0.07 |
| Baroda | 0.15 | 0.08 | 0.14 |
| Bengal | 0.11 | 0.08 | 0.27 |
| Bihar and Orissa | 0.17 | 0.13 | 0.26 |
| Bombay | 0.18 | 0.15 | 0.24 |
| Central India Agency (CIA) | 0.14 | 0.13 | 0.23 |
| Central Province | 0.16 | 0.14 | 0.29 |
| Gwalior | . | 0.12 | 0.21 |
| Hyderabad | 0.25 | 0.21 | 0.36 |
| Madras | 0.04 | 0.04 | 0.09 |
| Mysore | 0.01 | 0.01 | 0.04 |
| Punjab | 0.07 | 0.08 | 0.13 |
| Rajputana | 0.07 | 0.08 | 0.18 |
| United Province | 0.10 | 0.10 | 0.23 |
| All | 0.11 | 0.10 | 0.20 |

*Note:* The table presents the average proportion of females married at age 5-10 years in 1921 and 1931 for each historical province in our sample. The proportion of females married is measured as the number of married or widowed females divided by the total population of females aged 5-10 years at district level. Data are from the Census of India 1911-1931.

Table A.2: Summary Statistics - British India and the Princely States

| | British India | Princely states |
|---|---|---|
| | Mean | Mean |
| **District level characteristics** | | |
| Distance to coast (km) | 479.2 | 388.2 |
| Ln GDPPC (2000) | 2.585 | 2.844 |
| Manufacturing share of GDP (2000) | 0.102 | 0.111 |
| **School characteristics** | | |
| Total girl / total boy enrollment in class 6 | 0.935 | 0.913 |
| Total girl / total boy enrollment in class 5 | 0.939 | 0.923 |
| Proportion of rural schools | 0.883 | 0.869 |
| Number of classrooms | 4.415 | 5.023 |

*Note:* The table presents summary statistics for our sample analyzed in Section 6. The top panel shows district level variables: Log district level GDP per capita is measured in the year 2000. Distance to coast is measured in kilometers from the centroid of each district. The bottom panel presents data aggregated at district level from DISE school records, forming a district-level (unbalanced) panel for 2005-2013. The sample does not include Kerala.

Table A.3: Share of Females Married Aged 10-15 years in 1911 and 1981, by Historical Province

| | Share married: 10-15 female | | | | | |
|---|---|---|---|---|---|---|
| Year | 1911 | 1921 | 1931 | 1961 | 1971 | 1981 |
| Assam | 0.17 | 0.15 | 0.20 | 0.02 | 0.01 | 0.01 |
| Baroda | 0.46 | 0.34 | 0.32 | 0.06 | 0.03 | 0.02 |
| Bengal | 0.58 | 0.50 | 0.51 | 0.17 | 0.05 | 0.02 |
| Bihar and Orissa | 0.50 | 0.44 | 0.46 | 0.27 | 0.16 | 0.01 |
| Bombay | 0.58 | 0.50 | 0.42 | 0.14 | 0.06 | 0.03 |
| Central India Agency (CIA) | . | . | 0.43 | 0.42 | 0.32 | 0.18 |
| Central Province | 0.54 | 0.50 | 0.50 | 0.23 | 0.13 | 0.05 |
| Gwalior | . | 0.52 | 0.46 | 0.48 | 0.35 | 0.21 |
| Hyderabad | 0.69 | 0.59 | 0.58 | 0.36 | 0.21 | 0.11 |
| Madras | 0.25 | 0.21 | 0.21 | 0.07 | 0.03 | 0.01 |
| Mysore | 0.21 | 0.18 | 0.18 | 0.05 | 0.03 | 0.01 |
| Punjab | 0.38 | 0.33 | 0.31 | 0.09 | 0.06 | 0.03 |
| Rajputana | 0.43 | 0.40 | 0.40 | 0.32 | 0.25 | 0.18 |
| United Province | 0.52 | 0.50 | 0.46 | 0.28 | 0.20 | 0.11 |

*Note:* The table presents the average proportion of females married at age 10-15 years in 1911 and 1981 for each historical province in our sample. The proportion of females married is measured as the number of married or widowed females divided by the total population of females aged 10-15 years at district level. Data are from the Census of India 1911-1981.

Table A.4: Short run effects in ages 5-10: wild-bootstrap standard error

| | | | | |
|---|---|---|---|---|
| | Outcome: ln married ratio - 5-10 female | | | |
| $BI \times Year1931$ | .4792 | 1.1552 | 1.3838 | 1.7859 |
| t-statistics | 2.671 | 2.188 | 3.02 | 2.511 |
| p-value | .027 | .037 | .01 | .032 |
| Year FE | Y | Y | Y | Y |
| District FE | Y | Y | Y | Y |
| Incl. Mysore | N | N | N | N |
| Prov. trend | N | Y | N | Y |
| Ln pop. (1911) x year trend | N | N | Y | Y |
| | Outcome: married ratio - 5-10 female | | | |
| $BI \times Year1931$ | .0153 | .0164 | .0125 | .0187 |
| t-statistics | .952 | 1.353 | .681 | 1.145 |
| p-value | .3904 | .2633 | .5305 | .3193 |
| Year FE | Y | Y | Y | Y |
| District FE | Y | Y | Y | Y |
| Incl. Mysore | N | N | N | N |
| Prov. trend | N | Y | N | Y |
| Ln pop. (1911) x year trend | N | N | Y | Y |

*Note:* The table present the t-statistics and p-value for wild bootstrapping the $BI\times$ Year 1931 coefficients clustering at province level for the specifications in Table 1

.

