Access to the Emergency Contraceptive Pill and Women's Reproductive Health: Evidence from Public Reform in Chile*

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Abstract

We examine the sharp expansion in availability of the emergency contraceptive pill in Chile following legalised access through municipal public health-care centres. Combining a number of administrative datasets on health outcomes and pharmaceutical use, and using event study and difference-in-difference style methods, we document that this expansion improved certain classes of women's reproductive health outcomes, notably reducing rates of abortion related morbidity. These improvements are largest in areas of the country in which the rollout of the pill was largest. We also document some evidence that refusal to grant the pill upon a women's request is linked with a worsening in reproductive health outcomes.

JEL Codes: I18; J13; K38; H75.
Keywords: Emergency Contraceptives; Maternal Morbidity; Abortion; Event studies; Difference-in-differences; Public health.

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1 Introduction

This study examines whether publicly subsidised access to the emergency contraceptive (EC) pill can impact maternal health. Contraceptive use has been linked with an improvement in maternal health indicators, at least when considering survival (Cleland et al., 2012; Stover and Ross, 2010).[1] Bongaarts and Westoff (2000) had formerly proposed the idea that increasing contraceptive use could reduce abortion, an idea that more recently has been supported by the work of Miller and Valente (2016), who point to modern contraceptives acting as substitutes for abortion. What's more, there is clear evidence that unsafe abortion significantly impacts maternal health and survival (Grimes et al., 2006; Say et al., 2014; Ganatra et al., 2017) as well as evidence in the medical literature that abortive agents bought on the black market[2] are used in the absence of legal alternatives (see eg Grimes et al. (2006)). Thus, a causal chain could plausibly exist which is that the availability of the EC pill reduces clandestine abortions, and the reduction in clandestine abortions results in improvements in health outcomes.

To empirically test for a link between EC pill access and maternal health, we focus on the sharp expansion in availability of the EC pill in Chile over the first two decades of the 21st century. We seek to determine whether this availability resulted in reductions in key maternal morbidity events by examining legislative reform which made the EC pill available for free to any women enrolled in the public health system. In the entirety of the period under study, abortion was completely illegal in Chile, and our working hypothesis is that the EC provides an alternative post-coital contraceptive option for women, potentially avoiding clandestine and unsafe abortions. In line with this, our key

[1] Maternal mortality has received considerably more attention in the literature (Loudon, 1992), and is often referred to as the "tip of the iceberg", with the remaining mass consisting of the many events of maternal morbidity. For every woman who dies due to causes related to child birth, 20–30 more experience events inducing chronic morbidity with ongoing sequelae (Reichenheim et al., 2009; Firoz et al., 2013). As such, in this study we focus principally on morbidity outcomes.

[2] Or even over the counter in the case of misoprostol, which, while designed to treat stomach ulcers, has an off-label effect of inducing abortion in pregnant women.

maternal health measures are those caused by unsafe abortion, in particular inpatient visits classified as abortion related morbidity. We also discuss the impact on other outcomes such as haemorrhage in early pregnancy. We focus on the large number of non-mortal hospital visits (i.e. morbidity), though additionally document effects on mortality.

While we aim to continue a line of research which considers the impact of modern contraceptives on women's health, to our knowledge, this paper is the first study to examine the impact of access to the EC pill on maternal health. This study takes advantage of universal microdata on full inpatient visits, as well as variation in the availability of EC pill over time by municipalities within Chile, providing a credible estimate of the impact of the EC pill. Using recent advances in difference-in-differences style models and event study methods we are able to control for all fixed characteristics at the level of municipalities and time, while also controlling for additional potential confounders, namely, political characteristics of each municipality, and other contraceptive coverage. Our estimates suggest that upon arrival of the EC pill, municipalities which disburse the EC pill see improvements in maternal health outcomes (specifically abortion related morbidity) compared with municipalities which had not yet provided the EC pill. We observe that this effect is most marked in municipalities where there was particularly high request and granting of the EC pill. We additionally observe some suggestive evidence that the opposite result obtains when EC requests are refused: conditional on fixed municipal and time characteristics, abortion morbidity is higher when a municipality denies requests for access to the EC pill.

The roll-out of the EC pill in the Chilean public health system is emblematic, given that there was sub-national variation in availability over a number of years, and an absence of alternative legal[3] post-coital reproductive control outcomes in the country. This paper joins a small number of

[3]We note that the absence of legal options does not imply a lack of access to abortion informally. The work of Drovetta (2015); Palma Manríquez et al. (2018) provides detail about access to medical abortion and information about this procedure in Chile in the time period under study. We return to discuss how this interacts with our estimation strategy and results in sections 3.2 and 5.

studies examining the EC pill in Chile including recent work by Nuevo-Chiquero and Pino (2019), considerably updating and extending earlier work of Bentancor and Clarke (2017), as well as a number of studies examining the EC pill's impact in the USA, UK and other countries (Gross et al., 2014; Durrance, 2013; Girma, 2006, 2011; Mulligan, 2015; Moreau et al., 2009; Hu et al., 2005). These earlier studies, though, have not analysed maternal morbidity—instead focusing on the impact of the EC pill on fertility rates, abortion rates, rates of unplanned pregnancy, and the prevalence of sexually transmitted infection.

In what remains of the paper, we first provide some background on the nature of the expansion of the EC pill in Chile. We then describe the various sources of administrative data used in this paper in section 3.1, and the estimation methodology in section 3.2. We provide all results in section 4, and a brief discussion and conclusion in section 5.

2 Background on The EC Pill and its Rollout in Chile

The EC pill is a post-coital contraceptive which can be taken in the day(s) following unprotected sexual intercourse to reduce the likelihood of conception (von Hertzen et al., 2002). In Chile, the rollout of the EC pill followed a lengthy legislative process resulting in periods of sub-national (municipal) variation in availability of the medication. We note that abortion was illegal in Chile for the entire period of interest of this study, only being legalised in the case of three limited circumstances in 2017.[4] A full discussion of the rollout is provided in Casas Becerra (2008) and Nuevo-Chiquero and Pino (2019); Bentancor and Clarke (2017) (whose empirical strategies we broadly follow). Here we provide a brief overview of the rollout and the way this interacts with our identification strategy (discussed below). Interested readers are directed to Online Appendix B, or the aforementioned

[4] A discussion of induced abortion in Chile over this period is provided by Prada and Ball (2016). This report cites figures suggesting anywhere between 60,000-300,000 clandestine abortions p.a., and highlights that there have been few changes in the methods of clandestine abortion used from 1990 onwards, apart from growing use of misoprostol.

references, where fuller details are available.

Until 2008, the EC pill was completely unavailable in Chile, or available for only very short temporal windows and in limited cases (such as in case of rape). From 2008, a legal finding implied that mayors in each of the country's 346 municipalities could dictate whether the EC pill was available from local primary care clinics (Dides et al., 2009; Dides C. et al., 2010, 2011). There were subsequent legal challenges to EC pill availability, but in practice around half of Chilean municipalities reported that they disbursed the EC pill in the years following the 2008 finding, with the remainder either not providing the EC pill, or only providing it in very restricted circumstances. This municipal variation in EC pill availability lasted for around three years. In these years, there were a number of legal findings which gradually opened access to the EC pill to the entire country. For the sake of our analysis, we consider the period of 2009–2011 to be the period in which there is considerable municipality-level variation in EC pill availability. The end of this period in 2011 was with the passage of national law 20533 which modifies the sanitary code to allow midwives to provide the EC pill.

The fact that midwives were explicitly allowed to provide EC pill is important given that all EC pill requests through the Chilean public health system are channelled through midwives. Public provision of the EC pill in Chile is completely free, with users simply required to request the medication at their local primary care clinic. To do so, they must make an appointment with a midwife at the clinic, as midwives[5] are indicated by law as responsible for providing sexual health advice and contraceptive access (Congreso Nacional de Chile, 2010). This is the same procedure necessary to request any publicly provided contraceptive method including condoms, oral contraceptive pills or injectable contraceptives (which are all also freely provided).

Following 2011, according to the National Norms of Fertility, all midwives are obliged to provide

[5]These are known as *matronas/matrones* (if female/male) and play a key role in the provision of reproductive health and contraceptive advice (see eg Finley Baba et al. (2020) for discussion).

the EC pill upon request provided that the sexual encounter occurred within the last 5 days.[6] Prior to the laws clarifying access (discussed at more length in Appendix B) requests were frequently rejected in line with the Mayor's decision to provide or not provide the EC pill in the municipality (Casas Becerra, 2008). The only requirement for request is that women should be enrolled in the public health system, and associated with a health centre in the municipality. In Chile in the period under study around $3/4$ of all fertile-aged women are enrolled in the public health system, with the remaining $1/4$ enrolled in a the private health system.[7] In the case of the quarter of women who have private health insurance, access to the EC pill required a prescription and could be purchased in a pharmacy at prices of around 18 USD (Casas Becerra, 2008). To our knowledge, comprehensive data on private provision of the EC pill is not available, though anecdotal evidence suggests limited availability in pharmacies around 2008–2009 (Congreso Nacional de Chile, 2010, p. 45). It is important to note that while our aim in this paper is to assess the impact of the free public provision of the EC pill, the legal findings do have impacts on private access to the EC pill through pharmacies, as the initial legal finding clarified that pharmacies could, if desired, provide the EC pill (Nuevo-Chiquero and Pino, 2019, p. 5). We discuss how private provision interacts with our identification strategy below.

