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Abortion Legalization and Adolescent Fertility: New Evidence for Uruguay Based on the Synthetic Control Method

Cecilia Velázquez*

Following abortion legalization in Uruguay in late 2012, adolescent fertility rate fell by more than half. This paper aims at establishing a causality relationship. To estimate the impact of the abortion reform on adolescent fertility I use the Synthetic Control Method by comparing trends of Uruguay with Latin America and the Caribbean countries with restrictive abortion laws. Results suggest adolescent fertility rate was reduced in the post-reform period by an average of 8.3 births per 1,000 girls aged 15-19, a decline of almost 15% with respect to the synthetic control unit. In-space placebos indicate this effect is statistically significant at the 5% level. This conclusion holds after conducting an in-time placebo test and a leave-one-out test. To the present time, evidence on the impact of Uruguayan abortion legalization on adolescent fertility that has addressed endogeneity is mixed, and based entirely on identification strategies that exploit different sources of exogenous within-country variation that determines the exposure to the reform. My contribution here is to exploit between-country variation, bringing new evidence to the on-going debate.

Keywords: Abortion Legalization, Adolescent Fertility, Synthetic Control Method, Latin America and the Caribbean, Uruguay.

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1. Introduction

Despite socioeconomic growth in Latin America and the Caribbean (LAC) in recent years, adolescent fertility rate (AFR) remains high, second only to Sub-Saharan Africa (PAHO 2020). Each year, 3.2 million pregnancies occur in girls aged 15-19 in the region, two-thirds of which are unintended. LAC has the highest rate of adolescent unintended pregnancy in any world region, and more than half end in abortion (Sully et al. 2020). By 2019, only 2% of adolescents lived in LAC countries where abortion was broadly legal.[1] Hence, 876,000 unsafe abortions were reported among girls aged 15-19 that year (Sully et al. 2020). In Uruguay abortion was legalized in December 2012. In later years, AFR fell by more than half, raising the question of whether this decline can be attributed to abortion reform.

This paper studies the effect of Uruguayan abortion reform on adolescent fertility, addressing endogeneity issues using a non-experimental methodology, the Synthetic Control Method SCM (introduced by Abadie and Gardeazabal 2003). In brief, the SCM uses a weighted average of LAC countries with restrictive abortion laws to construct a suitable comparison group for Uruguay that as much as possible resembles the actual evolution of AFR before the reform.

I construct an annual panel dataset of LAC countries for 2001-2019 combining multiple data sources: the Global Sustainable Development Goals Indicators Database (SDG-UNSD), information for each country Vital Statistics Records when available, the Health

[1] Own calculations based on data of female population aged 15-19 from United Nations (2022) and The World's Abortion Laws of the Center for Reproductive Rights (CRR), consulted on June 1, 2022. Remez et al. (2020) and Singh et al. (2018) were consulted to determine the situation as of December 2019. It includes adolescent girls living in places where abortion is broadly legal, that is, permitted either without restriction due to reason (Cuba, Guyana, Puerto Rico and Uruguay) or on socioeconomic grounds (Barbados, Belize, and St. Vincent and Grenadines). Due to lack of disaggregated data, I was unable to include Mexico City and Oaxaca where abortion is allowed on request since 2007 and 2019, respectively. After abortion legalization in Argentina (December 2020) and Colombia (February 2022), this share increased to 16%.

Information Platform for the Americas (PLISA-PAHO), the World Population Review, The World's Abortion Laws (CRR), Remez et al. (2020) and Singh et al. (2018). The set of predictor variables includes the value of outcome variable in the year prior to the reform (2012) and the pre-intervention average of GDP per capita, urbanization rate, unemployment rate, share of births attended by skilled personnel and share of Christian population.

The results indicate that the abortion reduced AFR between 2013 and 2019 by an average of 8.3 births per 1,000 girls aged 15-19, a decline of almost 15% with respect to the synthetic Uruguay. The p-value based on in-space placebos indicates the effect is significant at the 5% level. This conclusion holds after conducting the robustness checks recommended for the methodology.

