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ABSTRACT

To Pill or Not to Pill? Access to Emergency Contraception and Contraceptive Behaviour*

We examine the effects of free-of-charge availability of emergency contraception on contraceptive behaviour in Chile. Using a survey of individuals 15 to 29, we exploit variation in availability at the municipality level as a consequence of legal and judicial decisions in the late 2000s. We find an increase in the use of emergency contraception in municipalities in which it was available through the public health system, but also an increase in the use of other methods of hormonal, pre-coital contraception, and a decrease of more traditional contraceptive methods. This effect is concentrated among groups with a low starting use of contraceptives, who may benefit from the contact with the health services. Unlike previous results for developed countries, our results indicate that there is scope for an effect of emergency contraception in settings with low starting levels of contraceptive use, and a significant potential for policies to increase adoption of regular contraception.

JEL Classification: I15, I18, J13

Keywords: emergency contraception, youth, contraceptive behaviour, risky behaviour

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1 Introduction

Family planning programs have been an essential component of the development agenda for the last decades (UNFPA, 2012). However, the consequences of access to contraception on fertility and risky behaviours in developing countries are still subjected to debate, and the repercussions of post-intercourse contraception (*emergency contraception* or *the morning after pill*) have not been sufficiently explored in the literature. In this paper, we study the consequences of emergency contraception availability on the use of other contraceptive methods in a middle-income country, exploiting variation coming from legislative and judicial decisions.

In developed countries, the introduction of modern contraceptive methods (*the pill*) reduced the risk of pregnancy, freeing women and partners from the cost of unwanted fertility (Goldin, 1990; Pop-Eleches, 2010). This in turn increased women's education, labor force participation, income and child investments (Goldin and Katz, 2002; Bailey, 2006). However, since contraception reduces the cost of engaging in sexual intercourse, increases in sexual activity could (partially or totally) compensate the effect of the decrease in the probability of the undesired outcome (Myers, 2017). A similar mechanism operates in the case of abortion: its availability should decrease unwanted births unless the increase in unprotected sexual activity compensates for the reduction of pregnancies taken to term.¹ Hence, the net effect has been regarded as an empirical question.

Emergency Contraception (EC), also known as *the morning after pill*, lays between abortion and regular contraception. Unlike regular contraception, it can be taken once sexual activity has taken place, but the time window for its intake prevents any update of information that occurs in the case of abortion.² Since its introduction in the 1980s, the conditions through which it can be accessed have substantially varied across countries and over time. The literature has reported only limited impact of emergency contraception in developed countries. For instance, Girma and Paton (2006, 2011) find no effect on teen births after an improvement on access in the UK, but an increase in sexually transmitted diseases. In the U.S., Gross, Lafortune and Low (2014) report no effect on births or abortions, but a decrease in reports of sexual assault when they become unnecessary to access emergency contraception, and Durrance (2013) and Mulligan (2016) show an increase in sexually transmitted diseases.

Contrary to developed countries, there is limited and mixed evidence of the effect of family planning policies in low and middle income countries. Joshi and Schultz (2013) find a substantial decrease on fertility when pre-intercourse contraception becomes available

¹Levine, Trainor and Zimmerman (1996) and Ananat, Gruber, Levine and Staiger (2009) present evidence for a large effect of abortion on fertility rates and maternal characteristics.

²Emergency contraception reduces the probability of pregnancy from 42 to 95 percent, depending on the time passed between sexual activity and its intake, but it offers only a 5-day window for its intake.

in Bangladesh, and Angeles, Guilkey and Mroz (2005) report a similar result for an expansion of a family planning program in Peru. On the other hand, Miller (2010) reports small effects on total fertility using the expansion of the *Profamilia* program in Colombia, but large gains from postponing first births. Miller and Valente (2016) show evidence of the substitutability between abortion and modern contraception in Nepal, while Cavalcanti, Kocharkov and Santos (2016) find larger positive welfare effects of subsidizing abortion than contraceptives.

We contribute to this literature by studying the consequences of free-of-charge availability of emergency contraception on contraceptive behaviour of young people in a middle income country, Chile. The context of Chile is ideal for analysing the effects of emergency contraception for various reasons. First, according to the United Nations, before the introduction of the EC pill, Chile had a relatively low rate of contraceptive use, even compared to other Latin American countries.³ Teenage pregnancy is still a relevant issue, with 55 births per 1,000 women between ages 15 to 19 in 2006 (compared to 40 for U.S. or 12 for Spain).⁴ Second, Chile has been one of the last countries to legalize abortion, and did so after our period of study, allowing us to isolate the effect on contraceptive choices.⁵ Finally, between years 2007 and 2010 there were a series of measures and counter-measures to allow/block the distribution of the EC pill, in the form of legal changes and judiciary decisions. These produced variation in emergency contraception availability across municipalities and over time, explained in detail in Section 2, that we exploit to identify its effect on the use of other contraceptive methods.

The paper closest to us, Bentancor and Clarke (2017), uses the same changes in emergency contraception availability in Chile to assess its effect on birth rates, foetal deaths and mother characteristics. Using data from 2009 to 2011, they report a substantial decrease in fertility and in late foetal deaths (used as a proxy for abortion), suggesting that the results reported previously for developed countries may not extend to developing countries. However, little is yet known of its impact on contraceptive behaviour.

We analyse the impact of emergency contraception availability on a representative sample of individuals aged 15 to 29. The Chilean National Surveys of Youth (*Encuesta Nacional de la Juventud*) includes not only information on municipality of residency and

³Estimates of the UN Population Division for 2006 indicate that only 65 percent of married or in-union women aged 15-49 in Chile used any method of contraception, compared with 80 percent in Brazil, 72 percent in Mexico, 70 percent in Peru or 78 percent in Uruguay (World Contraceptive Use 2018, <http://www.un.org/en/development/desa/population/publications/dataset/contraception/wcu2018.shtml>, accessed December 17, 2018.)

⁴World Bank, Adolescent fertility rate, <http://api.worldbank.org/v2/en/indicator/SP.ADO.TFRT?downloadformat=excel>, accessed December 17, 2018.

⁵In Latin America, only El Salvador and Honduras have a similarly restrictive legislation, but it is commonly the case in Sub-Saharan Africa. While this may affect the external validity of our results, it simplifies the estimation procedure, since there is possible substitution between contraception and abortion.

individual characteristics, but also self-reported contraceptive use, and other non-sexual risky behaviour, that we will use as a control experiment. Our results show a substantial increase in the use of emergency contraception when freely available, but also an increase in the use of the regular pill and other hormonal, pre-coital, contraceptives, suggesting spillover effects that go beyond the use of emergency contraception itself. Importantly, the effect is concentrated among sectors of the population that reported a low level of contraceptive use before any policy change.

Anecdotal evidence suggests that increased awareness of regular contraception might explain our results, if health professionals provide information on pre-intercourse contraception along with the distribution of the EC pill. To explore this potential channel, we conducted a small online survey of practitioners who prescribed the EC pill in or around 2010. 94% of practitioners report giving information on regular contraception at the time of distributing the EC pill. In addition, they report that 65% of individuals decided to start using another contraceptive method. Therefore, it is plausible that our results are capturing the consequences of this additional information that individuals receive upon requesting the EC pill. Its free distribution through the public health system might have contributed to increase the effectiveness of family planning policies.

The rest of the paper proceeds as follows. In section 2 we explain the context in which the distribution of emergency contraception was authorized in Chile. Section 3 presents the data and presents descriptive statistics, section 4 proposes our empirical strategy, while section 5 outlines the results. Section 6 discusses robustness checks and section 7 states the conclusion.