3 Data and Methods

3.1 Data

We construct a municipality×year dataset based upon various sources of administrative health records and measures of EC pill availability. We include a number of time-varying controls to capture

[6] The contents of these norms were confirmed in a structured interview with a midwife.

[7] For example, in 2010, figures from FONASA, the public health insurance system, show there were 3,507,325 women enrolled, and figures from the National Institute of Statistics of Chile estimate the total population of fertile-aged women was 4,574,965. This suggests 76.7% of fertile-aged women are enrolled in public health. On average, users of the public health system in Chile have a lower income, though the public health system is widely used across income quintiles (Frenz et al., 2013). All costs related to child birth and prenatal care are covered by the public health system, with users not required to cover out of pocket costs provided they are enrolled in FONASA.

potential determinants of municipal-level rollout.[8] Our data cover the 15 year period from 2002–2016, which we consider as (i) the pre-EC pill period of 2002-2008 which is used as a baseline, (ii) the rollout period of 2009–2011 where we can measure municipal-level variation in availability, and (iii) the full supply period of 2012–2016. In both the "rollout" and "full supply" periods we perfectly observe the number of EC pills disbursed by the Chilean public health system, as we discuss at more length below.

Measures of maternal health Our object of interest, maternal morbidity, is measured by two outcomes: the rate of abortion related morbidity and the rate of hemorrhage early in pregnancy (number of cases per thousand fertile-aged women). Abortion-related causes is a variable often examined in the wider literature when considering the impacts of unsafe abortion and includes all forms of morbidity classified as one of ICD-10 codes O02-O08 (for instance, spontaneous abortion and complications following induced terminations). This coding is provided in Singh and Maddow-Zimet (2016). Secondly, we consider "haemorrhage prior to 20 weeks of gestation" (ICD-10 code O20). This outcome is of interest (a) given its importance as one of the major complications of unsafe abortions (Gerdts et al., 2013; World Health Organization, 2018) and (b) given that it may plausibly respond to the arrival of the EC pill, due to the widespread use of misoprostol as an abortifacient agent in clandestine abortions prior to the availability of the EC pill in Chile. Discussions of the relationship between misoprostol use, clandestine abortion, and haemorrhage are provided in Clarke and Mühlrad (2020); Pourette et al. (2018); Grimes et al. (2006). The key potential mechanism of action is that safe EC pill usage may crowd out unsupervised and potentially unsafe use of misoprostol, which can result in

[8] The municipal determinants of the decision to provide the EC pill have been discussed in Bentancor and Clarke (2017). Among a large number of variables considered, EC pill provision was only robustly correlated with mayoral party, with provision less likely where mayors represented 'conservative' parties. As we discuss in the methods section, our estimates later in the paper do not rely on mayor characteristics being unrelated to the decision to provide the EC pill, just that they are not systematically related to both the precise moment the EC pill was made available, and other investments in maternal health.

severe bleeding. Estimates from medical literature suggest that 22% of deaths due to haemorrhage in the first trimester are caused by abortion (Haeri and Dildy, 2012) (similar values are not reported for non-mortal complications) lending plausibility to this suggested link. We generate municipality level rates of these events from high-quality micro-data registers recording all inpatient hospitalizations in the country (both in the public and private systems), which are available from 2001–2017. These records consist of an observation for each inpatient stay, and include a limited number of covariates such as patient's sex and age, the ICD-10 code registering the reason for the stay, and the date of entry and exit.[9] While we capture any hospitalization using this data, we will *not* observe any ambulatory visits to primary care clinics. In general these visits will be far less serious. It is however important to note that all estimates in the paper do not account for these cases.[10]

Measures of EC pill rollout and usage We generate two measures of rollout and usage of the EC pill in Chile, which is our principal independent variable of interest. For the rollout, our first indicator is a dummy variable, coming from a series of telephone surveys conducted by FLACSO between 2009–2011 (Dides et al., 2009; Dides C. et al., 2010, 2011). In these surveys, local health centres in each municipality were asked whether they prescribe the EC pill, and under what circumstances. If the centres respond that they do, the municipality is classified as providing EC. If they report that they do not, or that they only provide it in the limited case of rape, then they are classified as non-pill municipalities. Secondly, for measuring intensity of use, we generate a rate of pill disbursements and a rate of pill rejections, by harmonizing previously unused administrative data provided by the MoH.

[9] We observe the universe of 26.2 million hospital visits occurring over this period, 99.74% of which are correctly matched to the municipality of residence of the patient. These data unfortunately don't include richer covariates such as religion or ethnicity.

[10] While we do not have access to microdata for ambulatory visits, macro-level information shows that there are many such visits in the country each year. For example, in 2016 nationwide there were 755,547 ambulatory visits classified as gynecological check-ups. This compares to 299,855 hospitalizations for reasons related to maternal health in this period. Thus, our microdata captures only one (important) margin of healthcare utilization. It is worth noting, that for both principal morbidity outcomes (haemorrhage and abortion related causes), a large majority of cases would be expected to be treated in hospital, as laid out in the Government's technical treatment guidelines (Ministerio de Salud, 2011).

In the case of rejected pill requests, these only began being recorded in 2010, so data on this is not observed in 2009. A graph of the number of municipalities recorded to allow EC pill disbursement, and the actual disbursements according to MoH Data is provided as Figure 1. In Appendix Table A1 we document that these sources are in general agreement. We note that in a small number of cases, municipalities which report that they will not prescribe the EC pill in telephone surveys actually do prescribe the EC pill. In these cases, we update the measure of availability such that these municipalities are correctly recorded as allowing the EC pill.

Other municipal level records Finally, we collected or generated a number of other data sources at the municipal×year level. These are (a) the population of fertile-aged women (provided by the National Statistical Institute); (b) the identity, sex and party of each municipal mayor and his/her vote share (from the Electoral Service); (c) administrative records on all other contraceptive disbursements through the public health service, and placebo health outcomes generated from the same administrative health records (male morbidity, and morbidities in the puerperium period).

Combining these data sources, we were able to ensemble a dataset of a maximum of Chile's 346 municipalities over 15 years of data, or 5190 observations/registers. A small number of observations have missing measures in certain periods. In particular, our measure of EC pill availability has 103 missing observations for years in which municipalities did not provide information on their pill disbursement status. Similarly, the measure of refused pills is not recorded in 2009 only. We document summary statistics in the following section.

3.2 Methods

We exploit the staggered arrival of the EC pill to different municipalities by estimating the following panel event-study specification:

$$Health_{ct} = \alpha_0 + \sum_{j=-8}^{9} \delta_{-j} \Delta \text{EC Pill}_{c,t+j} + X'_{ct}\Gamma + \phi_c + \mu_t + \varepsilon_{ct}. \quad (1)$$

Here we follow the notation of Freyaldenhoven et al. (2018), where $\delta_{-1} = 0$ so that our reference period is one year prior to adoption in each municipality. We are interested in the 9 yearly leads and 8 yearly lags of the policy change, where leads capture any prevailing trends prior to the reform in earlier versus later-adopting municipalities, and lags show the change in health outcomes following EC pill availability. Given variation in reform timing, initial leads and lags capture differences in treatment status (treated vs. untreated), while later periods capture pure variation in timing. Year and municipal fixed effects μ_t and ϕ_c absorb time- and municipal-invariant factors, and standard errors are clustered by Chile's 346 municipalities. As well as capturing any dynamic impacts of the reform, for example growing knowledge diffusion, specification 1 provides evidence in favour of parallel (pre-)trends if we can reject that each $\delta_j = 0 \; \forall \; j < 0$, given that *prior* to the reform outcomes in both treated and untreated municipalities were following similar tendencies.