This paper contributes to the literature that studies policy changes regarding abortion to identify causal effects on fertility. Findings indicate that liberalize (restrict) abortion access reduces (increases) fertility, with stronger effects among adolescents (Bailey and Lindo 2018, Clarke and Mühlrad 2016, González et al. 2018, Gutiérrez-Vázquez and Parrado 2016, Mølland 2016, Pop-Eleches 2006, 2010, Valente 2014).[2] To the present time, evidence on the impact of Uruguayan abortion law on adolescent fertility that has addressed endogeneity is mixed. Antón et al. (2018) find an 8% reduction of unplanned births, but no impact on teenagers. Cabella and Velázquez (2022), rather, find that the reform reduced the AFR by 4%. Both papers were based entirely on identification

[2] See Bailey and Lindo (2018) for a summary of the literature for the United States, Clarke and Mühlrad (2016) and Gutiérrez-Vázquez and Parrado (2016) for Mexico City, González et al. (2018) for Spain, Mølland (2016) for Norway, Pop-Eleches (2006 and 2010) for Romania, and Valente (2014) for Nepal. In addition, abortion reforms may also affect other outcomes of women and the next generation. First, different studies have analyzed the effects for women facing different abortion policies finding mixed evidence on their educational and labor prospects (Angrist and Evans 1999; Foster 2019; González et al. 2018; Mølland 2016; Ribar 1994). Second, the evidence shows significant effects for the cohort of affected children (Ananat et al. 2009; Donohue and Levitt 2001; Gruber et al. 1999; Mølland 2016; Pop-Eleches 2006), except the research of Valente (2014).

strategies that exploit different sources of exogenous within-country variation that determines the exposure to the reform. In turn, my contribution is to exploit between-country variation, bringing new evidence to the on-going debate.

The paper is organized as follows. Section 2 presents the current legal status of abortion in LAC countries and its recent changes, in particular the Uruguayan reform. It also describes trends in adolescent fertility in LAC and Uruguay. Section 3 lays out the methodology and data. Section 4 discusses the main findings, and section 5 concludes.

2. Background

2.1. Legality of Abortion in LAC

Figure 1 presents LAC countries[3] grouped into six categories according to the legal status of abortion in force as of December 2019, using the classification system developed by the Center for Reproductive Rights (CRR). Women in countries in categories 1 to 4 live under restrictive laws, which ban abortion or permitted only on medical grounds (life, physical and mental health). Otherwise, women in categories 5 and 6 live in countries where abortion is broadly legal, i.e. permitted on socioeconomic grounds or upon request (by 2019, they accounted for 2% of adolescent women in LAC). Some countries in categories 2 to 5 offer exceptions for rape, incest and severe fetal anomaly (Remez et al. 2020; Singh et al. 2018; The World's Abortion Laws, CRR).

[3] This paper considers 34 LAC countries: 12 in South America -Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Suriname, Uruguay, and Venezuela-, plus 8 countries in Central America -Belize, Honduras, Costa Rica, El Salvador, Guatemala, Mexico, Nicaragua, and Panama-, plus 14 countries in the Caribbean -Antigua and Barbuda, Bahamas, Barbados, Cuba, Dominica, Dominican Republic, Grenada, Haiti, Jamaica, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, and Trinidad and Tobago-.

Since 2000 several LAC countries reformed their legislation towards expanding legal grounds for abortion (Table 1). This was the case of Saint Lucia (2004), Uruguay (2012), Chile (2017), Argentina (2020), Colombia (2006 and 2022) and some Mexican states.[4] By contrast, abortion was permitted in Nicaragua when the woman's life was at risk until its total ban in 2006.

Until the recent overturning of *Roe v. Wade* by the United States, the Nicaraguan case was the only setback worldwide (Singh et al. 2018). Following pro-life pressures, the United States Supreme Court removed the constitutional right to abortion in June 2022. Just one year later, abortion was completely banned in 13 states and the situation was precarious in other six (Baden and Driver, 2023).[5]

2.2. Uruguayan Abortion Reform

Abortion in Uruguay was decriminalized between 1934 and 1938. Since then, abortion was punishable by law and only allowed to save the woman's life or preserve her health (category 3), the law also mentioned rape, "family honor" and "economic problems". However, services to provide abortions were never implemented. Judges could exonerate women and doctors involved in clandestine abortions, which were common (López-

[4] Abortion laws are determined at the state level in Mexico. Abortion was legalized in Mexico City in 2007 and in Oaxaca in 2019. In the rest of the Mexican states abortion remained banned except in extreme circumstances of saving the woman's life, rape or in cases of severe fetal malformation. Therefore, Mexico is classified into category 2 due to the situation of most women. After the period of analysis, abortion was legalized in Colima, Hidalgo and Veracruz in 2021. Furthermore, in September 2021 the Mexican Supreme Court of Justice declared unconstitutional the total criminalization of abortion, although Mexican states are still in the process of reforming their laws to comply with the Supreme Court's decision.

