Will You Marry Me, Later?
Age-of-Marriage Laws and Child Marriage in Mexico

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August 2020

Abstract

We provide empirical evidence on the impact of raising the minimum age of marriage to 18 years old on child marriage, early motherhood, and school enrollment in Mexico. Using a difference-in-differences model that takes advantage of the staggered adoption of this reform across states, we show that banning child marriage leads to a large and statistically significant reduction in the number of registered child marriages. However, we find no effect on school attendance or early fertility rates. We provide evidence that the mechanism behind these results is the substitution of formal marriage for informal unions. These findings suggest that when informal unions are a viable option for young couples, raising the minimum age of marriage is not enough to prevent early unions and their negative consequences.

JEL Classifications: J12, J13, K36, I20

Keywords: child marriage, marriage laws, fertility, schooling

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1   Introduction

Approximately 650 million girls and women alive today were married before the age of 18, where marriage includes both formal marriages and informal unions in which partners cohabitate as if married (UNICEF, 2018). Eradicating this practice is key in the fight to reduce global poverty, as child marriage leads to lower educational attainment, earlier age at first childbirth, higher fertility, higher infant mortality and worse health and educational outcomes for the children born into child marriages (Field and Ambrus, 2008; Sekhri and Debnath, 2014; Chari et al., 2017; Garcia-Hombrados, 2018). Although most countries' laws set the minimum age of marriage at 18, they typically provide exceptions upon parental consent, pregnancy, authorization from the courts, or due to religious or customary laws, making child marriage legal in practice (Arthur et al., 2018).[1]

A common proposal for ending child marriage is to eliminate all exceptions to the minimum age of marriage.[2] As long as there is adequate enforcement, these reforms should reduce or even eradicate formal child marriages. But the enforcement of minimum-age-of-marriage laws may be weak if these laws are incompatible with prevailing social norms and practices (Acemoglu and Jackson, 2017).[3] Perhaps more importantly, raising the minimum age of marriage may not be effective in societies where informal unions are a viable option for young couples, as a drop in the number of formal marriages may be offset by an equal rise in the number of informal unions, leaving child marriage rates unchanged. Banning child marriage could even have negative welfare effects if people in informal unions do not have the same legal benefits or social recognition as those that are formally married. Alternatively, if laws banning child marriage have an expressive function (Benabou and Tirole, 2011), they may change social norms, reducing the incidence of

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[1]A survey of marriage laws in 193 countries conducted by the World Policy Center in 2013 revealed that when all exceptions were considered, 87% of these countries had a minimum age of marriage lower than 18.

[2]Several countries have recently set the minimum age of marriage at 18, without exception. Some examples include Chad, Costa Rica, Ecuador, Guatemala, Honduras, Malawi, Nepal, Panama, Turkmenistan, and Zimbabwe (Girls Not Brides, 2017).

[3]Enforcement may even be unfeasible in contexts where lack of widespread birth registration prevents age verification at marriage (Jensen and Thornton, 2003). This is not a concern in Mexico, the country we study in this paper, as birth registration is almost universal. A comparison of the number of registered births in 1999 from vital statistics data and the number of newborn babies in the 2000 census shows that over 96% of these births were registered (Péres Paredes and Meneses Mendoza, 2008).

both formal and informal child marriages.[4]

This paper provides empirical evidence on the impact of raising the minimum age of marriage using a natural experiment in Mexico. Researching the impact of changes in minimum-age-of-marriage laws is challenging, as these policies are commonly set at the national level, providing no counterfactual for credibly identifying their causal impact. Mexico provides a compelling case study for various reasons. Between 2008 and 2018, most states in Mexico increased their minimum age of marriage. These reforms occurred at different points in time, allowing us to exploit variation across states and over time using a two-way fixed effects difference-in-differences model. Another advantage of the Mexican context is the availability of granular data on marriages, births, and school attendance. Finally, Mexico ranks seventh in terms of the number of women who were child brides, and so studying the impact of changes in age-of-marriage laws in this context is important in and of itself.[5]

We first examine the extent to which the reform was enforced. Using microdata from marriage certificates, we find that banning child marriage leads to a large reduction in the rate of formal child marriage, particularly for 16- and 17-year-olds, the age group with the highest rate of child marriage before the onset of the prohibition. We find a 49% reduction in the formal child marriage rates for girls of this age.[6] Importantly, we show that these estimates are not biased by different pre-trends in states that enacted the ban on child marriage, by couples marrying in states in which child marriage was still legal, or by misreporting of age in marriage certificates.

After establishing that the reform led to a large and statistically significant reduction in formal child marriage rates, we study whether banning child marriage reduces school dropout and early motherhood, two important and detrimental consequence of early unions (Field and Ambrus, 2008; Chari et al., 2017). We present a simple conceptual framework that illustrates that in societies

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[4]As laws signal what is right and wrong, they can affect preferences over the regulated behavior, and lead to higher compliance by changing social norms. The impact of laws beyond deterrence has been empirically corroborated in the case of compulsory voting laws with symbolic fines for abstention in Switzerland and Austria (Funk, 2007; Hoffman et al., 2017), and seat belt laws with low enforcement in the U.S. (Cohen and Einav, 2003).

[5]For further details see https://www.girlsnotbrides.org/where-does-it-happen (last accessed May 4, 2020).

[6]The reform only led to a 49% reduction in registered child marriages because formal child marriage rates were decreasing in the entire country in our period of analysis for reasons unrelated to the reform. Our estimates capture the impact of the law change, above and beyond the countrywide drop in formal child marriage rates.

where informal unions carry a reputation penalty, banning child marriage will reduce fertility and increase school attendance. We use an event-study specification to examine this question empirically, since the impact of the reform could change over time, biasing our difference-in-difference estimates (Goodman-Bacon, 2018; de Chaisemartin and D'Haultfoeuille, Forthcoming). Using data on school attendance from the Mexican labor force survey and birth registry microdata, we find that the reform had no effect on school attendance and early motherhood.[7] We explore the mechanism behind this result using data on the civil status of young mothers at the moment of delivery. We find that for births where the mother is younger than 18, banning child marriage leads to a drop in the share of married mothers and an equivalent rise in the share of mothers in an informal union.[8] This shows that there are minimal social sanctions for informal unions in Mexico. This change in civil status could potentially have negative effects for young mothers and their children if girls in informal unions do not have the same legal rights or spousal support as those that are married. We examine whether the reform has an impact on prenatal investments and newborn health outcomes, and find no effects. The findings of this paper suggest that in places where cohabitation is socially acceptable, minimum-age-of-marriage laws are ineffective at avoiding the detrimental consequences of early unions.

This paper is related to the research studying the determinants of early marriage and the impact of policies aimed at reducing this practice. Corno et al. (2017) study how aggregate economic conditions affect child marriage rates in Sub-Saharan Africa and India, where marriage payments are a source of consumption smoothing. They find that negative shocks lead to more child marriages in societies with bride price, and less in places with norms of dowry. Jensen (2012) finds that providing job recruitment services to young women in rural India raises their probability of working and their investments in schooling or training, and reduces the likelihood of marrying over the study period. Baird et al. (2011) study the impact of a program granting cash transfers in Malawi,

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[7]In a contemporaneous working paper, Au Yong Lyn (2019) studies the same question as this paper using different data, and reaches different results on early fertility and school attendance. When we replicate our analysis using these alternative data, we confirm our results, as explained in detail in footnotes 29 and 32.

[8]Importantly, the sample of young mothers makes up for a big portion of the girls who were affected by the reform, as discussed in detail in Section 6.3.

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and find that after two years, unconditional cash transfers reduce child marriages and delay fertility, whereas cash transfers conditional on attending secondary school have no impact. Buchmann et al. (2018) study a program in Bangladesh that provides girls with empowerment training, in-kind transfers conditional on delaying marriage until the age of 18, or both. While financial incentives led to a sizable reduction in child marriages, school dropout, and teenage childbearing, the empowerment treatment had no effect on child marriage, and there was no complementarity between the two treatments. Finally, Bandiera et al. (2020) find that providing vocational and empowerment training to adolescent girls in Uganda increases the probability of working, and reduces the likelihood of marriage or cohabitation and teenage pregnancy.

There are a few studies in this literature focusing on age-of-marriage laws. Garcia-Hombrados (2018) studies the effect of raising the legal age of marriage in Ethiopia. He shows that the reform was effective at reducing child marriages, and that the resulting delay in the age of cohabitation decreased infant mortality. The closest paper to ours, Bharadwaj (2015), studies the impact of a 1957 reform in Mississippi that increased the minimum age of marriage from 12 to 15 for women and from 14 to 17 for men, introduced parental consent requirements for individuals below the age of 18, and implemented a compulsory three-day waiting period and blood tests. Using a difference-in-differences strategy, the author compares counties in Mississippi to those in neighboring states, and finds that three years after the law change, there was a large decrease in the overall marriage rate, a drop in overall birth rates, and a rise in school enrollment rates. While cohabitation was extremely rare in the U.S. at the end of the 1950s (Lundberg et al., 2016), informal unions and unregistered marriages are relatively common nowadays.[9] The question of how increases in the minimum age of marriage affect child marriage rates should be revisited in a context where informal unions are common, as they could undermine the effectiveness of legal prohibitions. The main contribution of our study is that it shows that banning child marriage is not effective in places

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[9]In the 74 developing countries that participated in the DHS and MICS surveys in 2008-2017, 36% of the 15-19-year-old girls who lived with their partners were not formally married. The share of girls who cohabitate without being legally married is probably higher, as DHS and MICS statistics do not distinguish between registered and unregistered marriages, and marriage registration is low in many developing countries (Center for Reproductive Rights, 2013; Center for Human Rights, 2018).

where formal marriage is not the only option for young couples. Our work is also related to Collin and Talbot (2019). This study uses a large sample of developing countries to test whether there is a discontinuity in the age-of-marriage distribution at the legal minimum age, where marriage includes formal and informal unions. The authors find a statistically significant discontinuity in around half of the cases, and attribute this to a weak enforcement of age-of-marriage laws.[10] As the data used in Collin and Talbot (2019) do not allow to distinguish between formal and informal unions, it is unclear if age-of-marriage laws do not bind due to lack of enforcement, or because minors enter informal unions when they are barred from getting legally married. In our setting, we can pin down the mechanism behind this null effect. In particular, we are the first to find that in a context where informal unions are socially acceptable, raising the minimum age of marriage leads young couples to substitute marriage for informal unions. Ours is also the first study examining the issue of child marriage in Latin America, a developing region that is currently home to almost 10% of the world's child brides (UNICEF, 2018). Reducing the incidence of child marriage in this region is especially important because despite the rapid worldwide decrease in child marriages, child marriage rates have remained constant over the last 25 years in Latin America.

The paper is organized as follows. Section 2 provides background on child marriage in Mexico, and Section 3 discusses the potential impact of banning child marriage. Section 4 describes the data and provides summary statistics, and Section 5 discusses our estimation strategy. Section 6 presents our results, and Section 7 discusses their implications. Section 8 provides evidence from several validity and robustness checks, and Section 9 concludes.

2   Child Marriage in Mexico

Child marriage is commonly defined as a union in which at least one of the parties is below the age of 18 (UNICEF, 2018), and includes formal marriage and cohabitation as if married. Throughout the paper, we refer to formal marriages as formal or registered marriages, and to cohabitation as

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[10]The authors do not consider exceptions to the minimum age of marriage based on religion, customs, pregnancy, or judicial authorization, and so it is unclear whether enforcement is also low when all exceptions are considered.

if married as informal unions. At the start of our study period in 2008, all Mexican states allowed persons younger than 18 to get formally married, albeit with some restrictions. Minors needed to have a certain age and the consent of their parents or guardians. The minimum age of marriage with parental consent varied across states. For example, the threshold was set at 14 in the states of Chihuahua and Durango, and 16 in Chiapas and Baja California Sur. In addition to the consent of the parents or guardians, a few states required that minors have the authorization of a judge or the mayor of their municipality. Those who were younger than the age of marriage with parental consent or did not have this consent could only get married with the permission of a judge or the municipal mayor. A few states also allowed girls who were younger than the minimum age to get married if they were pregnant.

Between 2008 and 2014, some states eliminated all exceptions for marriage below the age of 16, but still allowed 16-17-year-olds to get married, as shown in Figure 1. In December of 2014, the Federal Congress sanctioned a law defining the rights of children and adolescents. This law set the minimum age for marriage for both women and men at 18, without exception, and urged all federal entities to reform their legislation to incorporate this change. Since marriage laws are a competency of the states, it is the prerogative of state Congresses whether to adopt the reform or not.[11] As summarized in Appendix Table A.1, the adoption of the reform was gradual. By the end of 2015, only 8 states had changed their marriage laws in accordance to federal legislation. By December of 2018, the end of our study period, the reform was adopted by 30 of the 32 Mexican states.[12]

Child marriage includes informal unions as well as formal marriages. Informal child marriages may be punished by law if one of the partners is below the age of consent. Mexican states have a "hard" and a "soft" age of consent. The hard age of consent is typically 12 or 14, and intercourse with a person that is younger than this age is considered rape. The soft age of consent is 18 in most states, and intercourse with individuals who are above this age is not punished by

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[11]The states of Baja California Sur and Veracruz had already modified their legislation to ban child marriage earlier in 2014.

[12]Appendix Figures A.1 and A.2 show the geographical dispersion in the adoption of this reform.

law. There is a legal gray area between the two ages of consent in which the crime of *estupro* may apply. An adult commits *estupro* by having intercourse through seduction or deceit with an adolescent between these two ages of consent. Although the law is vague about what constitutes seduction or deceit, the typical example is promising the minor that a marriage will occur and then reneging on this promise. While *estupro* is punishable with jail time, this crime can only be prosecuted if the minor or her legal guardians present charges, and this is quite uncommon. In 2016, for example, only around 1,000 cases were brought forward for *estupro* in all of Mexico (UNICEF, 2019).

From a legal standpoint, marriage and informal unions are similar but not equivalent institutions. Informal unions only generate obligations and rights while the union lasts. Similarly to married couples, partners under informal unions are entitled to life insurance, inheritance, social security coverage, and maternal benefits.[13] Marriage, on the other hand, generates obligations and rights even after the divorce, for example allowing one of the spouses to claim a pension from the other spouse, something that does not happen in the case of an informal union. Informal unions are protected by law when there is no legal impediment for marriage, and the couple has been cohabitating for at least two years or has a child. This means that the rise in the minimum age of marriage not only prevents minors from from getting married, it also impedes them from being in a legally recognized informal union.

To understand the scope of the change in legislation and its potential to reduce child marriage rates, it is important to analyze the prevalence of this practice before the reform was introduced. Figure 2 show the evolution in the incidence of child marriage for the cohorts that turned 18 before the prohibition of child marriage. We obtained these data from the *Encuesta Nacional de la Dinámica Demográfica* (ENADID), a nationally representative demographic survey conducted in 2014 that has detailed information on relationship, schooling and fertility history. Our sample includes almost 84,000 women who were 20 to 54 years old at the time of the survey. Around

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[13]Informal unions (legally known as *concubinato*) are defined by the civil and family codes of the different Mexican states. For instance, in article 313 bis of the civil code of the state of Aguascalientes or article 297 of the civil code of the state of Puebla.

23% of respondents were formally married or in an informal union before turning 18, and this percentage is relatively constant across cohorts. Although overall child marriage rates in Mexico have not varied over the last decades, there has been a significant change in the type of union. While formal marriages accounted for approximately 75% of all child marriages in the older cohorts, as seen in Figure 2, less than a third of the child marriages of women born in the early 1990s were formal unions. Right before the ban on child marriage, approximately 6% of Mexican women got formally married before turning 18.

Despite the declining trend in formal child marriages, this practice was far from being eradicated before its ban. Using microdata from marriage certificates, Figure 3 shows the number of marriages in 2013 by the age of the bride, for every 1,000 girls and women of each age. Formal marriage rates were highest for women in their 20s, although child marriage was relatively frequent as well. There were 40,298 child marriages in total, accounting for almost 7% of total marriages. Most child marriages had a bride aged 14-17, with the largest share going to 16- and 17-year-olds, who got formally married at a rate similar to that of women in their early 30s. For every 1,000 girls ages 16 to 17, 16.08 got formally married in 2013. In contrast, there were only 2.30 marriages with a bride ages 14-15 for every 1,000 girls of this age. In 2008, before some states enacted a specific ban for this age group, the marriage rate for girls ages 14-15 was slightly larger, with 5.65 marriages for every 1,000 girls of this age group. There were very few marriages with a groom below the age of 18, as shown in Appendix Figure A.3, because child marriages had a groom that was 4.62 years older than the bride, on average.

2.1 Comparing Child Brides to Non-Child Brides

Having established that child marriage was relatively common before the reform, we now compare the baseline characteristics of women who were child brides to those who were not. Since there is no longitudinal survey following women from childhood to marriage, we use the *Encuesta Demográfica Retrospectiva* (EDER), a nationally representative survey conducted in 2017 to collect retrospective information on a wide array of demographic and socioeconomic characteristics. To

minimize measurement error from long-term recall, we limit our sample to the 4,438 women who were 24-34 at the time of the survey (i.e., 20-30 in 2013). We then divide them into three groups according to their civil status in the period before age 18. We compare women who were formally married, in an informal union without getting married, and single before the age of 18. Appendix Table A.2 shows that on average, women who were formally married or in an informal union before the age of 18 come from families of a lower socioeconomic status than those who were single. They are more likely to belong to an indigenous group, have parents with low educational attainment, and were more likely to live in a house of low structural quality with few durable assets when they were 14 years old.[14] At the age of 14, the women who eventually became child brides were less likely to be attending the appropriate grade level at school, and had a higher probability of being dropouts.

These baseline differences between women who were child brides and those who were not are amplified with time. Appendix Figure A.4 shows the maximum educational attainment for women of different cohorts, splitting the sample by whether they were child brides or not. We obtained these data from the ENADID survey, and use the same sample as the one used to analyze the evolution of child marriage.[15] In the cohorts born in the early 1990s, only 15% of the women who had been child brides (either through a formal marriage or informal union) have a secondary school degree or more, compared to 65% of the women who were not child brides.[16] There are stark differences in the rates of early motherhood in both groups as well. As shown in Appendix Figure A.5, 88% of the women who were married or in an informal union before the age of 18 gave birth before turning 20, whereas only 16% of the women who were not child brides had a

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[14]Importantly, 87% of the formal child marriages and informal unions in the sample started at age 15 or higher, and so these characteristics are mostly measured before the child marriage.

[15]Although some of this information is also available in EDER, we use ENADID due to its larger sample size. While EDER has information on 4,438 women ages 20-30 in 2013, there are almost 27 thousand women of these ages in ENADID. We do not use the ENADID survey to analyze baseline differences between these two groups, as it does not have retrospective information on life conditions during childhood.

[16]Compulsory schooling in Mexico is composed of six years of primary school and three years of middle school, known as *secundaria*. Secondary school (*bachillerato* or *preparatoria*) is not mandatory, and lasts for three years. The women born in the early 1990s were 20-24 at the time of the interview. Although some of them might still finish secondary school, it is worth noting that only 6% of those who had not finished high school were still studying at the time of the survey.

child before this age.

3   Conceptual Framework

Child marriages in Mexico can be separated into two main categories: marriages that occur after the couple engages in premarital sex and the girl gets pregnant, and marriages that occur for reasons unrelated to pregnancy (e.g. love, opportunity for a better life). We explore the reasons behind child marriage in Mexico using data from the 2014 ENADID survey. We limit our sample to the 11,317 women that got formally married before the age of 18 and were 20 to 54 years old at the time of the survey. We find that 38% of these women conceived their first child before they got married, and this share is relatively constant across cohorts.[17] These figures show that in most cases, formal marriage is not the result of a pregnancy.

When the laws banning child marriage are introduced, formal marriage is no longer an option. In Appendix B, we develop a simple theoretical framework to explain the effects of banning child marriage on fertility and school attendance. In this model, the impact of banning child marriage depends on the reputation cost of being in an informal union. If there are no social sanctions for informal unions, banning child marriage should produce a complete substitution from marriage to informal unions, leaving fertility and school attendance unaffected. If, on the other hand, informal unions carry a reputation penalty, banning child marriage leads to a reduction in fertility and school dropout, and this reduction is increasing with the the fraction of child marriages that occur for reasons unrelated to pregnancy.

As the impact of banning child marriage likely depends on the social norms around informal unions, we use data from the World Value Survey to compare social norms in Mexico to other countries. There are 77 countries in total, and 62 if we exclude the US, Canada, Australia, New Zealand and Western Europe. Figure 4 shows the share of respondents in each country that

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[17]We back out the month and year in which respondents became pregnant with their first child by subtracting 9 months from the month-year in which their first child was born. We then compare this date to the month-year in which they got married.

answered that they would not like to live next to an unmarried couple. Only 13% of Mexican respondents preferred not to have an unmarried couple as their neighbor, placing Mexico in the 42nd percentile overall and in the 29th percentile in the subsample of developing countries. As compared to other developing countries in Asia or Africa, informal unions are socially accepted in Mexico. Mexico is not an outlier, however, as its norms around informal unions are comparable to other Latin American countries with similarly high rates of child marriage such as Brazil, Uruguay, or Peru. One caveat is that this question does not specifically ask about informal unions by minors, and opinions about informal unions by underage persons may differ. In a nationally representative survey conducted in Mexico in 2012 (*Encuesta Nacional sobre Política y Prácticas Ciudadanas*), individuals are asked whether they would be accepting of certain actions by their hypothetical teenage son or daughter (15-18-years old). Two thirds of the respondents of age 40 or above agree with their teenage children moving in with their partners. All in all, the reputation cost for being in an informal union is small in Mexico.

4   Data and Descriptive Statistics

To calculate the number of formal marriages with a bride below the age of 18, we relied on marriage certificate microdata from 2008-2018 provided by INEGI, the Mexican statistical institute. This database contains all the legally registered marriages conducted in Mexico, and specifies the date and state in which the marriage took place, the age of the bride and groom, their state of residence, level of education, and occupation. During this period there were approximately 6 million marriages, of which 6% had a bride younger than 18 years old.[18] Since most registered child marriages in Mexico have a bride that is younger than 18 years old but a groom that is 18 or older, we focus on girls.[19] Using these data, we constructed a monthly panel for every state with the number of formal marriages with a bride ages 14 to 17. Even though there are marriages in which the

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[18]The age of the bride is missing in 0.30% of observations, which we drop from our sample.

[19]Almost 94% of the registered child marriages in 2008-2018 had a bride below the age of 18, whereas only 19% had an underage groom.

bride is 12 or 13, they account for less than 0.6% of the child marriages in our sample. To abstract from potential spillovers to states in which child marriage was still legal, we use the brides' state of residence. In Section 8.1 we show that our results are not sensitive to this choice.

We obtained data on live births in 2008-2018 from the Ministry of Health birth microdata. These data are derived from SINAC, a system created at the end of 2007 to obtain timely and detailed birth data. Hospital staff input information on the mother and newborn into the system on the day of the birth, and provide the parents with a document generated by SINAC that is required for obtaining their child's birth certificate later on.[20] This dataset reports the date and state in which the birth occurred, the length of gestation, the child's birth order, the number and timing of prenatal care visits, the newborn's birthweight, and the mother's birth date, state of residence, and civil status. There were almost 23 million live births in 2008-2018, of which 9% had a mother below the age of 18. Using these data, we constructed a monthly panel for every state with the number of live births, using the mothers' state of residence. Since the database has information on the date of birth and the length of gestation, we use the date of conception, as the reform could only affect fertility up until this moment. We restrict our sample to women who were 14 to 17 years old at the moment of conception.[21] We drop 0.32% of observations, for which the mother's age is missing, and keep only one observation for multiple births. Since we have information on births that occurred in 2008-2018, but we conduct our analysis at the moment of conception, our sample is composed of all births conceived between January 2008 and March of 2018 by women who were 14 to 17 years old at the moment of conception.

To calculate the formal child marriage rate and the fertility rate of young mothers we also

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[20]For births taking place outside of a medical unit, the mother is required to attend a health institution shortly after the birth to obtain this documentation. These account for a small share of births, since the vast majority of births are overseen by a doctor. While coverage is not universal, SINAC registered approximately 90% of births in its first years, and has a 95% coverage since 2013. Another database that could be used in this analysis is the one compiled by INEGI using microdata from birth certificates. However, these data are not suitable to calculate birth rates in recent years, because a sizable share of parents take some time to obtain their child's birth certificate. As only 80% of children obtain their birth certificate before their first birthday, the recommendation is to wait 4 years to have sufficiently high coverage. Further details on the coverage of both databases can be found in Hernández et al. (2015).

[21]Another advantage of the SINAC database is that unlike the data from birth certificates, it reports gestation length, allowing us to precisely pin down the month of conception. The length of gestation is missing in 0.4% of births, for which we assume a gestation of 40 weeks. The SINAC dataset also has detailed information on prenatal investments and health outcomes which are absent from the dataset derived from birth certificates.

need information on the population of each state, by age and gender. We obtained biannual population data for 2008-2018 from the *Consejo Nacional de Población* (CONAPO).[22] Our analysis focuses on girls ages 14 to 17, and splits them up into those who are 14-15 and 16-17, as the timing of the marriage ban differs for these two age groups in some states. Following standard definitions, we define the monthly child marriage rate of each age group in each state as the number of formal marriages with a bride of this age, for every 1,000 girls of this age group living in this state. Similarly, we define the monthly rate of early motherhood as the number of live births conceived in that month by a mother of this age, for every 1,000 girls of this age living in that state.

To analyze school attendance, we relied on the 2008-2018 waves of the *Encuesta Nacional de Ocupación y Empleo* (ENOE), a quarterly labor force survey with self-reported information on school attendance. We limit our sample to girls who were 14-17 years old at the moment of the survey. On average, each survey round interviews around 15 thousand girls in this age group. We also obtain time-varying control variables from several sources. We created a panel with the political party of the governor in all states from 2008 to 2018 using data from miscellaneous sources, to account for the fact that the enactment of the child marriage prohibition might depend on the party in power. We also put together a monthly panel with several economic indicators at the state level. The unemployment rate was obtained from INEGI, the poverty rate and average income of employed individuals from CONEVAL, and the female labor force participation of women ages 20 and over from ENOE, the Mexican labor force survey.[23] We also obtained the total population from CONAPO.

Our main independent variable throughout the analysis is a dummy for whether formal child marriage was prohibited in a given state, month and year.[24] In some states, this variable differs for girls ages 14-15 and 16-17. We went through the civil and family codes of each state to find

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[22]CONAPO compiles population counts for each state at the start and middle of each year, by gender and age. These statistics are derived from the decennial censuses and population counts taking place between censuses. Statistics for 2016 onwards are projected. We calculated the monthly population for each age group and gender using linear interpolation.

[23]The unemployment rate, poverty rate and average income of employed people were also calculated by INEGI and CONEVAL using data from ENOE. Since ENOE is a quarterly survey, we assume the same value within the months of each quarter.

[24]In the case of our school enrollment regressions, this regressor varies at the quarterly level.

out the date in which marriage was banned for each of these ages. We only consider that child marriage is banned if the legislation allows no exceptions. For the federal entities that banned child marriage, we obtained the date in which the articles that establish the minimum age for marriage were modified. Appendix Table A.1 summarizes this information for each state. Table 1 presents summary statistics of the variables used in our regressions.