$Health_{ct}$ refers to average rates of morbidity and EC $\text{Pill}_{c,t}$ refers to the availability of the emergency contraceptive pill in municipality c at time t. We include time-varying controls X_{ct} capturing socio-political characteristics of each municipality, as laid out in the Data section, though also show specifications without controls. Observations are consistently weighted by population.[11] It is important to note that in all cases, EC Pill refers to free provision by the *public* health system. In Chile,

[11] We do, however, document unweighted results, but our preferred estimates always weight by population to ensure that estimates are not driven by municipalities with very few hospitalizations where small total shifts can result in very large proportional changes.

following the passage of the EC pill laws, the pill was also sold at private pharmacies. Unlike public data, official data on EC pill usage in the private system is not available (Fernández et al., 2016). Thus, all estimates refer to the impact of the public reform. While we cannot formally assess the impact of private market provision without data on disbursements, if private provision fills gaps not met by the public health system 'spilling over' to areas not yet treated by the public system, our estimates will understate the actual full effect of EC pill availability (Clarke, 2019).

Panel event study models such as those in equation 1 have a number of significant advantages over standard parametric 'single-coefficient' two-way fixed effect models of the following form:

$$Health_{ct} = \alpha + \beta \text{EC Pill}_{ct} + X'_{ct}\Gamma + \phi_c + \mu_t + \varepsilon_{ct}. \tag{2}$$

where EC Pill_{ct} is a binary variable indicating the EC pill is available in municipality c and time t. Specifically, they take care of recent critiques that single coefficient models may be biased if effects are heterogeneous over time (Goodman-Bacon, 2018). However, recent advances by de Chaisemartin and D'Haultfœuille (2020) propose an estimator to avoid issues relating to heterogeneous impacts over time and time-varying adoption of policies. We thus follow their proposed DID_M estimator in line with equation 2 (full details of this method are included in Online Appendix C).[12] This estimator consists of comparing outcomes between all units which change their EC pill status to those which have not yet changed, around the time that the policy change occurs. This is implemented following de Chaisemartin et al. (2019), where we can observe both immediate changes, and changes over the following two years given the variation in treatment adoption. We additionally estimate mirrored leads as placebo tests, which implement the same comparisons between changing and non-changing units, but in periods entirely before treatment is adopted. As well as allowing for a single

[12] We acknowledge an anonymous referee for suggesting this strategy.

summary estimate, this method offers the benefit that all identification is drawn off the time period in which the staggered adoption of the EC pill occurred. We consistently conduct inference using a block-bootstrap procedure allowing for within-municipality correlations over time. We additionally explore one specification where EC Pill$_{ct}$ is replaced with Pill Rejected$_{ct}$, indicating whether each municipality *refused* to disburse requested EC pills in a given year.

We finally propose a series of models to take advantage of the *intensity of use* of the EC pill. The first is a fully interacted event-study specification, where we re-estimate equation 1, however we now estimate a series of lags and leads for three municipality types, (low/medium/high intensity) based on terciles of EC pill disbursements from official MoH disbursement data. Specifically:

$$Health_{ct} = \alpha_0 + \sum_{i=1}^{3} \sum_{j=-8}^{9} \delta_{i,-j} \Delta \left(\text{EC Pill}_{c,t+j} \times \text{Pill Intensity} = i \right) + X'_{ct}\Gamma + \phi_c + \mu_t + \varepsilon_{ct}, \quad (3)$$

where all details follow equation 1, however we now stratify by municipal treatment intensity (indexed with i here). Controls X'_{ct} are included separately for each tercile exposure group.[13] This model extends equation 1 to examine whether any health impacts are larger in areas with more intensive usage of the EC pill. Note that here we are simply breaking down average impacts from equation 1 into intensity-specific groups in a single model, allowing for treatment heterogeneity where groups are constant over time. Here heterogeneity is considered by intensity of policy adoption. Such models documenting heterogeneity in a DD setting are frequently estimated, see for example Bhalotra and Venkataramani (2015) (by race/age), and Myers and Ladd (2020) (by exposure time). Finally, for completeness, we additionally document effects based on a single-coefficient two way FE model, where the EC Pill indicator from 2 is replaced with a measure of the rate of pill disbursements in a

[13] The separation into terciles of intensity of EC pill usage is an arbitrary choice. We could present alternative groups, however this complicates the presentation of results and challenges statistical power, and as such we limit results here to three policy-specific exposure groups.

given municipality per 1000 women:

$$Health_{ct} = \alpha + \beta \text{Pill Disbursements}_{ct} + X'_{ct}\Gamma + \phi_c + \mu_t + \varepsilon_{ct}. \quad (4)$$

Here, once again any municipal-specific or time-specific factors are captured by respective fixed effects, and β captures the intensive margin impact of EC pill availability. As in the case of equation 2, rather than estimate this model using OLS, we follow the de Chaisemartin and D'Haultfœuille (2020) DID_M procedure, where we additionally consider one specification where Pill Disbursements$_{ct}$ is replaced by Pill Rejections$_{ct}$ to consider the (extensive margin) impact of rejected EC pill requests. Additional details related to estimation are provided in Online Appendix C.

4 Results

4.1 Descriptive Statistics

We provide descriptive plots of the two principal health outcomes over time in Figure 2.[14] In the case of abortion-related morbidity (panel (a)), while there is a slight downward trend from 2002-2008, there is a clear and sharp reduction following the rollout of the EC pill in Chile in 2009. In the case of haemorrhage early in pregnancy (panel (b)), there is considerably less evidence suggestive of a trend-break, with a general reduction in cases observed from 2002 to 2017.

Descriptive statistics of all morbidity and contraceptive measures by municipality and year are provided in Table 1. We observe that morbidity for abortion early in pregnancy is considerably more common than haemorrhage, at around 5.8 and 1.3 cases per 1,000 fertile-aged women respectively. Rates of morbidity in the puerperium are a similar order of magnitude to abortion early in pregnancy, at 5.4 cases per 1,000 fertile-aged women.[15] On average, each municipality prescribes 22 EC pills

[14] Plots by quinquennial age group are provided in Appendix Figures A1 and A2.
[15] As we discuss in section 4.3, we will consider this in placebo tests.

per year, though larger municipalities prescribe many more, with maximum disbursements of 1,029. The number of pills refused is considerably lower, at around 2.4 per municipality on average, though once again we note that there are municipalities who refuse many requests, with a maximum of 914 per year.

4.2 EC Pill Rollout and Morbidity Outcomes

Binary Treatment Measures Capturing EC Roll-out In Figure 3 we present main event study specifications following equation 1, reporting 90 and (as standard) 95% confidence intervals. Here we consider a baseline model with time-varying controls, and discuss a number of alternative specifications including models without controls in section 4.3. Figure 3 panel (a) displays the event study for rates of abortion morbidity. All pre-EC pill leads are observed to be close to zero and quite flat, with no significant differences observed between early and later adopters in the pre-reform period. In the post-reform period we observe a gradual reduction occurring with a downward movement observed even the first year of the EC pill's adoption in a given municipality. However, given that standard errors are quite large, these impacts are only observed to be significant from around the fourth year post-EC pill adoption. The effect size grows constantly over time, in line with the expanding availability of the EC pill in the country (refer to Appendix Tables A2-A3). In the first year of EC pill adoption, point estimates suggest an (insignificant) 0.2 fewer cases of abortion related morbidity per 1,000 women, growing to 1 fewer case per 1,000 women 4 years post-adoption, and slightly more than 2 fewer cases per 1,000 women 8 years post-adoption.

In Figure 3 panel (b) we present results for rates of haemorrhage early in pregnancy, observing no statistically significant change post-EC pill reform. This suggests that health improvements owing to EC pill availability in this context are channelled through fewer observed cases of abortion related

morbidity in hospitals, rather than a fall in cases classified as haemorrhage early in pregnancy.[16] While in general our preferred specifications are weighted based on the population of women in each municipality, we present unweighted specifications in Appendix Figure A3, observing similar patterns in the case of abortion related morbidity (a reduction post-EC rollout) however with slightly wider confidence intervals, however a slight reduction in the case of heamorrhage early in pregnancy when not weighting by the population of women. It is important to note that in the case of haemorrhage early in pregnancy this is suggestive of impacts observed in smaller municipalities which receive relatively larger importance in unweighted specifications.

In Figure 4 we present alternative DID_M estimates which explicitly contrast changers with non-changers in the period surrounding the reform. In panels (a) and (c) we present full DID_M dynamic and placebo estimates quantifying the impacts of EC pill availability on abortion related morbidity and haemorrhage respectively (panels (b) and (d) are discussed in the following paragraphs). Each coefficient compares morbidity rates between municipalities who gained access to the EC pill, and those whose status did not change. Pre-treatment years (-3, -2 and -1) are placebo estimates given that they compare similar changes in periods *before* the adoption took place. In the case of post-treatment lags (0, 1 and 2), estimation is driven by areas whose treatment status remains constantly switched on for 1, 2 and 3 years respectively.[17] In the case of abortion related morbidity, we observe results broadly in line with those documented in event studies. While pre-adoption leads are small and centred around zero, an immediate reduction is observed the year EC pill became available, growing to significant impacts at slightly over 1 fewer case per 1,000 women 2 years post-reform. In this case, the global estimate considering all dynamic leads following de Chaisemartin et al. (2019) is estimated at -0.837 fewer cases of abortion per 1,000 women. Note that this effect is sizeable when considering

[16] Note from Table 1 that the total rate of abortion related morbidity is around 5 times higher than cases classified as haemorrhage early in pregnancy.