Table A.5: Balancing test

| | Boys literacy rate - 10-15 | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| Mean | BI | PS | Diff |
| 1911 | 0.091 | 0.071 | |
| 1921 | 0.103 | 0.082 | |
| Change (1911-1921) | 0.010 | 0.012 | -0.002 |
| | | | (0.559) |
| Obs | 176 | 81 | 257 |

*Note:* The table present the summary statistics for boy literacy for the age group of 10-15, separately for districts in British India and Princely states in col (1)-(2). Col. (3) presents the differences in the mean of the two groups. p-value in parenthesis.

Table A.6: Short-Run Difference-in-Differences - Heterogeneity by Protestant Missionaries

(a) ln Proportion of Female Married 5-10

| | ln Proportion of Female Married 5-10 | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| BI × Year 1931 | 0.365*** | 0.374*** | 0.481*** | 0.459*** |
| | (0.0944) | (0.130) | (0.112) | (0.135) |
| BI × Year 1931 × HighMissions | -0.397* | -0.427** | -0.504** | -0.484** |
| | (0.223) | (0.202) | (0.233) | (0.204) |
| Observations | 771 | 771 | 696 | 696 |
| Number of Districts | 296 | 296 | 235 | 235 |
| Year FE | Y | Y | Y | Y |
| District FE | Y | Y | Y | Y |
| Incl. Mysore | N | N | N | N |
| Prov. trend | N | Y | N | Y |
| Ln pop. (1911) x year trend | N | N | Y | Y |

(b) Proportion of Female Married 5-10

| | Proportion of Female Married 5-10 | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| BI × Year 1931 | 0.0391*** | 0.0312*** | 0.0399*** | 0.0350*** |
| | (0.0106) | (0.0108) | (0.0122) | (0.0120) |
| BI × Year 1931 × HighMissions | -0.0829* | -0.0554 | -0.0839* | -0.0584 |
| | (0.0429) | (0.0427) | (0.0437) | (0.0431) |
| Observations | 771 | 771 | 696 | 696 |
| Number of Districts | 296 | 296 | 235 | 235 |
| Year FE | Y | Y | Y | Y |
| District FE | Y | Y | Y | Y |
| Incl. Mysore | N | N | N | N |
| Prov. trend | N | Y | N | Y |
| Ln pop. (1911) x year trend | N | N | Y | Y |

*Note:* The table presents estimates for equation (2). The sample includes panel data at the district level for 1911-1931. The outcome variable is log proportion of females married between 5-10 years of age for panel (a) and in level for panel (b). $BI$ is an indicator for districts under British India. $Year1931$ is an indicator for the year 1931. $HighMission$ is an indicator that the number of missionaries (in World Atlas of Christian Missions, 1911) in a district is above the median. The specification includes the additional interaction terms between $HighMissions \times Year1931$. Controls include log total population at age 10-15 years. Column (2) controls for province-specific year trend; column (3) controls for log population (age 10-15 years) in 1911 interacted with year trend; column (4) includes both as controls. Regions are defined according to the historical definition in the Census of India between 1911-1931. The sample includes Assam, Baroda, Bengal, Bihar and Orissa, Bombay, CIA, CP, Gwalior, Hyderabad, Madras, Punjab, Raputana, and UP, excluding Mysore. This also represents the list of historical provinces in the sample. The sample includes districts that are now in India. Standard errors are clustered at the district level. *, **, *** indicate significance at 10%, 5% and 1% level.

Table A.7: Placebo Outcome for Short-run Effect

| | ln Total pop. 40-60 |
|---|---|
| BI × Year 1931 | 0.0111 |
| | (0.0211) |
| Observations | 849 |
| District FE | Yes |
| Year FE | Yes |

*Note:* The table presents the treatment effect of the Sarda Act on the ln total district population of the age group 40-60. The specification estimated is equation (1).

Table A.8: Short-Run Difference-in-Differences - Sex ratio heterogeneity

(a) ln Proportion of Female Married 5-10

| | ln Proportion of Female Married 5-10 | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| BI × Year 1931 × $HighFemaleShare$ | 0.0534 | 0.0807 | -0.0115 | 0.0139 |
| | (0.119) | (0.139) | (0.0175) | (0.0177) |
| BI × Year 1931 | 0.158* | 0.159 | 0.0235* | 0.00635 |
| | (0.0855) | (0.105) | (0.0136) | (0.0133) |
| Observations | 849 | 849 | 849 | 849 |
| Number of Districts | 337 | 337 | 337 | 337 |
| Year FE | Y | Y | Y | Y |
| District FE | Y | Y | Y | Y |
| Incl. Mysore | N | N | N | N |
| Ln pop. (1911) x year trend | N | N | N | N |
| Prov. trend | N | Y | N | Y |