5 Estimation Strategy

We use a two-way fixed effects difference-in-differences model, which exploits variation in the enactment of laws banning child marriage across states and over time. To estimate the impact of the reform on registered child marriages, we use the following specification:

$$Y_{st} = \beta \, \textit{Child marriage banned}_{st} + X_{st}\rho + \gamma_s + \gamma_t + U_{st}, \tag{1}$$

where Y_{st} is the number of marriages in month-year t with a bride ages 14-15 or 16-17 living in state s, for every 1,000 girls of this age. We also estimate separate regressions for each age between 14 and 17. Our main explanatory variable, $\textit{Child marriage banned}_{st}$, is a dummy variable equal to 1 if individuals of the corresponding age group were not allowed to get married in state s in month-year t, and 0 if they were. X_{st} is a set of state-specific controls measured in period t, namely the unemployment rate, poverty rate, labor force participation of females ages 20 and above, average income of employed people, population (in ln), and dummy variables for whether the state governor belongs to PRI, PAN, or PRD. Prior to the ban on child marriage, some states started requiring minors to obtain the authorization of a judge or the mayor of their municipality to get married. We control for whether this requirement was in place. We include state fixed effects (γ_s) to control for the time-invariant characteristics of states that affect marriage decisions and may also be correlated with the occurrence and timing of the child marriage prohibition. The month-year fixed effects (γ_t) control for the trend and seasonality in child marriages common to all states.

Finally, U_{st} are the unobserved factors affecting child marriage rates in state s and period t, such as religious preferences and social attitudes. We allow for arbitrary within-state correlation of the errors by clustering our standard errors at the state level (Bertrand et al., 2004). Since we only have 32 clusters, we report wild-bootstrap p-values following Cameron et al. (2008).

As depicted in Appendix Figure A.6, there was substantial heterogeneity in the formal child marriage rate across states before the national push towards banning this practice. Importantly, our state fixed effects γ_s control for these and any other time-invariant differences across states. Our assumption for identifying the causal effect of banning child marriage is that conditional on state fixed effects, time fixed effects, and controls, the timing of the child marriage ban is uncorrelated with the error term. This assumption would be violated if the first states to ban child marriage were those in which child marriage rates were declining at a lower or higher rate. This could occur, for instance, if the prohibition of child marriage was driven by changes in religious preferences or social attitudes. We report the results of several tests validating our identification strategy in Sections 6 and 8.

In a two-way fixed effects difference-in-differences estimation as in equation (1), the estimate is a weighted average of the average treatment effects obtained from all possible two-by-two difference-in-difference estimators in the data, where the weights are proportional to the group sizes and the treatment variance within each pair (Goodman-Bacon, 2018; de Chaisemartin and D'Haultfoeuille, Forthcoming). Some two-by-two difference-in-difference estimators could have negative weights, potentially leading to large biases if treatment effects are heterogeneous (Abraham and Sun, 2020; de Chaisemartin and D'Haultfoeuille, Forthcoming). A concern in our setting is the possibility that the effect of banning child marriage varies over states or over time. This could occur, for example, if there is a lag between the enactment of the law and its implementation, or if the impact of the reform on school attendance and early motherhood takes some time to materialize. Importantly, a small share of the two-by-two difference-in-difference estimates in

our setting receive negative weights, mitigating these concerns.[25] Since there is no reason why the impact of banning child marriage on fertility or school attendance should remain constant over time, most of our estimations are conducted using the following two-way fixed effects event-study specification, which also allows to test for differential pre-trends:

$$Y_{st} = \sum_{j \in [-K,L], j \neq -1} \beta_j \; \textit{Child marriage banned}_{s(t+j)} + X_{st}\rho + \gamma_s + \gamma_t + U_{st} \tag{2}$$

, where $\textit{Child marriage banned}_{s(t+j)}$ is a dummy variable taking the value of 1 j months relative to the month in which the reform was enacted in state s, in states that banned child marriage, and 0 in all other months and states. As in equation (1), we run separate regressions for girls ages 14-15 and 16-17, as some states banned child marriage for younger girls first. Following common practice, we exclude $\textit{Child marriage banned}_{s(t-1)}$, thus normalizing relative to the month before the reform was put in place. Since some states implemented the reform towards the end of our sample window, as can be seen in Appendix Figure 1, the estimates of the longer lags are only estimated using early-adopters, and could be contaminated by sample composition changes. We discuss this issue when interpreting the results from these estimations in Section 6. The dependent variable in our fertility regressions is the number of first live births conceived in month-year t by a mother ages 14-15 or 16-17 living in state s, for every 1,000 girls of this age. In our main specification we focus on first births instead of all births because if any, the reform should have an impact on the extensive margin. Approximately 81.4% of the births in our sample with a mother younger than 18 at the time of conception are first births. We also report results using all births. Taking advantage of the fact that the birth registration data reports the length of gestation, we conduct our analysis at the moment of conception, as the reform could only affect fertility up to this point.

We also study the impact of the reform on school attendance using a similar event-study spec-

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[25]For example, in our estimates on the impact of banning child marriage for 16-17-year olds, less than 8% of the two-by-two difference-in-differences estimators receive a negative weight. We computed the proportion of negative weights using the twowayfeweights command in Stata.

ification. Unlike our analysis for registered marriages and fertility, we have a repeated (quarterly) cross-section of individual observations. We thus run the following regression:

$$Y_{ist} = \sum_{j \in [-K,L], j \neq -1} \beta_j \; Child \; marriage \; banned_{s(t+j)} \; + X_{ist}\rho + \gamma_s + \gamma_t + U_{ist} \qquad (3)$$

, where Y_{ist} is a dummy variable equal to 1 if person i living in state s is attending school in quarter-year t. We perform this analysis for girls who are 14 to 15 and 16 to 17 years old at the time of the survey. Our main regressors, $Child \; marriage \; banned_{s(t+j)}$, are dummy variables equal to 1 j quarters relative to the quarter in which child marriage was banned in state s for the relevant age group. Our vector of controls X_{ist} includes the standard controls, as well as dummies for age and town size. We use the sampling weights from the ENOE survey in these estimations.

6 Results

6.1 Formal Child Marriages

Table 2 shows the results of our difference-in-difference estimations on the impact of raising the minimum age of marriage on formal child marriage rates. In our preferred specification displayed in column 4, we control for month-year fixed effects, state fixed effects, and time-varying state characteristics. In the case of marriages with a bride ages 14 to 15, the estimates are negative, although they are not statistically significant. When focusing on girls ages 16-17, we find that outlawing child marriage results in 0.695 less formal marriages per month for every thousand girls of this age, a 49% reduction over the mean. The estimate is significant at the 1% based on standard errors clustered by state (in parentheses) and wild bootstrap p-values (in brackets). The legislation change does not cause a larger reduction in formal child marriages because child marriage rates

were dropping in all states before the reform.[26] Back of the envelope calculations reveal that the law change averted approximately 50 thousand formal child marriages. Column 5 reports the results of regressions weighting by the female population of the relevant age group, and the estimates are almost unchanged.

To understand the timing of the effects we use the event-study specification in equation (2). We plot the estimated coefficients and their 95% confidence intervals based on wild-bootstrap clustered standard errors for each month in the year before child marriage was banned, and 24 months after. We only report estimates for the first 24 lags because at the end of our sample period there were few states for which more than 24 months had passed since the reform.[27] Even with this restriction, the coefficient for the longest lag is estimated using only 26 of the 31 states that banned child marriage for 14- and 15-year-olds, and only 22 of the 30 states that banned it for all minors. The estimates of the longest lags must therefore be taken with caution due to differences in sample composition. Figure 5 presents the event-study estimates for 16- and 17-year-olds. The drop in child marriage rates is realized right when the ban occurs, and persists at similar levels for the following two years, indicating that there were few delays in the implementation of the reform. The impact in month 0 (i.e., the month in which the law was changed) is lower than in following months because the law changes were often conducted towards the end of the month. Importantly, the states that banned child marriage do not exhibit differential pre-trends in formal child marriage rates up to twelve months before the prohibition, as the lead coefficients are small and statistically indistinguishable from zero. We also report the results of these estimates in Table 3. For ease of interpretation, we grouped the estimates into 4-month periods.

Figure 6 plots the estimates of this event-study for 14- and 15-year-olds. The point estimates are quite similar to those in the difference-in-differences estimation reported in Table 2, but they are more precise, particularly in the first year after the reform. Our events-study estimates show

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[26]Age-of-marriage laws are mostly enforced in Mexico. Appendix Table A.3 shows that in the period after the reform, the monthly number of formal child marriages was very small in most states, and most of the non-enforcement took place in the first three months after the law change. The majority of the child marriages occurring after the reform are probably couples that took the matter to the courts and were allowed to get married with the ruling of the judge (García Sánchez, 2019).

[27]We bin longer lags together, and estimate them using a single dummy variable which is not reported in the plot.

that banning child marriage for this age group led to an average reduction of approximately 0.109 marriages per month for every thousand girls of this age group. Since child marriage was uncommon at these ages, these point estimates are 6 times smaller than those of girls ages 16-17. For exposition purposes, the remainder of the paper will focus on the impacts of the reform for girls ages 16-17, since the reduction in child marriages is mostly driven by this age group. Results on the impact of banning child marriage for 14- and 15-year-olds are presented in the Online Appendix.

After establishing that banning child marriage leads to a reduction in the rate of registered marriages, particularly for 16- and 17-year-old brides, we examine if the affected cohorts get formally married once they turn 18, or delay marriage even longer. If the 16-17-year-old girls who would have gotten married in the absence of the prohibition get married once they turn 18, we should see an increase in the marriage rate of 18-year-olds shortly after the ban (i.e., once the affected cohorts started turning 18). Given the dynamic nature of these potential effects, the most appropriate specification is an event-study. As can be seen in Appendix Figure A.7, the marriage rate of 18-year-olds does not increase after the reform, indicating that most couples postpone formal marriage even longer, or dissolve before they reach the minimum age of marriage.

6.2 School Attendance and Early Motherhood

Figure 7 presents the event-study estimates of the impact of banning child marriage on school attendance for 16- and 17- year-old girls. Our framework indicates that if there are social sanctions for being in an informal union, banning child marriage will reduce dropout rates. However, we find small and statistically insignificant impacts on school attendance. These null results persist seven quarters after the reform.[28] In particular, we can reject an average increase in the likelihood of attending school larger than 2.4 percentage points (3.4% increase over the mean). This confirms that the reputation cost of informal unions is negligible in Mexico. We observe similar impacts if

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[28]We also analyze whether banning child marriage has an impact on the time devoted to caretaking activities and housework using data from ENOE. On average, 16% of 16-17-year-old girls devote time to non-paid caretaking, whereas 93% devote some time to housework. The average weekly time spent on caretaking and housework is 2.8 and 11.9 hours, respectively. We run our event study estimates for these outcomes, and find no effect (results upon request).

we separately analyze girls in each age group, as shown in Table 4. We only report the estimates for the first 7 quarters after the reform, because there are few states with longer lags. The coefficient for the longest lag is estimated using 24 of the 30 states that enacted the reform. Importantly, there are no differential trends. Given that 6% of the 17-year-old girls in our sample are not attending school because they finished high school, we also conduct this analysis using a dummy for whether the girl attends school or completed high school as the dependent variable. Our conclusions are unchanged, as shown in Appendix Figure A.8.[29] We also estimate the impact of the reform using administrative data on school enrollment by age, gender, and state, obtained from the *Instituto Nacional para la Evaluación de Educación.* We combine these data with the mid-year population estimates from CONAPO to compute the share of girls enrolled in school at the start of the academic year (in August). Since this dataset ends in 2017 and only has annual information, there is not enough variation for an event-study estimation.[30] We present our difference-in-difference estimates of the effect of banning child marriage on school enrollment in Appendix Table A.4. Once again, we find that the reform has no impact on schooling decisions.

As predicted in our conceptual framework, the impact of banning child marriage on fertility depends on the social penalty faced by girls in an informal union. If social norms discourage girls from entering an informal union once child marriage is illegal, the prohibition of child marriage could lead to a reduction in birth rates. However, girls affected by the ban could conceive out of wedlock or in an informal union, thus reducing or even eliminating the effect of the reform on early fertility. Consistent with the latter, Figure 8 shows that the reform did not reduce the fertility rate of 16-17-year-old girls, the age group for which the reform had an impact on formal marriage rates.[31] In particular, we can reject an average drop larger than 0.2 births per 1,000 girls, a 4% reduction

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[29]Au Yong Lyn (2019) finds that this reform increases school attendance. While our analysis uses all waves of the Mexican labor force survey (ENOE) in 2008-2018, her paper only uses certain survey waves that also measure child labor (the *Módulo de Trabajo Infantil*). The ENOE is carried out four times a year, whereas this special module is conducted once every two years. Using these data imply losing a large share of observations and much of the identifying variation without any advantage. Even using this less-suitable data, we find a null impact on school attendance, as can be seen in Appendix Table A.5.

[30]While 17 of the 26 states that banned child marriage by August 2017 passed the reform a year or more before this date, only 5 of these states banned child marriage two or more years before August 2017.

[31]We also find no impact of banning child marriage on school attendance or fertility rates of 14-15-year olds, as shown in Appendix Figures A.9 and A.10.

over the mean. These findings confirm once again that in Mexico, informal unions are socially accepted. We also report the results of these estimates in Table 5, with estimates grouped into 4-month periods for ease of interpretation. We report the estimates for 15 lags because by March of 2018 (the end of our sample period), there were few states for which more than 15 months had passed since the reform. In particular, the coefficient for the longest lag is estimated using 22 of the 28 states that enacted the reform before March 2018. Importantly, there are no differential pre-trends in fertility rates. If we focus on all births instead of just first births (Appendix Table A.6), we do not find an effect either.[32]

6.3 Informal Unions

A possible reason for why the reform has no impact on school attendance and early motherhood is that the decrease in formal marriages is offset by an increase in informal unions. This is hard to examine empirically as there is no register of informal unions, and young girls have incentives to underreport being married or in an informal union when they are surveyed. We take advantage of the fact that the birth registration microdata has information on the self-reported civil status of the mother at the moment of delivery, and that women who are already having a child at a young age have less incentives to lie about their civil status. Importantly, 62% of women who were child brides prior to the reform had their first child before the age of 18 (Appendix Figure A.5), and so the sample of young mothers makes up for a big portion of the women who were affected by the reform. Since the increase in the minimum-age-of-marriage has no impact on early motherhood rates, we can explore whether the reform led to an increase in informal unions using the sample of girls who were mothers prior to the age of 18.

Using an event-study estimation, we examine the impact of banning child marriage on the

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[32]Au Yong Lyn (2019) finds an increase in early fertility using a dataset derived from birth certificates that has coverage issues towards the end of the sample, as explained in footnote 20. We replicate our analysis using these data and find no effect on fertility, as shown in Appendix Figure A.11. Unlike our baseline estimates, we cannot perform this analysis using data from 2018 due to delays in the registration of births.

share of 16-17-year-old mothers by civil status.[33] Since civil status is measured at the moment of birth, we perform this analysis using the month of delivery instead of the month of conception. Given that our analysis is conducted at the moment of conception rather than the moment of birth, we report the estimates for 24 lags (instead of 15 lags as in the fertility estimations). The results are presented in Figure 9 and Table 6. Consistent with our results on formal child marriage rates, we find that banning child marriage gradually reduces the share of 16- and 17-year-old mothers who are formally married.[34] This reduction in the share of married mothers is completely counteracted by an increase in the share of mothers in an informal union.[35] Importantly, there are no differential pre-trends in the civil status of mothers, substantiating the causal interpretation of our estimates. Taken together, these results indicate that informal unions carry no social sanction in Mexico, leading girls to substitute marriage for informal unions after the prohibition. In societies where informal unions are a valid option for young couples, banning child marriage will not reduce school dropout and early fertility.

7 Implications

The change in civil status that we observe for young mothers could potentially have negative effects for them and their children. One way to explore this hypothesis is to examine whether the increase in the minimum age of marriage has an impact on prenatal investments and newborn health outcomes. There a several reasons why pregnant women in informal unions may adopt less healthy behaviors than married women, translating intro worse health outcomes for their children at birth. As explained in Section 2, the rise in the minimum age of marriage prevents couples with

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[33]Only 0.3% of these mothers are divorced, separated or widowed. We include divorced mothers inside the definition of married women, while single mothers also include those that were separated or widowed.

[34]We find similar results if we examine all births instead of first births (Appendix Table A.7). Unlike the case of older girls, we find no impact of banning child marriage on the civil status of 14- and 15-year-old mothers at the time of delivery, as shown in Appendix Figure A.12. This null effect is likely due to the smaller reduction in child marriage rates for this age group, and the fact that the fertility rate at this age is substantially smaller than that of their 16-17-year-old counterparts.

[35]We also find a small decrease in the share of single mothers one year after the reform. We believe this could be driven by a normalization of informal unions.

underage members from being legally recognized. This lack of legal recognition and the lower exit costs from the relationship may discourage fathers from being involved during the pregnancy. This could reduce their provision of emotional support and how much they promote the engagement in healthy behaviors by the mother. A lower involvement by fathers could result in women investing less in prenatal care. This lack of legal recognition could also affect the girls' perception about the wantedness of the pregnancy (Kane, 2016). These perceptions could influence birth outcomes either directly or indirectly via other protective behaviors (Weller et al., 1987; Kroelinger and Oths, 2000; Shah et al., 2011, 2014).

Appendix Table A.8 shows that prior to the reform, young mothers who were formally married invested more in prenatal care, on average, than mothers of the same age with a different civil status. For instance, 75% of the girls that had their first child at ages 16-17 and were married received their first prenatal visit during the first trimester of pregnancy, as opposed to only 70% and 62% of the mothers that were in informal unions and single. Married mothers attended 7.2 prenatal visits on average during their pregnancy, compared with 6.5 and 6.2 visits by mothers that were in informal unions or single. It should be noted, however, that there is less of a gap in infant health for children from married and cohabitant mothers. As these differences (or lack thereof) could be driven by selection factors, a more rigorous analysis is needed.

Using an event-study specification, we estimate the impact of banning child marriage on the investments in prenatal care of 16- and 17-year-old mothers and the health outcomes of their offspring at birth. We consider that a girl can be affected by the reform up until the moment of conception, since the potential protection effect of marriage occurs during the pregnancy (Kane, 2016). We present the results in Table 7, where the estimates are grouped into 4-month periods for ease of interpretation. We find that the reform did not modify the prenatal investment of mothers that had their first child at ages 16-17.[36] In particular, we do not find an increase in the probability of receiving prenatal care or attending their first prenatal visit during the first trimester of pregnancy. There is no impact either on the number of prenatal visits, or on the likelihood of having a

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[36]We do not find any impact on prenatal investments and newborn health of 14- and 15-year-olds either, as seen in Appendix Table A.9.

cesarean delivery. Consistent with the null impacts on prenatal investments, we find no effect either on newborn health. We can reject an increase larger than 0.3 percentage points in the probability of having a first birth with low birth weight, and an increase larger than 0.2 percentage points in the probability of having a premature baby. Importantly, there are no differential pre-trends. We do not find an effect either if we allow the reform to have an impact up until the moment of birth, instead of conception (Appendix Table A.10).

Although we do not observe any short-term impacts on newborn health, this shift in civil status may have medium and long-term effects. As we show in Section 6.1, the girls who were affected by the reform do not get legally married once they turn 18. This could be a result of the dissolution of these unions, as informal unions are easier to terminate than marriages. The dissolution of early unions could potentially have positive effects on womens' welfare, particularly when the quality of the match is not high. This hypothesis is supported by the findings of a previous literature that shows that when marriages are easier to terminate, through unilateral divorce, there is an increase in the likelihood that a relationship with domestic violence ends (Stevenson and Wolfers, 2006). Alternatively, couples may stay together but postpone their marriage even longer, or not get married at all. Substituting marriage for informal unions could be beneficial if it increases the bargaining power of women and decreases spousal violence within couples that stay together (Brassiolo, 2016), or detrimental if domestic violence is used to prevent women from exiting the relationship (Garcia-Ramos, 2019). A shift from marriage to informal unions may be undesirable if unions that are easier to dissolve lead couples to invest less in marriage-specific capital (Stevenson, 2007).[37] Furthermore, people in informal unions do not have the same rights as those that are formally married after the relationship dissolves, as discussed in Section 2. As the recent enactment of the laws raising the minimum age of marriage does not allow us to examine medium and long-run effects, we leave this for future research.

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[37]Stevenson (2007) shows that couples that could potentially have access to unilateral divorce are 10% less likely to support a spouse through school, 5% more likely to have a wife in the labor force and 6% less likely to have a child.

8 Validity and Robustness Checks

8.1 Accuracy of Marriage Certificate Data

Blank et al. (2009) show that using marriage certificate data to study the impact of age-of-marriage laws can lead to biased estimates for two reasons. First, underage individuals could potentially travel to states where child marriage is permitted and get married there. Since our marriage certificate data has information on the state of occurrence of the marriage and the state of residence of the bride and groom, we can examine whether this issue is likely to bias our estimates. Only 2% of the child marriages in our period of analysis took place in a state that does not coincide with the bride's or groom's state of residence, leaving little room for bias from spillovers. As shown in columns 1 and 2 of Appendix Table A.11, the magnitude and statistical significance of our estimates is almost unaffected if we conduct our analysis using the state in which the marriage took place instead of the bride's state of residence.[38,39] The second concern raised by the findings of Blank et al. (2009) is that underage people can still marry in their state of residence by lying about their age. The possibility that young people lie about their age to get around the child marriage prohibition is less of a concern in our setting, as state laws require the submission of birth certificates to get married.[40] If underage brides were lying about their age as a response to the ban in child marriages, we should see a rise in the marriage rate for 18-year-olds immediately after the reform. As we show in Appendix Figure A.7, this is not the case.

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[38] As we explain in Section 2, a consequence of the ban on child marriage is that informal unions are no longer recognized by law. This implies that there are even more advantages to formal marriage in this context that could be obtained by marrying in a different state. We examine whether the reform led girls to marry in adjacent states using an event-study estimation in which the dependent variable is the monthly number of out-of-state formal child marriages with a bride ages 16-17, for every 1,000 girls of this age living in the state. We exclude 2017 and 2018 since few states shared a border with a state where child marriage was still legal at that time (Appendix Figure A.1). As can be seen in Appendix Figure A.13, the reform had no effect on the rate of out-of-state child marriages, and the point estimates are very small in comparison to the average child marriage rate of 1.133 marriages a month. The fact that couples do not get married in another state indicates that perhaps girls and their partners are uninformed about the advantages of formal marriage, or that the cost of getting married in another state is too high.

[39] We also redo this analysis focusing on the groom's state of residence, as the bride and groom reside in different states in 5% of the child marriages in our sample. As can be seen in columns 3 and 4 of Appendix Table A.11, our coefficients are almost identical to our baseline specification which uses the state of residence of the bride.

[40] The evidence from Blank et al. (2009) is from the U.S. in the 1950s, when documentary evidence of proof of age was not generally required to get married.

8.2 Unobservable Confounders

As discussed in Section 5, our assumption for identifying the causal effect of banning child marriage is that conditional on state fixed effects, month-year fixed effects, and controls, there are no time-varying state-specific factors correlated with the ban in child marriage and our outcome variables. One potential source of bias is that child marriage prohibitions could be driven by a state-specific decline in the value placed on marriage. If that were the case, we should also observe a drop in the marriage rates of older women not affected by the ban. However, as can be seen in Appendix Table A.12 and Appendix Figures A.14-A.15, banning child marriage has no impact on the marriage rates and share of married mothers for women of other ages. In the case of fertility, our null impacts could be driven by unobservable determinants of fertility that correlate with the timing of the child marriage ban. For example, states might have decreased the funding for contraception programs, leading to higher childbearing rates that counteract a reduction in fertility resulting from the reform. However, as shown in Appendix Figures A.16-A.17, the ban in child marriage is not correlated with changes in the fertility rates of women in other age groups, further corroborating our findings.

8.3 Exclusion of Oaxaca and Zacatecas

In June of 2016, the state of Zacatecas changed the punishment for intercourse with a person ages 16 to 17 from *estupro* to rape. The state of Oaxaca followed suit in November of 2018. It is unclear whether marriage and/or informal unions were legal for this age group after these changes. As a robustness check, we exclude these two states from our analysis. As shown in Appendix Table A.13, our main estimates are robust to this exclusion.

9   Conclusions

We examine the impact of increasing the minimum age of marriage on child marriage rates, school attendance, and early fertility in Mexico. Using microdata derived from marriage certificates, we

find that banning child marriage leads to a large and statistically significant reduction in the number of registered child marriages. However, the reform does not reduce the dropout or fertility rates of the affected cohorts. Using data on the civil status of mothers reported in birth registration data, we find that the reduction in the share of married mothers caused by the child marriage ban is counteracted by an equivalent rise in the share of young mothers in an informal union. These findings indicate that in Mexico, the social sanctions faced by girls in informal unions are negligible. This change in civil status could potentially have negative effects if girls in informal unions do not have the same legal benefits or spousal support as those that are married. However, we do not find any effects on prenatal investments or newborn health. Even though we do not find negative short-run consequences, the medium to long-term impacts are unclear. As the reform was recently enacted, we will explore this in future research. These results suggest that in places where cohabitation is a socially acceptable alternative to formal marriage, raising the minimum age of marriage is not enough to reduce child marriage rates, or prevent its detrimental consequences.

The findings of this paper are especially relevant for other countries in Latin America and the Caribbean, where norms around informal unions are similar, and child marriage and early fertility rates are comparable to those in Mexico, as shown in Appendix Figure A.18. One option for policymakers in these contexts is to modify age-of-consent laws to make informal child marriages illegal as well. Alternatively, recent findings from Malawi (Baird et al., 2011), India (Jensen, 2012), Bangladesh (Buchmann et al., 2018), and Uganda (Bandiera et al., 2020) show that policies providing young girls with economic opportunities or direct incentives to delay marriage may be effective at reducing child marriage rates. Future research should corroborate whether these findings also generalize to other regions, where the drivers of child marriage may differ.

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Figure 1: Progressive Adoption of the Child Marriage Ban
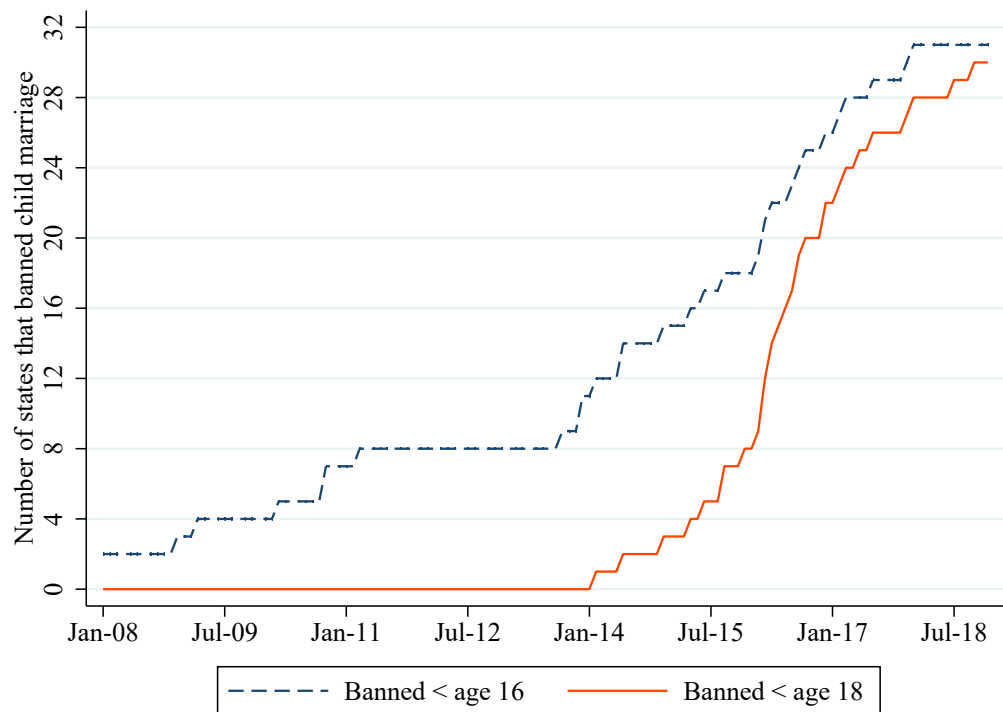
Notes: This figure shows the evolution in the number of states that banned child marriages (orange line) and banned child marriages only for minors below the age of 16 (blue line). We obtained the date of the reform for each state from the states' civil and family codes.