[17] Here, given that identification is drawn entirely by units which *change* treatment status, and changes in treatment status all occur in some period between 2008-2011, we cannot estimate greater than 3 pre- and 3 post-treatment indicators.

the total number of cases in the population, accounting for slightly more than 12% of inpatient cases relating to abortion in the pre-reform period. In the case of haemorrhage early in pregnancy, similar patterns are observed to those from event studies, with both insignificant placebo and post-treatment indicators, once again suggesting no significant change in rates of haemorrhage flowing from the EC pill availability.

In Appendix Table A4 we present total treatment effects for each of these variables (pooling all post-treatment indicators) in each quinquennial age group from 15–19 years up to 45–49 years. Column (a) presents the global summary of panels (a) and (c) of Figure 4. We observe that the global impact of -0.837 in the case of abortion related morbidity is driven mainly by younger women, with significant impacts among the 15–19 year old population and the 25–29 year age group. In the case of haemorrhage early in pregnancy, in weighted specifications we observe insignificant estimates across the entire age spectrum. In Appendix Table A5 we present similar estimates without weighting by municipal populations, here observing reductions in abortion related morbidity, and again, some evidence suggestive of reductions in haemorrhage when population weights are not applied.

The Impact of Rejection of EC Pill Requests on Outcomes Panels (b) and (d) of Figure 4 consider the role that *rejected* requests for the EC pill plays on maternal health outcomes. We present identical models as those presented in panels (a) and (c), but rather than considering whether a municipality officially allows EC pill disbursements, examine the impact of municipalities officially rejecting EC pill requests from women. In the case of abortion related morbidity, we observe opposite impacts to those described based on EC pill *availability*. Where municipalities ever reject EC pill requests, we observe slight increases in the rate of abortion related morbidity, with a point estimate of 0.176 additional cases in the post EC-period. This point estimate accounts for around 3 percent of the baseline rate of abortion related morbidity nationwide. In turning to haemorrhage early in pregnancy,

while a similarly signed effect is observed with a large magnitude (0.074 *more* cases following EC pill rejection), in this case effects are not statistically significant.

Combining Binary Treatments with Intensity of EC Pill Usage Finally, we turn to a number of models to consider the *intensity* of use of the EC pill and the impact of total disbursements on health outcomes. In Figure 5a, we document that high-intensity pill municipalities have the largest reduction in abortion related morbidity following the introduction of the EC pill. Indeed, when stratifying by the intensity of EC pill rollout, only in this highest intensity group are effects immediately significant, with point estimates generally begin the most negative among all groups. In the first three post-EC pill periods, reductions of between 0.8 to 1 fewer case of abortion related morbidity are observed per 1,000 women. In medium-intensity areas significant effects are also observed, though they emerge more gradually, while in low-intensity areas significant effects are never observed. We replicate these results for haemorrhage early in pregnancy in Figure 5b. In this case, and in line with the fact that we never observe significant impacts in the entire population on rates of haemorrhage early in pregnancy, we observe no significant effects at any point (either pre- or post-treatment) or in any group – additional evidence suggesting that effects are largely focused on maternal morbidity cases classified as owing to abortion.

For completeness, we also present DID_M estimates following equation 4 where our treatment variable is now the number of pills disbursed per 1,000 women. These models are presented in Table 2. Table 2 provides a summary of all DID_M models, presenting first, for comparison, the binary models discussed above (in column 1 for EC pill availability and 3 for EC pill rejection), and then using continuous measures in columns 2 and 4. In column 2, we consider DID_M estimate following de Chaisemartin and D'Haultfœuille (2020) where instead of a simple binary availability measure we consider a treatment measure capturing the number of EC pills disbursed per 1,000 women in the

municipality. Then in column 4 we consider a similar model, but rather than EC pill disbursements per 1,000 we consider EC pill rejections per 1,000 women.

In panel A column 1 we observe the (previously discussed) clear reduction in rates of abortion following EC-pill availability. In column 2 we also observe that the point estimate (of -0.062 fewer cases) is suggestive of *larger* reductions in abortion related morbidity in municipalities with more EC pill disbursements. However, these continuous models are estimated with considerable imprecision, suggesting quite wide confidence intervals, overlapping zero. Broadly similar patterns are observed when considering EC pill rejections in columns 3 and 4. There is evidence of a clear and significant (at least at 90%) increase in rates of abortion when municipalities refuse to disburse EC pills, and rates of abortion related morbidity are estimated to be higher when rates of EC pill rejection are higher, but this latter 'continuous' effect is not estimated with sufficient precision to reject a null of no gradient in levels of intensity.

4.3 Placebo Outcomes, Alternative Explanations and Additional Tests

Despite the event-study evidence and lack of pre-trends, we still may be concerned that these results are capturing systematic differences in prevailing health outcomes within municipalities. If for example, at the same time the EC pill was adopted municipalities engaged in general health-promoting policies or more aggressive contraceptive campaigns, our estimates may capture this, rather than a true EC pill effect.

We examine this in a number of ways. First, in all results documented in the paper we include controls for a mayor's party, gender, and vote share upon election. Recent work by Nuevo-Chiquero and Pino (2019), which provides a comprehensive analysis of the EC pill rollout and its impacts on other contraceptive use, suggests that the EC pill in Chile may have—beyond any direct effect—also had a technological change effect given that it caused shifts towards more modern contraceptive methods.

We have collected and systematised administrative records on the full coverage of contraceptive methods used in Chile for the entire population covered by the public health system. These data record all freely provided contraceptive methods disbursed by the state. In Figure 6 we plot trends in alternative contraceptive methods used in Chile between 2003 and 2017 based on these administrative data. It is interesting to note in Figure 6 that there has been a clear and gradual shift in contraceptive methods used within the public health system in the country, in particular, a steady shift away from the copper IUD and towards injectable birth control methods. We have thus additionally included time-varying controls capturing coverage of other modern contraceptive methods in all the models displayed up to this point in the paper.[18]

We do, however, document that our results are not driven by these particular control variables and modelling choices. In Appendix Figures A5, A6, A7, A8 we replicate our analysis of the health impacts of the EC pill unconditional on time-varying controls and observe that in each case, the documented findings are substantively similar. We also documented that the previously documented results are not sensitive to including only political controls (refer to online Appendix Figures A9, A10, A11 and A12, corresponding, respectively, to Figures 3a, 3b, 5a and 5b).

More generally, to provide a test of the idea that these results may be capturing general improvements in health rather than anything related to the EC pill, we conduct a number of placebo tests. These tests consist of estimating identical specifications following equation 1, however now using health outcomes which do not plausibly depend on EC pill availability. The first of these is a pure placebo test where we consider rates of male morbidity between the ages of 15-49. This is an analogous age to the reproductive health outcomes considered previously, however for men rather than

[18] We note tha data that we could harmonize on full contraceptive measures is only available at the level of each health service in Chile, while our principal regressions are each based on data at the level of each municipality. Each health service includes multiple municipalities, and so the rates of birth control coverage refer to average coverage at the level of each health service, rather than each individual municipality. In Appendix Figure A4 we document the correspondence between health services and municipalities within the country.

women. We consider an alternative placebo based on morbidity during the puerperium period for women aged 15-49. While this will not reflect the mechanism discussed earlier in which the EC pill can act as a substitute for clandestine abortion, it is not necessarily a perfect placebo if the EC pill impacts the *composition* of cohorts of mothers.[19]

In Figure 7 we present these results. Figure 7(a) documents the impact of the roll-out of the EC pill on all-cause male morbidity. We observe no significant impacts, with results clustered around 0 cases per 1,000 men (the mean for this outcome displayed in Table 1 is around 30 inpatient visits per 1,000 men per year), suggesting the findings discussed earlier in the paper are not simply proxying generalised improvements in health occurring earlier in municipalities which adopted the EC pill earlier. We document results for complications in the puerperium in Figure 7(b). Once again, we observe no statistically significant lag or lead terms, although point estimates are slightly noisier. These results again suggest that the reproductive health outcomes documented earlier are not simply proxying general improvements in health, or even general improvements in maternal health, but are specific to causes early in gestation, consistent with the EC pill acting to crowd-out unsafe health behaviours early in pregnancy. We additionally note that these placebo tests hold even when considering intensity of use of the EC pill and DID_M models. Identical event studies estimated by different terciles of EC pill use (as presented for the main outcomes in Figure 5) are displayed in Appendix Figure A13, and DID_M models are presented in Appendix Figure A14 and Appendix Table A6, in all cases with no significant effects.