2 Background

This section describes the Chilean context and argues why this case study can expand the understanding of the role of contraception in developing countries. The Chilean Constitution (1980) protects the “right of life of those soon to be born” (*la vida del que está próximo a nacer*). Until 2017, Chile was one of the few countries in Latin America in which abortion was forbidden altogether.⁶ Illegal abortions did nevertheless occur in Chile, and estimates range between 60,000 and 100,000 per year (Casas and Vivaldi, 2014).

Pre-intercourse contraception has become widely available for the entire population over the last decades. The decree from the Ministry of Health called *Normas Nacionales sobre Regulación de la Fertilidad* (National Rules on Regulation of Fertility) published in 2007 regulates the access to contraceptive methods in the public health

⁶A bill approved in 2017 known as abortion under three circumstances (*aborto en tres causales*) allowed women to have an abortion if the mother’s life is at risk, the fetus will not survive the pregnancy, or in the case of rape.

service (FONASA). Modern contraceptive methods are available for all women through hospitals and local health centers. Hospitals are operated by the Ministry of Health through its regional branches called *Servicios de Salud*, while local health centers, called *consultorios*, are run directly by municipalities.

In contrast, emergency contraception has been openly debated in Chile for over a decade. Denounced as abortive, its distribution was forbidden in August 2001 by the Chilean Supreme Court, regardless of whether the health care provider was public or private. This decision was subsequently challenged and revoked in November 2005, with the Supreme Court not finding enough evidence of emergency contraception being abortive. Until February 2007, the EC pill was provided by the public health service only in case of rape. Pharmacies were allowed to sell emergency contraception, but a substantial share of them, including some of the most important pharmacy chains in the country, refused to do so (Casas Becerra, 2008). Therefore, access to emergency contraception was possible but restricted and expensive for the majority of the Chilean population.

The 2007 Decree regulated this anomalous situation. It allowed free distribution of emergency contraception in the public health service through hospitals and local health centres. This regulation was subsequently challenged in front of the Supreme Court. The Supreme Court decision of April 2008 forbade the distribution of emergency contraception in the public health network, arguing that such distributions needed to be authorized by a higher order norm (by law rather than by decree). No other part of the regulation included in the 2007 Decree was affected by this decision.

This decision ended the first period of free distribution of emergency contraception and gave place to an anomalous situation, in which emergency contraception was available through pharmacies (at a cost) and, in some cases, through local *consultorios*. These local health center are operated by municipalities instead of the Ministry of Health, and it was unclear from the Supreme Court decision whether the prohibition operated at this level. Therefore, emergency contraception was available in some municipalities but not in others, depending, on the willingness of the mayor to provide emergency contraception but also on his or her understanding of the legal repercussions of the Supreme Court decision.⁷ This “partial ban” on emergency contraception lasted until June 2009. The *Contraloría* (government’s auditor) established that the Supreme Court decision was also applicable at the municipality level, and therefore all distribution of emergency contraception within any public health service was illegal.

⁷On the one side of the spectrum was Puente Alto’s mayor Manuel José Ossandón, who stated that the emergency contraception distribution is against the fundamental principles since “there is still a technical doubt of whether it is abortive ... If they show [the EC pill] is a contraceptive method, I don’t have any worry and I will give it away for free myself anywhere”. On the other side, El Bosque’s mayor Sadi Melo declared that “we have distributed approximately 20 to 25 pills in the last six months... [The EC] is not distributed over-the-counter, but with a protocol, a program for prevention and responsible sexuality” (*La Tercera*, June 19, 2009).

The “full ban” lasted until January 2010, when congress approved a bill (Law No. 20418 of 8 January 2010) allowing the free distribution of the EC pill. However, the lower rank norm putting these dispositions into practice was delayed until 2013 (Health Ministry Decree of 28 March 2013), yielding a period of uncertain distribution.⁸ Dides, Benavente, Sáez, Nicholls and Correa (2011) describe two reasons for this uncertainty. First, the director of the *Servicio de Salud de Coquimbo* forbade midwives from prescribing contraceptives, arguing that according to the Sanitation Code they could only prescribe drugs needed for deliveries. A bill was put forward in Congress to allow midwives to prescribe contraceptives (Law No. 20533), and enacted in September 2011. Second, several *consultorios* did not distribute the emergency pill arguing that they were out of stock. Some *consultorios* offered the *Yuzpe Method*, a combination of several doses of pre-intercourse contraceptive pills, as an alternative.⁹ This lack of stock of emergency contraception was greatly reduced with the enactment of the 2013 Health Ministry Decree. From 2013 onwards, the emergency contraception pill has been freely distributed.

Figure 1 illustrates the different periods regarding emergency contraception availability, along with the survey waves that we use in our estimation (presented in the next section).

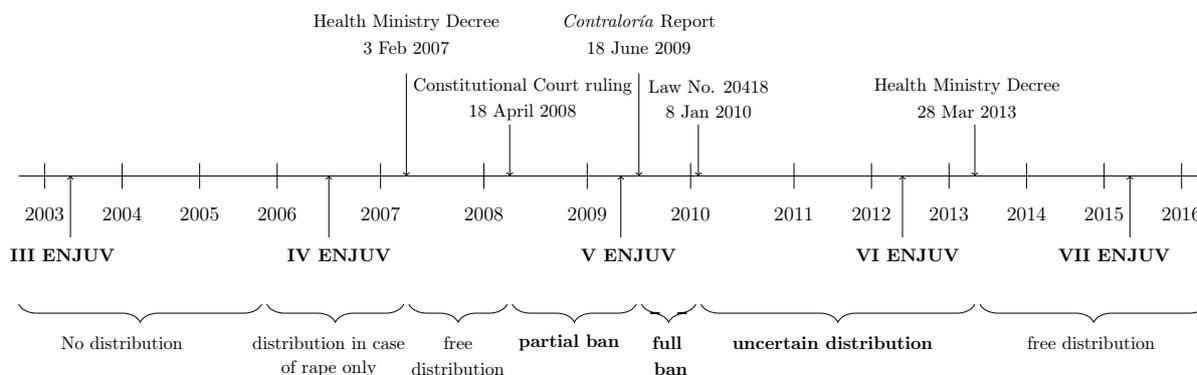


Figure 1: Emergency Contraception Availability and ENJUV Surveys

⁸Gonzalo Navarrete, Lo Prado’s mayor, stated that “due to a lack of media coverage of the law, there are still uneven criteria for the emergency contraception distribution: some municipalities distribute it in case of rape, others when the condom fails” (*La Tercera*, June 30, 2012).

⁹It is possible that some *consultorios* gave the “out of stock” explanation as an excuse for not distributing the pill.

3 Data

We take advantage of the timing of the Chilean National Surveys of Youth (*Encuestas Nacionales de Juventud*, ENJUV hereafter), a cross section survey that took place at three-year intervals since the 1990s. In particular, we use waves III to VII, that took place in 2003, 2006, 2009, 2012 and 2015. The ENJUV interviews a nationally representative sample of men and women aged 15 to 29. It contains information on personal characteristics, including municipality of residence, education, religion or socio-economic status. Additionally, young people were asked to fill a self-completing questionnaire regarding their sexual behaviour, among other sensitive topics. Each respondent was asked whether they ever had sexual intercourse, and, if so, which contraceptive method was used on their most recent intercourse, although no information was recorded on when it occurred. They were presented with a list of contraceptive methods that included the morning after pill (*píldora del día después* or *píldora anticonceptiva de emergencia*).