Figure 2: Evolution in the Share of Women who were Child Brides
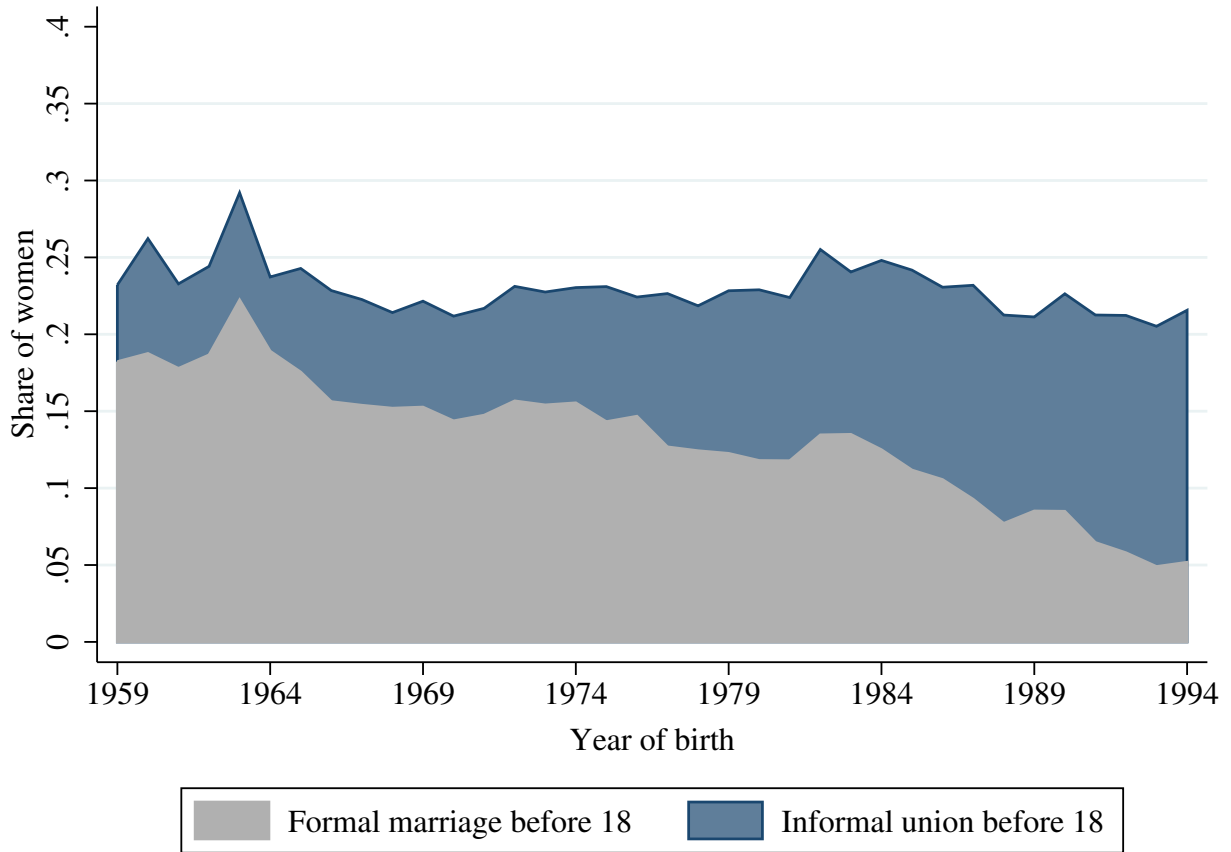
Notes: This graph depicts the share of women who were formally married and in an informal union before the age of 18, by their birth year. These two categories are mutually exclusive. Women in an informal union are those who had an informal union before the age of 18 but did not get formally married by this age. The source of these data is the *Encuesta Nacional de la Dinámica Demográfica* (ENADID), a demographic survey conducted in 2014. We took the sample of 83,554 women who were 20-54 at the time of the survey, and computed the share of women in each category using sampling weights.

Figure 3: Number of Registered Marriages per 1,000 Girls and Women of Each Age in 2013
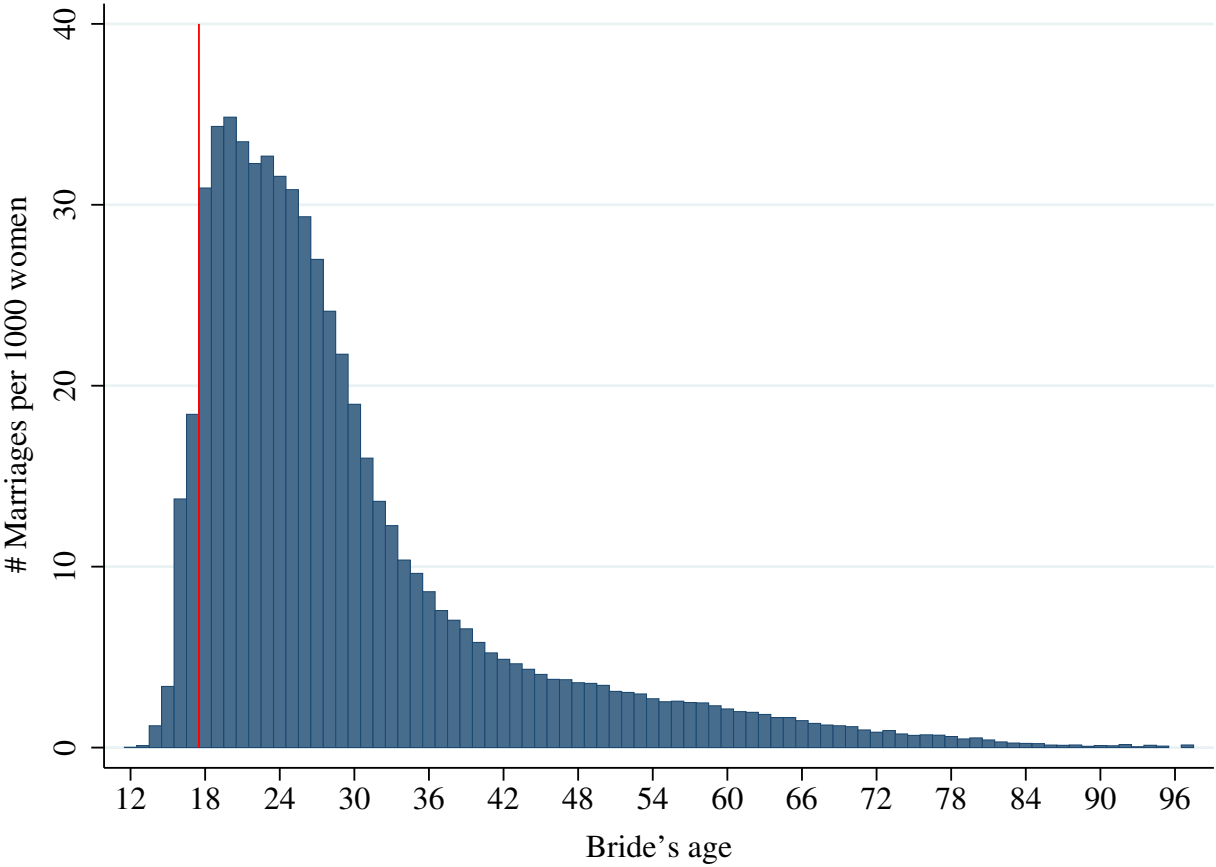
Notes: This figure depicts the number of legally registered marriages by the age of the bride, per 1,000 women and girls of each age in 2013. The number of marriages was obtained from marriage certificate microdata, and the population from CONAPO.

Figure 4: Cross-Country Comparison of the Norms around Informal Unions

Would not have unmarried couple as neighbors

Would not have unmarried couple as neighbors
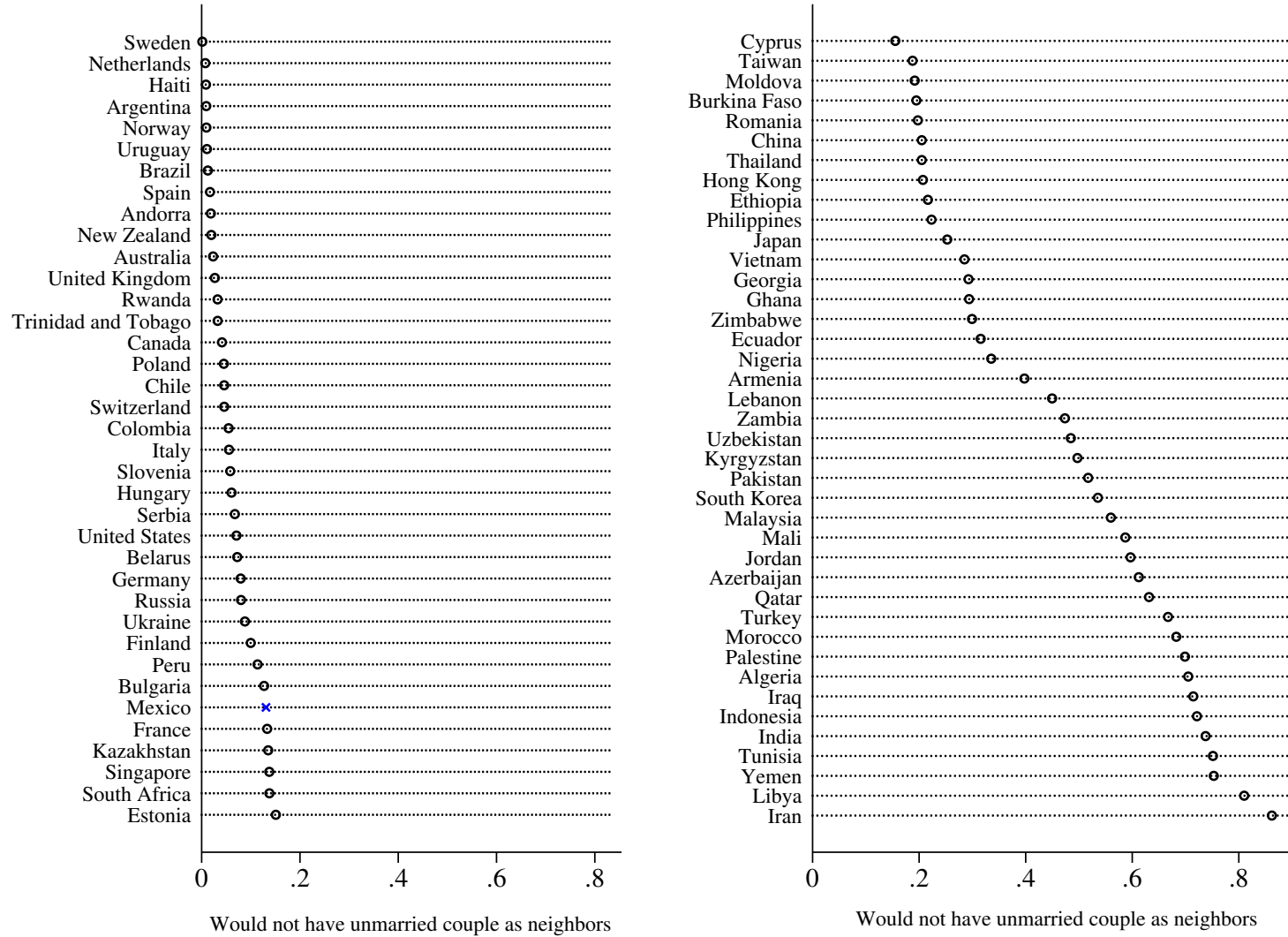
Notes: The data from this figure comes from the 5th and 6th waves of the World Value Survey. For countries that participated in both waves, we use the most recent data. This graph displays the share of respondents ages 40 and above in each country that answered that they would not like to live next to an unmarried couple.

Figure 5: Event-Study Estimates of the Effect of Banning Child Marriage on Formal Marriage Rates of 16- and 17-Year-Old Girls

Notes: The sample includes all Mexican states in 2008-2018, and the unit of observation is a month-state. The figure plots the coefficients and 95% confidence intervals based on wild-bootstrap clustered standard errors of a regression in which the dependent variable is the monthly number of marriages with a bride ages 16-17 per 1,000 girls of this age who reside in state *s* in month-year *t*. The regressors of interest are dummy variables for each month relative to the period in which child marriage was banned for this age group in state *s*, with the month before the reform being the omitted category. We only report 12 lead coefficients for ease of interpretation, and 24 lag coefficients because there are few states for which more than 24 months have passed since the reform was enacted. The regression also includes state fixed effects, month-year fixed effects, states' unemployment rate, poverty rate, female labor force participation, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether girls of this age required the authorization of a judge/mayor to get married. Standard errors are clustered at the state level.

Figure 6: Event-Study Estimates of the Effect of Banning Child Marriage on Formal Marriage Rates of 14- and 15-Year-Old Girls
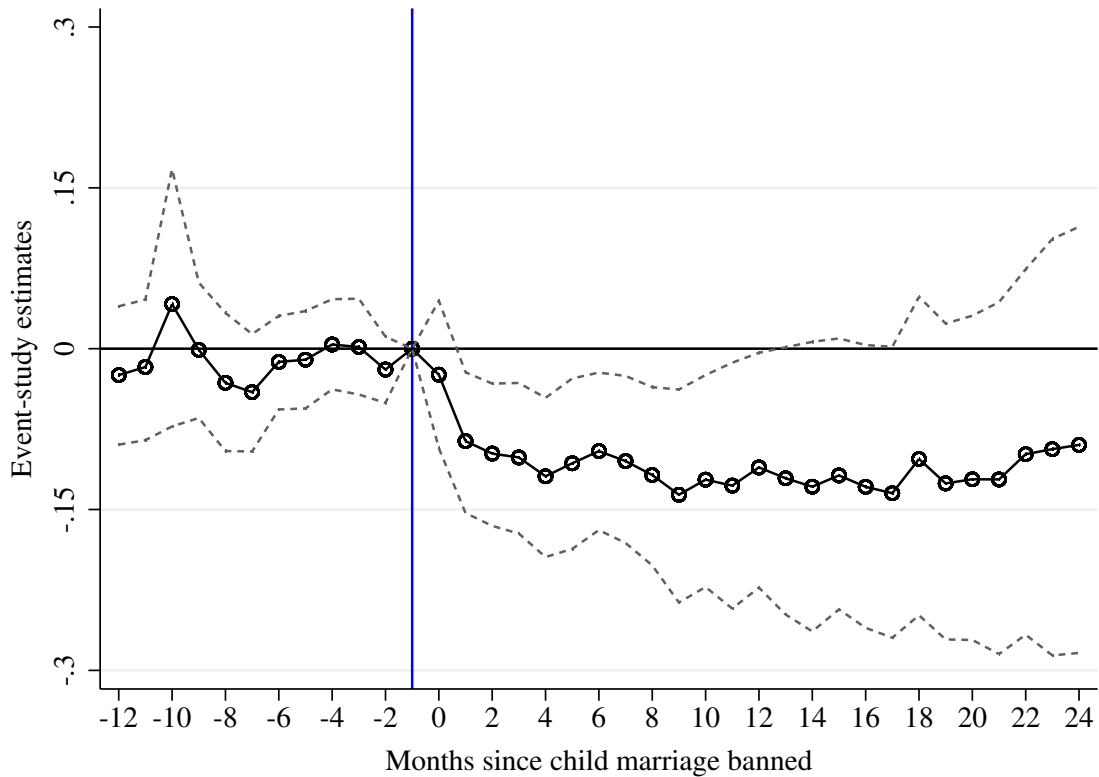
Notes: The sample includes all Mexican states in 2008-2018, and the unit of observation is a month-state. The figure plots the coefficients and 95% confidence intervals based on wild-bootstrap clustered standard errors of a regression in which the dependent variable is the monthly number of marriages with a bride ages 14-15 per 1,000 girls of this age who reside in state s in month-year t. The regressors of interest are dummy variables for each month relative to the period in which child marriage was banned for this age group in state s, with the month before the reform being the omitted category. We only report 12 lead coefficients for ease of interpretation, and 24 lag coefficients because there are few states for which more than 24 months have passed since the reform was enacted. The regression also includes state fixed effects, month-year fixed effects, states' unemployment rate, poverty rate, female labor force participation, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether girls of this age required the authorization of a judge/mayor to get married. Standard errors are clustered at the state level.

Figure 7: Event-Study Estimates of the Effect of Banning Child Marriage on School Attendance of 16- and 17-Year-Old Girls

Notes: The sample is composed of all 16-17-year-old girls interviewed in ENOE in 2008-2018. This figure plots the coefficients and 95% confidence intervals based on wild-bootstrap clustered standard errors of a regression in which the dependent variable is a dummy for whether the individual attended school at the moment of the survey. The regressors of interest are dummy variables for each quarter relative to the period in which child marriage was banned for this age group in the girl's state of residence, with the quarter before the reform being the omitted category. We only report 5 lead coefficients for ease of interpretation, and 7 lag coefficients because there are few states for which more than 7 quarters have passed since the reform was enacted. The regression also includes state fixed effects, quarter-year fixed effects, states' unemployment rate, poverty rate, female labor force participation, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, a dummy for whether girls of this age required the authorization of a judge/mayor to get married, age dummies, and town-size dummies. These estimates are weighted using the sampling weights provided in ENOE. Standard errors are clustered at the state level.

Figure 8: Event-Study Estimates of the Effect of Banning Child Marriage on Early Motherhood of 16- and 17-Year-Old Girls
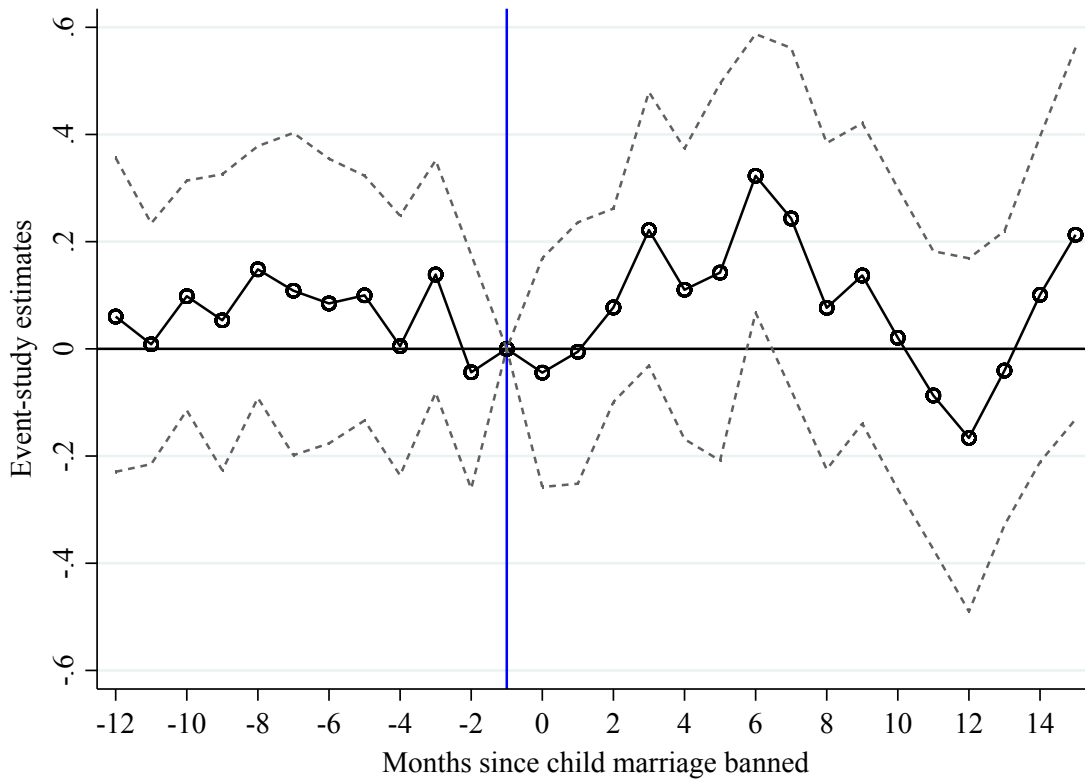
Notes: The sample includes all Mexican states from January 2008 to March 2018, and the unit of observation is a month-state. This figure plots the coefficients and 95% confidence intervals based on wild-bootstrap clustered standard errors of a regression in which the dependent variable is the monthly number of (live) first births conceived in that month by 16- and 17-year-old girls, per 1,000 girls of this age who reside in that state. The regressors of interest are dummy variables for each month relative to the period in which child marriage was banned for this age group in state *s*, with the month before the reform being the omitted category. We only report 12 lead coefficients for ease of interpretation, and 15 lag coefficients because there are few states for which more than 15 months have passed since the reform was enacted. The regression also includes state fixed effects, month-year fixed effects, states' unemployment rate, poverty rate, female labor force participation, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether girls of this age required the authorization of a judge/mayor to get married. Standard errors are clustered at the state level.
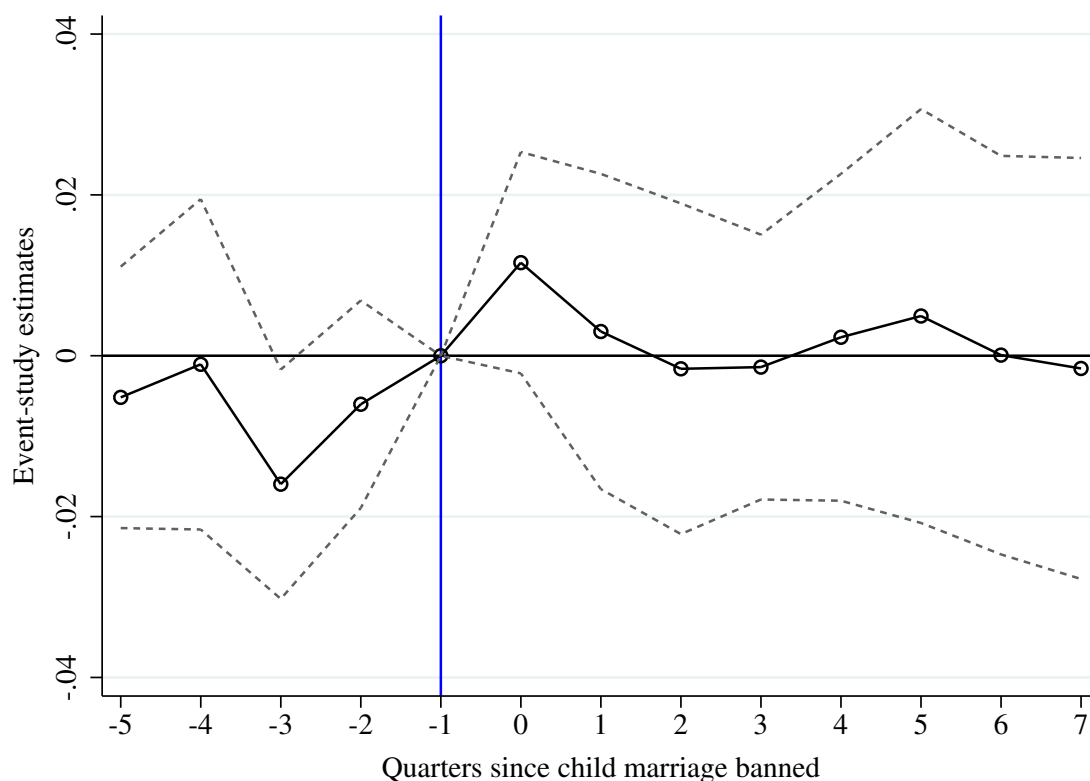
Figure 9: Event-Study Estimates of the Effect of Banning Child Marriage on Civil Status of 16-17-Year-Old Mothers
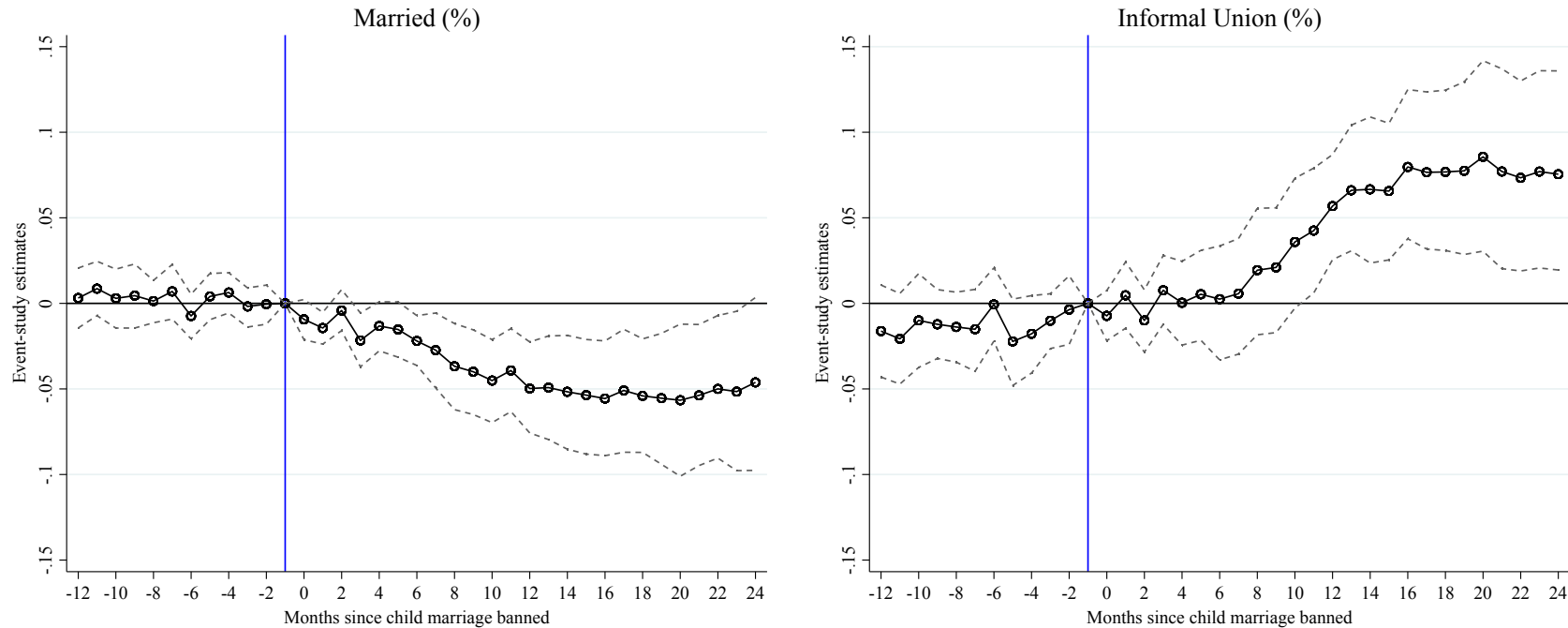
Notes: The sample includes all Mexican states in 2008-2018, and the unit of observation is a month-state. These figures plot the coefficients and 95% confidence intervals based on wild-bootstrap clustered standard errors of a regression in which the dependent variable is the percentage of first births delivered by girls ages 16-17 that are in a marriage and informal union at the moment of delivery, respectively. The regressors of interest are dummy variables for each month relative to the period in which child marriage was banned for this age group in state *s*, with the month before the reform being the omitted category. We only report 12 lead coefficients for ease of interpretation, and 24 lag coefficients because there are few states for which more than 24 months have passed since the reform was enacted. The regression also includes state fixed effects, month-year fixed effects, states' unemployment rate, poverty rate, female labor force participation, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether girls of this age required the authorization of a judge/mayor to get married. Standard errors are clustered at the state level.