(b) Proportion of Female Married 5-10

| | Proportion of Female Married 5-10 | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| BI × Year 1931 × $HighFemaleShare$ | -0.0115 | 0.0139 | -0.00872 | 0.0182 |
| | (0.0175) | (0.0177) | (0.0187) | (0.0182) |
| BI × Year 1931 | 0.0235* | 0.00635 | 0.0188 | 0.00557 |
| | (0.0136) | (0.0133) | (0.0146) | (0.0144) |
| Observations | 849 | 849 | 750 | 750 |
| Number of Districts | 337 | 337 | 259 | 259 |
| Year FE | Y | Y | Y | Y |
| District FE | Y | Y | Y | Y |
| Incl. Mysore | N | N | N | N |
| Ln pop. (1911) x year trend | N | N | Y | Y |
| Prov. trend | N | Y | N | Y |

*Note:* The table presents estimates for equation (1) with additional interaction terms with the indicator $HighFemaleShare$. The sample includes panel data at the district level for 1911-1931. The outcome variable is log proportion of females married between 5-10 years of age for panel (a) and in level for panel (b). $BI$ is an indicator for districts under British India. $Year1931$ is an indicator for the year 1931. $HighFemaleShare$ is an indicator of the district having a share of females in the age group of 5-10 above the median in 1921. Controls include log total population at age 10-15 years. Column (2) controls for province-specific year trend; column (3) controls for log population (age 10-15 years) in 1911 interacted with year trend; column (4) includes both as controls. Regions are defined according to the historical definition in the Census of India between 1911-1931. The sample includes Assam, Baroda, Bengal, Bihar and Orissa, Bombay, CIA, CP, Gwalior, Hyderabad, Madras, Punjab, Raputana, and UP, excluding Mysore. This also represents the list of historical provinces in the sample. The sample includes districts that are now in India. Standard errors are clustered at the district level. *, **, *** indicate significance at 10%, 5% and 1% level.

Table A.9: Short-Run Difference-in-Differences - Female aged 15-20

(a) ln Proportion of Female Married 15-20

| | ln Proportion of Female Married 15-20 | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| BI × Year 1931 | 0.0353*** | 0.0246** | 0.0467*** | 0.0371*** |
| | (0.00834) | (0.0117) | (0.0106) | (0.0131) |
| Observations | 847 | 847 | 748 | 748 |
| Number of Districts | 337 | 337 | 259 | 259 |
| Year FE | Y | Y | Y | Y |
| District FE | Y | Y | Y | Y |
| Incl. Mysore | N | N | N | N |
| Ln pop. (1911) x year trend | N | N | Y | Y |
| Prov. trend | N | Y | N | Y |

(b) Proportion of Female Married 15-20

| | Proportion of Female Married 15-20 | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| BI × Year 1931 | 0.0248*** | 0.0153* | 0.0327*** | 0.0241*** |
| | (0.00619) | (0.00825) | (0.00777) | (0.00929) |
| Observations | 847 | 847 | 748 | 748 |
| Number of Districts | 337 | 337 | 259 | 259 |
| Year FE | Y | Y | Y | Y |
| District FE | Y | Y | Y | Y |
| Incl. Mysore | N | N | N | N |
| Ln pop. (1911) x year trend | N | N | Y | Y |
| Prov. trend | N | Y | N | Y |

*Note:* The table presents estimates for equation (1) with additional controls. The sample includes panel data at the district level for 1911-1931. The outcome variable is log proportion of females married between 15-20 years of age for panel (a) and in level for panel (b). $BI$ is an indicator for districts under British India. $Year1931$ is an indicator for the year 1931. Controls include log total population at age 10-15 years. Column (2) controls for province-specific year trend; column (3) controls for log population (age 10-15 years) in 1911 interacted with year trend; column (4) includes both as controls. Regions are defined according to the historical definition in the Census of India between 1911-1931. The sample includes Assam, Baroda, Bengal, Bihar and Orissa, Bombay, CIA, CP, Gwalior, Hyderabad, Madras, Punjab, Ra, and UP, excluding Mysore. This also represents the list of historical provinces in the sample. Standard errors are clustered at the district level. *, **, *** indicate significance at 10%, 5% and 1% level.

Table A.10: Short-Run Difference-in-Differences - Male aged 15-20

(a) ln Proportion of Male Married 15-20

| | Ln Proportion of Male Married 15-20 | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| BI × Year 1931 | 0.0429 | 0.0572 | 0.0313 | 0.0677 |
| | (0.0288) | (0.0378) | (0.0350) | (0.0430) |
| Observations | 848 | 848 | 749 | 749 |
| Number of Districts | 337 | 337 | 259 | 259 |
| Year FE | Y | Y | Y | Y |
| District FE | Y | Y | Y | Y |
| Incl. Mysore | N | N | N | N |
| Ln pop. (1911) x year trend | N | N | Y | Y |
| Prov. trend | N | Y | N | Y |