Throughout this paper our main interest has been considering maternal *morbidity* outcomes. In Appendix results we document alternative measures of interest. Table A7 and Figures A15-A16 present estimates using birth rates, which broadly agree with findings from Bentancor and Clarke

[19] We note however that Bentancor and Clarke (2017) find relatively little evidence for changing composition of mothers following the EC pill, at least in terms of education and age.

(2017) (albeit with considerably wider confidence intervals in event study models) pointing to larger impacts among younger women, with the largest impacts observed among the ages of 25–29 in Appendix Table A7, (trends are provided in Figure A17). Of particular interest are results from Appendix Figure A18 and Table A8 which document the same estimates for maternal *mortality*. In the case of mortality, as documented in Figure A18 we do not observe any significant impacts on average, in line with the idea that these events represent just a very small 'tip of the iceberg' of maternal health outcomes.[20] This underlies the importance of focusing on maternal morbidity outcomes to capture the full weight of reform impacts.

5 Discussion and Conclusion

In this study we examine the impact of the EC pill on a number of women's health outcomes. To do so, we consider the case of a municipal-rollout in EC pill availability in Chile's public health system. This is an illustrative case, given that unlike a number of other studies of the rollout of the EC pill, in the entire period under study abortion was illegal. This work is the first to our knowledge which has full measures of both the intensity of usage of the EC pill in the publich health system as well as a measure of unfulfilled requests, in a setting where there is a sharp expansion in the availability of the EC pill. We document that in this case, the availability of the EC pill can have appreciable impacts on women's health outcomes, and in particular observe that a higher intensity of EC pill disbursement is associated with reductions in rates of abortion related morbidity. Our evidence suggests that this is the principal morbidity class impacted, with much less evidence to suggest impacts on rates of haemorrhage early in pregnancy.

These results are at odds with a number of previous evaluations of the impact of the EC pill,

[20] The magnitudes in Chile are small. In 2014, 34 maternal deaths occurred in the country and 252,194 live births occurred, giving a maternal mortality ratio of 13.5 deaths per 100,000 live births. Of these 34 deaths, only 3 were classified as owing to abortion.

which often find no, or small, impacts at the population level. We have conducted several robustness checks which indicate that these results are not an artifact/spurious, but that, in Chile during the period we study, the municipal rollout and usage of the EC pill indeed had beneficial effects on maternal morbidity. A potential explanation of these divergent results owes to context. Unlike previous studies often based in the UK and US, this study examines a setting were abortion was entirely illegal. Thus, a potential explanation of these results is that growing EC pill availability reduced the need to be exposed to the health risks inherent in clandestine abortion.[21] Our results are consistent with the EC pill and abortion functioning as substitutes in at least some cases, particularly in contexts where access to abortion is limited. This finding echoes results in Miller and Valente (2016),[22] providing evidence on a particular expansion in the supply of contraceptive methods. More importantly, our results indicate that the EC pill can improve women's health in this context where access to abortion is severely restricted. Even though access to some type of abortion is legal in most countries of the world, restrictions on access are not only common, but have been increasing in recent years, particularly in the U.S. (Stotland, 2018), suggesting a broadening relevance for the results in this study.

The results of this paper suggest that the impact of the EC pill may be relatively large in this context. Based on the "DID_M" results estimated in the paper, a back of the envelope calculation suggests that as many as 27,000 cases of hospitalizations related to abortion may have been avoided due to this EC pill availability.[23] Regardless of the number of hospitalizations avoided, it is worth noting that the wholesale price of an EC pill to the government varied between $1.50 USD to $8.22

[21] We unfortunately are not able to directly measure rates of induced abortion, and certainly our outcomes include morbidity related to spontaneous abortion, therefore, this statement is only speculative.

[22] Miller and Valente (2016, p. 979) state "This finding has important implications for public policy and foreign aid, suggesting that an effective strategy for reducing expensive and potentially unsafe abortions may be to expand the supply of modern contraceptives"

[23] Full calculations are provided in an earlier working paper version of this study (Clarke and Salinas, 2021, section 4.3). Such back of the envelope calculations should nevertheless be taken as being simply suggestive and illustrative given that the public reform opened the door also for provision of the EC pill by the private sector through pharmacies, and we are unable to observe data on private provision of the EC pill through pharmacies.

USD[24], while estimates presented by the Chilean Budgetary Department suggest that, on average, a single night of hospitalisation costs 43,842 CLP (Instituto de Administración de Salud, 2016) (or around 60 USD at current exchange rates). These rough estimates, which only include the direct savings in terms of hospitalisation, suggest that the public provision of EC pills may pay for itself various times over.

While the Chilean case offers a number of important lessons and an ideal setting to study the EC pill in isolation of abortion, there are a number of limitations to this study. Our measures of EC pill and contraceptive use covers only the population using the public health system, and does not capture private provision. These results should thus interpreted with this in mind. Secondly, while the rollout of the EC pill depends on decisions beyond the scope of each woman who requests EC pills, it is still based on a political calculus, namely depending on mayoral decisions. Similarly, as discussed in the body of the paper, while this study covers a considerable variation in availability of the EC pill in each municipality, it is impossible to isolate all variation in availability of the EC pill in the country given the sporadic availability of the EC pill in the lead up to the reform, as well as the ability of women to simulate the EC pill with the ordinary oral contraceptive pill. Finally, we note that while abortion was not legal during the time of the rollout of the EC pill, evidence suggests that information and usage of (clandestine) medical abortifacients has been on the rise, and that this also should reduce complications and hospitalizations (Drovetta, 2015). This thus offers a competing explanation for the reduction in rates of hospitalization observed in aggregate figures, however to bias our estimates, usage of such procedures would need to be more intense in early adopting municipalities.

This research relates to an established and growing body of work documenting the importance of women's autonomy as a determinant of health (see eg Bloom et al. (2001)). In particular, we find

[24] These records were compiled from CENABAST, (the National Centre for Medical Provision), and are available for 9 different bulk purchases of the EC pill from 5 different suppliers from between 2015–2020. We searched for all purchases using the generic name Levonorgestrel, which covers 3 different brands supplied (Cerciora, Escapel-2, and Pregnon).

some evidence that a higher rate of rejected pill requests is associated with higher rates of abortion related morbidity, possibly because women who see their request unfulfilled end up using far riskier options to terminate their pregnancies. There is an ample range of variation in the rejection of pill request in the period we studied, with certain municipalities denying several hundreds of pill requests a month. Certainly, some requests are rejected for medical reasons, such as a late timing of the request. However, in the particular case of Chile, there is reason to think that rejections were not only medically based. During the years in which access to the EC pill was contingent on the mayor's will, anecdotal evidence suggested the existence of "ideological rejections". For instance, the mayor of the largest municipality of the country stated that the EC pill was against his moral principles and that he would not allow its disbursement.[25] Our results suggest that these type of decisions not only go against the right of women to make autonomous decisions about their own body and reproductive function, but severely hinder women's health.

[25] Such press coverage (in Spanish) can be found, for example, here (archived copy provided): https://web.archive.org/web/20201123174000/https://www.elmostrador.cl/braga/2017/06/13/vecina-de-puente-alto-le-reclama-a-ossandon-que-no-entregan-pildora-del-dia-despues-en-municipios-de-derecha/.