Table 1: Descriptive Statistics

	Mean	SD	Min	Max	N
Dependent variables					
Formal child marriage rate (14-15)	0.196	0.324	0.000	2.734	4,224
Formal child marriage rate (16-17)	1.133	1.146	0.000	7.296	4,224
Attends school (14-15)	0.890	0.313	0.000	1.000	329,765
Attends school (16-17)	0.733	0.442	0.000	1.000	329,566
Child fertility rate (14-15)	2.598	0.514	0.939	5.477	3,936
Child fertility rate (16-17)	5.486	0.915	1.439	9.363	3,936
Independent variables					
Child marriage banned (14-15)	0.419	0.493	0.000	1.000	4,224
Child marriage banned (16-17)	0.217	0.412	0.000	1.000	4,224
Real average income of employed people	1752.807	494.197	858.144	3768.327	4,224
Poverty rate	0.387	0.123	0.115	0.714	4,224
Unemployment rate	0.043	0.015	0.008	0.096	4,224
Female labor force participation (ages 20 and above)	0.468	0.053	0.288	0.607	4,224
Total population (in ln)	14.843	0.745	13.264	16.657	4,224
State governor from PRI	0.540	0.498	0.000	1.000	4,224
State governor from PAN	0.237	0.425	0.000	1.000	4,224
State governor from PRD	0.171	0.377	0.000	1.000	4,224
Permission of judge/mayor required (14-15)	0.406	0.491	0.000	1.000	4,224
Permission of judge/mayor required (16-17)	0.333	0.471	0.000	1.000	4,224

Notes: Except for the individual data on school attendance, the unit of observation for all variables is a month-state, and the sample includes all Mexican states in 2008-2018. *Formal child marriage rate* is the monthly number of marriages with a bride of the relevant age, per 1,000 girls of the corresponding age group that reside in that state, calculated using the marriage certificate microdata provided by INEGI and population estimates by CONAPO. Individual data on school attendance for girls was obtained from ENOE, and the sample includes all girls who were 14-17 years old at the moment of the survey. *Attends school* is a dummy for whether the respondent, belonging to the corresponding age group, reported that she was attending school. *Child fertility rate* is the monthly number of first births conceived in that month per 1,000 girls of the corresponding age group that reside in that state, calculated using the birth registry microdata provided by SINAC and population estimates by CONAPO. *Child marriage banned* is a dummy variable taking the value of 1 if child marriage was banned, without exception, for the corresponding age group. The unemployment rate was obtained from INEGI, the poverty rate and average income of employed individuals from CONEVAL, the female labor force participation of women ages 20 and over from ENOE, and data on total population was obtained from ENOE. *State governor from PRI* is a dummy variable for whether the state governor belongs to the PRI political party. The analogous definition applies to the following two variables. *Permission of judge/mayor required* is a dummy variable for whether individuals of the corresponding age needed a judge or mayor to sign off on the marriage, in addition to the consent of their parents.

Table 2: Effect of Banning Child Marriage on Formal Child Marriage Rates

	(1)	(2)	(3)	(4)	(5)
Panel A: Ages 14-15					
Child marriage banned	0.007	0.010	-0.063	-0.089	-0.097
	(0.131)	(0.133)	(0.093)	(0.073)	(0.093)
	[0.994]	[0.991]	[0.597]	[0.311]	[0.432]
Observations	4,224	4,224	4,224	4,224	4,224
R^2	0.237	0.256	0.561	0.638	0.623
Dependent variable mean (control)	0.268	0.268	0.268	0.268	0.258
Panel B: Ages 16-17					
Child marriage banned	-0.476***	-0.445***	-0.716***	-0.695***	-0.702***
	(0.156)	(0.156)	(0.178)	(0.175)	(0.154)
	[0.000]	[0.000]	[0.002]	[0.002]	[0.004]
Observations	4,224	4,224	4,224	4,224	4,224
R^2	0.358	0.394	0.747	0.761	0.766
Dependent variable mean (control)	1.432	1.432	1.432	1.432	1.352
Year FE	✓				
Month-year FE		✓	✓	✓	✓
State FE			✓	✓	✓
Controls				✓	✓
Population weights					✓

Notes: The sample includes all Mexican states in 2008-2018, and the unit of observation is a month-state. The dependent variable in Panel A (B) is the monthly number of marriages with a bride ages 14-15 (16-17) per 1,000 girls of this age who reside in that state, and the regressor of interest is a dummy for whether child marriage was not allowed for the corresponding age group in that given state and month. Controls include states' unemployment rate, poverty rate, labor force participation of females ages 20 and above, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether girls of this age required the authorization of a judge/mayor to get married. Standard errors clustered by state are in parentheses, and cluster-robust wild-bootstrap p-values in square brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 3: Event-Study Estimates of the Effect of Banning Child Marriage on Formal Child Marriage Rates

	# Marriages per 1,000 girls of age			
	14	15	16	17
Child marriage banned - Months [-12, -9]	0.005	0.001	0.088	0.086
	(0.020)	(0.041)	(0.068)	(0.079)
	[0.793]	[0.977]	[0.217]	[0.296]
Child marriage banned - Months [-8, -5]	-0.015	-0.026	0.046	0.004
	(0.013)	(0.020)	(0.035)	(0.059)
	[0.257]	[0.165]	[0.166]	[0.945]
Child marriage banned - Months [0, 3]	-0.038**	-0.110***	-0.437***	-0.571***
	(0.014)	(0.035)	(0.138)	(0.148)
	[0.010]	[0.004]	[0.001]	[0.000]
Child marriage banned - Months [4, 7]	-0.056***	-0.151***	-0.584***	-0.748***
	(0.020)	(0.047)	(0.158)	(0.171)
	[0.014]	[0.006]	[0.001]	[0.000]
Child marriage banned - Months [8, 11]	-0.068**	-0.177***	-0.636***	-0.818***
	(0.028)	(0.061)	(0.167)	(0.184)
	[0.029]	[0.012]	[0.001]	[0.000]
Child marriage banned - Months [12, 15]	-0.058*	-0.173**	-0.670***	-0.836***
	(0.033)	(0.072)	(0.175)	(0.198)
	[0.133]	[0.048]	[0.001]	[0.000]
Child Marriage Banned - Months [16, 19]	-0.055	-0.184**	-0.666***	-0.830***
	(0.038)	(0.084)	(0.189)	(0.217)
	[0.222]	[0.064]	[0.001]	[0.001]
Child marriage banned - Months [20, 23]	-0.049	-0.163*	-0.592***	-0.761***
	(0.045)	(0.095)	(0.208)	(0.244)
	[0.385]	[0.152]	[0.007]	[0.004]
Month-year FE	✓	✓	✓	✓
State FE	✓	✓	✓	✓
Controls	✓	✓	✓	✓
Observations	4,224	4,224	4,224	4,224
R^2	0.592	0.650	0.749	0.744
Dependent variable mean (control)	0.136	0.399	1.237	1.628

Notes: The sample includes all Mexican states in 2008-2018, and the unit of observation is a month-state. The dependent variable is the monthly number of marriages with a bride in the age group specified in the column header, per 1,000 girls of this age who reside in that state. The regressors of interest are dummy variables for each 4-month period relative to the period in which child marriage was banned for the relevant age group in state *s*, with the period before the reform being the omitted category. We only report lead coefficients for up to 12 months before the reform for ease of interpretation, and lag coefficients for 23 months after the reform for simplicity, and because there are few states for which more than 23 months have passed since the reform was enacted. Controls include states' unemployment rate, poverty rate, labor force participation of females ages 20 and above, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether girls of this age required the authorization of a judge/mayor to get married. Standard errors clustered by state are in parentheses, and cluster-robust wild-bootstrap p-values in square brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 4: Event-Study Estimates of the Effect of Banning Child Marriage on School Attendance of 16- and 17-Year-Old Girls

	Girls of age		
	16-17	16	17
Child marriage banned in 3 quarters	-0.016**	-0.012	-0.019
	(0.007)	(0.013)	(0.016)
	[0.040]	[0.433]	[0.232]
Child marriage banned in 2 quarters	-0.006	-0.010	-0.000
	(0.007)	(0.008)	(0.014)
	[0.405]	[0.246]	[0.988]
Child marriage banned this quarter	0.012	0.015	0.008
	(0.007)	(0.010)	(0.010)
	[0.132]	[0.179]	[0.456]
Child marriage banned 1 quarter ago	0.003	-0.002	0.009
	(0.010)	(0.010)	(0.013)
	[0.772]	[0.861]	[0.485]
Child marriage banned 2 quarters ago	-0.002	-0.007	0.004
	(0.010)	(0.012)	(0.014)
	[0.888]	[0.575]	[0.758]
Child marriage banned 3 quarters ago	-0.001	0.005	-0.007
	(0.008)	(0.009)	(0.015)
	[0.869]	[0.588]	[0.644]
Child marriage banned 4 quarters ago	0.002	0.012	-0.006
	(0.010)	(0.011)	(0.016)
	[0.825]	[0.292]	[0.709]
Child marriage banned 5 quarters ago	0.005	0.008	0.004
	(0.013)	(0.016)	(0.019)
	[0.732]	[0.618]	[0.849]
Child marriage banned 6 quarters ago	0.000	0.008	-0.007
	(0.013)	(0.014)	(0.018)
	[0.994]	[0.596]	[0.699]
Child marriage banned 7 quarters ago	-0.002	0.004	-0.006
	(0.013)	(0.015)	(0.020)
	[0.914]	[0.825]	[0.790]
Quarter-year FE	✓	✓	✓
State FE	✓	✓	✓
Controls	✓	✓	✓
Observations	329,566	165,244	164,322
R^2	0.067	0.061	0.063
Dependent variable mean (control)	0.697	0.733	0.661

Notes: The sample is composed of girls of the age specified in the column header interviewed in ENOE between 2008 and 2018. The dependent variable is a dummy for whether the girl attended school at the moment of the survey. The regressors of interest are dummy variables for each quarter relative to the period in which child marriage was banned for this age group in the girl's state of residence, with the quarter before the reform being the omitted category. We only report 5 lead coefficients for ease of interpretation, and 7 lag coefficients because there are few states for which more than 7 quarters have passed since the reform was enacted. The regression also includes state fixed effects, quarter-year fixed effects, states' unemployment rate, poverty rate, female labor force participation, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, a dummy for whether girls of this age required the authorization of a judge/mayor to get married, age dummies, and town-size dummies. These estimates are weighted using the sampling weights provided in ENOE. Standard errors clustered by state are in parentheses, and cluster-robust wild-bootstrap p-values in square brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5: Event-Study Estimates of the Effect of Banning Child Marriage on Early Motherhood of 16- and 17-Year-Old Girls

	# First births per 1,000 girls of age		
	16-17	16	17
Child marriage banned - Months [-12, -9]	0.032	-0.037	0.101
	(0.085)	(0.102)	(0.099)
	[0.732]	[0.727]	[0.325]
Child marriage banned - Months [-8, -5]	0.086	0.051	0.120
	(0.079)	(0.085)	(0.091)
	[0.319]	[0.572]	[0.207]
Child marriage banned - Months [0, 3]	0.035	-0.062	0.133*
	(0.064)	(0.079)	(0.071)
	[0.560]	[0.447]	[0.066]
Child marriage banned - Months [4, 7]	0.177	0.132	0.223*
	(0.107)	(0.120)	(0.122)
	[0.127]	[0.300]	[0.083]
Child marriage banned - Months [8, 11]	0.009	0.011	0.008
	(0.087)	(0.115)	(0.086)
	[0.910]	[0.941]	[0.925]
Child marriage banned - Months [12, 15]	-0.008	-0.072	0.056
	(0.121)	(0.149)	(0.121)
	[0.948]	[0.671]	[0.667]
Month-year FE	✓	✓	✓
State FE	✓	✓	✓
Controls	✓	✓	✓
Observations	3,936	3,936	3,936
R^2	0.677	0.578	0.600
Dependent variable mean (control)	5.584	5.203	5.967

Notes: The sample includes all Mexican states from January 2008 to March 2018, and the unit of observation is a month-state. The dependent variable is the monthly number of (live) first births conceived by a girl from the age group specified in the column header, per 1,000 girls from the age group who reside in that state. The regressors of interest are dummy variables for each 4-month period relative to the period in which child marriage was banned for this age group in state *s*, with the period before the reform being the omitted category. We only report lead coefficients for up to 12 months before the reform for ease of interpretation, and lag coefficients for 15 months after the reform, as there are few states for which more than 15 months have passed since the reform was enacted. Controls include states' unemployment rate, poverty rate, labor force participation of females ages 20 and above, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether girls of this age required the authorization of a judge/mayor to get married. Standard errors clustered by state are in parentheses, and cluster-robust wild-bootstrap p-values in square brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 6: Event-Study Estimates of the Effect of Banning Child Marriage on Civil Status of 16- and 17-Year-Old Mothers

	Married	Union	Single	Missing
Child marriage banned - Months [-12, -9]	0.004	-0.007	0.011*	-0.008***
	(0.006)	(0.008)	(0.006)	(0.002)
	[0.535]	[0.438]	[0.083]	[0.000]
Child marriage banned - Months [-8, -5]	0.000	-0.005	0.008	-0.003**
	(0.004)	(0.006)	(0.005)	(0.001)
	[0.954]	[0.416]	[0.101]	[0.046]
Child marriage banned - Months [0, 3]	-0.013**	0.007	0.003	0.003*
	(0.005)	(0.007)	(0.006)	(0.002)
	[0.019]	[0.390]	[0.603]	[0.079]
Child marriage banned - Months [4, 7]	-0.020**	0.011	0.007	0.002
	(0.008)	(0.015)	(0.012)	(0.003)
	[0.021]	[0.494]	[0.639]	[0.507]
Child marriage banned - Months [8, 11]	-0.041***	0.037*	0.001	0.003
	(0.013)	(0.018)	(0.013)	(0.003)
	[0.000]	[0.068]	[0.942]	[0.388]
Child marriage banned - Months [12, 15]	-0.052***	0.071***	-0.023*	0.003
	(0.015)	(0.017)	(0.012)	(0.004)
	[0.001]	[0.000]	[0.075]	[0.423]
Child marriage banned - Months [16, 19]	-0.055***	0.085***	-0.033*	0.002
	(0.018)	(0.022)	(0.015)	(0.003)
	[0.002]	[0.000]	[0.058]	[0.512]
Child marriage banned - Months [20, 23]	-0.054**	0.086***	-0.035*	0.003
	(0.022)	(0.026)	(0.018)	(0.003)
	[0.016]	[0.002]	[0.081]	[0.390]
Month-year FE	✓	✓	✓	✓
State FE	✓	✓	✓	✓
Controls	✓	✓	✓	✓
Observations	4,224	4,224	4,224	4,224
R^2	0.839	0.749	0.713	0.453
Dependent variable mean (control)	0.173	0.599	0.211	0.017

Notes: The sample includes all Mexican states in 2008-2018, and the unit of observation is a month-state. The dependent variable is the share of 16-17-year-old mothers residing in a given state and who gave birth in a given month that had the civil status in the column header at the moment of delivery. The regressors of interest are dummy variables for each 4-month period relative to the period in which child marriage was banned for this age group in state *s*, with the period before the reform being the omitted category. We only report lead coefficients for up to 12 months before the reform for ease of interpretation, and lag coefficients for 23 months after the reform, as there are few states for which more than 23 months have passed since the reform was enacted. Controls include states' unemployment rate, poverty rate, labor force participation of females ages 24 and above, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether girls of this age required the authorization of a judge/mayor to get married. Standard errors clustered by state are in parentheses, and cluster-robust wild-bootstrap p-values in square brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 7: Event-Study Estimates of the Effect of Banning Child Marriage on Prenatal Investment of 16-17-Year-Old Mothers and Newborn Health

	Prenatal investments				Newborn health		
	Prenatal care	First visit 1T	# Prenatal visits	Caesarean	Premature	Low birthweight	Apgar < 7
Child marriage banned - Months [-12, -9]	-0.002	-0.001	-0.027	-0.002	0.002	0.000	0.001
	(0.002)	(0.006)	(0.031)	(0.003)	(0.002)	(0.002)	(0.001)
	[0.388]	[0.848]	[0.407]	[0.573]	[0.520]	[0.861]	[0.574]
Child marriage banned - Months [-8, -5]	-0.001	0.001	-0.015	-0.002	0.002	0.000	0.002**
	(0.001)	(0.005)	(0.023)	(0.004)	(0.002)	(0.002)	(0.001)
	[0.229]	[0.864]	[0.571]	[0.555]	[0.404]	[0.814]	[0.011]
Child marriage banned - Months [0, 3]	0.000	0.001	-0.003	0.007*	-0.000	-0.001	0.000
	(0.001)	(0.004)	(0.023)	(0.004)	(0.002)	(0.002)	(0.001)
	[0.928]	[0.687]	[0.881]	[0.099]	[0.898]	[0.719]	[0.751]
Child marriage banned - Months [4, 7]	0.002	0.009**	-0.005	-0.004	-0.002	-0.002	0.000
	(0.002)	(0.004)	(0.042)	(0.005)	(0.002)	(0.002)	(0.001)
	[0.296]	[0.048]	[0.907]	[0.418]	[0.284]	[0.327]	[0.837]
Child marriage banned - Months [8, 11]	0.002	0.005	-0.028	0.012**	0.002	0.003	-0.000
	(0.002)	(0.005)	(0.053)	(0.005)	(0.002)	(0.002)	(0.001)
	[0.275]	[0.377]	[0.630]	[0.039]	[0.330]	[0.247]	[0.877]
Child marriage banned - Months [12, 15]	0.001	0.008	-0.018	0.009	0.001	0.001	-0.001
	(0.002)	(0.006)	(0.068)	(0.008)	(0.002)	(0.002)	(0.001)
	[0.722]	[0.176]	[0.809]	[0.292]	[0.534]	[0.835]	[0.663]
Month-year FE	✓	✓	✓	✓	✓	✓	✓
State FE	✓	✓	✓	✓	✓	✓	✓
Controls	✓	✓	✓	✓	✓	✓	✓
Observations	1,445,952	1,454,669	1,413,457	1,454,064	1,456,281	1,376,682	1,443,456
R^2	0.008	0.012	0.022	0.011	0.001	0.003	0.003
Dependent variable mean (control)	0.972	0.679	6.683	0.368	0.055	0.058	0.012

Notes: The sample includes all women who had their first child between January 2008 and March of 2018 and were 16 to 17 years old at the moment of conception. In columns 1, 2 and 4, the dependent variables are dummies for whether the mother had any prenatal cares, had her first prenatal visit in the first trimester, and had a c-section, respectively. The dependent variable in column 3 is the number of prenatal visits. The dependent variables in columns 5-7 are dummy variables for whether the child was born with the condition specified in the column header. The regressors of interest are dummy variables for each 4-month period relative to the period in which child marriage was banned for this age group in the state of residence of the mother, with the period before the reform being the omitted category. We only report lead coefficients for up to 12 months before the reform for ease of interpretation, and lag coefficients for 15 months after the reform, as there are few states for which more than 15 months have passed since the reform was enacted. Controls include states' unemployment rate, poverty rate, labor force participation of females ages 20 and above, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether girls of this age required the authorization of a judge/mayor to get married. Standard errors clustered by state are in parentheses, and cluster-robust wild-bootstrap p-values in square brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

ONLINE APPENDIX

Appendix A   Appendix Figures and Tables

Figure A.1: Adoption of the Child Marriage Ban

2014

2015

2016

2017

2018
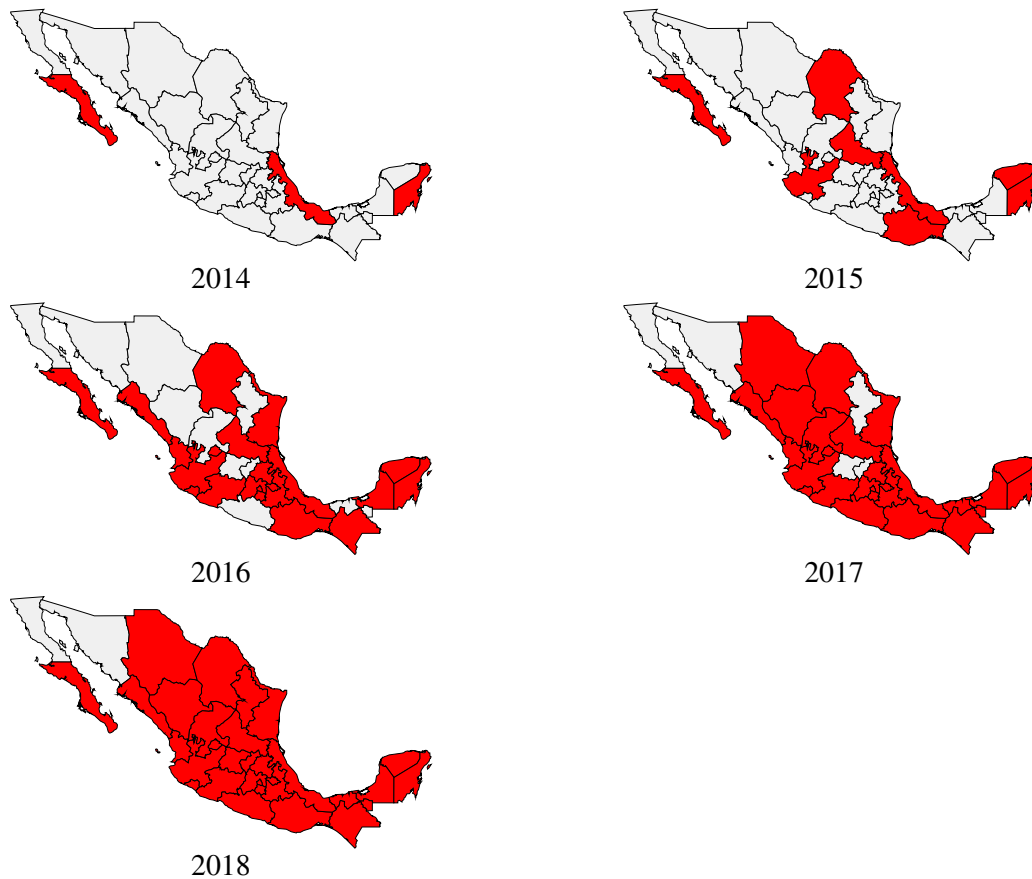
Notes: These maps depict the evolution in the adoption of the ban on child marriage across Mexican states. States depicted in red had a minimum age of marriage of 18 years old, without exception, at some point in the corresponding year. For the 30 states that banned child marriage, we obtained the year of the reform by looking at the date in which the articles that establish the minimum age for marriage were modified in the civil or family codes. The exact dates and the corresponding legislation is provided in Appendix Table A.1.

Figure A.2: Adoption of the Ban for Child Marriages Below Age 16

2008

2010

2012

2014

2016

2018
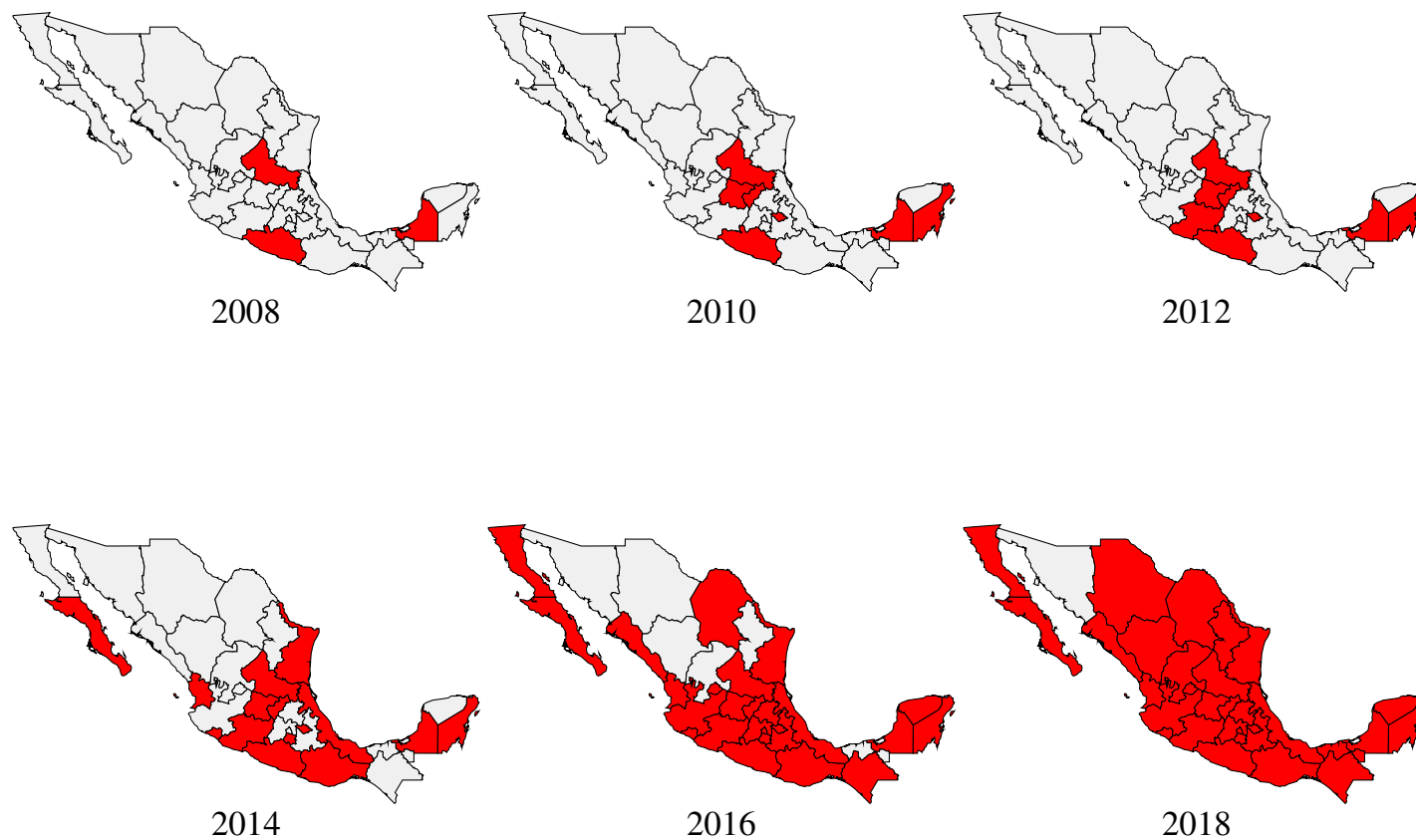
Notes: These maps depict the evolution in the adoption of the ban on child marriages below the age of 16 across Mexican states. States depicted in red had a minimum age of marriage of 16 years old or more, without exception, at some point in the corresponding year. For the 31 states that banned child marriage for this age group, we obtained the year of the reform by looking at the date in which the articles that establish the minimum age for marriage were modified in the civil or family codes. The exact dates and the corresponding legislation is provided in Appendix Table A.1.