[5] *"Abortion is completely banned in 13 states (Alabama, Arkansas, Idaho, Kentucky, Louisiana, Mississippi, Missouri, North Dakota, Oklahoma, South Dakota, Tennessee, Texas and West Virginia). Abortion is unavailable in Wisconsin because of ongoing legal complexities. In Arizona, a court clarified that an 1864 abortion ban, pre-dating statehood, will not be repealed, but doctors will not be prosecuted for providing abortions (a ban on abortion at 15 weeks of pregnancy is in effect). In Georgia, a six-week abortion ban (passed in 2019) was allowed to take effect in November 2022 while litigation continues. Ohio's six-week abortion ban (passed in 2019) is also in litigation and abortion remains legal in the state up to 22 weeks after the last menstrual period. In Utah, the state's trigger ban remains blocked and an 18-week abortion ban is in effect. In Wyoming, the state's trigger ban originally went into effect shortly after the Dobbs ruling, but has since been blocked in court"* (Baden and Driver, 2023). Abortion access in Puerto Rico is also under threat and legislature is considering abortion restrictions (Mazzei, 2022).

Gómez and Abracinskas 2009). Sanseviero et al. (2003) estimated 33,000 abortions in 2000 (41 per 1,000 women aged 15-49), 13% under 20 years old (32.5 per 1,000 women aged 15-19). Unfortunately, these estimates coincide with a severe socioeconomic crisis and may be biased upwards.

Between 2007 and 2009, 2,717 women consulted for unintended/unaccepted pregnancies at Pereira Rossell Hospital, where health professionals had been providing counsel and care before and after clandestine abortions since 2001 (Labandera et al. 2016). Despite providing information, they were legally banned from prescribing misoprostol. Since 2002, it was available on the black market, replacing surgical abortions at clandestine clinics with drug-induced abortions at home (López-Gómez 2014).

After a failed attempt in 2008, abortion was legalized in late 2012 (Law 18987). The introduced reform allows costs-covered pregnancy termination in the health system until week 12 (14 in case of rape and at any time at risk of maternal death or severe fetal anomalies).

The woman requesting pregnancy termination must be a citizen or legal resident for more than one year. Three consultations are required: in the first, the gynecologist verifies gestational age; in the second, scheduled within 24 hours, a three-professional board (gynecologist, social worker and psychologist) provides information to the woman; after a mandatory five-day waiting period, the woman can confirm her decision in the third consultation.[6]

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[6] The gynecologist decides on the most suitable procedure. The vast majority (98.8%) were medication abortions and almost 97% of those women used the medication as outpatients (Fiol et al. 2016). A fourth and final consultation for medical check and to provide contraception is scheduled 10 days after abortion. Girls under 18 years old (legal age of majority) can decide to terminate an unwanted pregnancy if the three-professional board approves it after assessing her progressive autonomy.

Law implementation faced challenges. A significant number of gynecologists claimed conscientious objection, raising barriers to the provision of abortions in many places. A good example of the misuse of conscientious objection is Salto state, where all 12 resident gynecologists invoked it after the law passed, leaving women without abortion services for several months. This problem was exacerbated during periods of less strict regulatory criteria for the use of conscientious objection. Even worse, the current government (2020-2025) has appointed objecting gynecologists to manage abortion and reproductive health services (Abracinskas and Puyol, 2022; MYSU 2014, 2015, 2016a, 2016b, 2017, 2021).

Over the first decade of implementation, health services registered 95,770 legal abortions. After an initial rise, abortion numbers have remained stable since 2016 at around 10,000 per year, even during COVID-19 lockdowns in 2020-2021. The legal abortion rate increased from 8.5 per 1,000 women aged 15-49 in 2013 to 12.1 in 2018, then declined to 11.5 in 2020, and rebounded to 12.1 in 2022. As shown in Figure 2, for women aged 15-19 the trend was quite different. The legal abortion rate within this age group increased from 8.9 in 2013 to 12.2 in 2016, declined to 9.4 in 2021, and rebounded to 10.1 in 2022.