Contraceptive choices and the probability of having ever had intercourse, our main outcomes of interest, are presented in Table 1. For our estimation, we classify pre-intercourse contraceptive methods in highly effective and non-highly effective, considering highly effective only the following methods: pill, IUD, diaphragm, injectable and other types of hormonal contraception.¹⁰ This classification also allows us to abstract from the introduction of new contraceptive methods, particularly new hormonal contraceptives (e.g., patches or injectables). Contraceptive choices are then grouped in 4 categories: emergency contraception, highly effective methods, non-highly effective methods and no method at all.¹¹

We observe a small increase over time in the share of respondents who had sexual intercourse prior to the interview, particularly from 2006 to 2009. This increase appears to have a different timing than the increase in the use of emergency contraception (column 2), more concentrated between 2009 and 2012, as it would be expected from the policy changes reported in Figure 1. Over time, young people appear more likely to be using any contraception, and mostly so highly effective contraception.

Table A1 in the Appendix includes the mean and standard deviations for the individual characteristics included in our estimation. We control for age, gender, education, religion, marital status, number of children, socio-economic background or labour force status of respondent and occupational group of household head.

As previously available information on emergency contraception at the municipality

¹⁰Individuals who report using male or female sterilization are small in number and excluded from our analysis.

¹¹We keep one contraceptive method per respondent in the following way: if the EC pill was used, we assumed all other methods were used unsuccessfully. If a highly effective method was used, we assume the goal of other methods (e.g., condoms) was not preventing pregnancy. Only if no emergency contraception and no highly effective method was used, a non-highly effective method is recorded.

Table 1: Descriptive Statistics: individual intercourse and contraception choices

Survey year	Ever sexual intercourse	Contraceptive choice at last sexual intercourse			
	(1)	Emergency contraception	Highly effective method	Non-highly effective method	No method
	(1)	(2)	(3)	(4)	(5)
2003	0.681 (0.466) 6962	0 4738	0.421 (0.494) 4738	0.238 (0.426) 4738	0.341 (0.474) 4738
2006	0.651 (0.475) 6034	0.003 (0.053) 3958	0.362 (0.481) 3958	0.345 (0.475) 3958	0.291 (0.454) 3958
2009	0.708 (0.455) 7294	0.003 (0.057) 5163	0.398 (0.490) 5163	0.328 (0.470) 5163	0.270 (0.444) 5163
2012	0.717 (0.451) 7623	0.028 (0.166) 5465	0.437 (0.496) 5465	.0331 (0.471) 5465	0.203 (0.402) 5465
2015	0.707 (0.455) 7333	0.018 (0.131) 5187	0.425 (0.494) 5187	0.343 (0.475) 5187	0.214 (0.410) 5187
Total	0.695 (0.460) 35246	0.011 (0.105) 24511	0.411 (0.492) 24511	0.317 (0.465) 24511	0.260 (0.439) 24511

Notes: Only the pill, IUD, diaphragm, injectable and other pre-intercourse hormonal contraceptives are considered highly effective methods. Few individuals report male or female sterilization, and these are dropped from our sample.

level was taken with a yearly frequency, and not necessarily close to the survey, we rely on the information reported by ENJUV respondents to develop a measure of availability at the municipality level, introduced in Table 2.¹² Column 1 presents the probability of anyone in the municipality of the respondent reporting having used emergency contraception during their last sexual intercourse, by survey year. Thus, we assume emergency contraception to be available if anyone (including the respondent itself) used it on the municipality as contraceptive during their last sexual intercourse. This measure experiences a small increase from 2006 to 2009 and a sharp increase in the next interval, reflecting the changes in policy presented in Figure 1. This measure, however, is problematic. As explained in Section 2, emergency contraception was only freely available in the public health network from 2007, but it was available in pharmacies (at a cost) and through the private health system since November 2005 and throughout the entire period.¹³ For

¹²ENJUV surveys usually took place during the months of March and April, while the FLASCO survey of municipalities by Dides, Benavente and Moran (2009) used by Bentancor and Clarke (2017) took place in October/November, and only for some years in our sample.

¹³Emergency contraception was also available in cases of rape through the public health service since

this reason, use of emergency contraception does not necessarily reflect free availability through the public health service. Hence, we construct an alternative measure (column 2) that assumes no availability in 2003 and 2006 for all municipalities, and assumes availability thereafter only if the number of respondents reporting emergency contraception as the method used in the last sexual intercourse is higher than the one reported for 2006. Finally, we assume no availability in 2003 and 2006 and availability thereafter if the share of emergency contraception users is higher than in 2006 (column 3), to account for changes in the composition of the ENJUV survey.¹⁴ We observe similar levels and pattern for all measures, with an increase availability particularly from 2009 to 2012, as the changes in regulation would predict. Our measures are highly correlated to each other. Our preferred measure is presented in column 2, although the results are robust to the use of alternative measures.

Table 2: Descriptive statistics: EC pill availability in municipality c in year t

Survey year	P(any respondent used EC _{ct}) (1)	P(# EC users _{ct} > # EC users _{c,2006}) (2)	P(%EC users _{ct} > %EC users _{c,2006}) (3)
2003	0	0	0
	6967	6967	6967
2006	0.217 (0.412)	0	0
	6034	6034	6034
2009	0.301 (0.459)	0.276 (0.447)	0.251 (0.433)
	7360	7360	7360
2012	0.726 (0.446)	0.625 (0.484)	0.632 (0.482)
	7655	7655	7655
2015	0.708 (0.455)	0.636 (0.481)	0.636 (0.481)
	7422	7422	7422
Total	0.405 (0.491)	0.326 (0.469)	0.322 (0.467)
	35438	35438	35438

Notes: Column (1) considers emergency contraception was available if anyone in that municipality reported using emergency contraception; columns (2) and (3) considers emergency contraception was available if a higher number and a higher share of respondents respectively than that municipality in 2006.

Note that it may be the case that, even if emergency contraception was available, the 2005 Supreme Court not finding evidence of the morning after pill being abortive (see Section 2 for more details).

¹⁴Note that these measures do not exclude the own use of emergency contraception. Hence, by construction, municipalities with emergency contraception will have higher use.

lack of demand prevents us from observing its use in our data. If this is the case, our control group (municipalities in which the EC pill was not available) would include some municipalities in which young people had access to this type of contraceptive. If this is the case, our estimates would represent a lower bound of the true effect.

4 Empirical strategy

In this section, we discuss briefly our empirical strategy and identification assumptions. We exploit variation in emergency contraception availability across municipalities in Chile during the period 2003 to 2015, arguably caused by a series of legislative and judicial decisions, described in detail in Section 2. During this time, family planning policy was decided by the central government; only as a consequence of the judicial decision and the unclear regulatory framework it resulted in, municipalities were allowed a certain degree of discretion on the provision of emergency contraception.