Figure A.3: Number of Registered Marriages per 1,000 Boys and Men in 2013, by the Groom's Age
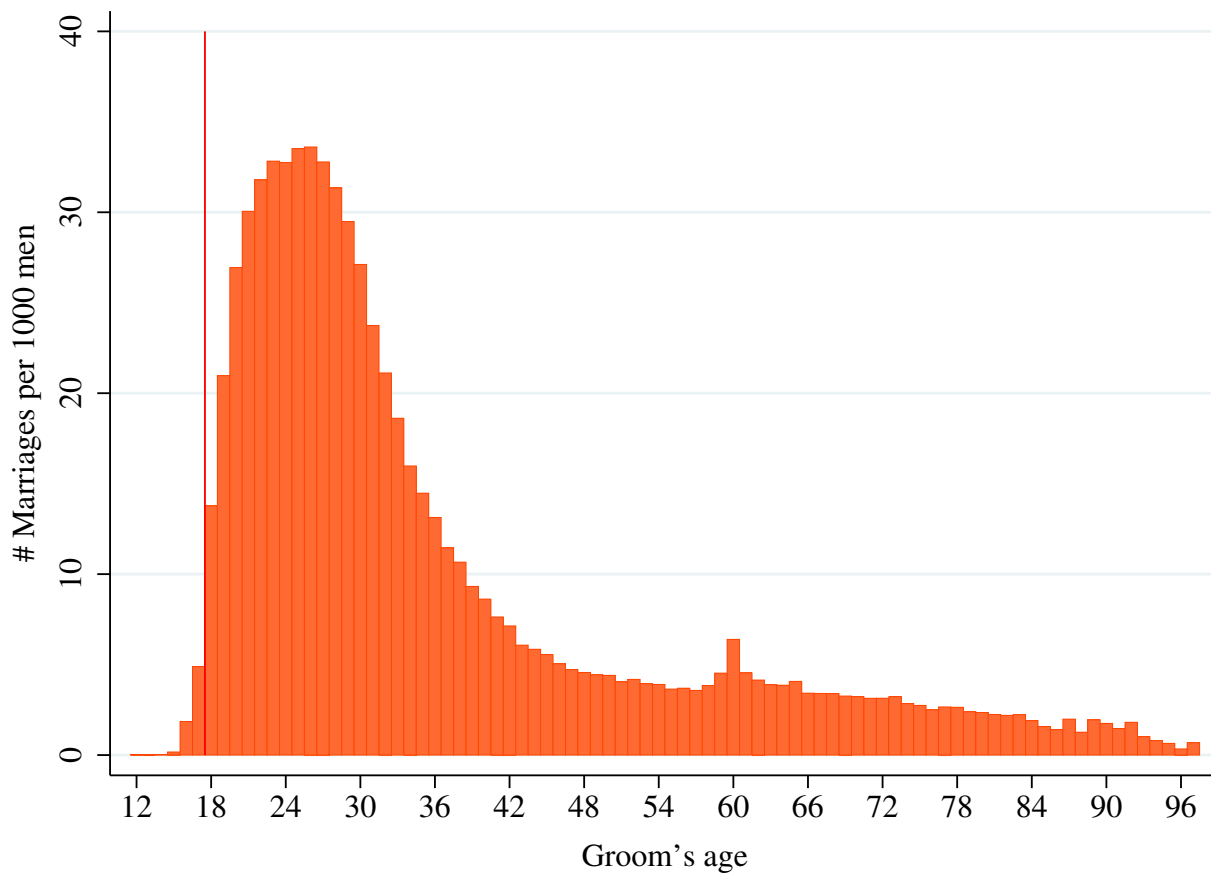
Notes: This figure depicts the number of legally registered marriages by the age of the groom, per 1,000 boys and men of each age in 2013. The number of marriages was obtained from marriage certificate microdata, and the population from CONAPO.

Figure A.4: Comparison of Schooling Attainment for Child Brides and Non-Child Brides
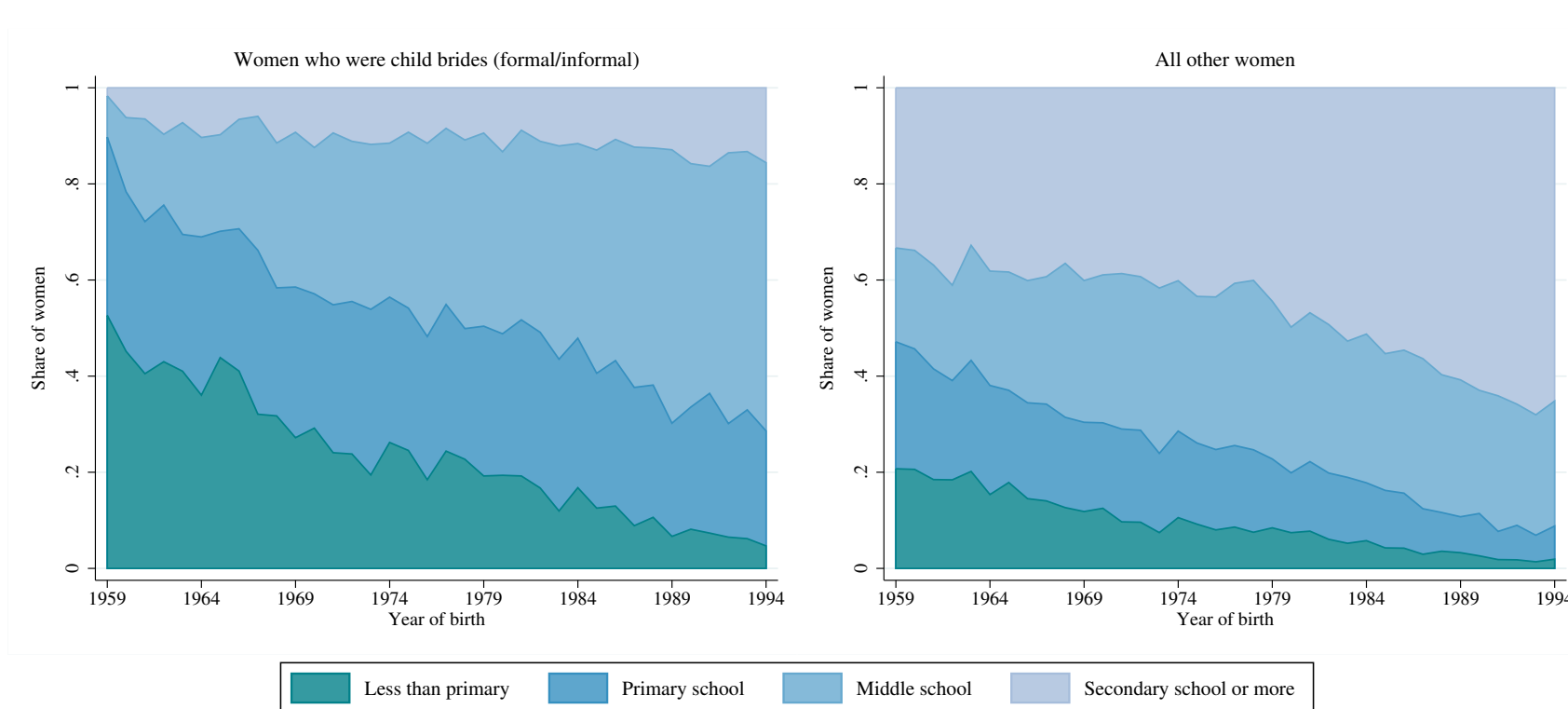
Notes: The graphs show the share of women according to their maximum educational attainment, by birth year. The sample in the first graph is limited to women who were in a formal marriage or informal union before the age of 18, whereas the sample in the second graph contains the remaining women (i..e, those who were not in a formal marriage or informal union before turning 18). The source of these data is the *Encuesta Nacional de la Dinámica Demográfica* (ENADID), a demographic survey conducted in 2014. We took the sample of 83,554 women who were 20-54 at the time of the survey, and computed the share of women in each category using sampling weights.

Figure A.5: Comparison of Age at First Birth for Child Brides and Non-Child Brides
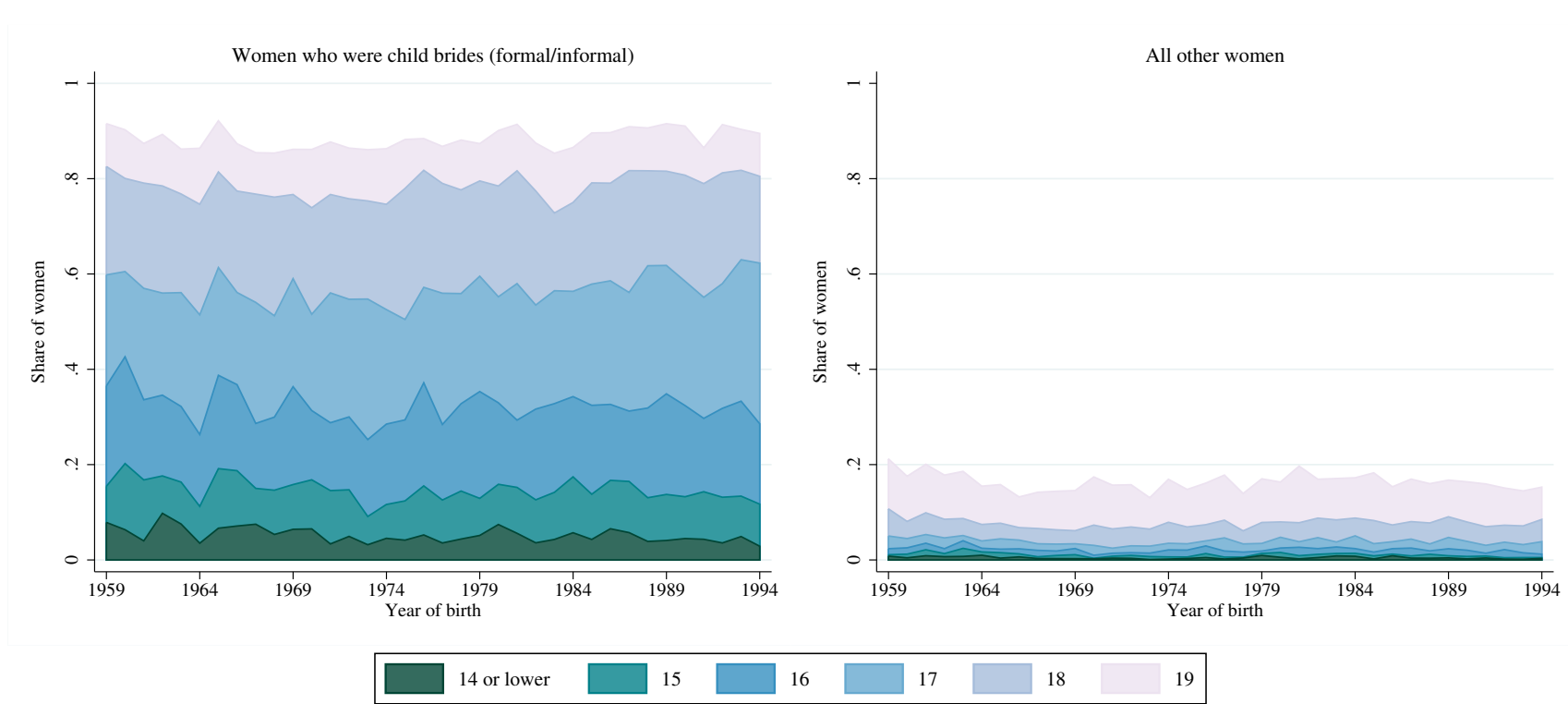
Notes: The graphs show the share of women who had their first birth at different ages, by cohort. The sample in the first graph is limited to women who were in a formal marriage or informal union before the age of 18, whereas the sample in the second graph contains the remaining women (i..e, those who were not in a formal marriage or informal union before turning 18). The source of these data is the *Encuesta Nacional de la Dinámica Demográfica* (ENADID), a demographic survey conducted in 2014. We took the sample of 83,554 women who were 20-54 at the time of the survey, and computed the share of women in each category using sampling weights.

Figure A.6: Number of Registered Marriages in 2013 per 1,000 Girls Ages 14-17

(16.72, 24.86]
(9.84, 16.72]
(6.30, 9.84]
(5.32, 6.30]
[1.86, 5.32]
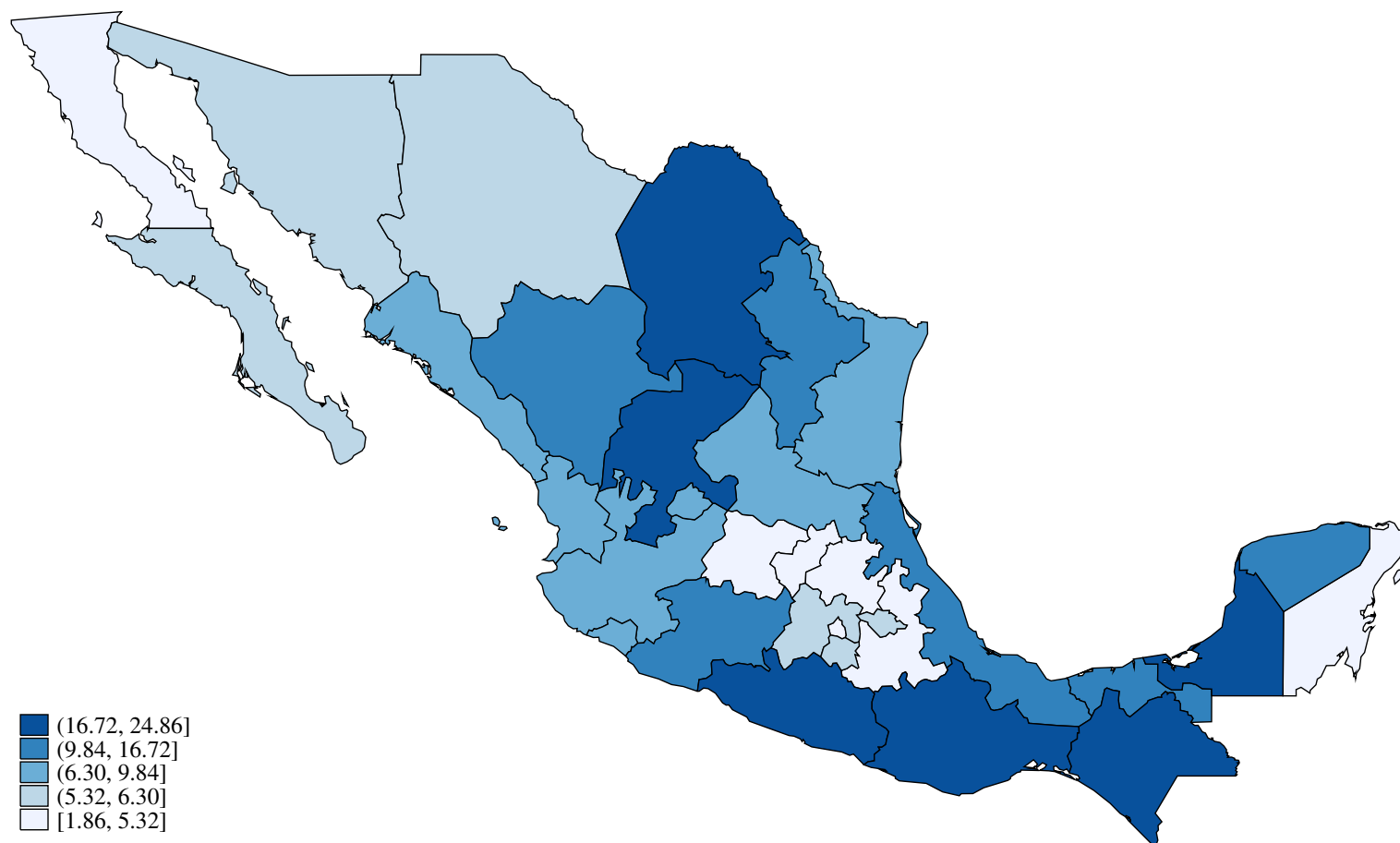
Notes: This figure depicts the number of legally registered marriages with a bride ages 14-17, per 1,000 girls of this age in 2013. The number of marriages was obtained from marriage certificate microdata, and the population from CONAPO.

Figure A.7: Event-Study Estimates of the Effect of Banning Child Marriage on Formal Marriage Rates of 18-Year-Old Girls
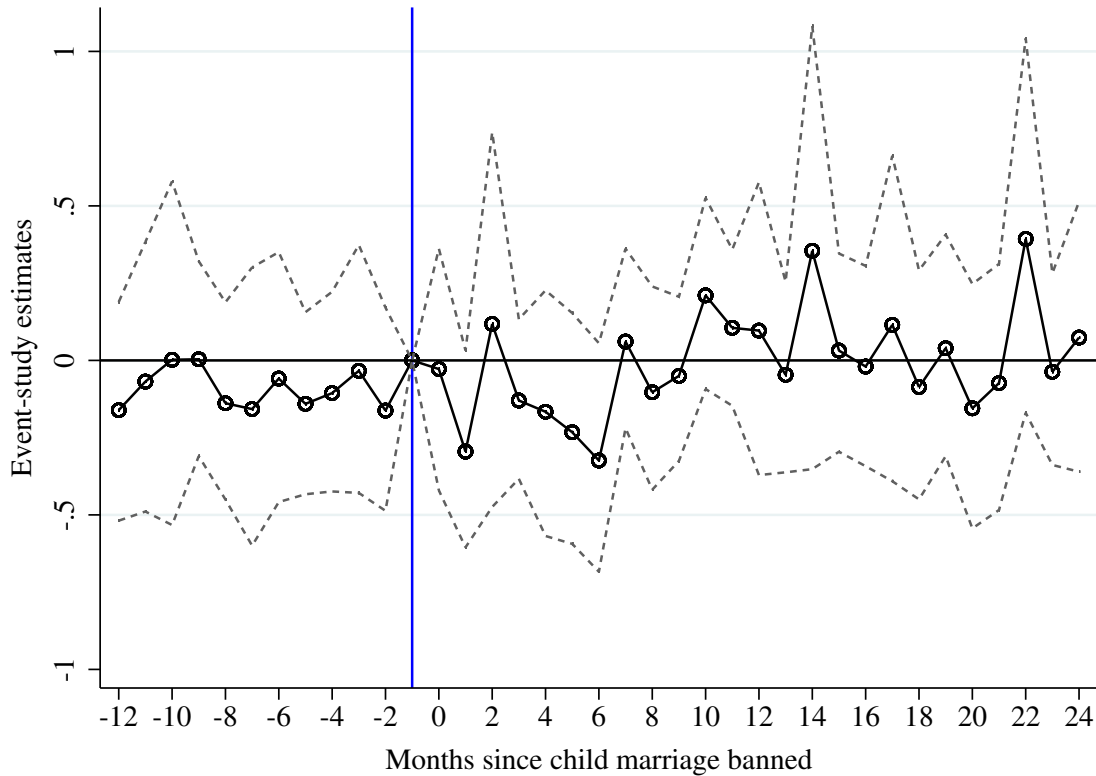
Notes: The sample includes all Mexican states in 2008-2018, and the unit of observation is a month-state. The figure plots the coefficients and 95% confidence intervals based on wild-bootstrap clustered standard errors of a regression in which the dependent variable is the monthly number of marriages with an 18-year-old bride, per 1,000 girls of this age who reside in state *s* in month-year *t*. The regressors of interest are dummy variables for each month relative to the period in which child marriage was banned for everyone below the age of 18 in state *s*, with the month before the reform being the omitted category. We only report 12 lead coefficients for ease of interpretation, and 24 lag coefficients because there are few states for which more than 24 months have passed since the reform was enacted. The regression also includes state fixed effects, month-year fixed effects, states' unemployment rate, poverty rate, labor force participation of females ages 20 and above, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether 16- and 17-year-olds required the authorization of a judge/mayor to get married. Standard errors are clustered at the state level.

Figure A.8: Event-Study Estimates of the Effect of Banning Child Marriage on School Attendance/Attainment of 16- and 17-Year-Old Girls
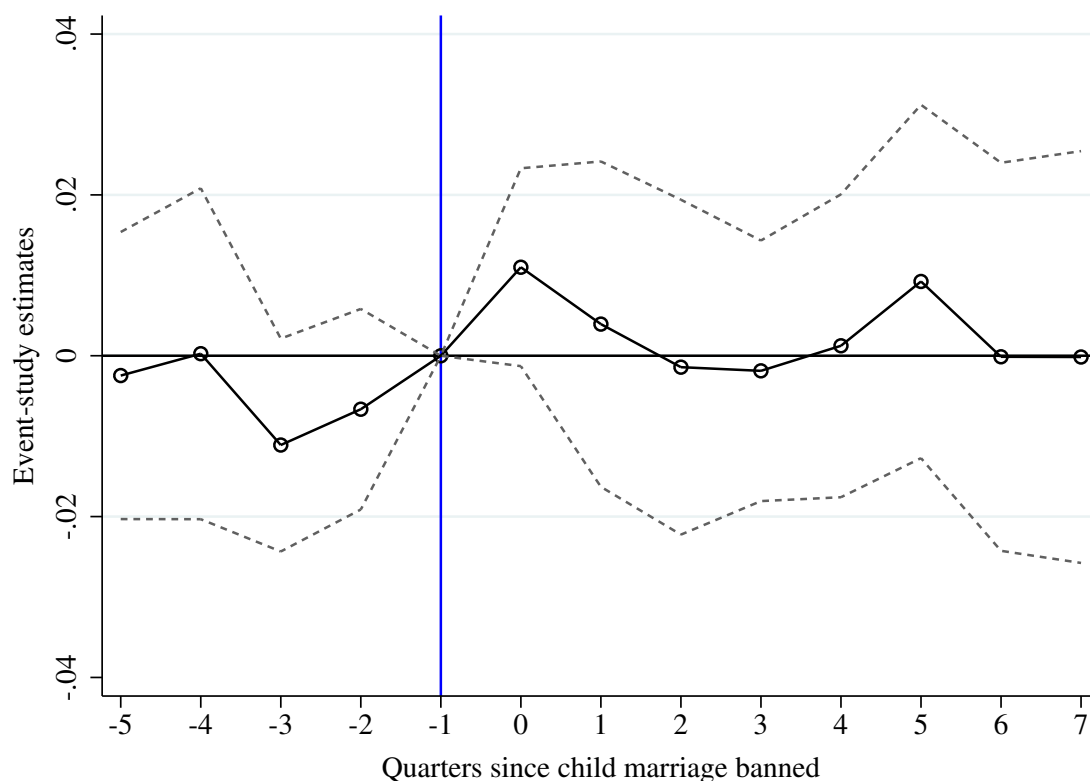
Notes: The sample is composed of all 16-17-year-old girls interviewed in ENOE in 2008-2018. This figure plots the coefficients and 95% confidence intervals based on wild-bootstrap clustered standard errors of a regression in which the dependent variable is a dummy for whether the girl attended school or completed high school at the moment of the survey. The regressors of interest are dummy variables for each quarter relative to the period in which child marriage was banned for this age group in the girl's state of residence, with the quarter before the reform being the omitted category. We only report 5 lead coefficients for ease of interpretation, and 7 lag coefficients because there are few states for which more than 7 quarters have passed since the reform was enacted. The regression also includes state fixed effects, quarter-year fixed effects, states' unemployment rate, poverty rate, female labor force participation, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, a dummy for whether girls of this age required the authorization of a judge/mayor to get married, age dummies, and town-size dummies. These estimates are weighted using the sampling weights provided in ENOE. Standard errors are clustered at the state level.

Figure A.9: Event-Study Estimates of the Effect of Banning Child Marriage on School Attendance of 14- and 15-Year-Old Girls
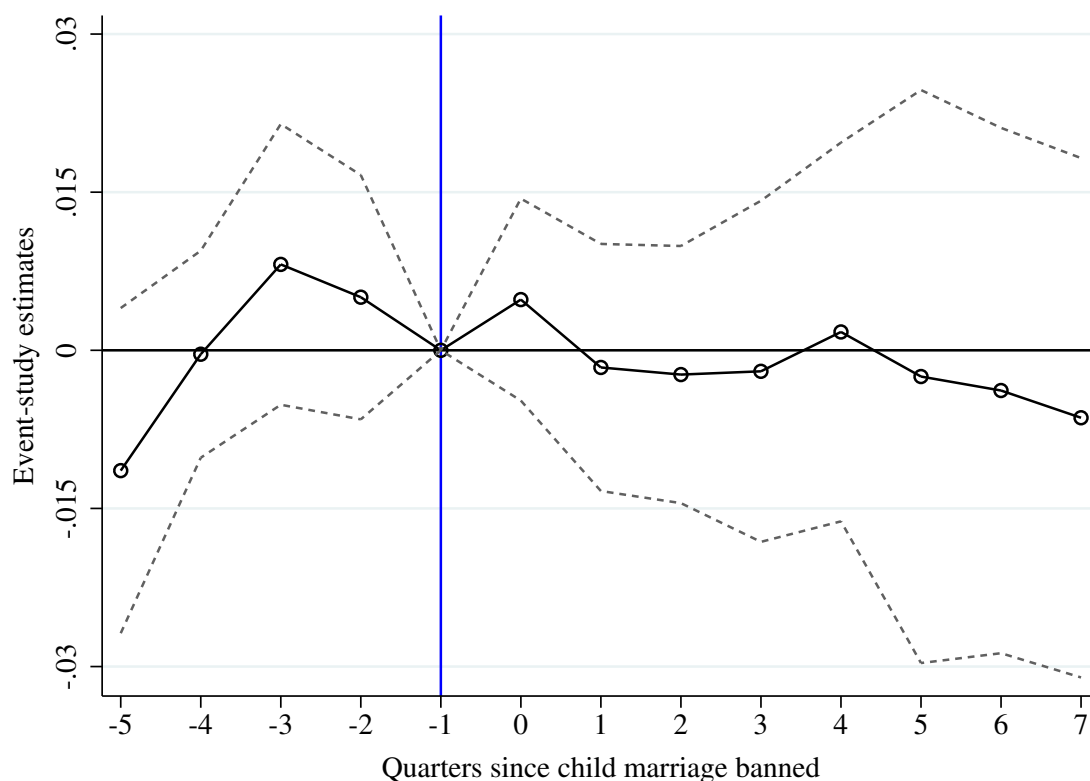
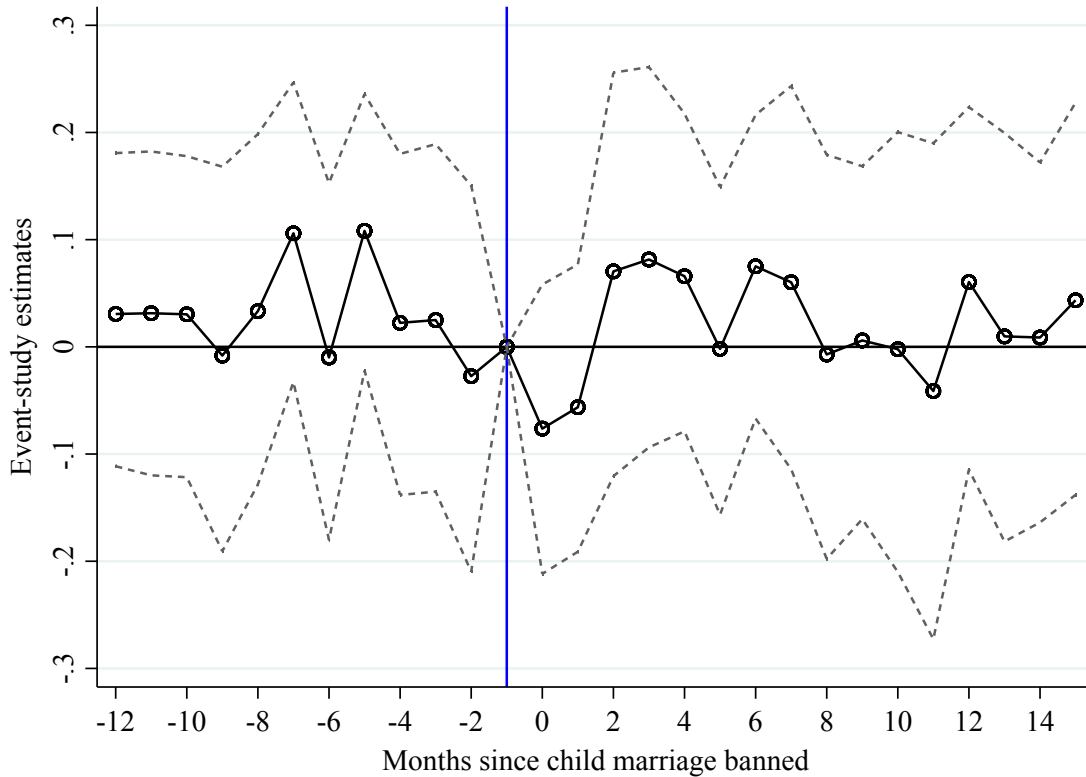*Notes:* The sample is composed of all 14-15-year-old girls interviewed in ENOE in 2008-2018. This figure plots the coefficients and 95% confidence intervals based on wild-bootstrap clustered standard errors of a regression in which the dependent variable is a dummy for whether the individual attended school at the moment of the survey. The regressors of interest are dummy variables for each quarter relative to the period in which child marriage was banned for this age group in the girl's state of residence, with the quarter before the reform being the omitted category. We only report 5 lead coefficients for ease of interpretation, and 7 lag coefficients because there are few states for which more than 7 quarters have passed since the reform was enacted. The regression also includes state fixed effects, quarter-year fixed effects, states' unemployment rate, poverty rate, female labor force participation, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, a dummy for whether girls of this age required the authorization of a judge/mayor to get married, age dummies, and town-size dummies. These estimates are weighted using the sampling weights provided in ENOE. Standard errors are clustered at the state level.