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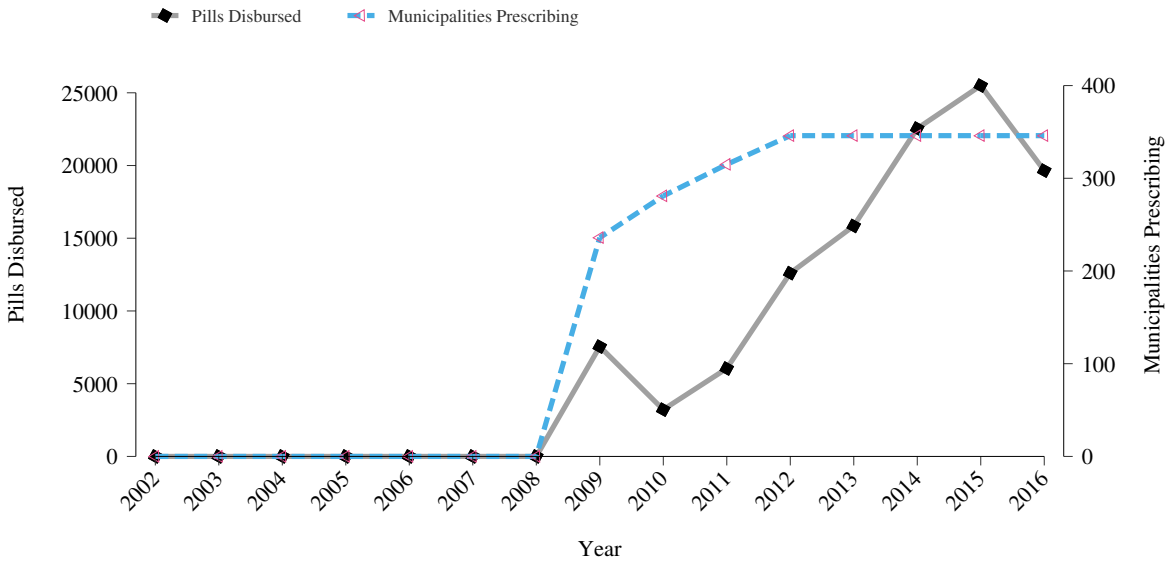
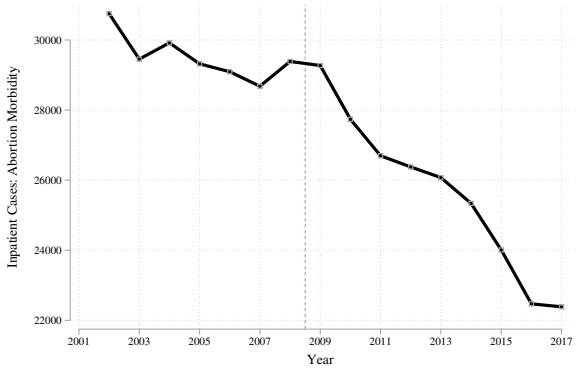
Figures and Tables

Figure 1: The Rollout of the Emergency Contraceptive Pill in Chile

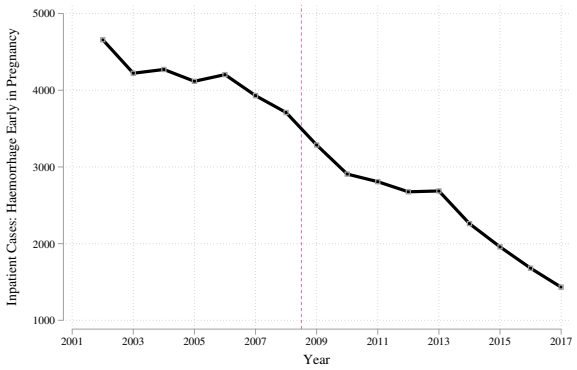


Notes: Administrative data on pill disbursements were transcribed from the full Monthly Health Statistics (*Resúmen de Estadísticas Mensuales*) of the Ministry of Health of the Government of Chile. These values were provided in a series of disaggregated online ledgers by the MoH. We have transcribed these ledgers to form a consistent municipal level register of all EC pills disbursed. A research assistant first transcribed this data by hand. A full audit of the transcription was then conducted, with discrepancies in transcription found in 0.29% of cases. These were corrected in the audit, resulting in the final database.

Figure 2: Descriptive Trends of Main Morbidity Outcomes of Interest



(a) Abortion Morbidity



(b) Haemorrhage

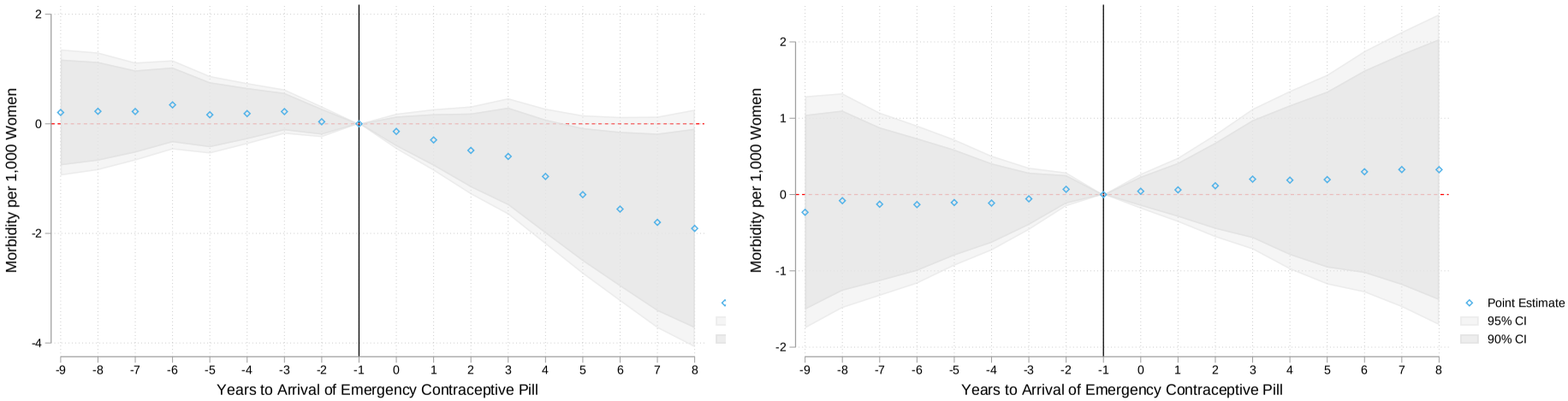
Notes: All cases of morbidities are calculated from administrative health data on all hospitalizations in the country. Abortion morbidity refers to all ICD-10 codes capturing pregnancies with abortive outcomes (O02-O08) and Haemorrhage refers to "Haemorrhage early in pregnancy" (ICD-10 code O20).

Table 1: Summary Statistics

	Obs.	Mean	Std. Dev.	Min.	Max.
Number of Cases of Abortion Related Morbidity (15-49)	5190	79.88	130.93	0	1037
Number of Cases of Haemorrhage Early in Pregnancy (15-49)	5190	9.51	13.22	0	145
Number of Complications Related to the Puerperium (15-49)	5170	30.86	50.49	0	1135
Number of Cases of all Cause Male Morbidity (15-49)	5170	345.93	499.42	0	6603
Population of Fertile-Aged Women (15-49)	5190	13016.50	21084.08	10	175979
Population of Fertile-Aged Men (15-49)	5190	13157.60	20848.55	68	173079
Abortion Morbidity per 1,000 Reproductive Age Women	5190	5.81	4.17	0	200
Rate of Haemorrhage per 1,000 Reproductive Age Women	5190	1.38	1.87	0	18
Rate of Complications Related to the Puerperium	5170	3.00	3.67	0	100
Rate of Male Morbidity per 1,000 15-49 year-old Men	5170	30.38	16.53	0	325
Municipality Has Pill Availability	5190	0.49	0.50	0	1
Number of Pills Disbursed	5190	21.77	74.58	0	1029
Number of Pills Refused	4844	2.43	22.78	0	914
Pills Disbursed per 1000 Women	5190	1.92	8.60	0	405
Pill Requests Rejected per 1000 Women	4844	0.38	12.55	0	862

Notes: Summary statistics are documented for municipality by year cells, based on administrative data on inpatient stays released by the Chilean Ministry of Health, and measures of the availability and usage of the morning after pill collected by survey, and in a municipal health surveillance system. There are 346 municipalities in Chile, and so a maximum of 346 cells per year. Information on populations is provided by the National Institute of Statistics. As codified in Decree 1671 of the MoH, any hospitalisations must be recorded in a standard way, and records exist for each visit starting at the administrative point of entry to the hospital, so will capture visits even if they are for less than one day.

Figure 3: Event Study Tests of the Impact of the EC Pill on Maternal Health Outcomes



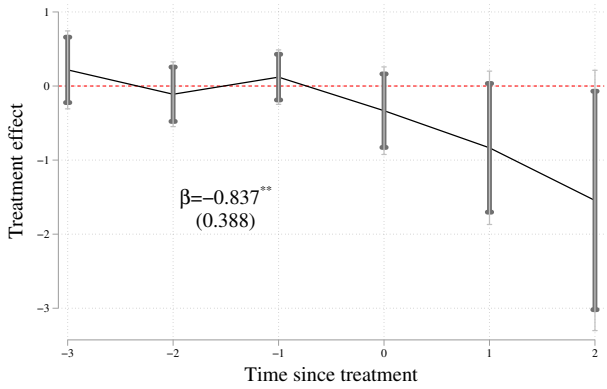
(a) Abortion-Related Morbidity

(b) Haemorrhage Early in Pregnancy

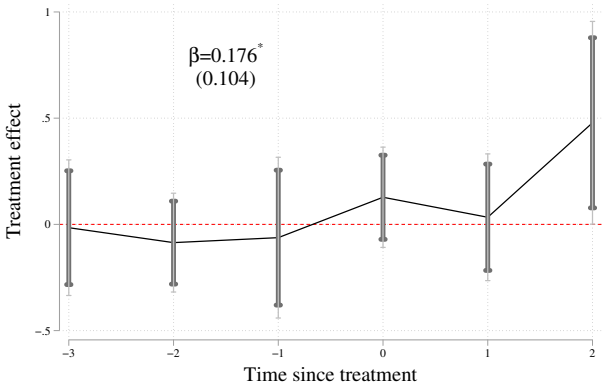
Notes: Event studies follow specification 1, where the outcome variable is the rate of abortion related morbidity per 1,000 fertile-aged women (panel (a)) and the rate of haemorrhage early in pregnancy (< 21 weeks) (panel (b)). Specifications are weighted using the number of fertile-aged women in each municipality, and standard errors are clustered by municipality. Unweighted specifications are displayed as Appendix Figure **??**. The vertical solid line indicates 1 year prior to the first year in which a municipality disburses the EC pill.