(b) Proportion of Male Married 15-20

| | Proportion of Male Married aged 15-20 | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| BI × Year 1931 | -0.00726 | -0.000616 | -0.0116 | 0.00277 |
| | (0.00829) | (0.00985) | (0.0105) | (0.0117) |
| Observations | 848 | 848 | 749 | 749 |
| Number of Districts | 337 | 337 | 259 | 259 |
| Year FE | Y | Y | Y | Y |
| District FE | Y | Y | Y | Y |
| Incl. Mysore | N | N | N | N |
| Ln pop. (1911) x year trend | N | N | Y | Y |
| Prov. trend | N | Y | N | Y |

*Note:* The table presents estimates for equation (1) with additional controls. The sample includes panel data at the district level for 1911-1931. The outcome variable is log proportion of females married between 15-20 years of age for panel (a) and in level for panel (b). $BI$ is an indicator for districts under British India. $Year1931$ is an indicator for the year 1931. Controls include log total population at age 10-15 years. Column (2) controls for province-specific year trend; column (3) controls for log population (age 10-15 years) in 1911 interacted with year trend; column (4) includes both as controls. Regions are defined according to the historical definition in the Census of India between 1911-1931. The sample includes Assam, Baroda, Bengal, Bihar and Orissa, Bombay, CIA, CP, Gwalior, Hyderabad, Madras, Punjab, Ra, and UP, excluding Mysore. Standard errors are clustered at the district level. *, **, *** indicate significance at 10%, 5% and 1% level.

Table A.11: Short-run effect on Literacy Rate

| | Outcome: Female literacy (10-15) |
|---|---|
| | lit. rate |
| | (1) |
| BI × Year 1931 | -0.0481 |
| | (0.0445) |
| Observations | 798 |
| Number of Districts | 300 |
| Year FE | Y |
| District FE | Y |
| Incl. Mysore | N |
| Prov. trend | Y |
| Baseline literacy rate (1921) | 0.0229 |

Note: The table presents the short-run effect of the Sarda Act on the literacy rate for females aged 10-15. It presents the estimate of equation (1) with the literacy rate of females as an outcome. Female literacy rate is measured by the number of literate female aged 10-15 divided by total number of female aged 10-15 in each district. The sample includes districts that are now in India, excluding districts that are in Pakistan and Bangladesh. Control includes log total population aged 10-15. Standard error clustered at the district level. *, **, *** indicate significance at 10%, 5% and 1% level.

Table A.12: Summary statistics for present-day Pakistan and Bangladesh districts

| | Marriage rate of female 5-10 | | |
|---|---|---|---|
| | British India districts | | |
| | 1911 | 1921 | 1931 |
| Assam | .02904 | .01902 | .11772 |
| Bengal | .0869 | .06123 | .27657 |
| Bombay | .02564 | .02996 | .08253 |
| North West Frontier | .00579 | .00207 | .01969 |
| Punjab | .01735 | .01614 | .04734 |
| | Princely state districts | | |
| | 1911 | 1921 | 1931 |
| Bombay | . | .05824 | .10221 |
| Punjab | .0159 | .01547 | .03754 |

*Note:* The table presents the province-level average marriage rate of females aged 5-10, including only districts in present-day Bangladesh and Pakistan in 1911-1931.

Table A.13: Short-Run Difference-in-Differences - Including districts in present-day Pakistan and Bangladesh

(a) ln Proportion of Female Married 5-10

| | ln Proportion of Female Married 5-10 | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| BI × Year 1931 | 0.255*** | 0.258** | 0.326*** | 0.316** |
| | (0.0728) | (0.114) | (0.0911) | (0.125) |
| Observations | 960 | 960 | 857 | 857 |
| Number of Districts | 376 | 376 | 296 | 296 |
| Year FE | Y | Y | Y | Y |
| District FE | Y | Y | Y | Y |
| Incl. Mysore | N | N | N | N |
| Prov. trend | N | Y | N | Y |
| Ln pop. (1911) x year trend | N | N | Y | Y |

(b) Proportion of Female Married 5-10

| | Proportion of Female Married 5-10 | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| BI × Year 1931 | 0.0155* | 0.0142* | 0.00762 | 0.0151 |
| | (0.00896) | (0.00850) | (0.0108) | (0.0104) |
| Observations | 960 | 960 | 857 | 857 |
| Number of Districts | 376 | 376 | 296 | 296 |
| Year FE | Y | Y | Y | Y |
| District FE | Y | Y | Y | Y |
| Incl. Mysore | N | N | N | N |
| Prov. trend | N | Y | N | Y |
| Ln pop. (1911) x year trend | N | N | Y | Y |

*Note:* The table presents estimates for equation (1) with additional controls. The sample includes panel data at the district level for 1911-1931. The outcome variable is the log proportion of females married between 5-10 years of age for panel (a) and in level for panel (b). $BI$ is an indicator for districts under British India. $Year1931$ is an indicator for the year 1931. Controls include log total population in ages 10-15 years. Column (2) controls for province-specific year trend; column (3) controls for log population (age 10-15 years) in 1911 interacted with year trend; column (4) includes both as controls. Regions are defined according to the historical definition in the Census of India between 1911-1931. The sample includes Assam, Baroda, Bengal, Bihar and Orissa, Bombay, CIA, CP, Gwalior, Hyderabad, Madras, Punjab, Raputana, UP, North West Frontier, excluding Mysore. This also represents the list of historical provinces in the sample. The sample includes districts that are now in India, Pakistan, and Bangladesh. Standard errors are clustered at the district level. *, **, *** indicate significance at 10%, 5% and 1% level.