Figure A.10: Event-Study Estimates of the Effect of Banning Child Marriage on Early Motherhood of 14- and 15-Year-Old Girls

Notes: The sample includes all Mexican states from January 2008 to March 2018, and the unit of observation is a month-state. This figure plots the coefficients and 95% confidence intervals based on wild-bootstrap clustered standard errors of a regression in which the dependent variable is the monthly number of (live) first births conceived in that month by 14 to 15-year-old girls, per 1,000 girls of this age who reside in that state. The regressors of interest are dummy variables for each month relative to the period in which child marriage was banned for this age group in state *s*, with the month before the reform being the omitted category. We only report 12 lead coefficients for ease of interpretation, and 15 lag coefficients because there are few states for which more than 15 months have passed since the reform was enacted. The regression also includes state fixed effects, month-year fixed effects, states' unemployment rate, poverty rate, female labor force participation, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether girls of this age required the authorization of a judge/mayor to get married. Standard errors are clustered at the state level.

Figure A.11: Event-Study Estimates of the Effect of Banning Child Marriage on Early Motherhood of 16- and 17-Year-Old Girls – Birth Certificate Data
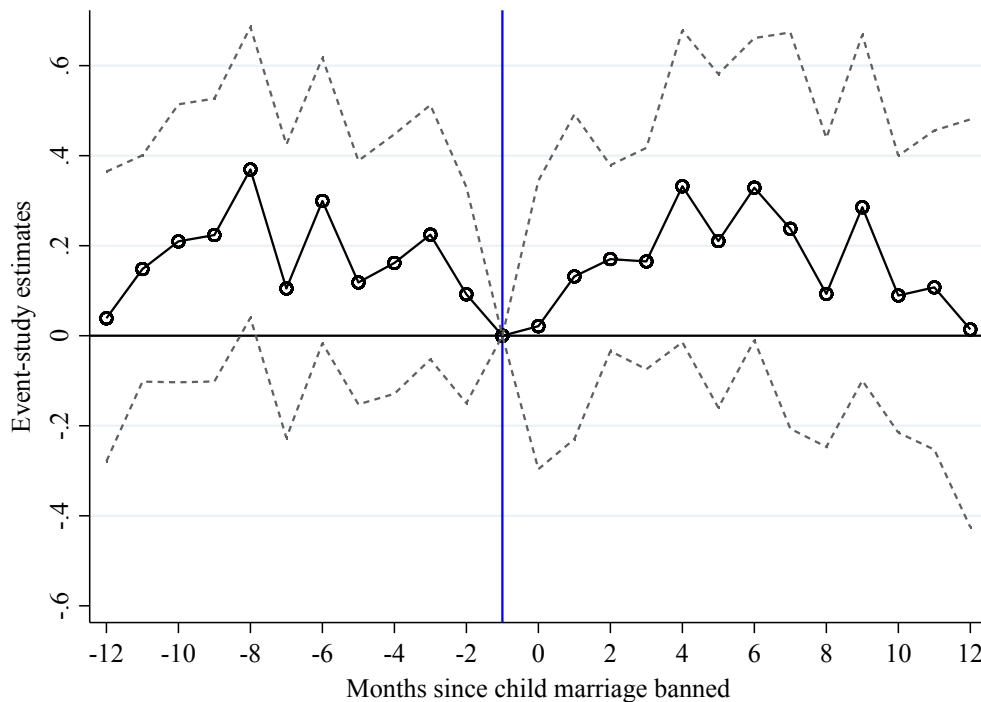

Notes: This figure uses the birth certificate microdata obtained from the National Institute for Statistics and Geography (INEGI). The sample includes all Mexican states from January 2008 to March 2017, and the unit of observation is a month-state. This figure plots the coefficients and 95% confidence intervals based on wild-bootstrap clustered standard errors of a regression in which the dependent variable is the monthly number of (live) first births conceived in that month by 16 to 17-year-old girls, per 1,000 girls of this age who reside in that state. This dataset does not have information about weeks of gestation, or the month and year of birth of the mothers. We calculate the year and month of conception assuming all births had 40 weeks of gestation, and we also assume that at the moment of conception, mothers were one year younger than they were at the moment of delivery. The regressors of interest are dummy variables for each month relative to the period in which child marriage was banned for this age group in state *s*, with the month before the reform being the omitted category. We only report 12 lead coefficients for ease of interpretation, and 12 lag coefficients because there are few states for which more than 12 months have passed since the reform was enacted. The regression also includes state fixed effects, month-year fixed effects, states' unemployment rate, poverty rate, female labor force participation, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether girls of this age required the authorization of a judge/mayor to get married. Standard errors are clustered at the state level.

Figure A.12: Event-Study Estimates of the Effect of Banning Child Marriage on Civil Status of 14-15-Year-Old Mothers
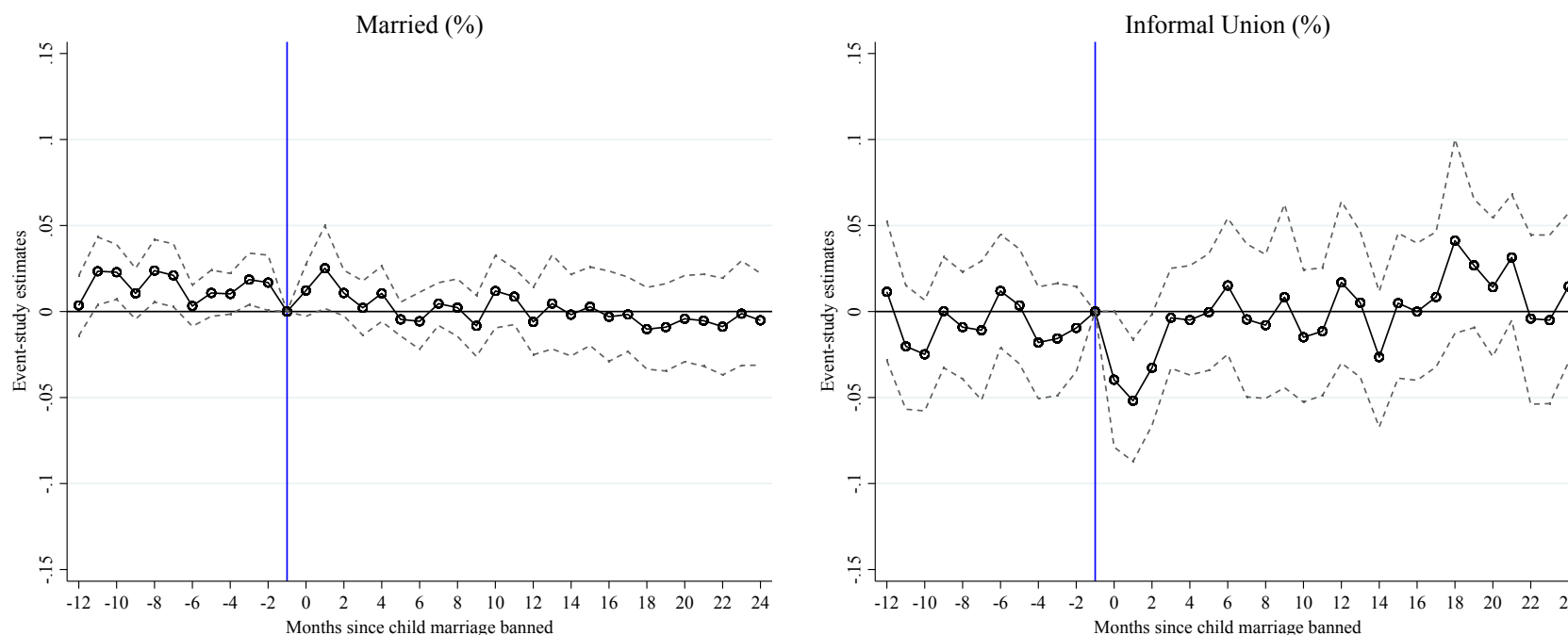
Notes: The sample includes all Mexican states in 2008-2018, and the unit of observation is a month-state. These figures plot the coefficients and 95% confidence intervals based on wild-bootstrap clustered standard errors of a regression in which the dependent variable is the percentage of first births delivered by girls ages 14-15 that are in a marriage and informal union at the moment of delivery, respectively. The regressors of interest are dummy variables for each month relative to the period in which child marriage was banned for this age group in state *s*, with the month before the reform being the omitted category. We only report 12 lead coefficients for ease of interpretation, and 24 lag coefficients because there are few states for which more than 24 months have passed since the reform was enacted. The regression also includes state fixed effects, month-year fixed effects, states' unemployment rate, poverty rate, female labor force participation, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether girls of this age required the authorization of a judge/mayor to get married. Standard errors are clustered at the state level.

Figure A.13: Event-Study Estimates of the Effect of Banning Child Marriage on Out-of-State Marriage Rates of 16- and 17-Year-Old Girls
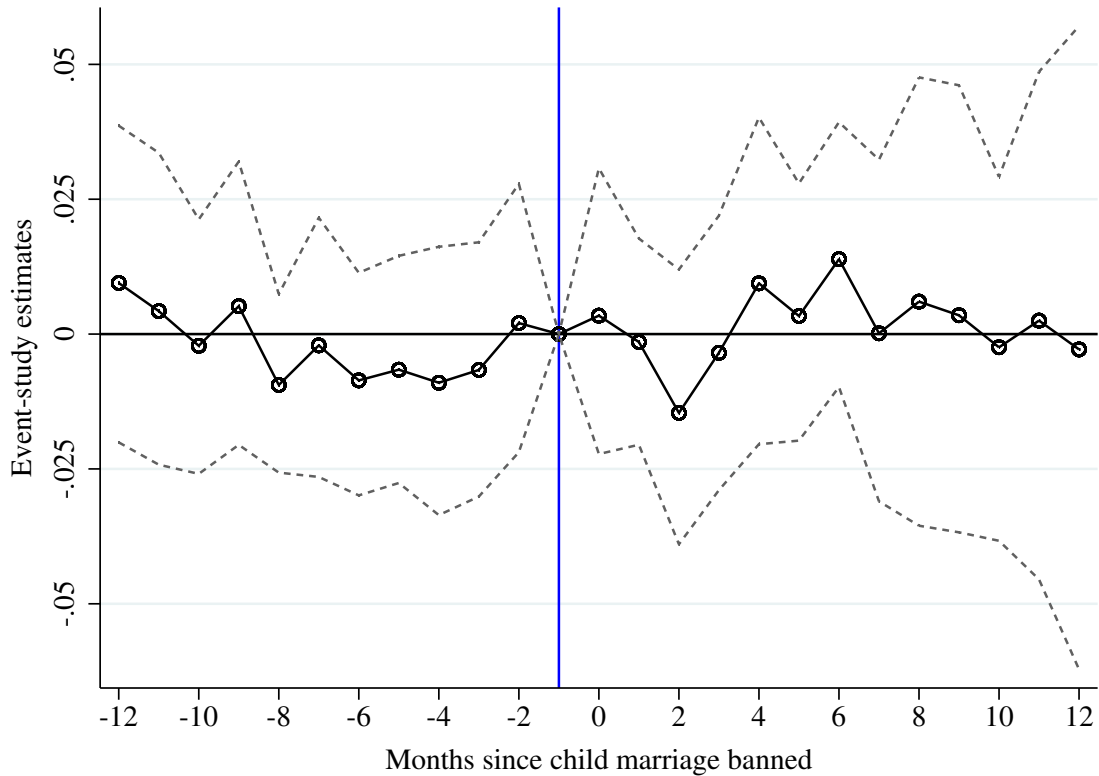
Notes: The sample includes all Mexican states in 2008-2016, and the unit of observation is a month-state. The figure plots the coefficients and 95% confidence intervals based on wild-bootstrap clustered standard errors of a regression in which the dependent variable is the monthly number of out-of-state marriages with a bride ages 16-17, per 1,000 girls of this age who reside in state *s* in month-year *t*. The regressors of interest are dummy variables for each month relative to the period in which child marriage was banned for this age group in state *s*, with the month before the reform being the omitted category. We only report 12 lead coefficients for ease of interpretation, and 12 lag coefficients because there are few states for which more than 12 months have passed since the reform was enacted in this period. The regression also includes state fixed effects, month-year fixed effects, states' unemployment rate, poverty rate, female labor force participation, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether girls of this age required the authorization of a judge/mayor to get married. Standard errors are clustered at the state level.

Figure A.14: Event-Study Estimates of the Effect of Banning Child Marriage on Civil Status of 19-24-Year-Old Mothers
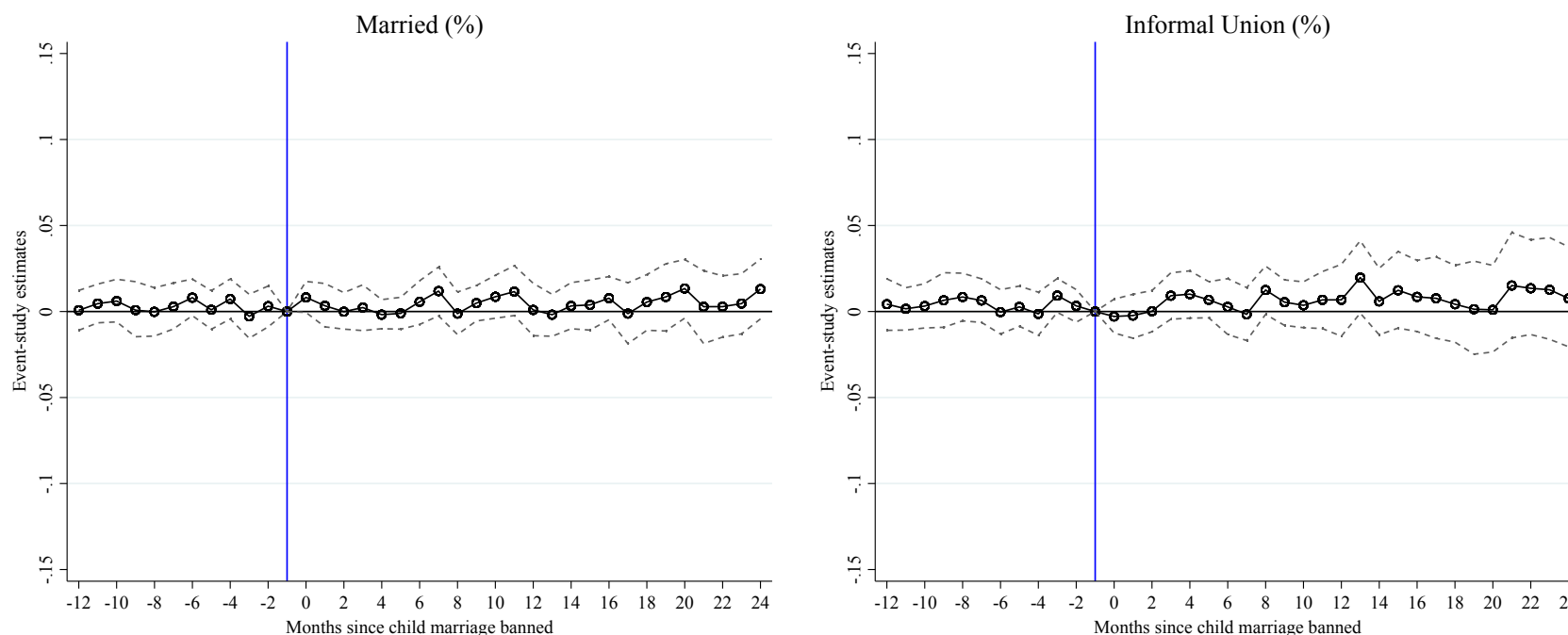
Notes: The sample includes all Mexican states in 2008-2018, and the unit of observation is a month-state. These figures plot the coefficients and 95% confidence intervals based on wild-bootstrap clustered standard errors of a regression in which the dependent variable is the percentage of deliveries from women ages 19-24 that are in a marriage and informal union at the moment of delivery, respectively. The regressors of interest are dummy variables for each month relative to the period in which child marriage was banned for everyone below the age of 18 in state *s*, with the month before the reform being the omitted category. We only report 12 lead coefficients for ease of interpretation, and 24 lag coefficients because there are few states for which more than 24 months have passed since the reform was enacted. The regression also includes state fixed effects, month-year fixed effects, states' unemployment rate, poverty rate, female labor force participation, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether 16- and 17-year-old girls required the authorization of a judge/mayor to get married. Standard errors are clustered at the state level.

Figure A.15: Event-Study Estimates of the Effect of Banning Child Marriage on Civil Status of 25-29-Year-Old Mothers
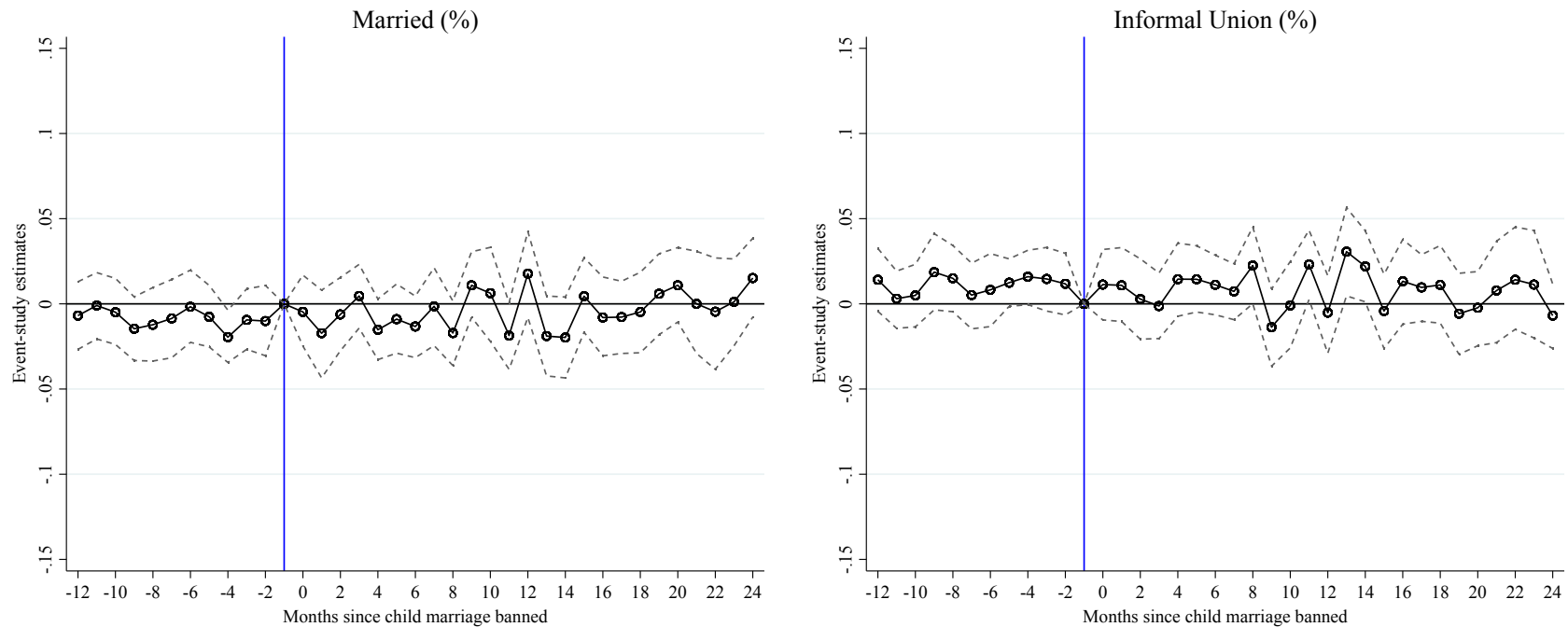
Notes: The sample includes all Mexican states in 2008-2018, and the unit of observation is a month-state. These figures plot the coefficients and 95% confidence intervals based on wild-bootstrap clustered standard errors of a regression in which the dependent variable is the percentage of deliveries from women ages 25-29 that are in a marriage and informal union at the moment of delivery, respectively. The regressors of interest are dummy variables for each month relative to the period in which child marriage was banned for everyone below the age of 18 in state *s*, with the month before the reform being the omitted category. We only report 12 lead coefficients for ease of interpretation, and 24 lag coefficients because there are few states for which more than 24 months have passed since the reform was enacted. The regression also includes state fixed effects, month-year fixed effects, states' unemployment rate, poverty rate, female labor force participation, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether 16- and 17-year-old girls required the authorization of a judge/mayor to get married. Standard errors are clustered at the state level.

Figure A.16: Event-Study Estimates of the Effect of Banning Child Marriage on Fertility Rates of 19-24-Year-Old Women
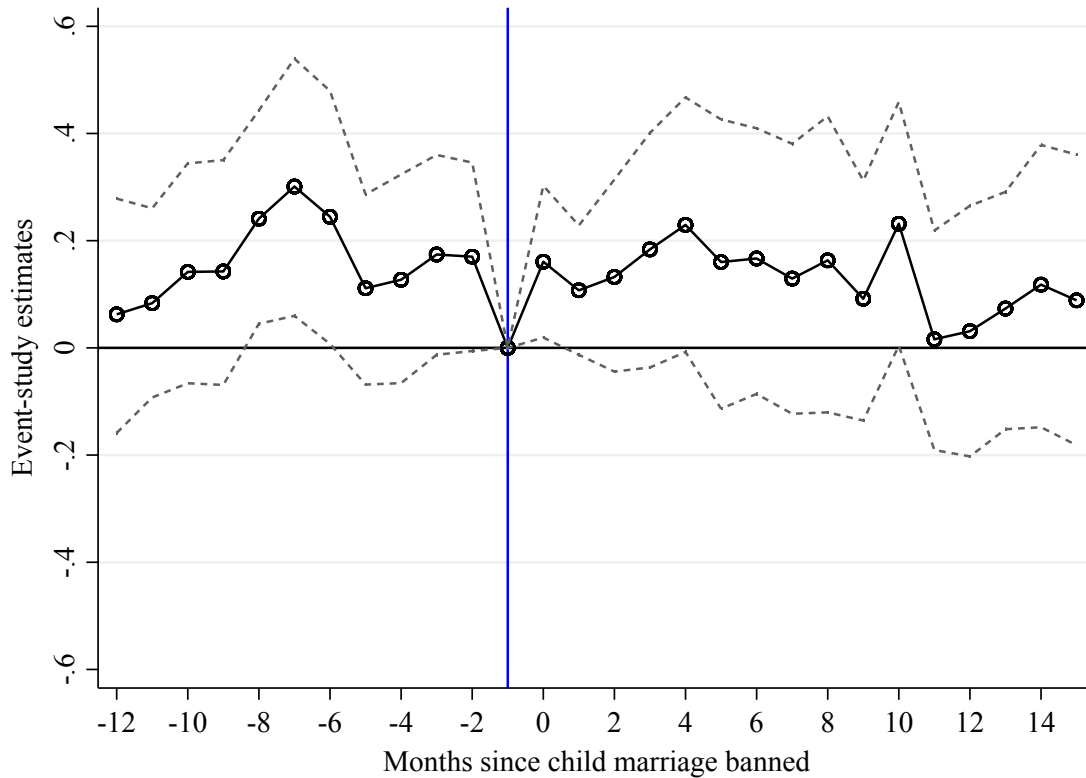
Notes: The sample includes all Mexican states from January 2008 to March 2018, and the unit of observation is a month-state. This figure plots the coefficients and 95% confidence intervals based on wild-bootstrap clustered standard errors of a regression in which the dependent variable is the monthly number of (live) first births conceived in that month by 19- to 24-year-old women, per 1,000 women of this age who reside in that state. The regressors of interest are dummy variables for each month relative to the period in which child marriage was banned for everyone below the age of 18 in state *s*, with the month before the reform being the omitted category. We only report 12 lead coefficients for ease of interpretation, and 15 lag coefficients because there are few states for which more than 15 months have passed since the reform was enacted. The regression also includes state fixed effects, month-year fixed effects, states' unemployment rate, poverty rate, female labor force participation, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether 16- and 17-year-old girls required the authorization of a judge/mayor to get married. Standard errors are clustered at the state level.

Figure A.17: Event-Study Estimates of the Effect of Banning Child Marriage on Fertility Rates of
25-29-Year-Old Women
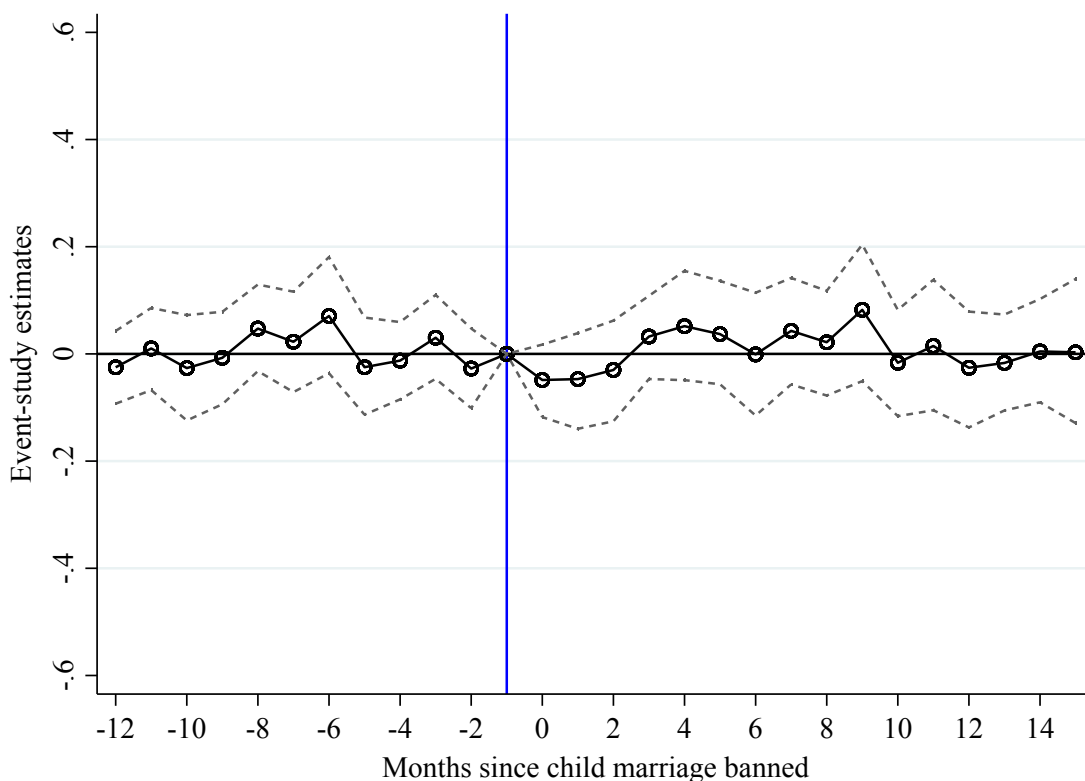
Notes: The sample includes all Mexican states from January 2008 to March 2018, and the unit of observation is a
month-state. This figure plots the coefficients and 95% confidence intervals based on wild-bootstrap clustered standard
errors of a regression in which the dependent variable is the monthly number of (live) first births conceived in that
month by 25- to 29-year-old women, per 1,000 women of this age who reside in that state. The regressors of interest
are dummy variables for each month relative to the period in which child marriage was banned for everyone below the
age of 18 in state *s*, with the month before the reform being the omitted category. We only report 12 lead coefficients
for ease of interpretation, and 15 lag coefficients because there are few states for which more than 15 months have
passed since the reform was enacted. The regression also includes state fixed effects, month-year fixed effects, states'
unemployment rate, poverty rate, female labor force participation, average income of employed individuals, population
(in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether 16-
and 17-year-old girls required the authorization of a judge/mayor to get married. Standard errors are clustered at the
state level.