However, it is unlikely that this discretion was used in a random manner. Plausibly, municipal governments and mayors responded to the characteristics of their municipalities, allowing or forbidding emergency contraception depending on elements such as demand, attitudes towards contraceptives or other, potentially unobservable, municipal characteristics. To use emergency contraception availability at the municipality level to estimate a causal relationship between this availability and contraceptive choices, we would need to control for municipality characteristics that may influence the mayor’s decision and individuals’ choice of contraception. We will then use the remaining, municipality-mayor specific variation coming from the reading of the consequences of the Supreme Court decision, for identification. Hence, in addition to a dummy variable for availability of the EC pill and individual characteristics (X_{ict}), we control for year dummies δ_t (to capture changes over time at the national level in, for instance, attitudes towards contraception), municipality dummies, μ_c (to control for observable and unobservable time-invariant municipal characteristics), and municipality-specific linear time trends, $\phi_c * year_t$ (to control for changes over time of these municipality characteristics).¹⁵ Therefore, our OLS estimation equation of outcome Y for individual i in municipality c at time t is as follows:

$$Y_{ict} = \alpha + \beta \text{ EC pill availability}_{ct} + X'_{ict}\gamma + \delta_t + \mu_c + \phi_c * year_t + \varepsilon_{ict}$$

In addition to including this wide array of controls to our main specification, we include two robustness checks to test whether our estimates may be confounded by, for

¹⁵We include the following individual characteristics: gender, age, living in an urban region, religion, marital status, education, socio-economic group, labour force status and occupation of the household head.

instance, non-linear changes over time of unobservable characteristics. First, we run a regression of the effect of emergency contraception availability in 2009 on contraceptive behaviour in 2003 and 2006, before any of the mentioned changes took place. We find that municipalities in which the EC pill will become available in 2009 report, if anything, a lower use of contraceptives in 2003 and 2006, suggesting that unobserved elements that would cause a higher demand for emergency contraception are less present on our treated municipalities. If this is the case, our estimates would be a lower bound of the true effect. This results can be found in table A3 in the Appendix.

Finally, to address non-linear changes over time in unobservables, such as the way municipalities address risks taken by young people, we perform a placebo test using non-sexual risky behaviours. Smoking, drinking alcohol or using drugs are unlikely to be affected by the policy itself, but would be affected by unobservables biasing our results. This robustness check is presented in detail in Section 6.

5 Results

5.1 Contraception availability and engagement in sexual activity

Contraception availability may affect not only the type of contraception used, but also whether or not individuals engage in sexual intercourse in the first place. An increase in sexual activity as the one reported in [Arcidiacono, Khwaja and Ouyang \(2012\)](#) may alter the unobservable characteristics of individuals making contraceptive choices, confounding our parameters of interest. Hence, we first consider whether emergency contraception availability at the municipality level is correlated with a higher proportion of young people reporting ever had sex.

Table 3 presents the OLS results for our estimation equation when the dependant variable takes value 1 if the individual reported ever having had sexual intercourse. Column 1 includes the results without any individual, municipality or time controls. Municipalities where the morning after pill was available present a higher share of young people who ever had sex, suggesting the same unconditional relationship observed in previous literature. However, once controls for individual characteristics (column 2) are added, the size of the coefficient is substantially reduced. Adding municipality- and time-fixed effects (columns 3 and 4) and municipality-specific time trends (column 5) appears to completely dismiss this relationship, showing, if anything, a small negative but insignificant relationship between availability of emergency contraception and sexual intercourse.¹⁶ This suggest that the availability of contraception is not likely to have a significant impact on the

¹⁶Our results are robust to alternative specifications, namely logit and probit (results available upon request).

composition of our estimating sample, and, as such, unlikely to affect the unobservable characteristics of individuals making contraceptive choices.

Table 3: Probability of ever having had sexual intercourse, 15-29 year old (OLS)

	(1)	(2)	(3)	(4)	(5)
EC pill availability	0.028*** (0.007)	0.012* (0.006)	-0.016 (0.012)	-0.016* (0.009)	-0.017 (0.011)
N	35246	35246	35246	35246	35246
R ²	0.001	0.336	0.002	0.335	0.340
Municipality and year FE			✓	✓	✓
Individual characteristics		✓		✓	✓
Municipality-specific time trends					✓

Notes: Robust standard errors clustered at the municipality level are reported in parentheses. * denotes significance at the 10% level, ** at the 5% level and *** at the 1% level. Individual controls include age, gender, education, marital status, children, socio-economic status and occupation.

5.2 Use of contraceptive methods

We now turn to the contraceptive choice for individuals 15 to 29 during their last sexual intercourse. We classified the pre-sexual intercourse methods in highly effective or non-highly effective methods and study the probability of choosing (1) Emergency Contraception; (2) a highly effective method; (3) a non-highly effective method; or (4) no method at all. We estimate our estimation equation by OLS separately for each choice, where the dependant variable takes value 1 if the corresponding method was reported, and 0 otherwise. Hence, each column represents a separate OLS regression.¹⁷

Table 4 presents the results for the four alternatives and the same sets of specifications as in Table 3. We observe a large, positive effect of emergency contraceptive availability on its use (Panel A, column 1), which is robust to include controls for personal characteristics, municipality- and year-fixed effects and municipality-specific time trends (columns 2 to 5). This could be due to the way our treatment variable was constructed, as own use is not excluded from our measure. However, the size of the coefficient (an increase in the probability of 2.2 percentage points, with an average level of 11%) suggests that the coefficient captures an actual increase in the use of emergency contraception in municipalities included in our treatment group. This leads us to believe that the policy was effective and indeed emergency contraception was used more frequently on those municipalities in which it was readily available.

Furthermore, the availability of emergency contraception is accompanied by an increase in the use of other forms of modern contraception. Panel B presents this set

¹⁷Our results are robust to alternative specifications. The multinomial logit specification reports similar results, but our data does not allow for controlling for municipality-specific time trends.

of results. The use of effective contraception increases by 2.9 percentage points, from an average use of 40%. Note that no other element regarding contraceptive provision was left up to the discretion of municipality officials, so this would suggest a spillover effect of emergency contraception availability. On the other hand, the likelihood of using non-effective contraception substantially decreases in municipalities where emergency contraception is available. Finally, we observe no evidence of emergency contraception availability being correlated with the likelihood of having unprotected intercourse when controls are added (Panel D).¹⁸

Table 4: Method used in last sexual intercourse, 15-29 year old (OLS)

	(1)	(2)	(3)	(4)	(5)
<i>Panel A: Emergency contraception pill</i>					
EC pill availability	0.023*** (0.002)	0.022*** (0.002)	0.021*** (0.003)	0.021*** (0.002)	0.022*** (0.003)
N	24511	24511	24511	24511	24511
R ²	0.010	0.013	0.013	0.015	0.015
<i>Panel B: Any highly effective method</i>					
EC pill availability	0.022* (0.011)	0.018 (0.012)	0.034** (0.014)	0.032** (0.014)	0.026* (0.014)
N	24511	24511	24511	24511	24511
R ²	0.000	0.082	0.003	0.086	0.087
<i>Panel C: Any non-highly effective method</i>					
EC pill availability	0.022* (0.012)	0.004 (0.012)	-0.057*** (0.015)	-0.056*** (0.015)	-0.053*** (0.015)
N	24511	24511	24511	24511	24511
R ²	0.000	0.075	0.006	0.076	0.077
<i>Panel D: No method used</i>					
EC pill availability	-0.067*** (0.009)	-0.043*** (0.009)	0.003 (0.013)	0.002 (0.012)	0.005 (0.012)
N	24511	24511	24511	24511	24511
R ²	0.005	0.028	0.010	0.028	0.029
Municipality and year FE			✓	✓	✓
Individual characteristics		✓		✓	✓
Municipality-specific time trends					✓

Notes: Robust standard errors clustered at the municipality level are reported in parentheses. * denotes significance at the 10% level, ** at the 5% level and *** at the 1% level. Pill, IUD, diaphragm, injectable and other hormonal contraceptives are considered highly effective methods. Individual controls include age, gender, education, marital status, children, socio-economic status and occupation.