Table A.14: Medium-Run Difference-in-Differences, Yearly Effects

| | ln Share of Female Married 10-15 | | Share of Female Married 10-15 | |
|---|---|---|---|---|
| | Sample | | | |
| | 1911-1961 | 1911-1981 | 1911-1961 | 1911-1981 |
| | (1) | (2) | (3) | (4) |
| BI × Year 1931 | 0.109*** | 0.178*** | 0.0175 | 0.0187 |
| | (0.0391) | (0.0559) | (0.0109) | (0.0119) |
| BI × Year 1961 | -0.433*** | -0.368*** | -0.0684*** | -0.0567*** |
| | (0.104) | (0.110) | (0.0207) | (0.0213) |
| BI × Year 1971 | | -0.524*** | | -0.0486** |
| | | (0.150) | | (0.0240) |
| BI × Year 1981 | | -0.590*** | | -0.0254 |
| | | (0.153) | | (0.0254) |
| Observations | 1007 | 1501 | 1007 | 1503 |
| Number of Districts | 285 | 286 | 285 | 286 |
| Year FE | Y | Y | Y | Y |
| District FE | Y | Y | Y | Y |

*Note:* The table presents estimates of equation (3) with flexible year indicators for 1961, 1971, and 1981. The outcome variable is the log proportion of females married between 10 and 15 years of age for columns (1)-(2) and the level of the proportion of females married between 10 and 15 years of age for columns (3)-(4). *BI* is an indicator variable for districts formerly under British India. Year 1931 is an indicator for the year 1931. Control includes (log) total population of males at age 10-15 years. Columns (1) and (3) include samples from 1911-1931 and 1961. Columns (2) and (4) include samples from the years 1911-1931 and 1961-1981. Standard errors are clustered at the district level. *, **, *** indicate significance at 10%, 5% and 1% level.

Table A.15: Medium-run Difference-in-Differences- - including 1941

| | ln Married ratio (female) | | Married ratio (female) | |
|---|---|---|---|---|
| | 5-10 | 10-15 | 5-10 | 10-15 |
| | (1) | (2) | (3) | (4) |
| BI × Year 1931 | -0.0463 | -0.0868** | -0.0000448 | -0.0541*** |
| | (0.0927) | (0.0373) | (0.0174) | (0.0161) |
| BI × Year 1941 | -0.803*** | -0.383*** | -0.0941*** | -0.151*** |
| | (0.154) | (0.0636) | (0.0180) | (0.0205) |
| Observations | 283 | 286 | 283 | 286 |
| No. of Dist | 75 | 75 | 75 | 75 |
| Year FE | Y | Y | Y | Y |
| District FE | Y | Y | Y | Y |
| Controls | N | N | N | N |

Notes: The table includes districts in which the 1941 data are available and are of comparable age group as 1911-1931, consisting of districts from Bengal, Bihar and Orissa, Bombay, Gwalior, Hyderabad, and Rajputana. Districts from Mysore and Baroda are excluded.

Table A.16: Medium-run Difference-in-Differences - including 1941 and restricting princely states to include only Baroda and Mysore

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| | ln Married ratio (female) | | Married ratio (female) | |
| | 5-10 | 10-15 | 5-10 | 10-15 |
| BI × Year 1931 | -0.726*** | -0.149** | 0.0794*** | -0.0918*** |
| | (0.216) | (0.0560) | (0.0166) | (0.0181) |
| BI × Year 1941 | 0.366 | 0.140 | -0.0530*** | -0.120*** |
| | (0.287) | (0.165) | (0.0150) | (0.0299) |
| Observations | 171 | 173 | 172 | 173 |
| No. of Dist | 45 | 45 | 45 | 45 |
| Year FE | Y | Y | Y | Y |
| District FE | Y | Y | Y | Y |
| Controls | N | N | N | N |

Notes: The table includes districts in which the 1941 data are available and are of comparable age group as 1911-1931, consisting of districts from Bengal, Baroda, Bombay, Mysore, and Rajputana.

Table A.17: Medium-run effect on literacy rate

| | Outcome: Female literacy (10-15) |
|---|---|
| | lit. rate |
| | (1) |
| BI × Year 1931 | -0.0310 |
| | (0.0269) |
| BI × Post (1961-1981) | 0.0730*** |
| | (0.0223) |
| Observations | 1476 |
| Number of Districts | 286 |
| Year FE | Y |
| District FE | Y |

Note: The table presents the medium-run effect of the Sarda Act on the literacy rate for females aged 10-15. It presents the estimate of equation (1) with the literacy rate of females (age 10-15) as an outcome. Female literacy rate is measured by the number of literate female aged 10-15 divided by total number of female aged 10-15 in each district. Control includes log population of 10-15 years old males. Standard error clustered at the district level. *, **, *** indicate significance at 10%, 5% and 1% level.