Figure 4: DID_M Estimates of the Impact of the EC Pill on Maternal Health Outcomes

Abortion Related Morbidity

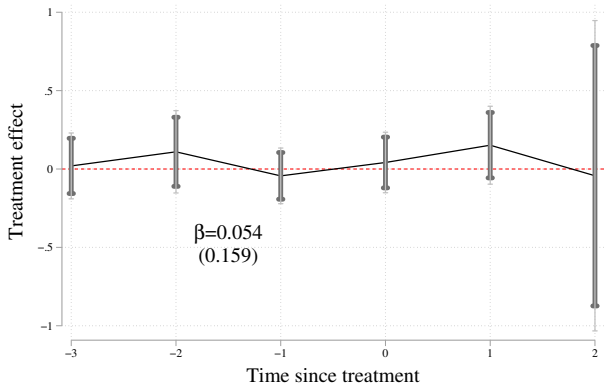


(a) EC Pill Available and Abortion Morbidity

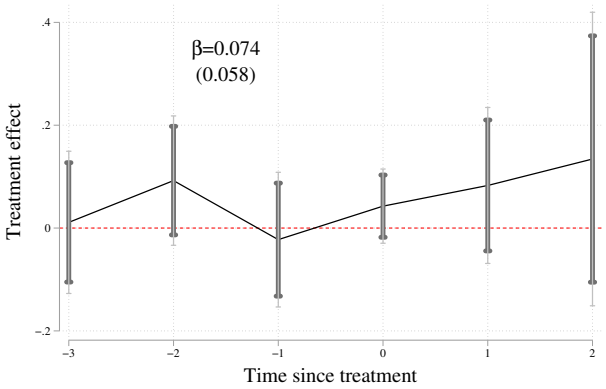


(b) EC Pill Rejections and Abortion Morbidity

Haemorrhage Early in Pregnancy



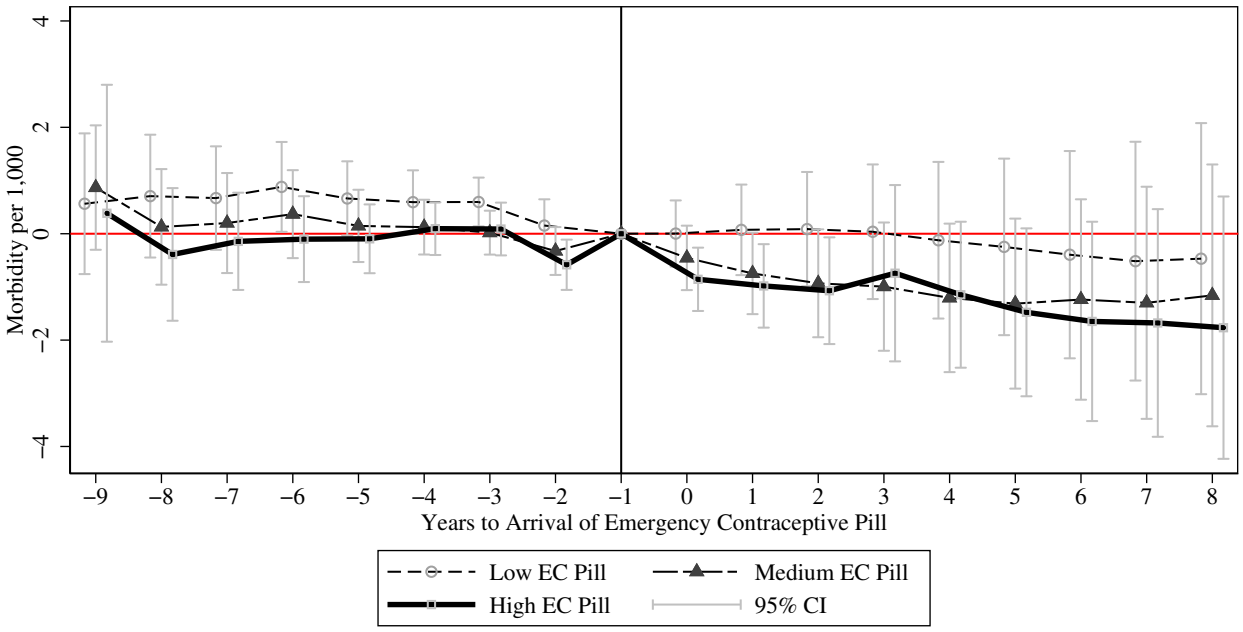
(c) EC Pill Available and Haemorrhage



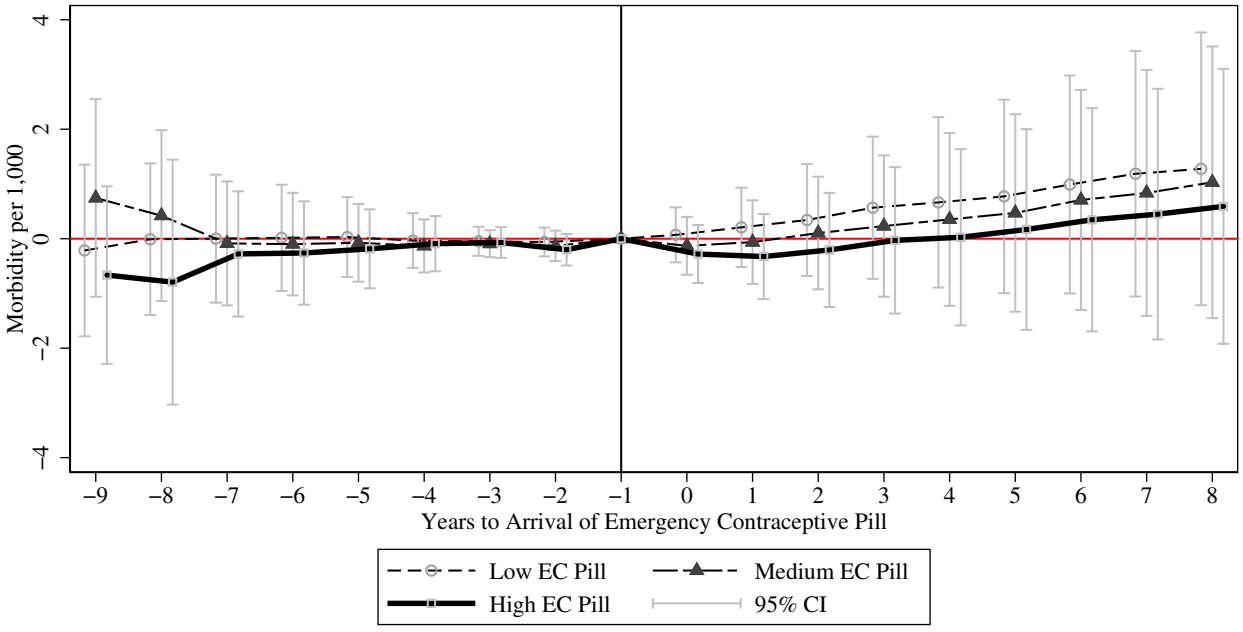
(d) EC Pill Rejections and Haemorrhage

Notes: Each panel presents de Chaisemartin and D'Haultfœuille (2020) DID_M estimates of the impact of EC pill legislation on morbidity due to abortion (top row) or haemorrhage early in pregnancy (bottom row). In each case leads -3, -2, and -1 are placebo tests, while lags 0, 1, and 2 are immediate or dynamic effects. The thin black line presents point estimates in each case, the thick grey error bar presents 90% CIs, and the thinner grey error bar presents 95% CIs. Panels (a) and (c) estimate specification 2 using a binary "availability" measure, while Panels (b) and (d) estimate specification 2, replacing EC Pill availability with a binary "Pill Rejected" indicator. All specifications follow de Chaisemartin and D'Haultfœuille (2020), where flexible year fixed effects and municipal fixed effects are included, along with all control variables described in Notes to Figure 3. Inference is conducted using a block bootstrap by municipality. Global effect sizes for each model (and standard errors in parentheses) are indicated on plots.