As we explained in Section 1, contraceptive use in Chile is relatively low, even compared with other Latin American countries of similar characteristics. Emergency contra-

¹⁸Unfortunately, the ENJUV is not an adequate dataset to replicate the results on fertility from Bentancor and Clarke (2017), the paper closest to us. Although it includes information on whether the respondent was ever pregnant or had a child, only a very small sample of respondents experienced a pregnancy or a birth within the last 12 months.

ception is not recommended as a substitute for regular contraception, and its provision is often accompanied by the provision of information or even the alternative contraception method. To understand the mechanism behind this increase in highly effective contraceptive use, we conducted an online survey of practitioners (doctors and midwives) who were registered to prescribe the EC pill in or around year 2010.¹⁹ Our survey contacted them by email and asked about EC pill distribution and whether additional information was given at the time of the visit. Of a total of 549 registered practitioners with an email address, we received a valid answer from 115.

A large majority of these practitioners (94%) reported providing information about other contraceptives at the same time as the EC pill was provided. All of those provided information about the contraceptive pill (or other hormonal contraceptives) and over 90% reported information on preservatives. Hence, it seems that this was a regular convention among doctors and midwives when asked for emergency contraception.²⁰ Furthermore, on average, practitioners reported that 65% of individuals chose to use another method after receiving emergency contraception.

Hence, the increase in highly effective contraception that we observe could be driven by this secondary effect of emergency contraception. This is important for two reasons: first, prior literature has reported large effects of emergency contraception on fertility for Chile. This should be interpreted with care, as it may include both a direct effect of the morning after pill itself, along with the effect of an increase in the use of other highly effective contraceptive methods. Therefore, similar policy changes in settings in which information is already available or in which highly effective contraception is already widely used may not provide similar effects. This would explain, for instance, the lack of effect reported for the US (see, for instance, [Gross *et al.*, 2014](#)), or the UK ([Girma and Paton, 2011, 2006](#)). Second, our results indicate that even in settings in which emergency contraception is already available, information or awareness of contraceptive methods, or policies that bring young individuals in touch with the health system may enhance the effects.²¹

5.3 Heterogeneous effects

We next examine potential heterogeneous effects that could contribute towards understanding the effects of this policy. In particular, we examine effects by age, gender and

¹⁹The website www.profesionalesquedanlapae.org, maintained by the ONG Prosalud, listed practitioners who were willing to prescribe the EC pill. The website is no longer available, so we used archive.org to retrieve this information.

²⁰Most practitioners report having done this through a conversation, although some reported providing information through flyers.

²¹Chile has implemented programs, such as *Programa Puente*, in which a central part of them is ensuring disadvantaged families are connected to the formal social system.

urban status. For each method, odd columns present the results for the specification including only individual characteristics, year and municipality fixed-effects, while even columns include as well municipality-specific time trends.

Age Panel A of Table 5 presents heterogeneous effects of emergency contraception availability by age. We choose 20 at the time of the interview as cut-off age, as it is the average of our estimating sample, but the results presented here are robust to alternative cut-offs.²² The effect of emergency contraception availability on its use is significantly stronger among the youngest respondents, with the results in columns 1 and 2 suggesting an increase of 2.7 percentage points for the younger group, with a smaller increase (around 2 percentage points) for older respondents.

This group is not only more reactive to the policy itself, but its spillovers appear larger as well. The effect of free-of-charge emergency contraception availability on the use of highly effective methods is mostly driven by younger respondents, with virtually no effect for individuals 20 to 29. They are also more likely to have substituted away from non-highly effective methods. Finally, while for the entire sample we observe no change in the probability of not using contraception, younger individuals in municipalities in which Emergency Contraception was available report less frequently (3 percentage points) having had unprotected sexual intercourse than in municipalities without emergency contraception availability.

Overall, the relationship between emergency contraception availability and behaviour change appears stronger among younger respondents, not only through its use, but also changing the use of other contraceptive methods. These individuals, aged 20 and younger, were using less frequently highly effective contraception in 2006, before the policy came into effect (see Table A2 in the Appendix). Only 24% of individuals aged 20 or younger report a highly effective method in 2006, compared with 44% for those older than 20. Hence, they may be less aware of the alternatives to emergency contraception than older respondents, and more responsive to the increase in information that came along with availability.

Gender Panel B of Table 5 presents our baseline results when an interaction for gender is included. This estimation provides some interesting insights. The effect is highly concentrated among men. The increase in the use of emergency contraception in municipalities in which it is available free of charge is stronger for men (3 percentage points for 1.7 for women), suggesting a larger decrease in contraception access by gender. Furthermore, this lower cost is also associated with a decrease in unprotected sex for men.

²²In particular, we observe the same effect if we choose 18 as cut-off age. The 2013 decree introduced clear conditions for individuals below 18 to access the emergency contraception.

On the other hand, women appear to have more frequent unprotected intercourse when emergency contraception is available.

The effect of emergency contraception availability on the use of highly effective methods appears to be driven completely by men, while women do not appear to change their probability of choosing this type of methods. However, we observe no difference on the effect on the use of non-highly effective methods. Taken together, these results suggest that men are, as a consequence of emergency contraception availability, moving away from unprotected intercourse or non-highly effective methods (i.e., condoms) towards not only emergency contraception by also other pre-intercourse highly effective methods. Women, on the other hand, are substituting away from non-highly effective methods towards emergency contraception, and, quite surprisingly, no method at all.

Similarly to the case of younger respondents, differences in prior use of different contraceptive methods also appear by gender. In 2006, 47% of women reported having used a highly effective contraceptive method while only 24% of men did.²³ The pattern described by the “high-use” group for both age and gender is quite similar, as it can be seen in Panels A and B. In both cases, the effect of the policy is larger for the group starting with a lower level of use. These groups also decrease the incidence of unprotected intercourse, while it increases for the other group. The effect in the use of highly effective methods is fully concentrated in the group with a low level of use, suggesting an indirect effect of emergency contraception availability for low use groups. These groups may resort to the use of emergency contraception in different situations (e.g., a broken condom, rather than a missed pill), and hence the advice and information that they receive may as well be different, shaping their reaction.

Alternatively, both groups (young and male respondents) may present a different pattern in the type of relationships to which the “last sexual intercourse” question refers to. This is a feature of the data, so if men and younger respondents have a different number of sexual partners, it might be the case that we capture a higher share of occasional intercourse among these groups than among the women or older respondents. For every wave but the 2012 ENJUV wave, respondents are asked with whom did they have their last sexual encounter. 88% of women report having had this last encounter with a stable partner (spouse, fiancé or boyfriend), compared to 71% of men. We do not find substantial difference on the effect of emergency contraception availability along this dimension.²⁴

²³In most other dimensions, men and women are well-balanced. The only differences appear in socio-economic status, urbanization and education of the household head. In all of these, women appear more frequently in the group traditionally reporting lower contraceptive use (lower socio-economic status, more frequently rural and a lower education of the household head), so it is unlikely that differences in contraception use are picking up mere differences in background.

²⁴Results available upon request. Note that relationship status is not included as a control in our baseline specifications as it is not available for the 2012 wave.