Table A.18: Migration at province level: summary statistics

| | Emigrants per 1,000 population of origin | | | | | |
|---|---|---|---|---|---|---|
| | Total | | Destination BP | | Destination PS | |
| Origin province | 1921 | 1931 | 1921 | 1931 | 1921 | 1931 |
| BP (share of pop in BI: 83-100%) | 25.29 | 24.34 | 19.59 | 18.4 | 5.66 | 5.89 |
| sd | (12.42) | (9.52) | (13.94) | (10.92) | (5.61) | (5.63) |
| N | | | 8 | | | |
| PS | 68.29 | 60.03 | 48.23 | 41.4 | 20.03 | 9.61 |
| sd | (36.13) | (30.51) | (33.78) | (26.25) | (27.64) | (10.26) |
| N | | | 6 | | | |

*Note:* The table presents summary statistics for the number of emigrants per 1,000 population in each of the provinces/states. The top (bottom) panel presents the statistics for British provinces (princely states). The data is available at province level from Census. In the British provinces, the majority of population are in districts that belong to British India (83%-100%), while it also includes districts that belong to princely states. Column (1)-(2) present average number of emigrants per 1,000 population for year 1921 and 1931 respectively, column (3)-(4) are the average number of emigrants to British Provinces (per population at the origin provinces). Column (5)-(6) are average number of emigrants to princely states, per population at the origin provinces. Standard deviation are presented in parenthesis.

Table A.19: Short-Run Effect on (DiD) on Age Structure

| Outcome: no. of female 5-10/10-15 | | |
|---|---|---|
| | (1) | (2) |
| BI × Year 1931 | 0.0199 | -0.00202 |
| | (0.0215) | (0.0264) |
| Observations | 850 | 850 |
| Number of Districts | 337 | 337 |
| District FE | Y | Y |
| Year FE | Y | Y |
| Province-specific trend | N | Y |

*Note:* The table presents estimates of equation (8) where the outcome is age structure, measured as the ratio of number of girls at age 5-10 to number of girls at age 10-15 for each district of each census year 1911-1931. Sample include Assam, Baroda, Bengal, Bihar and Orissa, Bombay, CIA, CP, Gwalior, Hydebarad, Madras, Punjab, Rajasthan, and UP. Standard errors are clustered at district level. *, **, *** indicate significance at 10%, 5% and 1% level.

## B Social Reform

Social reforms that were introduced by the British depended upon the discretion of the governors-general in charge and the native social reformers (Chitnis and Wright, 2007). All the British social reforms that were introduced by the governors-general were in direct conflict with the existing laws of Indian society (Lord William Bentinck, 1829; Carroll, 1983). The laws were passed after much deliberation by the reformist governors-general. The first of the most important social reforms introduced in colonial India was the abolition of Sati in 1829. Sati was only practiced by upper caste Hindus in Bengal, Rajputana, and Central India. It was a practice that involved a widow immolating herself on her husband's funeral pyre. The reform was pushed forward by a native social reformer, Raja Ram Mohan Roy. Lord William Bentinck introduced this law, arguing that the general masses of India were uncivilized and would continue this custom if the British did not bring forward a legal reform making it a punishable offense. In a speech in 1829, he pointed out that Britain could afford to abolish Sati without fearing a rebellion from the natives because the majority of Indian soldiers in the British army belonged to the tribes that did not practice Sati (Fisch, 2000). Since Sati was only practiced by few ethnic groups in India, it was possible to extend the law outside British jurisdictions. The British negotiated with the princely states to abolish Sati - Rajputana was the last native state to abolish it in 1861 (Ramusack, 2003).

Since then, most of the social reforms were implemented within British India and did not apply to the princely states. With the initiative of the educationalist Pandit Iswar Chandra Vidyasagar, the British passed the Hindu Widow Remarriage Act of 1856. Until then, widow remarriage among upper caste Hindus had been prohibited, and Hindu widows were expected to live a life of austerity (Peers, 2013).

Although Sati was abolished in all of India, as a practice, it was not as widespread as female infanticide and child marriage (Grey, 2013), which existed across all of India and in all religions. Unlike Sati, the practice of female infanticide was not restricted to upper caste Hindus. The abolition of female infanticide (1870) and child marriage were harder to implement as they went directly against the widespread age-old customs of the natives across castes and tribes (Grey, 2011). The laws related to these practices were again confined to British India. In 1891, the Age of Consent Law was passed that raised the age of consent to 12 years. This bill created much tension among the native population (Ramusack, 2003; Chitnis and Wright, 2007). The reforms were slow.

The Female Infanticide Prevention Act of 1870 was passed in British India to prevent the murder of female infants. Female infanticide was a very common practice in India because girls were perceived as an economic burden due to the dowry and other social customs (Census of India 1891, Sen (2002)).[36]

[36] See also Baines (1893)

## C Age Structure

In this section, we examine the possibility of misreporting age in the census data of 1911-1931 and its implications for our estimation of the short-run effect of the Sarda Act.