Figure A.18: Cross-Country Comparison of Child Marriage and Adolescent Fertility Rates
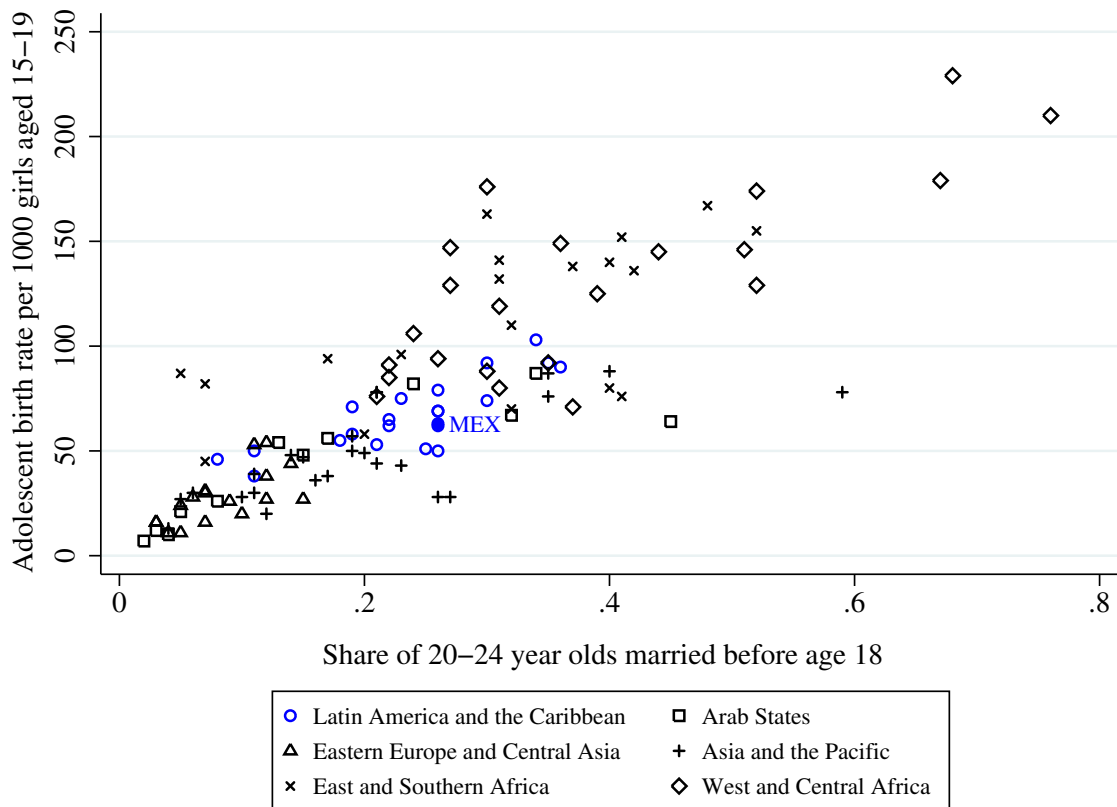
Notes: This figure depicts the relationship between the percentage of women ages 20-24 who were married before the age of 18 and the adolescent fertility rate for 116 countries. Marriage is defined as formal marriage or cohabitation as if married, and the adolescent fertility rate is the number of births per 1,000 girls ages 15-19. The marker shape identifies the region each country belongs to. The data was compiled by the United Nations Population Fund from the Sustainable Development Goals database, and includes 116 countries in Africa, Asia and the Pacific (except Japan), Eastern Europe, and Latin America and the Caribbean. Only countries with statistics in 2006-2017 are included.

Table A.1: Timing of the Adoption of the Child Marriage Ban by State

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Aguascalientes									Feb		
Baja California									Sep		
Baja California Sur							Jun				
Campeche									May		
Coahuila de Zaragoza								Sep			
Colima							Jun		Sep		
Chiapas									Apr		
Chihuahua										Dec	
Mexico City									Jul		
Durango										Feb	
Guanajuato		Mar									Jul
Guerrero										May	
Hidalgo									Dec		
Jalisco								Apr			
Mexico									Mar		
Michoacan				Mar					Apr		
Morelos							Dec		Aug		
Nayarit						Dec			Mar		
Nuevo Leon											Jan
Oaxaca						Dec		Dec			
Puebla									Mar		
Queretaro			Oct								Oct
Quintana Roo			Oct				Dec				
San Luis Potosi	Dec							Sep			
Sinaloa									Aug		
Sonora											
Tabasco										Jul	
Tamaulipas						Sep			Jun		
Tlaxcala			Mar						Dec		
Veracruz							Feb				
Yucatan								Jun			
Zacatecas										Mar	

Banned < 16 only 🟦

Banned < 18 🟥

Notes: This table reports whether the ban on child marriage was in place in each state for 2008-2018. In years displayed in blue, marriage was banned without exceptions for all girls below the age of 16. In years displayed in red, marriage was banned for everyone below the age of 18. In years in which a reform took place, we show the situation after this reform, and specify the month in which the change took place. We obtained the date of the reform for each state from the states' civil and family codes.

Table A.2: Comparison of Women's Background Characteristics by their Civil Status as Children

	Civil status before age 18		
	Formally married	Informal union	Single
Indigenous group			
Belongs to indigenous group	0.157	0.176	0.092
Speaks indigenous language	0.093	0.087	0.051
Father speaks indigenous language	0.146	0.141	0.095
Mother speaks indigenous language	0.123	0.127	0.092
Father's educational attainment			
Less than primary school	0.242	0.202	0.099
Primary school	0.384	0.364	0.396
Middle school	0.114	0.112	0.171
Secondary school	0.183	0.149	0.256
Tertiary/University	0.059	0.090	0.157
Missing	0.132	0.196	0.092
Mother's educational attainment			
Less than primary school	0.185	0.242	0.134
Primary school	0.508	0.454	0.422
Middle school	0.153	0.142	0.196
Secondary school	0.202	0.186	0.318
Tertiary/University	0.019	0.034	0.089
Missing	0.083	0.081	0.027
Household assets and housing quality at age 14			
Durable asset index (0-1)	0.393	0.372	0.554
Housing quality index (0-1)	0.436	0.424	0.615
Agricultural asset index (0-1)	0.122	0.109	0.097
Had a domestic worker	0.011	0.017	0.075
Other characteristics			
Attended school at age 14	0.735	0.710	0.903
Attended middle school at age 14	0.624	0.596	0.851
Went to a private primary school	0.007	0.002	0.068
Worked at age 14	0.127	0.168	0.080
Domestic work at home age 14	0.563	0.483	0.365
At least one parent worked in agriculture	0.356	0.279	0.171
Number of siblings (by mother)	5.234	5.526	4.591
Observations	357	570	3,511

Notes: These data were taken from the *Encuesta Demográfica Retrospectiva* (EDER), a nationally representative demographic survey conducted in 2017. We took the sample of 4,438 women who were 24-34 at the time of the survey (i.e., 20-30 in 2013), divided them into three groups according to their civil status before the age of 18, and computed averages for each group using sampling weights. Column 1 includes all women who were formally married before the age of 18, and column 2 includes those that were in an informal union (but not formally married) before this age. Column 3 includes women who were not formally married or in an informal union at any point before the age of 18. The *Durable asset index* was constructed by us, and captures whether the household in which the woman lived at the age of 14 had a television, car, stove, refrigerator, washing machine, blender, record player, phone, computer, camera, and encyclopedia. *HH quality index* is an index we constructed for whether the house in which the respondent lived at age 18 had piped water, a ceiling made of tiles, an interior bathroom, and was located in a paved street. *Agricultural asset index* is an index for whether the house in which the woman lived at age 14 had livestock used for traction, cattle, and a tractor.

Table A.3: Compliance with the Reform

State	Monthly number of marriages with bride ages 14-15			Monthly number of marriages with bride ages 16-17		
	Before ban	After ban	>3 months after ban	Before ban	After ban	>3 months after ban
Aguascalientes	0.4	0.0	0.0	30.8	0.0	0.0
Baja California	7.9	0.0	0.0	30.5	-	-
Baja California Sur	2.3	0.2	0.2	12.2	1.8	1.5
Campeche	-	0.3	0.3	48.8	1.5	0.1
Coahuila de Zaragoza	14.1	0.3	0.0	154.0	2.6	0.6
Colima	3.9	0.6	0.6	14.0	0.6	0.2
Chiapas	28.0	1.0	0.0	265.9	2.1	0.2
Chihuahua	10.4	0.8	0.6	60.1	6.5	3.7
Mexico City	5.9	0.0	0.0	65.2	0.6	0.0
Durango	18.3	0.0	0.0	61.4	0.1	0.2
Guanajuato	64.3	0.9	0.2	53.0	4.5	0.7
Guerrero	-	69.2	67.0	285.4	2.2	0.7
Hidalgo	9.5	0.2	0.0	37.6	1.5	0.1
Jalisco	4.0	0.0	0.0	200.4	1.2	0.3
Mexico	66.8	5.9	1.1	289.7	21.2	4.0
Michoacan	97.1	10.2	7.5	254.3	6.2	0.1
Morelos	0.5	0.0	0.0	28.6	0.1	0.1
Nayarit	7.8	1.8	1.6	27.0	0.6	0.1
Nuevo Leon	18.2	0.0	0.0	110.6	0.1	0.0
Oaxaca	72.3	3.1	1.3	143.1	0.9	0.1
Puebla	20.5	0.7	0.1	91.4	4.4	0.8
Queretaro	3.3	0.6	0.5	20.4	1.0	-
Quintana Roo	8.5	0.3	0.3	33.0	3.7	1.6
San Luis Potosi	18.5	1.7	1.3	67.9	3.3	1.2
Sinaloa	19.1	0.1	0.1	78.0	0.5	0.3
Sonora	4.7	-	-	41.3	-	-
Tabasco	11.9	0.2	0.0	57.0	0.6	0.3
Tamaulipas	21.0	2.8	2.5	66.6	4.1	1.5
Tlaxcala	6.7	2.3	2.2	22.5	1.7	0.3
Veracruz	73.3	0.1	0.0	208.8	0.3	0.1
Yucatan	12.4	0.0	0.0	109.4	1.6	0.0
Zacatecas	17.0	0.0	0.0	72.5	0.1	0.1

Notes: This table reports the monthly number of formal marriages with a bride below the age of 18 taking place in each state. We report these figures for the period before child marriage was banned (since January 2008), for the entire period after the reform was enacted (until December 2018), and for the period starting three months after the reform was enacted and ending in December 2018. The first three columns show these figures for marriages with a bride ages 14-15, and the remaining columns show these figures for marriages with a bride ages 16-17.

Table A.4: Effect of Banning Child Marriage on School Enrollment

	Girls of age			
	14	15	16	17
Child marriage banned	-0.001	-0.007	0.003	0.000
	(0.010)	(0.008)	(0.008)	(0.011)
	[0.929]	[0.370]	[0.736]	[0.983]
Year FE	✓	✓	✓	✓
State FE	✓	✓	✓	✓
Controls	✓	✓	✓	✓
Observations	320	320	320	320
R^2	0.739	0.883	0.920	0.887
Dependent variable mean (control)	0.877	0.715	0.649	0.543

Notes: The sample is composed of all states in 2008-2017, and the unit of observation is a state-year. The dependent variable is the share of girls of the age group specified in the column header that were enrolled in school at the start of the school year. The regressor of interest is a dummy variable for whether child marriage was banned for this age group in August of that year. The regression also includes state fixed effects, year fixed effects, the states' unemployment rate, poverty rate, female labor force participation, average income of employed individuals, population (in ln), a dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether girls of this age required the authorization of a judge/mayor to get married. All of the controls are measured at the start of the school year. Standard errors clustered by state are in parentheses, and cluster-robust wild-bootstrap p-values in square brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table A.5: Effect of Banning Child Marriage on School Attendance – *Módulo de Trabajo Infantil* Data

	Ages 14-15		Ages 16-17	
	(1)	(2)	(3)	(4)
Child marriage banned	0.008	0.008	-0.010	-0.017
	(0.007)	(0.006)	(0.013)	(0.013)
	[0.288]	[0.263]	[0.430]	[0.220]
Controls		✓		✓
Survey year FE	✓	✓	✓	✓
State FE	✓	✓	✓	✓
Observations	45,582	45,582	45,551	45,551
R^2	0.012	0.054	0.017	0.061
Dependent variable mean (control)	0.874	0.874	0.718	0.718

Notes: The sample is composed of girls of the age specified in the column header interviewed in the last trimester of the Mexican labor force survey in 2007, 2009, 2011, 2015 and 2017. The dependent variable is a dummy for whether the girl attended school at the moment of the survey. The regressor of interest is a dummy for whether marriage for girls in the relevant age group was banned in the girl's state of residence before October of the survey year. The regression also includes state fixed effects, year fixed effects, states' unemployment rate, poverty rate, female labor force participation, average income of employed individuals, population (in ln), a dummy variables for whether the state governor belongs to PRI, PAN, or PRD, a dummy for whether girls of this age required the authorization of a judge/mayor to get married, age dummies, and town-size dummies. Standard errors clustered by state are in parentheses, and cluster-robust wild-bootstrap p-values in square brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table A.6: Event-Study Estimates of the Effect of Banning Child Marriage on Early Motherhood of 16- and 17-Year-Old Girls – All Births

	# Total births per 1,000 girls of age		
	16-17	16	17
Child marriage banned - Months [-12, -9]	-0.018	-0.049	0.013
	(0.100)	(0.108)	(0.120)
	[0.877]	[0.669]	[0.919]
Child marriage banned - Months [-8, -5]	0.064	0.015	0.113
	(0.094)	(0.091)	(0.117)
	[0.529]	[0.885]	[0.346]
Child marriage banned - Months [0, 3]	-0.005	-0.089	0.080
	(0.090)	(0.099)	(0.103)
	[0.959]	[0.368]	[0.450]
Child marriage banned - Months [4, 7]	0.171	0.145	0.199
	(0.129)	(0.132)	(0.144)
	[0.216]	[0.307]	[0.181]
Child marriage banned - Months [8, 11]	-0.030	-0.044	-0.014
	(0.101)	(0.123)	(0.106)
	[0.761]	[0.746]	[0.879]
Child marriage banned - Months [12, 15]	-0.044	-0.045	-0.042
	(0.152)	(0.168)	(0.154)
	[0.798]	[0.822]	[0.787]
Month-year FE	✓	✓	✓
State FE	✓	✓	✓
Controls	✓	✓	✓
Observations	3,936	3,936	3,936
R^2	0.718	0.630	0.651
Dependent variable mean (control)	7.187	6.316	8.061

Notes: The sample includes all Mexican states from January 2008 to March 2018, and the unit of observation is a month-state. The dependent variable is the monthly number of (live) births conceived in that month by a girl of the age group specified in the column header, per 1,000 girls of this age who reside in that state. The regressors of interest are dummy variables for each 4-month period relative to the period in which child marriage was banned for this age group in state *s*, with the period before the reform being the omitted category. We only report lead coefficients for up to 12 months before the reform for ease of interpretation, and lag coefficients for 15 months after the reform, as there are few states for which more than 15 months have passed since the reform was enacted. Controls include states' unemployment rate, poverty rate, labor force participation of females ages 20 and above, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether girls of this age required the authorization of a judge/mayor to get married. Standard errors clustered by state are in parentheses, and cluster-robust wild-bootstrap p-values in square brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table A.7: Event-Study Estimates of the Effect of Banning Child Marriage on Civil Status of 16- and 17-Year-Old Mothers – All Births

	Married	Union	Single	Missing
Child marriage banned - Months [-12, -9]	0.002	-0.007	0.012*	-0.007***
	(0.005)	(0.008)	(0.006)	(0.002)
	[0.669]	[0.360]	[0.043]	[0.000]
Child marriage banned - Months [-8, -5]	-0.000	-0.004	0.007	-0.003**
	(0.004)	(0.005)	(0.005)	(0.001)
	[0.963]	[0.490]	[0.124]	[0.039]
Child marriage banned - Months [0, 3]	-0.014**	0.007	0.004	0.003**
	(0.005)	(0.007)	(0.006)	(0.002)
	[0.016]	[0.301]	[0.576]	[0.046]
Child marriage banned - Months [4, 7]	-0.019**	0.009	0.007	0.003
	(0.008)	(0.014)	(0.012)	(0.002)
	[0.025]	[0.563]	[0.648]	[0.202]
Child marriage banned - Months [8, 11]	-0.038***	0.035*	0.001	0.002
	(0.012)	(0.019)	(0.014)	(0.003)
	[0.001]	[0.089]	[0.956]	[0.389]
Child marriage banned - Months [12, 15]	-0.049***	0.068***	-0.024*	0.004
	(0.015)	(0.017)	(0.012)	(0.003)
	[0.002]	[0.000]	[0.066]	[0.222]
Child marriage banned - Months [16, 19]	-0.051***	0.082***	-0.033**	0.002
	(0.017)	(0.022)	(0.016)	(0.003)
	[0.003]	[0.000]	[0.063]	[0.405]
Child marriage banned - Months [20, 23]	-0.051**	0.086***	-0.037*	0.003
	(0.021)	(0.027)	(0.019)	(0.003)
	[0.018]	[0.002]	[0.076]	[0.415]
Month-year FE	✓	✓	✓	✓
State FE	✓	✓	✓	✓
Controls	✓	✓	✓	✓
Observations	4,224	4,224	4,224	4,224
R^2	0.847	0.755	0.713	0.475
Dependent variable mean (control)	0.172	0.615	0.195	0.017

Notes: The sample includes all Mexican states in 2008-2018, and the unit of observation is a month-state. The dependent variable is the share of 16-17-year-old mothers residing in a given state and who gave birth in a given month that had the civil status in the column header at the moment of delivery. The regressors of interest are dummy variables for each 4-month period relative to the period in which child marriage was banned for this age group in state *s*, with the period before the reform being the omitted category. We only report lead coefficients for up to 12 months before the reform for ease of interpretation, and lag coefficients for 23 months after the reform, as there are few states for which more than 23 months have passed since the reform was enacted. Controls include states' unemployment rate, poverty rate, labor force participation of females ages 20 and above, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether girls of this age required the authorization of a judge/mayor to get married. Standard errors clustered by state are in parentheses, and cluster-robust wild-bootstrap p-values in square brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table A.8: Prenatal Investments and Newborn Health by Civil Status of 16- and 17-Year-Old Mothers Before 2014

	Mothers' civil status			
	Married	Informal union	Single	Missing
Received prenatal care	0.981	0.971	0.953	0.960
Received first prenatal visit during the first trimester	0.746	0.703	0.618	0.687
Total number of prenatal visits	7.160	6.536	6.227	6.393
Delivery by caesarean	0.397	0.358	0.370	0.398
Less than 37 weeks of gestation	0.054	0.054	0.061	0.062
Birthweight lower than 2500 grams	0.055	0.060	0.063	0.068
Apgar score less than 7	0.013	0.013	0.012	0.014
Observations	232,874	769,043	264,059	199,41

Notes: These data were taken from the birth registry microdata in 2008-2013. We took the sample of women who were 16-17 at the time of conception of their first child, divided them into four groups according to their civil status, and computed averages for each group. Column 1 includes formally married mothers, column 2 includes those that were in an informal union (but not formally married), column 3 includes women who were single, and column 4 includes women who did not report their civil status.

Table A.9: Event-Study Estimates of the Effect of Banning Child Marriage on Prenatal Investment of 14- and 15-Year-Old Mothers and Newborn Health

	Prenatal investments				Newborn health		
	Prenatal care	First visit 1T	# Prenatal visits	Caesarean	Premature	Low birthweight	Apgar < 7
Child marriage banned - Months [-12, -9]	0.001	0.002	0.040	-0.005	0.000	0.002	0.000
	(0.002)	(0.007)	(0.037)	(0.005)	(0.002)	(0.002)	(0.001)
	[0.506]	[0.796]	[0.296]	[0.389]	[0.868]	[0.244]	[0.739]
Child marriage banned - Months [-8, -5]	-0.000	-0.001	0.049	-0.006	-0.001	0.002	0.002*
	(0.002)	(0.006)	(0.034)	(0.005)	(0.003)	(0.003)	(0.001)
	[0.876]	[0.880]	[0.169]	[0.271]	[0.787]	[0.450]	[0.085]
Child marriage banned - Months [0, 3]	-0.001	0.009	0.040	-0.003	0.001	0.001	0.000
	(0.002)	(0.005)	(0.045)	(0.005)	(0.002)	(0.002)	(0.001)
	[0.531]	[0.108]	[0.408]	[0.557]	[0.754]	[0.494]	[0.702]
Child marriage banned - Months [4, 7]	-0.003	0.007	0.033	-0.015**	-0.003	-0.001	0.001
	(0.002)	(0.007)	(0.045)	(0.007)	(0.002)	(0.002)	(0.002)
	[0.318]	[0.341]	[0.498]	[0.027]	[0.179]	[0.523]	[0.392]
Child marriage banned - Months [8, 11]	-0.004	0.000	-0.026	-0.009	-0.001	0.002	0.002*
	(0.002)	(0.007)	(0.049)	(0.007)	(0.004)	(0.003)	(0.001)
	[0.147]	[0.971]	[0.641]	[0.172]	[0.820]	[0.613]	[0.099]
Child marriage banned - Months [12, 15]	-0.003	-0.002	-0.019	-0.008	-0.000	0.003	0.002
	(0.003)	(0.007)	(0.055)	(0.010)	(0.003)	(0.003)	(0.001)
	[0.520]	[0.709]	[0.771]	[0.439]	[0.984]	[0.394]	[0.216]
Child marriage banned - Months [16, 20]	0.000	0.001	0.024	-0.009	-0.000	0.005	0.001
	(0.003)	(0.009)	(0.066)	(0.010)	(0.003)	(0.003)	(0.001)
	[0.921]	[0.928]	[0.752]	[0.466]	[0.896]	[0.141]	[0.495]
Month-year FE	✓	✓	✓	✓	✓	✓	✓
State FE	✓	✓	✓	✓	✓	✓	✓
Controls	✓	✓	✓	✓	✓	✓	✓
Observations	677,017	681,428	660,994	681,272	682,318	644,459	675,903
R^2	0.009	0.012	0.022	0.011	0.002	0.004	0.003
Dependent variable mean (control)	0.963	0.636	6.349	0.354	0.061	0.063	0.013

Notes: The sample includes all women who had their first child between 2008 and March of 2018 and were 14 to 15 years old at the moment of conception. In columns 1, 2 and 4, the dependent variables are dummies for whether the mother had any prenatal cares, had her first prenatal visit in the first trimester, and had a c-section, respectively. The dependent variable in column 3 is the number of prenatal visits. The dependent variables in columns 5-7 are dummy variables for whether the child was born with the condition specified in the column header. The regressors of interest are dummy variables for each 4-month period relative to the period in which child marriage was banned in the state of residence of the mother, with the period before the reform being the omitted category. We only report lead coefficients for up to 12 months before the reform for ease of interpretation, and lag coefficients for 15 months after the reform, as there are few states for which more than 15 months have passed since the reform was enacted. Controls include states' unemployment rate, poverty rate, labor force participation of females ages 20 and above, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, PRD or another political party, and a dummy for whether 14- and 15-year-olds girls required the authorization of a judge/mayor to get married. Standard errors clustered by state are in parentheses, and cluster-robust wild-bootstrap p-values in square brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table A.10: Event-Study Estimates of the Effect of Banning Child Marriage at the Moment of Birth on Prenatal Investment of 16- and 17-Year-Old Mothers and Newborn Health

	Prenatal investments				Newborn health		
	Prenatal care	First visit 1T	# Prenatal visits	Caesarean	Premature	Low birthweight	Apgar < 7
Child marriage banned - Months [-12, -9]	0.000	0.004	-0.049	-0.008	0.003	0.001	0.002***
	(0.002)	(0.007)	(0.036)	(0.006)	(0.003)	(0.002)	(0.001)
	[0.919]	[0.597]	[0.241]	[0.242]	[0.269]	[0.561]	[0.006]
Child marriage banned - Months [-8, -5]	-0.004***	0.001	-0.041	0.007	0.001	-0.003	0.000
	(0.001)	(0.006)	(0.023)	(0.005)	(0.002)	(0.002)	(0.001)
	[0.005]	[0.899]	[0.106]	[0.237]	[0.765]	[0.252]	[0.979]
Child marriage banned - Months [0, 3]	0.001	0.004	0.022	-0.003	-0.003	-0.003	0.000
	(0.002)	(0.004)	(0.022)	(0.004)	(0.003)	(0.002)	(0.001)
	[0.647]	[0.384]	[0.337]	[0.428]	[0.346]	[0.304]	[0.808]
Child marriage banned - Months [4, 7]	0.002	0.010*	0.040	0.002	-0.004	-0.004	0.000
	(0.002)	(0.005)	(0.037)	(0.004)	(0.003)	(0.003)	(0.001)
	[0.392]	[0.069]	[0.301]	[0.597]	[0.266]	[0.291]	[0.873]
Child marriage banned - Months [8, 11]	0.002	0.009	0.023	0.006	-0.002	-0.002	-0.001
	(0.003)	(0.007)	(0.041)	(0.005)	(0.002)	(0.002)	(0.001)
	[0.519]	[0.216]	[0.595]	[0.309]	[0.506]	[0.476]	[0.549]
Child marriage banned - Months [12, 15]	0.002	0.007	0.002	0.001	-0.005*	-0.005	-0.000
	(0.003)	(0.009)	(0.050)	(0.006)	(0.003)	(0.003)	(0.001)
	[0.635]	[0.458]	[0.968]	[0.909]	[0.058]	[0.134]	[0.850]
Child marriage banned - Months [16, 19]	0.004	0.012	0.021	0.013	-0.001	-0.002	-0.001
	(0.003)	(0.010)	(0.062)	(0.007)	(0.002)	(0.002)	(0.001)
	[0.200]	[0.251]	[0.748]	[0.112]	[0.771]	[0.381]	[0.327]
Child marriage banned - Months [20, 23]	0.001	0.011	0.020	0.010	0.000	-0.000	-0.001
	(0.003)	(0.011)	(0.073)	(0.009)	(0.003)	(0.002)	(0.001)
	0.891	0.392	0.820	0.332	0.910	0.933	0.411
Month-year FE	✓	✓	✓	✓	✓	✓	✓
State FE	✓	✓	✓	✓	✓	✓	✓
Controls	✓	✓	✓	✓	✓	✓	✓
Observations	1,316,217	1,324,519	1,284,848	1,323,941	1,326,024	1,252,604	1,313,597
R^2	0.008	0.013	0.022	0.011	0.002	0.004	0.003
Dependent variable mean (control)	0.968	0.661	6.535	0.360	0.058	0.060	0.012

Notes: The sample includes all women who had their first child in 2008-2018 and were 16 to 17 years old at the moment of birth. In columns 1, 2 and 4, the dependent variables are dummies for whether the mother had any prenatal cares, had her first prenatal visit in the first trimester, and had a c-section, respectively. The dependent variable in column 3 is the number of prenatal visits. The dependent variables in columns 5-7 are dummy variables for whether the child was born with the condition specified in the column header. The regressors of interest are dummy variables for each 4-month period relative to the period in which child marriage was banned for this age group in the state of residence of the mother, with the period before the reform being the omitted category. We only report lead coefficients for up to 12 months before the reform for ease of interpretation, and lag coefficients for 23 months after the reform, as there are few states for which more than 23 months have passed since the reform was enacted. Controls include states' unemployment rate, poverty rate, labor force participation of females ages 20 and above, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether girls of this age required the authorization of a judge/mayor to get married. Standard errors clustered by state are in parentheses, and cluster-robust wild-bootstrap p-values in square brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table A.11: Effect of Banning Child Marriage on Child Marriage Rates – State of Occurrence of the Marriage and Groom's State of Residence