Table 5: Heterogeneous effects of emergency contraception on the method used in last sexual intercourse, 15-29 year old (OLS)

	Emergency contraception		Highly effective method		Non-highly effective method		No method	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Panel A: age</i>								
EC pill availability	0.026*** (0.004)	0.027*** (0.004)	0.082*** (0.015)	0.070*** (0.016)	-0.078*** (0.016)	-0.063*** (0.019)	-0.030** (0.014)	-0.034** (0.014)
EC pill availability*age>20	-0.007* (0.004)	-0.007* (0.004)	-0.084*** (0.014)	-0.085*** (0.014)	0.037*** (0.014)	0.038*** (0.014)	0.054*** (0.012)	0.054*** (0.012)
N	24511	24511	24511	24511	24511	24511	24511	24511
R ²	0.015	0.014	0.087	0.090	0.076	0.078	0.029	0.032
<i>Panel B: gender</i>								
EC pill availability	0.028*** (0.004)	0.030*** (0.005)	0.059*** (0.014)	0.046*** (0.016)	-0.054*** (0.017)	-0.039* (0.020)	-0.033** (0.014)	-0.037*** (0.014)
EC pill availability*female	-0.013*** (0.004)	-0.013*** (0.004)	-0.048*** (0.012)	-0.049*** (0.013)	-0.003 (0.011)	-0.003 (0.011)	0.065*** (0.010)	0.065*** (0.010)
N	24511	24511	24511	24511	24511	24511	24511	24511
R ²	0.016	0.015	0.086	0.089	0.076	0.078	0.029	0.033
<i>Panel C: urban</i>								
EC pill availability	0.021*** (0.007)	0.019*** (0.007)	0.007 (0.030)	-0.010 (0.033)	-0.000 (0.027)	0.010 (0.027)	-0.028 (0.025)	-0.020 (0.027)
EC pill availability*urban	0.001 (0.007)	0.004 (0.007)	0.027 (0.030)	0.031 (0.032)	-0.059** (0.024)	-0.055** (0.024)	0.032 (0.026)	0.019 (0.028)
N	24511	24511	24511	24511	24511	24511	24511	24511
R ²	0.015	0.014	0.086	0.089	0.076	0.078	0.028	0.031
Municipality and year FE	✓	✓	✓	✓	✓	✓	✓	✓
Individual characteristics	✓	✓	✓	✓	✓	✓	✓	✓
Municipality-specific time trends		✓		✓		✓		✓

Notes: Robust standard errors clustered at the municipality level are reported in parentheses. * denotes significance at the 10% level, ** at the 5% level and *** at the 1% level. Pill, IUD, diaphragm, injectable and other hormonal contraceptives are considered highly effective methods.

Urban Panel C of Table 5 presents the results by whether respondents were living in an urban or rural environment. Note that municipalities may include both rural and urban sections (although not all do), so living in an urban or rural environment does not necessarily imply a particular type of municipality. 86% of our estimation sample lives in an urban environment.

There is not significant evidence of a different effect between young people living in rural and urban settings. The only significant difference appears in the probability of using a non-highly effective method of contraception, a probability that decreases significantly only in urban settings when emergency contraception becomes available. Although not significant differences are estimated, it appears to be compensated by smaller increases in the probability of using both no method and highly effective methods. Unlike younger respondents and men, there were no major differences in use between groups in 2006 (see Table A2), although the same of rural respondent was arguably small.

6 Robustness checks

Even when controlling for municipality-specific time trends, it might be the case that our measure of emergency contraception availability is capturing time-varying elements that correlate with risky behaviours.²⁵ To address this concern, we now perform a robustness check on the relationship between emergency contraception availability and other risky choices. If the availability of emergency contraception is correlated with unobservables that reduce risky behaviours overall, as suggested by our results, we should expect to find a reduction in risky behaviours such as drug use once the EC pill becomes available.

The ENJUV survey collects information on the probability of having engaged in risky behaviours in the year prior to the interview. In particular, individuals were asked whether they drink alcohol, smoked cigarettes or marijuana or consumed cocaine. About 65% of our sample reported having consumed alcohol over the last 12 months, 52% smoked cigarettes, 20% marijuana and only 2.5% reported having used cocaine.

Table 6 presents evidence of the relationship between emergency contraception availability and these risks. When none or only individual characteristics are included (columns 1 and 2), we observe a positive relationship between risky behaviours (cigarettes and marijuana) and availability of the morning after pill. Once we add controls for municipality and year (columns 3 and onwards), there is no evidence of individuals aged 15 to 29 being more likely to engage in risky behaviours such as alcohol, cigarettes or drug use. Therefore, this table provides additional evidence of the morning after pill having an effect on

²⁵Rashad and Kaestner (2004) document a strong and positive correlation between drug use and adolescent sexual behavior. The literature has not been able to establish a clear causal relationship from the former to the latter (Grossman, Kaestner and Markowitz, 2004; Carpenter, 2005; Yörük and Yörük, 2015).

reducing sexual risky behaviour and not risky behaviours overall.

Table 6: Effect of emergency contraception availability on other risky behaviours (OLS)

	(1)	(2)	(3)	(4)	(5)
<i>Panel A: Alcohol</i>					
EC pill availability	0.063*** (0.011)	0.033*** (0.009)	0.022 (0.020)	0.020 (0.016)	0.026 (0.019)
N	22584	22584	22584	22584	22584
R ²	0.004	0.118	0.002	0.106	0.109
<i>Panel B: Cigarettes</i>					
EC pill availability	0.018 (0.012)	0.004 (0.012)	0.010 (0.015)	0.010 (0.013)	0.010 (0.016)
N	22501	22501	22501	22501	22501
R ²	0.000	0.059	0.003	0.056	0.060
<i>Panel C: Marijuana</i>					
EC pill availability	0.070*** (0.011)	0.039*** (0.008)	0.016 (0.015)	0.014 (0.013)	0.001 (0.015)
N	22113	22113	22113	22113	22113
R ²	0.008	0.075	0.019	0.070	0.075
<i>Panel D: Cocaine</i>					
EC pill availability	0.004 (0.003)	0.001 (0.003)	0.003 (0.004)	0.004 (0.004)	0.003 (0.006)
N	21915	21915	21915	21915	21915
R ²	0.000	0.018	-0.000	0.016	0.018
Municipality and year FE			✓	✓	✓
Individual characteristics		✓		✓	✓
Municipality-specific time trends					✓

Notes: Robust standard errors clustered at the municipality level are reported in parentheses. * denotes significance at the 10% level, ** at the 5% level and *** at the 1% level. Individual controls include age, gender, education, marital status, children, socio-economic status and occupation.

7 Conclusion

This paper studies the consequences of freely available emergency contraception on contraceptive behaviour. In a developing country, we exploit a series of judicial decisions and legislative changes from 2006 to 2013, that allowed variation in the distribution of the *morning after pill* across municipalities and over time. Our results show that transitioning from a context in which emergency contraception was available only through the private health system at a cost to one in which it was available free of charge in the public health system is correlated with an increase in its use by individuals aged 15 to 29. This suggests an unmatched demand for this type of contraception. Interestingly, this change is also correlated with an increase in the use of other forms of modern or highly effective contraception (i.e., hormonal contraception or IUD), and a decrease in the use of

traditional, less effective methods, including condoms. Our results are robust to control not only for individual characteristics and time and municipality fixed effects, but also for municipality-specific time trends, to account for changes over time in unobservables at the municipality level.

This effect is also concentrated in groups of the population who exhibit a lower level of use before the policy change, namely younger individuals (below 20) and men. This suggests that spillovers from emergency contraception availability may be specific to a context of low use of modern contraceptives. These groups may benefit particularly from being in contact with the formal health system regarding their contraceptive choices, and from the additional information that may receive alongside the EC pill. This information may be particularly valuable for individuals approaching the formal health network in an unplanned manner (e.g., after a broken condom). Although our data does not allow us to test this hypothesis, the effect could partially be a by-product of encouraging these groups to get in touch with the formal health system. Conditional Cash Transfer programs (CCTs) in developing countries frequently include as part of the treatment to provide individuals with information on health, hygiene and nutrition.²⁶ In contrast, most literature on developed countries explore variation in over-the-counter distribution of the EC pill, hence potentially driving individuals away from the formal health system.²⁷

Our results are relevant for two reasons. First, it is unlikely that the lack of effect of emergency contraception reported in the literature for developed countries would apply to developing countries. While Chile presents a lower level of contraceptive use than similar countries, low use of hormonal contraception is the norm for regions targeted by these type of policies, either directly by governments or other organizations. Second, it contributes towards reconciling previous results in developed countries showing little effect of emergency contraception with the results of [Bentancor and Clarke \(2017\)](#). The large decrease in fertility observed following the introduction of emergency contraception in Chile may be driven by the overall effect of the policy on contraceptive behaviour, rather than only by emergency contraception itself.