The announcement of the Sarda Act may have created an incentive for households to misreport the age of their girls because the 1931 census was conducted close to the time that the Sarda Act was announced and implemented. Households may have overreported the age of their married daughters if they were under 14 years of age at the time the census was conducted. This overreporting may have minimized the risk for families of being penalized for organizing marriages for girls below the age of 14 years.

We examine the extent of such misreporting behavior and test whether it confounds our difference-in-differences estimates in equation (1). For each district, gender, and census year, we measure the age structure of the district using the relative number of the population of district $i$ in year $t$ in the age group of 5-10 to that of age group 10-15. Specifically, we compute the ratio $R_{it}$ using:

$$R_{it} = \frac{T_{it}^{5-10}}{T_{it}^{10-15}}$$

where $T_{it}^{5-10}$ and $T_{it}^{10-15}$ are the population of the age group from 5 to 10 years, and 10 to 15 years, respectively.

Figure A.2 plots the histogram of age structure at the district level by census year and gender. Panel (a) of Figure A.2 plots the histograms of age structure for girls for the census years 1911-1931. In 1911 and 1921, the modes of the relative population size of the two age groups are around 1.2-1.3, suggesting that, on average, there were more girls at age 5-10 years in comparison with age 10-15 years. In 1931, the mode of that ratio is slightly lower than that in 1911-1921. This suggests that in 1931 there were on average fewer children aged 5-10 compared with 1921 or 1911 within each district, relative to those aged 10-15 years. Panel (b) in Figure A.2 plots the same measure for boys; which reveals a similar pattern, although the magnitude of the shift is weaker for boys. This is consistent with the finding that there could be age misreporting in the 1931 census to a certain extent, or if there are other reasons for rapid demographic change between 1921 to 1931.

We then examine whether this age structure change or potential misreporting was different between British India and the princely states. We estimate the following variant of equation (1):

$$R_{it} = \beta_1 BI_i \times Year1931 + \mu_i + \gamma_t + \epsilon_{it} \tag{8}$$

We report the estimates of equation (8) in Table A.19. We find that the estimate of $\beta_1$ in equation (8) is not statistically significantly different from zero. This suggests that any change in the age structure was not correlated with the princely states and districts in British India,

and it does not support the hypothesis that the Sarda Act caused natives to misreport age. The change in the reported age structure shown in Figure A.2 could be related to other unobserved national factors, which would be controlled for by year fixed effect in the estimation of equation (1). We therefore consider that the possibility of misreporting age would not confound our estimation of equation (1).

## D Construction of district level panel data, 1911-1981

The lists of districts in the censuses of 1911-1931 are highly consistent across years. Changes in district names and district divisions are evident between 1931 and 1961 and from 1961 onwards. We track the district name changes using district history records from Government of India district websites, and we aggregate the district splits during 1961-1981 to match with the corresponding 1931 district. In the few occurrences of district merges, we match the merged district with the original districts, and our empirical analysis clustered at the merged district level in these cases. In the case of districts with multiple origins, where each origin could be linked to more than one post-independence district, we keep the district-year data point where the district's names are the same across all years.

The original archives are available at the British Library, LSE Library, and the University of Oxford Library, which formed our main sources. The census tables for each province are reported in their respective volume for each year. The marriage and literacy data we used are from the "Age, sex and civil condition" and the "Literacy" section in the census volume from each province. The electronic copies of some provinces and years are also available at online resources from the Repository of Gokhale Institute Of Politics & Economics (GIPE). Figure A.4 shows a capture of the original census book.

Figure A.4: Age, sex and civil condition tables in Census of India, 1911

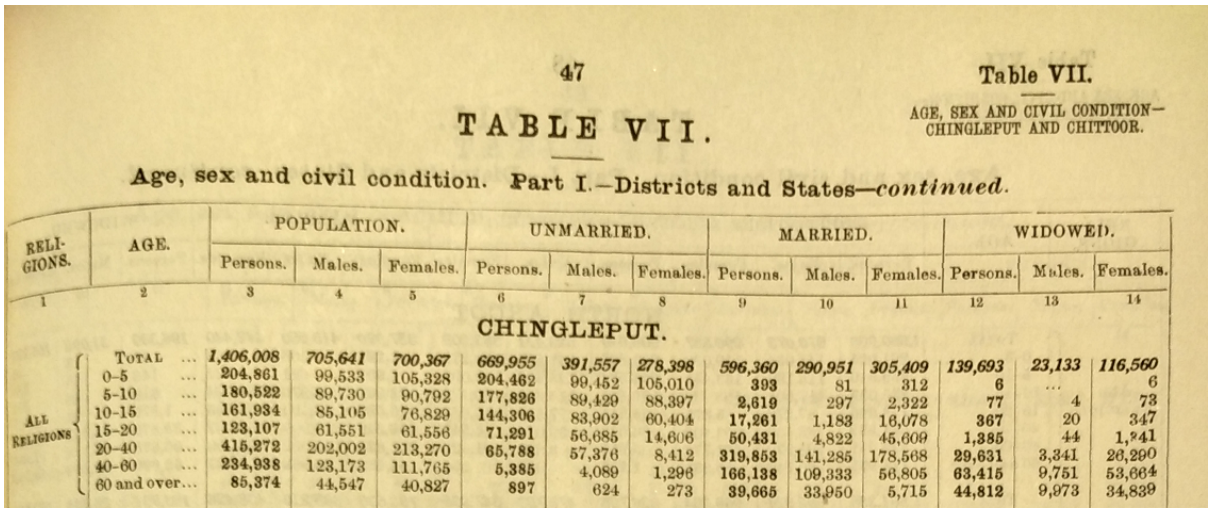


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Table VII.