Figure 5: Event Study Tests of the Intensity of the EC Pill on Maternal Health Outcomes



(a) Intensity of EC Pill and Abortion Related Morbidity



(b) Intensity of EC Pill and Haemorrhage Early in Pregnancy

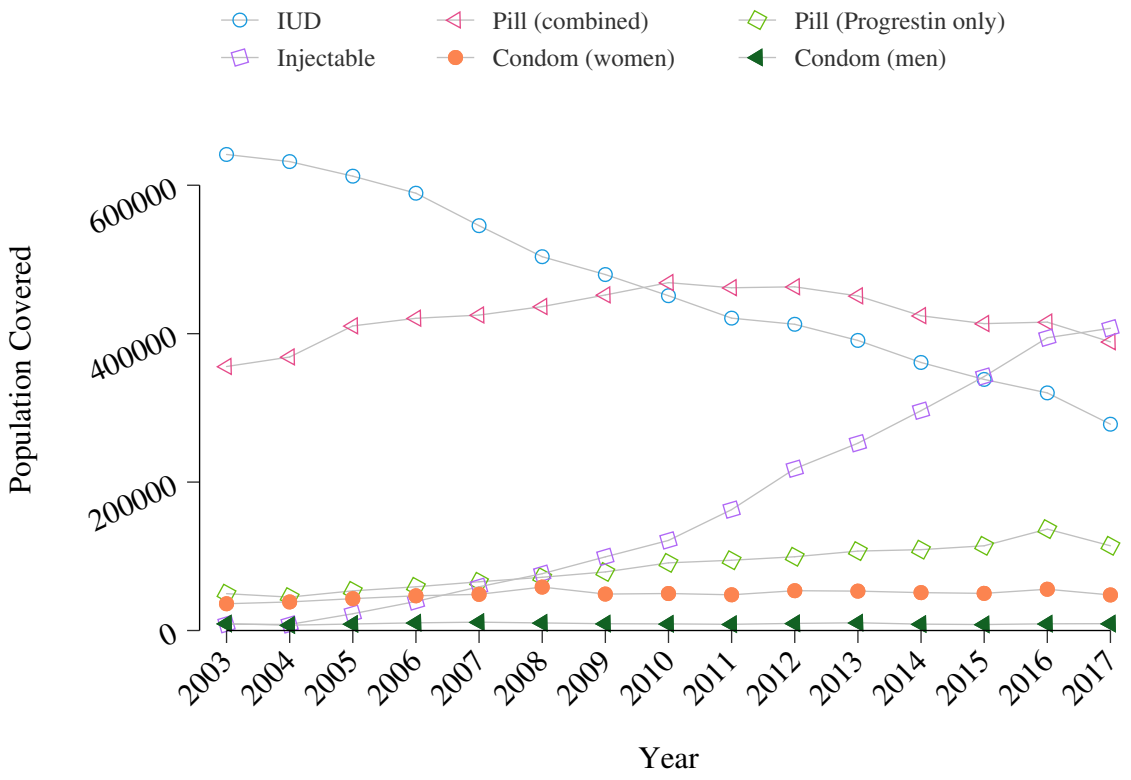
Notes: Each set of point estimates and 95% confidence intervals refer to the EC pill roll-out leads and lags for municipalities with low, medium, and high rates of pill disbursements. These definitions are created based on the rate of pill disbursement per municipality, splitting the sample into three evenly sized groups. Coefficients are slightly shifted around the yearly leads and lags to visualise each estimate separately. All additional details follow Figure 3.

Table 2: DID_M Estimates and Placebos – Binary and Continous Models

	Pill Availability		Pill Rejection	
	(1)	(2)	(3)	(4)
Panel A: Abortion Related Morbidity				
Binary Classification (EC Pill)	-0.837**		0.176*	
	(0.388)		(0.104)	
Continuous Classification (EC Pills per 1,000 Women)		-0.062		0.168
		(0.078)		(0.166)
Placebo 1	0.120	0.021	-0.062	-0.045
	(0.187)	(0.098)	(0.193)	(0.110)
Placebo 2	-0.111	0.063	-0.086	-0.044
	(0.223)	(0.115)	(0.119)	(0.111)
Placebo 3	0.218	-0.046	-0.016	-0.016
	(0.268)	(0.095)	(0.163)	(0.200)
Observations	5190	5190	5190	5190
Panel B: Haemorrhage Early in Pregnancy				
Binary Classification (EC Pill)	0.054		0.074	
	(0.159)		(0.058)	
Continuous Classification (EC Pills per 1,000 Women)		0.018		0.076
		(0.039)		(0.055)
Placebo 1	-0.044	-0.025	-0.023	-0.012
	(0.091)	(0.034)	(0.067)	(0.031)
Placebo 2	0.110	0.036	0.092	0.068
	(0.134)	(0.032)	(0.064)	(0.062)
Placebo 3	0.020	-0.004	0.011	-0.009
	(0.107)	(0.036)	(0.071)	(0.066)
Observations	5190	5190	5190	5190

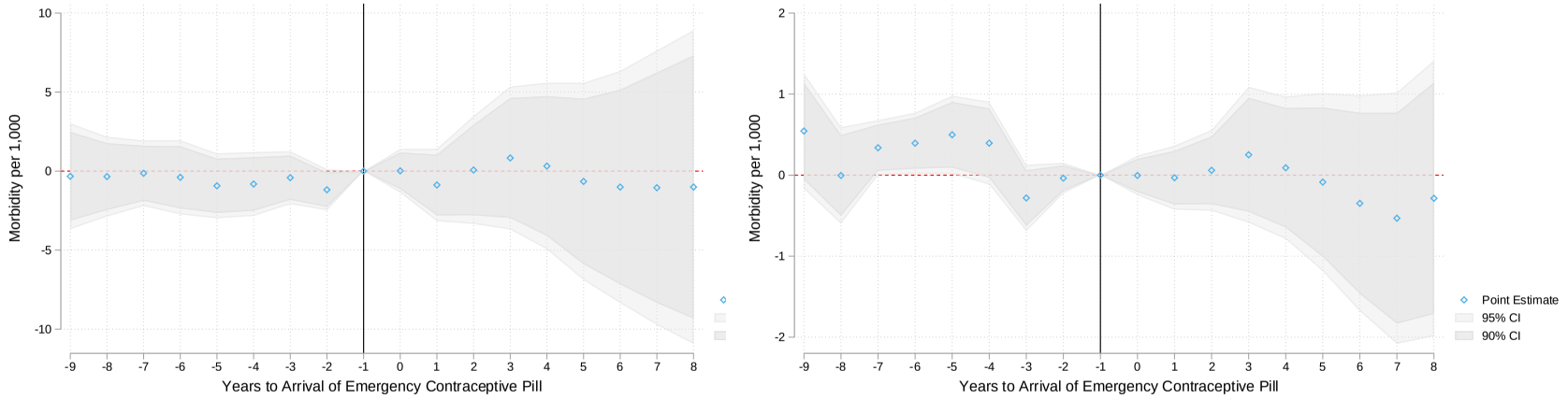
Notes: Aggregate DID_M estimates as well as placebo tests are presented for estimated impacts on abortion related morbidity (panel A) and haemorrhage early in pregnancy (panel B). Columns 1 and 2 consider the impacts of EC pill availability on morbidity outcomes, while columns 3 and 4 consider the impacts of EC pill refusal on morbidity outcomes. Binary classifications refer to models examining indicators for availability (column 1) or refusal (column 3), while continuous classifications refer to models examining estimated impacts of pills disbursed per 1,000 fertile aged women (column 2) or pills refused per 1,000 fertile aged women (column 4). All other details follow those indicated in Notes to Figure 4.

Figure 6: Coverage of Alternative Contraceptive Methods used in Chile



Notes: Administrative data on all contraceptive disbursements provided by the public health system were transcribed (at the health service level) from the full Monthly Health Statistics (*Resúmen de Estadísticas Mensuales*) of the Ministry of Health of the Government of Chile. Data are provided for the copper intrauterine device (IUD), the oral pill (both the combined oestrogen and progestogen pill as well as the progestogen-only pill), injectable contraceptives, and condoms (both those requested by women and those requested by men). Trends displayed here are for the total population covered by each method in the entirety of the country.

Figure 7: Placebo Tests using Full Morbidity Records and Puerperium Health Outcomes



(a) Male Morbidity

(b) Puerperium

Notes: Event studies follow specification 1, where the outcome variables are all-cause male morbidity between the ages of 15–49 in panel (a), and morbidity owing to complications related to the puerperium period (based on ICD codes O85-O92) in panel (b). Each outcome is per 1,000 residents of the same sex aged 15–49 (per 1,000 males in panel (a) and 1,000 females in panel (b)). Specifications are weighted using the number of fertile-aged men and women respectively in each municipality, and standard errors are clustered by municipality.