²⁶Mexico's CCT program, PROGRESA, requires all household members to have an annual checkup in a health facility, where special attention is paid to family planning and detection of diseases ([Gertler, 2004](#)). [Barber and Gertler \(2010\)](#) report a better use of pre-natal check-ups for pregnant women who attended information meetings. [Lamadrid-Figueroa, Angeles, Mroz, Urquieta-Salomón, Hernández-Prado, Cruz-Valdez and Téllez-Rojo \(2010\)](#) find that the program increased the use of contraceptives on average, but there was a small decrease in use for those close to the eligibility threshold. Regarding fertility, [Todd and Wolpin \(2006\)](#) and [Stecklov, Winters, Todd and Regalia \(2007\)](#) do not find overall effects of the program (see [Parker and Todd, 2017](#) for a comprehensive review of the effects of PROGRESA).

²⁷[Gross et al. \(2014\)](#) interpret their results of a decrease in sexual assaults reported after easier access to emergency contraception in the U.S. as reducing transaction costs for victims. However, it might also limit access to other services provided to them.

References

- ANANAT, E. O., GRUBER, J., LEVINE, P. B. and STAIGER, D. (2009). Abortion and selection. *The Review of Economics and Statistics*, **91** (1), 124–136.
- ANGELES, G., GUILKEY, D. and MROZ, T. (2005). The determinants of fertility in rural Peru: Program effects in the early years of the national family planning program. *Journal of Population Economics*, **18** (2), 367–389.
- ARCIDIACONO, P., KHWAJA, A. and OUYANG, L. (2012). Habit persistence and teen sex: Could increased access to contraception have unintended consequences for teen pregnancies? *Journal of Business & Economic Statistics*, **30** (2), 312–325.
- BAILEY, M. J. (2006). More power to the pill: The impact of contraceptive freedom on women’s life cycle labor supply. *The Quarterly Journal of Economics*, **121** (1), 289–320.
- BARBER, S. L. and GERTLER, P. J. (2010). Empowering women: how Mexico’s conditional cash transfer programme raised prenatal care quality and birth weight. *Journal of development effectiveness*, **2** (1), 51–73.
- BENTANCOR, A. and CLARKE, D. (2017). Assessing Plan B: The effect of the morning after pill on children and women. *The Economic Journal*, **127** (607), 2525–2552.
- CARPENTER, C. (2005). Youth alcohol use and risky sexual behavior: evidence from underage drunk driving laws. *Journal of Health Economics*, **24** (3), 613–628.
- CASAS, L. and VIVALDI, L. (2014). Abortion in Chile: the practice under a restrictive regime. *Reproductive Health Matters*, **22** (44), 70–81.
- CASAS BECERRA, L. (2008). La saga de la anticoncepción de emergencia en Chile: Avances y desafíos.
- CAVALCANTI, T., KOCHARKOV, G. and SANTOS, C. (2016). Family planning and development: Aggregate effects of contraceptive use. *Unpublished manuscript*.
- DIDES, C., BENAVENTE, M. and MORAN, J. (2009). Entrega de la píldora anticonceptiva de emergencia en el sistema de salud municipal de Chile: Estado de situación, 2009.
- , —, SÁEZ, I., NICHOLLS, L. and CORREA, T. (2011). Provisión de Anticoncepción de Emergencia en el Sistema de Salud Municipal de Chile: Estado de situación, 2011.
- DURRANCE, C. P. (2013). The effects of increased access to emergency contraception on sexually transmitted disease and abortion rates. *Economic Inquiry*, **51** (3), 1682–1695.
- GERTLER, P. J. (2004). Do conditional cash transfers improve child health? Evidence from PROGRESA’s control randomized experiment. *The American Economic Review*, **94** (2), 336–341.
- GIRMA, S. and PATON, D. (2006). Matching estimates of the impact of over-the-counter emergency birth control on teenage pregnancy. *Health Economics*, **15** (9), 1021–1032.

- and — (2011). The impact of emergency birth control on teen pregnancy and STIs. *Journal of Health Economics*, **30** (2), 373–380.
- GOLDIN, C. (1990). *Understanding the Gender Gap*. New York: Oxford University Press.
- and KATZ, L. F. (2002). The power of the pill: Oral contraceptives and women’s career and marriage decisions. *Journal of Political Economy*, **110** (4), 730–770.
- GROSS, T., LAFORTUNE, J. and LOW, C. (2014). What happens the morning after? The costs and benefits of expanding access to emergency contraception. *Journal of Policy Analysis and Management*, **33** (1), 70–93.
- GROSSMAN, M., KAESTNER, R. and MARKOWITZ, S. (2004). Get High and Get Stupid: The Effect of Alcohol and Marijuana Use on Teen Sexual Behavior. *Review of Economics of the Household*, **2** (4), 413–441.
- JOSHI, S. and SCHULTZ, T. P. (2013). Family planning and women’s and children’s health: Long-term consequences of an outreach program in Matlab, Bangladesh. *Demography*, **50** (1), 149–180.
- LAMADRID-FIGUEROA, H., ANGELES, G., MROZ, T., URQUIETA-SALOMÓN, J., HERNÁNDEZ-PRADO, B., CRUZ-VALDEZ, A. and TÉLLEZ-ROJO, M. M. (2010). Heterogeneous impact of the social programme Oportunidades on use of contraceptive methods by young adult women living in rural areas. *Journal of Development Effectiveness*, **2** (1), 74–86.
- LEVINE, P. B., TRAINOR, A. B. and ZIMMERMAN, D. J. (1996). The effect of Medicaid abortion funding restrictions on abortions, pregnancies and births. *Journal of Health Economics*, **15** (5), 555 – 578.
- MILLER, G. (2010). Contraception as development? New evidence from family planning in Colombia. *The Economic Journal*, **120** (545), 709–736.
- and VALENTE, C. (2016). Population policy: Abortion and modern contraception are substitutes. *Demography*, **53** (4), 979–1009.
- MULLIGAN, K. (2016). Access to emergency contraception and its impact on fertility and sexual behavior. *Health Economics*, **25** (4), 455–469.
- MYERS, C. K. (2017). The Power of Abortion Policy: Reexamining the Effects of Young Women’s Access to Reproductive Control. *The Journal of Political Economy*, **125** (6), 2178–2224.
- PARKER, S. W. and TODD, P. E. (2017). Conditional Cash Transfers: The Case of Progresa/Oportunidades. *Journal of Economic Literature*, **55** (3), 866–915.
- POP-ELECHES, C. (2010). The supply of birth control methods, education, and fertility evidence from Romania. *Journal of Human Resources*, **45** (4), 971–997.
- RASHAD, I. and KAESTNER, R. (2004). Teenage sex, drugs and alcohol use: problems identifying the cause of risky behaviors. *Journal of Health Economics*, **23** (3), 493–503.