	State where marriage happened		Groom's state of residence	
	Age 14-15	Age 16-17	Age 14-15	Age 16-17
Child marriage banned - Months [-12, -9]	-0.000	0.062	0.003	0.088
	(0.031)	(0.072)	(0.029)	(0.071)
	[0.999]	[0.407]	[0.926]	[0.248]
Child marriage banned - Months [-8, -5]	-0.022	0.020	-0.022	0.030
	(0.015)	(0.046)	(0.015)	(0.045)
	[0.145]	[0.642]	[0.147]	[0.502]
Child marriage banned - Months [0, 3]	-0.079***	-0.534***	-0.075***	-0.500***
	(0.025)	(0.148)	(0.024)	(0.142)
	[0.007]	[0.001]	[0.007]	[0.000]
Child marriage banned - Months [4, 7]	-0.112***	-0.727***	-0.104***	-0.655***
	(0.034)	(0.167)	(0.033)	(0.164)
	[0.004]	[0.000]	[0.009]	[0.000]
Child marriage banned - Months [8, 11]	-0.127**	-0.782***	-0.124**	-0.716***
	(0.045)	(0.177)	(0.044)	(0.176)
	[0.016]	[0.000]	[0.018]	[0.000]
Child marriage banned - Months [12, 15]	-0.121*	-0.792***	-0.118*	-0.747***
	(0.053)	(0.184)	(0.051)	(0.186)
	[0.058]	[0.000]	[0.052]	[0.000]
Child Marriage banned - Months [16, 19]	-0.126*	-0.783***	-0.119*	-0.744***
	(0.062)	(0.200)	(0.059)	(0.203)
	[0.085]	[0.001]	[0.088]	[0.001]
Child marriage banned - Months [20, 23]	-0.110	-0.705***	-0.103	-0.675***
	(0.072)	(0.222)	(0.068)	(0.227)
	[0.195]	[0.005]	[0.199]	[0.006]
Month-year FE	✓	✓	✓	✓
State FE	✓	✓	✓	✓
Controls	✓	✓	✓	✓
Observations	4,224	4,224	4,224	4,224
R^2	0.646	0.757	0.655	0.765
Dependent variable mean (control)	0.273	1.452	0.267	1.426

Notes: The sample includes all Mexican states in 2008-2018, and the unit of observation is a month-state. The dependent variable in columns 1 and 2 is the monthly number of marriages that took place in that state with a bride in the age group specified in the column header, per 1,000 girls of this age who reside in that state. The dependent variable in columns 3 and 4 is the monthly number of marriages that took place in the groom's state of residence with a bride in the age group specified in the column header, per 1,000 girls of this age who reside in that state. The regressors of interest are dummy variables for each 4-month period relative to the period in which child marriage was banned for the relevant age group in state *s*, with the period before the reform being the omitted category. Columns 1 and 2 consider whether child marriage was banned in the state in which the marriage took place, and columns 3 and 4 consider whether it was banned in the groom's state of residence. We only report lead coefficients for up to 12 months before the reform for ease of interpretation, and lag coefficients for 23 months after the reform for simplicity, and because there are few states for which more than 23 months have passed since the reform was enacted. Controls include states' unemployment rate, poverty rate, labor force participation of females ages 20 and above, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether girls of this age required the authorization of a judge/mayor to get married. Standard errors clustered by state are in parentheses, and cluster-robust wild-bootstrap p-values in square brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table A.12: Event-Study Estimates of the Effect of Banning Child Marriage on Adults' Formal Marriage Rates

	# Marriages per 1,000 women of age			
	19-24	25-29	30-34	35-39
Child marriage banned - Months [-12, -9]	0.103	0.077	0.043	-0.000
	(0.126)	(0.100)	(0.064)	(0.047)
	[0.435]	[0.491]	[0.540]	[0.989]
Child marriage banned - Months [-8, -5]	-0.058	-0.004	-0.009	-0.029
	(0.110)	(0.093)	(0.053)	(0.042)
	[0.602]	[0.968]	[0.869]	[0.503]
Child marriage banned - Months [0, 3]	0.024	0.060	0.039	0.015
	(0.116)	(0.100)	(0.064)	(0.047)
	[0.857]	[0.582]	[0.571]	[0.773]
Child marriage banned - Months [4, 7]	-0.060	-0.009	-0.023	-0.027
	(0.097)	(0.085)	(0.045)	(0.033)
	[0.538]	[0.925]	[0.627]	[0.430]
Child marriage banned - Months [8, 11]	-0.067	-0.051	-0.016	-0.006
	(0.070)	(0.058)	(0.043)	(0.036)
	[0.363]	[0.404]	[0.731]	[0.866]
Child marriage banned - Months [12, 15]	0.038	0.069	0.048	0.035
	(0.118)	(0.097)	(0.061)	(0.043)
	[0.785]	[0.492]	[0.453]	[0.434]
Child marriage banned - Months [16, 19]	-0.082	-0.062	-0.005	-0.022
	(0.107)	(0.099)	(0.059)	(0.040)
	[0.470]	[0.559]	[0.938]	[0.583]
Child marriage banned - Months [20, 23]	-0.136	-0.120	-0.025	-0.001
	(0.099)	(0.080)	(0.056)	(0.043)
	[0.199]	[0.178]	[0.664]	[0.977]
Month-year FE	✓	✓	✓	✓
State FE	✓	✓	✓	✓
Controls	✓	✓	✓	✓
Observations	4,224	4,224	4,224	4,224
R^2	0.582	0.503	0.412	0.377
Dependent variable mean (control)	2.821	2.168	1.084	0.599

Notes: The sample includes all Mexican states in 2008-2018, and the unit of observation is a month-state. The dependent variable is the monthly number of marriages with a bride in the age group specified in the column header, per 1,000 women from this age who reside in that state. The regressors of interest are dummy variables for each 4-month period relative to the period in which child marriage was banned for everyone below the age of 18 in state *s*, with the period before the reform being the omitted category. We only report lead coefficients for up to 12 months before the reform for ease of interpretation, and lag coefficients for 23 months after the reform for simplicity, and because there are few states for which more than 23 months have passed since the reform was enacted. Controls include states' unemployment rate, poverty rate, labor force participation of females ages 20 and above, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether 16- and 17-year-olds required the authorization of a judge/mayor to get married. Standard errors clustered by state are in parentheses, and cluster-robust wild-bootstrap p-values in square brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table A.13: Event-Study Estimates Excluding Oaxaca and Zacatecas

	Child marriage rate	Attends school	Early fertility rate	Share married mothers	Share mothers in informal union
Child marriage banned - Months [-12, -9]	0.098 (0.071) [0.160]	-0.017** (0.007) [0.039]	0.068 (0.080) [0.393]	0.004 (0.006) [0.540]	-0.005 (0.008) [0.565]
Child marriage banned - Months [-8, -5]	0.029 (0.045) [0.501]	-0.006 (0.007) [0.401]	0.096 (0.081) [0.243]	0.000 (0.004) [0.985]	-0.006 (0.006) [0.338]
Child marriage banned - Months [0, 3]	-0.540*** (0.148) [0.000]	0.010 (0.007) [0.208]	0.040 (0.066) [0.543]	-0.014** (0.006) [0.024]	0.006 (0.008) [0.455]
Child marriage banned - Months [4, 7]	-0.715*** (0.166) [0.000]	0.004 (0.011) [0.734]	0.180 (0.115) [0.149]	-0.022** (0.013) [0.013]	0.009 (0.019) [0.642]
Child marriage banned - Months [8, 11]	-0.783*** (0.175) [0.000]	-0.002 (0.011) [0.889]	0.018 (0.094) [0.866]	-0.043*** (0.013) [0.000]	0.035* (0.019) [0.089]
Child marriage banned - Months [12, 15]	-0.804*** (0.184) [0.000]	-0.004 (0.009) [0.675]	-0.013 (0.129) [0.912]	-0.055*** (0.016) [0.001]	0.073*** (0.018) [0.000]
Child marriage banned - Months [16, 19]	-0.799** (0.201) [0.000]	-0.001 (0.011) [0.956]		-0.057*** (0.018) [0.002]	0.086*** (0.022) [0.000]
Child marriage banned - Months [20, 23]	-0.729*** (0.228) [0.001]	0.003 (0.014) [0.848]		-0.056** (0.022) [0.010]	0.088*** (0.027) [0.006]
Month/Quarter-year FE	✓	✓	✓	✓	✓
State FE	✓	✓	✓	✓	✓
Controls	✓	✓	✓	✓	✓
Observations	3,960	307,136	3,690	3,960	3,960
R^2	0.771	0.066	0.685	0.836	0.748
Dependent variable mean (control)	1.385	0.700	5.588	0.166	0.602

Notes: This table presents the results of our main estimations for girls of age 16-17, excluding the states of Oaxaca and Zacatecas. The dependent variable in column 1 is the monthly number of marriages per 1,000 girls of age 16-17 who reside in that state. The dependent variable in column 2 is a dummy for whether the girl attended school at the moment of the survey. The dependent variable in column 3 is the monthly number of (live) first births conceived in that month, per 1,000 girls of ages 16-17 who reside in that state. The dependent variable in columns 4-5 is the share of 16-17-year-old mothers residing in a given state and who gave birth in a given month that had the civil status in the column header at the moment of delivery. The regressors of interest are dummy variables for each 4-month period relative to the period in which child marriage was banned in state *s*, with the period before the reform being the omitted category. We only report lead coefficients for up to 12 months before the reform for ease of interpretation, and lag coefficients for 23 months after the reform, as there are few states for which more than 23 months have passed since the reform was enacted. As the sample is 9 months shorter in the fertility regression because the analysis is conducted at the moment of conception, we only report 15 lags in this case. Controls include states' unemployment rate, poverty rate, labor force participation of females ages 20 and above, average income of employed individuals, population (in ln), dummy variables for whether the state governor belongs to PRI, PAN, or PRD, and a dummy for whether girls of this age required the authorization of a judge/mayor to get married. The estimates in column 2 are weighted using the sampling weights provided in ENOE. Standard errors clustered by state are in parentheses, and cluster-robust wild-bootstrap p-values in square brackets. * significant at 10%; ** significant at 5%; *** significant at 1%.

Appendix B   Theoretical Framework

Model Setup

We develop a simple theoretical framework to explain the effects of banning child marriage on fertility and school attendance. There is continuum of girls of ages 14 to 17 (i) that differ in their benefit of getting an education (b_i), the resources of their parents (p_i), the resources of their potential husband or boyfriend (q_i), and their enjoyment from engaging in premarital sex (I_i).[1] Girls observe all of this at $t = 0$. In the next period, $t = 1$, they decide whether to have risky premarital sex or not $PS = \{0, 1\}$. If they decide to have risky premarital sex, they have a child with probability 1. In $t = 2$, the girls decide to get married (M), form an informal union (IU), or stay at home with their parents and remain single (S). If they get married or form a union they have a child with probability 1, as long as they did not have one in $t = 1$. We assume that consumption only takes place in $t = 2$, although the main conclusions of the model hold if we assume that girls also consume in $t = 1$. We assume that these decisions are taken only by the girls or that they have completely altruistic parents.[2]

The utility function of the girls depends on their enjoyment from engaging in premarital intercourse (I_i),[3] their consumption (C_i), and a reputation cost (R):

$$U_i = f(I_i, C_i, R)$$

We assume that for girls that have premarital sex, utility is increasing in the enjoyment the girl derives from sex ($\frac{\partial U_i}{\partial I_i} > 0$). A higher consumption increases utility ($\frac{\partial U_i}{\partial C_i} > 0$), while reputation costs decrease utility ($\frac{\partial U_i}{\partial R} < 0$). Girls consume a bundle of goods and services with a price normalized to 1, which includes things like food, housing, health assistance, or affection. We assume that girls bear a reputation cost when they premarital sex (and a child born out of wedlock) and/or when they form an informal union. The reputation cost of having premarital sex is $\tau > 0$, while the reputation cost of being in an informal union is $\epsilon > 0$ in societies where these type of unions are not accepted, and $\epsilon = 0$ in societies where informal unions are viewed as equal to

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[1]We assume that the socioeconomic status of the parents does not determine the girls' returns to education. We borrow the enjoyment of sex terminology from Fernández-Villaverde et al. (2014).

[2]Evidence from Castro (2019) suggests that parents do not make marital decisions in Mexico.

[3]We assume that the girls that engage in premarital intercourse derive extra utility than those that only engage in intercourse once they are married or in an informal union, as they start their sexual life earlier.

marriage. We assume that getting married or staying single have no reputation costs.[4]

Girls face a budget constraint such that their consumption is lower or equal to their resources. The girls' resources will depend on the resources of their boyfriend/husband (q_i) if they decide to get married or form an informal union or the resources of their parents (p_i) and the resources they could obtain by staying in school if they stay single.[5] The returns to education are the difference between the benefit of education (b_i) and the cost of going to school (c). We assume that all girls have positive returns to education $b_i \geq c$, except if they have a kid, when $c = \infty$, such that it is always optimal for them to drop out.[6] In equilibrium, the budget constraint binds:

$$C_i^M = C_i^{IU} = q_i{}^7 \quad \text{and} \quad C_i^S = \begin{cases} p_i + b_i - c & \text{if } PS = 0 \\ p_i & \text{if } PS = 1 \end{cases}$$

To make the model more tractable, we assume the following utility function:

$$U_i = I_i + C_i - R$$

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[4]Our results do not change if we assume instead that getting marriage without having premarital sex has a reputation cost and that girls that have premarital sex face a reputation cost if they stay single.

[5]Consumption could also be affected (positively or negatively) by having a kid. For simplicity, we assume that having a kid only has an impact on utility through an increase in the cost of education. However, our results are very similar if women that get married, form an informal union or have premarital sex face an additional cost in their consumption associated with having a child.

[6]In this model we assume that girls only drop out of school if they get pregnant. Using data from the Mexican Labor Force survey (ENOE), we observe that only 16% of the 14-17-year-old girls who were mothers were still in school in 2008-2018, compared to 83% in the case of their peers who were not mothers. Our results are very similar if we assume that for some girls, $b_i < c$.

[7]Although lifetime consumption may be different for girls in marriages and informal unions, we assume girls are short sighted and maximize their short-run consumption. We assume that short-term consumption under marriage is the same as in informal unions, since marriages only differ from informal unions in that they are harder to dissolve, and they grant spouses rights and obligations after the dissolution takes place (see Section 2). We could relax these assumptions by allowing the relative utility of marriage and informal unions to vary across girls. For instance, some girls might benefit in the long-run from having entered an informal union because informal unions are easier to dissolve, and this flexibility may make it easier to terminate a "bad" match. Some girls may have a higher utility under marriage, as married women can claim a pension from their spouse if they get divorced. The main conclusions of the model hold under this alternative assumption.

The decision tree is the following:
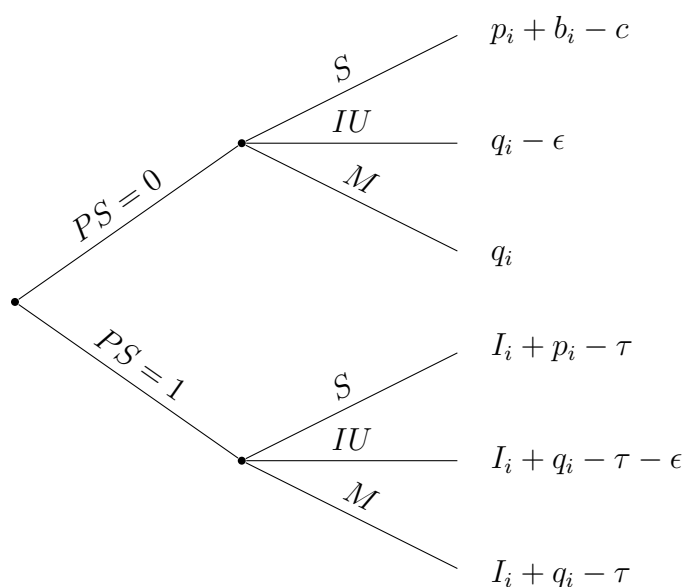
Equilibrium Before Ban on Formal Child Marriage

We solve the model by backward induction. At $t = 2$, girls choose their civil status. This decision depends on whether they have premarital sex or not:

1. Girls that did not have premarital sex ($PS = 0$) choose to remain single (S) if $p_i + b_i - c \geq q_i$. If $p_i + b_i - c < q_i$ these girls will get married (M) instead.[8] Other things equal, girls that encounter a potential husband with relatively more resources than their parents and have a lower benefit from education are more likely to get married.

2. Girls that had premarital sex ($PS = 1$) remain single (S) if $p_i \geq q_i$, and get married (M) if $p_i < q_i$.[9] These girls will always drop out as a consequence of having a child. Their decision of whether to remain single or get married only depends on the difference between the wealth of their potential husband and their parents.

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[8] If $\epsilon = 0$ these girls will be indifferent between forming an informal union (IU) or getting married (M). Whenever girls are indifferent between these two options, we assume that half of them form an informal union and half get married. This is equivalent to assuming that the decision is taken by a coin toss. We also assume that when the utility of getting married is equal to the utility of remaining single, girls decide to be single, as this is their status quo.

[9] If $\epsilon = 0$ these girls will be indifferent between forming an informal union (IU) or getting married (M).

In $t = 1$, girls decide between having premarital sex or not ($PS = \{0, 1\}$). This decision depends on their choice of civil status:

1. Girls with $p_i + b_i - c < q_i$ always get married. Those with $I_i > \tau$ have premarital sex $(\mathbf{1}, \mathbf{M})$, while girls with $I_i \leq \tau$ do not have premarital sex $(\mathbf{0}, \mathbf{M})$.[10]

2. Girls whose $p_i < q_i \leq p_i + b_i - c$ stay single and attend school if they decide not to have premarital sex, but get married if they have premarital sex. Girls with $I_i > p_i - q_i + b_i - c + \tau$ have premarital sex and get married $(\mathbf{1}, \mathbf{M})$. Girls with $I_i \leq p_i - q_i + b_i - c + \tau$ do not have premarital sex, stay single and attend school $(\mathbf{0}, \mathbf{S})$.

3. Girls whose $p_i \geq q_i$ always remain single. Those with $I_i > b_i - c + \tau$ have premarital sex $(\mathbf{1}, \mathbf{S})$, while those with $I_i \leq b_i - c + \tau$ do not have premarital sex and stay in school $(\mathbf{0}, \mathbf{S})$.

The optimal equilibrium for girl (i) depends on her benefit from education (b_i), the difference in resources of her parents and her potential husband/boyfriend ($p_i - q_i$) and her utility from premarital sex (I_i). There are four groups of girls in equilibrium, two of which remain single: girls that do not have premarital sex, remain single and continue their education, and girls that have premarital sex, remain single, and drop out of school. These girls have relatively wealthy parents and/or high returns to education. The first group of girls do not engage in premarital sex, stay single and attend school $(\mathbf{0}, \mathbf{S})$. There are two subgroups of girls for which this equilibrium arises. First, girls whose potential husband has more resources than their parents but not enough to compensate for the loss of education. Second, girls with a low utility from having premarital sex and parents with more resources than their potential partner. In particular, this equilibrium arises when the following conditions hold:

$$p_i < q_i \leq p_i + b_i - c, \quad I_i \leq p_i - q_i + b_i - c + \tau$$
$$\text{or} \tag{1}$$
$$p_i \geq q_i, \quad I_i \leq b_i - c + \tau$$

The second group of girls have premarital sex and stay single $(\mathbf{1}, \mathbf{S})$. These girls have relatively wealthy parents and a utility of sex that compensates for the loss of reputation and education. This equilibrium occurs if the following conditions hold:

$$p_i \geq q_i, \quad I_i > b_i - c + \tau \tag{2}$$

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[10]We assume that when the benefit of having premarital sex is exactly equal to the cost, girls decide not to have premarital sex.

The two remaining groups of girls get married in equilibrium, as their potential partner has relatively high resources compared to their parents' resources and their benefits from getting an education. One group of girls does not have premarital sex and gets married $(0, M)$. These girls have a low utility of premarital sex and a potential husband/boyfriend with relatively high resources that compensate for the education loss. This equilibrium arises if the following conditions hold:

$$p_i + b_i - c < q_i, \quad I_i \leq \tau \tag{3}$$

The final group of girls have premarital sex and get married $(1, M)$.[11] There are two subgroups of girls for which this equilibrium arises. First, girls whose potential husband has more resources than their parents but not enough to compensate for the loss of education, and a utility from premarital sex that makes up for all these losses. Second, girls for which the husband's resources compensate for the education loss as well. Formally, this equilibrium occurs when the following conditions are met:

$$p_i < q_i \leq p_i + b_i - c, \quad I_i > p_i - q_i + b_i - c + \tau$$

$$\text{or} \tag{4}$$

$$p_i + b_i - c < q_i, \quad I_i > \tau$$

Equilibrium After Ban on Formal Child Marriage

When a ban on child marriage is introduced, getting married (M) is no longer an option. We solve again by backward induction. At $t = 2$:

1. Girls that do not have premarital sex ($PS = 0$) choose to remain single (S) if $p_i + b_i - c \geq q_i - \epsilon$. They choose an informal union (IU) if $p_i + b_i - c < q_i - \epsilon$.

2. Girls that have premarital sex ($PS = 1$) now choose to remain single (S) if $p_i \geq q_i - \epsilon$, while they form an informal union (IU) if $p_i < q_i - \epsilon$.

At $t = 1$, girls decide whether to have premarital sex or not:

1. Girls with $p_i + b_i - c < q_i - \epsilon$ always form an informal union and drop out of school. Those with $I_i > \tau$ have premarital sex $(1, IU)$, while girls with $I_i \leq \tau$ choose not to $(0, IU)$.

2. Girls whose $p_i < q_i - \epsilon \leq p_i + b_i - c$ stay single and attend school if they decide not to have premarital sex, but form an informal union if they have premarital sex. Girls with

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[11]We measure the relative size of these two groups in Mexico using data from the 2014 ENADID survey. As we explain in Section 3, in most cases, formal marriage is not the result of a pregnancy.

$I_i > p_i - q_i + b_i - c + \tau + \epsilon$ have premarital sex and form an informal union $(\mathbf{1}, \mathbf{IU})$. Girls with $I_i \leq p_i - q_i + b_i - c + \tau + \epsilon$ do not have premarital sex, stay single and attend school $(\mathbf{0}, \mathbf{S})$.

3. Girls whose $p_i \geq q_i - \epsilon$ always remain single. Girls with $I_i > b_i - c + \tau$ have premarital sex $(\mathbf{1}, \mathbf{S})$, while those with $I_i \leq b_i - c + \tau$ do not have premarital sex and stay in school $(\mathbf{0}, \mathbf{S})$.

The new optimal equilibrium for girl i still depends on her benefit from education (b_i), the difference in resources of her parents and her potential husband/boyfriend $(p_i - q_i)$ and her utility from premarital sex (I_i). But unlike the situation in which child marriage is legal, the optimal equilibrium now depends on the reputation cost of informal unions (ϵ).

A first group of girls will refrain from having premarital sex, and will stay single and attend school $(\mathbf{0}, \mathbf{S})$ when these new conditions hold:

$$p_i < q_i - \epsilon \leq p_i + b_i - c, \quad I_i \leq p_i - q_i + b_i - c + \tau + \epsilon$$
$$\text{or} \tag{5}$$
$$p_i \geq q_i - \epsilon, \quad I_i \leq b_i - c + \tau$$

A second group of girls have premarital sex and stay single $(\mathbf{1}, \mathbf{S})$ when the following conditions hold:

$$p_i \geq q_i - \epsilon, \quad I_i > b_i - c + \tau \tag{6}$$

A third group of girls do not have premarital sex and form informal unions $(\mathbf{0}, \mathbf{IU})$ when the following conditions hold:

$$p_i + b_i - c < q_i - \epsilon, \quad I_i \leq \tau \tag{7}$$

A final group of girls have premarital sex and form informal unions $(\mathbf{1}, \mathbf{IU})$ when the following conditions are met:

$$p_i < q_i - \epsilon \leq p_i + b_i - c, \quad I_i > p_i - q_i + b_i - c + \tau + \epsilon$$
$$\text{or} \tag{8}$$
$$p_i + b_i - c < q_i - \epsilon, \quad I_i > \tau$$

After the introduction of the ban, the equilibria $(\mathbf{0}, \mathbf{M})$ and $(\mathbf{1}, \mathbf{M})$ cease to exist. If there is no reputation cost for being in an informal union $(\epsilon = 0)$, banning child marriage produces a complete

substitution from marriage to informal unions, leaving fertility and school attendance unaffected. If, on the other hand, informal unions carry a reputation penalty ($\epsilon > 0$), banning child marriage leads to a reduction in fertility and school dropout for certain girls. The response to the reform will differ for girls that get married before $(0, M)$ and after having a child $(1, M)$. Below we describe the new equilibria for these two groups of girls.

1. Girls that would have chosen $(0, M)$ if it were legal:

   - If $\epsilon < q_i - p_i - b_i + c$, they choose $(0, IU)$.

   - If $\epsilon \geq q_i - p_i - b_i + c$, they choose $(0, S)$.

   For a certain ϵ, banning child marriage will make girls whose potential partner is sufficiently wealthy ($q_i - p_i - b_i + c > \epsilon$) substitute marriage for informal unions, whereas those with a less wealthy partner will remain single. The latter will therefore stop having kids at a young age and will remain in school. In countries with a very high ϵ, everyone will substitute marriage for remaining single when child marriage is banned, putting an end to teenage fertility and school dropout for this first group of girls.

2. Girls that would have chosen $(1, M)$ if it were legal:

   - If $\epsilon < q_i - p_i - b_i + c$, they choose $(1, IU)$.

   - If $q_i - p_i - b_i + c \leq \epsilon < q_i - p_i$, some choose $(1, IU)$, and other $(0, S)$:

     - Those with $I_i > \tau$ and $p_i + b_i - c < q_i$ or $I_i > b_i - c + \tau$ and $p_i + b_i - c \geq q_i$ or $p_i - q_i + b_i - c + \tau < I_i \leq b_i - c + \tau$, $p_i + b_i - c \geq q_i$ and $\epsilon < I_i + q_i - p_i - b_i + c - \tau$ choose $(1, IU)$.

     - Girls with $p_i - q_i + b_i - c + \tau < I_i \leq b_i - c + \tau$, $p_i + b_i - c \geq q_i$ and $\epsilon \geq I_i + q_i - p_i - b_i + c - \tau$ choose $(0, S)$.

   - If $\epsilon \geq q_i - p_i$, some choose $(1, S)$ and others $(0, S)$:

     - Girls with $I_i > \tau$ and $p_i + b_i - c < q_i$ or $I_i > b_i - c + \tau$ and $p_i + b_i - c \geq q_i$ choose $(1, S)$.

     - Girls with $p_i - q_i + bi - c + \tau < I_i \leq b_i - c + \tau$ and $p_i < q_i \leq p_i + b_i - c$ choose $(0, S)$.

   Given ϵ, banning child marriage will make some of these girls choose not to have premarital sex, remain single and stay in school, reducing early fertility and school dropout. These girls have relatively high returns to education, a low enjoyment of premarital sex and/or wealthy

parents ($\epsilon \geq I_i + q_i - p_i - b_i + c - \tau$ and $I_i \leq b_i - c + \tau$). For the remaining girls in this group there is no reduction in fertility and school dropout because the reform does not deter them from having premarital sex. In countries with a very high ϵ, a child marriage ban will reduce (but not eliminate) teenage fertility and school dropout for these girls. Therefore, independently of the value of ϵ, banning child marriage will have a lower impact on fertility and schooling in countries where child marriage is mostly a consequence of pregnancy.