AGE, SEX AND CIVIL CONDITION—CHINGLEPUT AND CHITTOOR.

TABLE VII.

Age, sex and civil condition. Part I.—Districts and States—*continued*.

| RELIGIONS. | AGE. | POPULATION. | | | UNMARRIED. | | | MARRIED. | | | WIDOWED. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Persons. | Males. | Females. | Persons. | Males. | Females. | Persons. | Males. | Females. | Persons. | Males. | Females. |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| | | | | | CHINGLEPUT. | | | | | | | | |
| ALL RELIGIONS | TOTAL ... | *1,406,008* | *705,641* | *700,367* | *669,955* | *391,557* | *278,398* | *596,360* | *290,951* | *305,409* | *139,693* | *23,133* | *116,560* |
| | 0–5 ... | 204,861 | 99,533 | 105,328 | 204,462 | 99,452 | 105,010 | 393 | 81 | 312 | 6 | ... | 6 |
| | 5–10 ... | 180,522 | 89,730 | 90,792 | 177,826 | 89,429 | 88,397 | 2,619 | 297 | 2,322 | 77 | 4 | 73 |
| | 10–15 ... | 161,934 | 85,105 | 76,829 | 144,306 | 83,902 | 60,404 | 17,261 | 1,183 | 16,078 | 367 | 20 | 347 |
| | 15–20 ... | 123,107 | 61,551 | 61,556 | 71,291 | 56,685 | 14,606 | 50,431 | 4,822 | 45,609 | 1,385 | 44 | 1,341 |
| | 20–40 ... | 415,272 | 202,002 | 213,270 | 65,788 | 57,376 | 8,412 | 319,853 | 141,285 | 178,568 | 29,631 | 3,341 | 26,290 |
| | 40–60 ... | 234,938 | 123,173 | 111,765 | 5,385 | 4,089 | 1,296 | 166,138 | 109,333 | 56,805 | 63,415 | 9,751 | 53,664 |
| | 60 and over... | 85,374 | 44,547 | 40,827 | 897 | 624 | 273 | 39,665 | 33,950 | 5,715 | 44,812 | 9,973 | 34,839 |

*Note:* The figure shows part of the Age, Sex and Civil condition table in the Census of India 1911, for the district Chingleput in Madras Presidency.

# E Migration discussion

In this section, we examine the extent of migration in the period 1921-1931 in British India and the princely states. Migration data at the province/state level are available from the Census report, which also indicates the destination provinces/states. It allows us to understand better the pattern of migration between British India districts and the princely states.

If migration over long distance for marriage reason is common and feasible for the average households, households in British India districts that have a strong inclination or preference to marry their daughters at a young age may choose to marry their daughters to nearby princely states to avoid the Sarda Act in 1931. In that case, our estimates of the short and medium-run effect could capture the sorting effect on households with different marriage practices due to migration, in addition to any effect on changing female child marriage practice of a given group.

The British India regions and princely states are defined (and analyzed) at the district level, but the migration data from the Census are reported at a more aggregate province/state level. Some provinces include districts/populations from British India and the princely states. We calculate the share of the population in a province under British India. There are two clear groups of province/states - those with 83-100% of the population belonging to British India districts and those that entirely consist of princely states. We refer to provinces that have more than 83% share of the population under British India as British provinces in this section. Focusing on the same set of provinces/states as in our district-level analysis in section-4.3, 5.3, 6.3, we have 8 British provinces and 6 princely states.

Table A.18 presents the summary statistics on migration at province/states level, in terms of the number of emigrants per 1,000 population of the origin province/state. The average level of emigrants was about 51 per 1,000 population in 1921. This suggests that about 5% of the population migrated to provinces/states outside of where they were born. There is more out-migration in princely states on average, where emigrants per 1,000 population are 68.29, compared to 25.29 in the British provinces.

We do not find any significant changes in the average level of emigration in 1931 for either the British provinces or princely states. The number of out-migration in princely states went down slightly from 68 to 60. There was almost no change in total emigration in British provinces in 1931 compared to 1921. This suggests that migration was stable during this period of time.

In particular, the number of emigrants from British provinces to princely states was 6 per 1,000 population in 1921 and remained unchanged between 1921 to 1931. This suggests that there is no significant movement of migration from British provinces to princely states that could possibly be associated with the avoidance of the Sarda Act. The out-migration from princely states, to either the British provinces or between princely states, both went down slightly. We, therefore, observe no significant change in the migration pattern between British provinces and princely states during the period 1921-1931.