- STECKLOV, G., WINTERS, P., TODD, J. and REGALIA, F. (2007). Unintended effects of poverty programmes on childbearing in less developed countries: Experimental evidence from Latin America. *Population Studies*, **61** (2), 125–140.
- TODD, P. E. and WOLPIN, K. I. (2006). Assessing the Impact of a School Subsidy Program in Mexico: Using a Social Experiment to Validate a Dynamic Behavioral Model of Child Schooling and Fertility. *The American Economic Review*, **96** (5), 1384–1417.
- UNFPA (2012). *Choices not Chance. UNFPA Family Planning Strategy 2012-2020*. Tech. rep., United Nations Population Fund.
- YÖRÜK, C. E. and YÖRÜK, B. K. (2015). Alcohol consumption and risky sexual behavior among young adults: evidence from minimum legal drinking age laws. *Journal of Population Economics*, **28** (1), 133–157.

Appendix

Table A1: Descriptive statistics: control variables

	2003	2006	2009	2012	2015	All years
Female	0.5464 (0.498)	0.5481 (0.498)	0.5489 (0.498)	0.5475 (0.498)	0.554 (0.497)	0.549 (0.498)
Age	20.845 (4.325)	20.380 (4.229)	20.475 (4.129)	20.769 (4.165)	20.758 (4.142)	20.654 (4.199)
Urban	0.869 (0.337)	0.877 (0.328)	0.837 (0.370)	0.874 (0.332)	0.873 (0.333)	0.866 (0.341)
Catholic	0.572 (0.495)	0.595 (0.491)	0.487 (0.500)	0.483 (0.500)	0.374 (0.484)	0.498 (0.500)
Evangelic	0.151 (0.358)	0.139 (0.346)	0.134 (0.341)	0.130 (0.336)	0.138 (0.345)	0.138 (0.345)
Student	0.492 (0.500)	0.548 (0.498)	0.542 (0.498)	0.571 (0.495)	0.579 (0.494)	0.547 (0.498)
Single	0.870 (0.336)	0.922 (0.268)	0.934 (0.248)	0.942 (0.235)	0.960 (0.196)	0.927 (0.261)
Education						
Primary education	0.114 (0.318)	0.075 (0.263)	0.156 (0.363)	0.081 (0.272)	0.061 (0.239)	0.098 (0.297)
High School	0.646 (0.478)	0.630 (0.483)	0.360 (0.480)	0.572 (0.495)	0.613 (0.487)	0.561 (0.496)
Vocational training	0.098 (0.297)	0.098 (0.298)	0.426 (0.495)	0.125 (0.330)	0.129 (0.335)	0.178 (0.383)
Some college	0.143 (0.350)	0.197 (0.398)	0.058 (0.234)	0.223 (0.416)	0.197 (0.398)	0.163 (0.370)
Socio-economic group						
ABC1	0.048 (0.213)	0.071 (0.257)	0.050 (0.219)	0.061 (0.239)	0.037 (0.189)	0.053 (0.225)
C2	0.133 (0.340)	0.179 (0.384)	0.302 (0.459)	0.194 (0.395)	0.152 (0.359)	0.193 (0.394)
C3	0.265 (0.441)	0.334 (0.472)	0.198 (0.399)	0.305 (0.460)	0.331 (0.471)	0.285 (0.452)
D	0.396 (0.489)	0.323 (0.468)	0.347 (0.476)	0.397 (0.490)	0.416 (0.493)	0.378 (0.485)
E	0.1592 (0.366)	0.093 (0.290)	0.103 (0.304)	0.044 (0.204)	0.064 (0.245)	0.091 (0.288)
Working	0.289 (0.453)	0.281 (0.449)	0.276 (0.447)	0.314 (0.464)	0.309 (0.462)	0.295 (0.456)
Out of labour force	0.530 (0.499)	0.509 (0.500)	0.510 (0.500)	0.545 (0.498)	0.531 (0.499)	0.526 (0.499)
Occupation of household head						
Occasional unskilled worker	0.070 (0.255)	0.074 (0.263)	0.081 (0.273)	0.032 (0.177)	0.085 (0.279)	0.068 (0.252)
Unskilled worker	0.199 (0.399)	0.185 (0.389)	0.185 (0.389)	0.190 (0.392)	0.024 (0.154)	0.155 (0.362)
Skilled blue collar worker	0.319 (0.466)	0.330 (0.470)	0.379 (0.485)	0.411 (0.492)	0.266 (0.442)	0.342 (0.474)
Low skilled white collar worker	0.222 (0.416)	0.320 (0.467)	0.295 (0.456)	0.258 (0.438)	0.347 (0.476)	0.288 (0.453)
Medium skilled white collar worker	0.063 (0.243)	0.082 (0.274)	0.047 (0.212)	0.059 (0.236)	0.233 (0.423)	0.098 (0.297)
Managers	0.008 (0.089)	0.009 (0.092)	0.007 (0.085)	0.004 (0.066)	0.041 (0.199)	0.014 (0.118)
Retired	0.117 (0.321)	0 (0)	0.005 (0.073)	0.031 (0.173)	0.003 (0.060)	0.032 (0.175)
Unemployed	0 (0)	0 (0)	0 (0)	0.010 (0.098)	0 (0)	0.002 (0.046)
Housewife	0.003 (0.057)	0 (0)	0 (0)	0.004 (0.067)	0 (0)	0.002 (0.040)
Observations	6967	6034	7360	7655	7422	35438

Notes: Note: Means and standard deviations (in parentheses). GSE groups are constructed using information on income and living conditions. ABC1 class is regarded as high class, C2 and C3 as middle class and D and E as lower classes.

Table A2: Descriptive statistics of contraceptive use, 2006 ENJUV survey, by group

	Ever sexual intercourse	Contraceptive choice at last sexual intercourse			
		Emergency contraception	Highly effective method	Non-highly effective method	No method
	(1)	(2)	(3)	(4)	(5)
<i>Panel A: age</i>					
Age \leq 20	0.449 (0.497) 3420	0.003 (0.057) 1534	0.242 (0.428) 1534	0.439 (0.496) 1534	0.316 (0.465) 1534
Age $>$ 20	0.927 (0.260) 2614	0.002 (0.050) 2424	0.437 (0.496) 2424	0.285 (0.452) 2424	0.275 (0.447) 2424
<i>Panel B: gender</i>					
Men	0.664 (0.472) 2727	0.002 (0.047) 1811	0.237 (0.425) 1811	0.443 (0.497) 1811	0.318 (0.466) 1811
Women	0.649 (0.477) 3307	0.003 (0.057) 2147	0.467 (0.499) 2147	0.262 (0.440) 2147	0.268 (0.443) 2147
<i>Panel C: urban</i>					
Rural	0.636 (0.481) 740	0 471	0.361 (0.481) 471	0.287 (0.452) 471	0.352 (0.478) 471
Urban	0.659 (0.474) 5294	0.003 (0.056) 3487	0.362 (0.481) 3487	0.352 (0.478) 3487	0.283 (0.450) 3487
Total	0.656 (0.475) 6034	0.709 (0.454) 3958	0.362 (0.481) 3958	0.345 (0.475) 3958	0.003 (0.053) 3958

Table A3: Placebo test: effect of EC availability in 2009 on 2006 and 2003 contraceptive behaviours

	Highly effective contraception	Non-highly effective contraception	No contraception
EC pill availability in 2009	-0.034** (0.016)	0.017 (0.013)	0.019 (0.016)
N	7408	7408	7408
R ²	0.136	0.124	0.041
Year dummies	✓	✓	✓
Individual characteristics	✓	✓	✓