2.3. Adolescent Fertility in LAC and Uruguay

Adolescent fertility in LAC remained at very high levels despite the steady decline in total fertility (Cabella and Pardo 2014; ECLAC 2011; Lima et al. 2017) and the downward trend in AFRs since 2000 (Figure 3).[7] Currently, the region has the second highest AFR in the world, with 53 births per 1,000 women aged 15-19, higher than the world average

[7] It is noteworthy the reduction in AFR by more than half in Uruguay, Chile, El Salvador, Honduras and several Caribbean countries (Antigua and Barbuda, Bahamas, Dominican Republic, Grenada, Jamaica, Puerto Rico and Saint Lucia). Nicaragua, Cuba and Peru are exceptions: Nicaragua's rate remained practically unchanged at levels similar to those of Sub-Saharan Africa, while Peru and Cuba slightly increased their AFRs.

(42) (United Nations 2022), raising concern among governments committed with the SDGs agenda.[8]

In Uruguay, AFR faced more than 40 years of cycles of increase-decrease-stagnation at high levels. Since the early 2000s it fluctuated around 60 births per 1,000 women aged 15-19, contrasting with its low total fertility rate and favorable socioeconomic indicators (Rodríguez-Vignoli and Cavenaghi 2014). This trend reversed after the drop that began in 2013 to reach an all-time low of 26 per 1,000 in 2021 (Figure 4).[9]

About 3.2 million pregnancies occur each year in LAC in girls aged 15-19, 67% of which are unintended. LAC has the highest rate of adolescent unintended pregnancy in any world region (Sully et al. 2020)[10] and has increased in recent years (Rodríguez-Vignoli 2017). Sully et al. (2020) report that 41% of these pregnancies occur despite the use of modern contraception (typically short-acting methods such as condoms or the pill with potential non-use and user error). More than half (54%) of unintended adolescent pregnancies end in abortion. The majority (77%) of adolescent abortions in LAC are unsafe due to restrictive laws.

Despite the possibility of termination since the Uruguayan reform, most adolescent mothers still report that their pregnancies were mistimed/unwanted (Perinatal Information System and Cabella et al. 2017). Besides inconsistent use of contraceptive methods –as in other LAC countries–, childbearing in adolescence in Uruguay is associated to reluctance to pregnancy termination (Brunet et al. 2019) and is more common among less-educated girls who have a limited set of alternatives to motherhood (De Rosa et al.

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[8] Sustainable Development Goal 3.7 proposes to ensure universal access to sexual and reproductive health services, and one of the indicators to track progress in this area is the AFR.
[9] AFR continued to decline to 22 and 20.9 in 2022 and 2023 (preliminary data) respectively.
[10] Sully et al. (2020) cover low- and middle-income countries, this does not include Uruguay.

2016). Although disparities in reproductive schedules by education narrowed in recent years, they remain considerable (Cabella and Velázquez, forthcoming).

3. Empirical Strategy

3.1. Synthetic Control Method

The SCM (introduced by Abadie and Gardeazabal 2003, and further developed by Abadie et al. 2010, 2015, and Abadie 2021) constructs a weighted average of untreated units to resemble the pre-treatment characteristics of one treated unit.

I observe $J+1$ countries, 1 treated country plus J remaining countries as potential comparisons, over time horizon $t = 1, 2, \ldots T$. Only the first country Uruguay ($j = 1$) is exposed to the abortion reform while the remaining J countries ($j = 2, \ldots J+1$) are the potential control units not exposed to the reform. I set the J untreated countries as the donor pool. Let T_0 be the number of pre-reform periods, with $1 \leq T_0 < T$.

For each unit j at time t, I observe the outcome of interest Y_{jt}. I also observe a set of k predictors of the outcome for each unit $j, X_{1j}, \ldots, X_{kj}$, which may include pre-intervention values of Y_{jt} and which are themselves unaffected by the intervention.[11] I will define X_1 as the vector of K predictors for Uruguay ($j = 1$) and X_0 as the matrix which measures the values of the same variables for countries in the donor pool.

The treatment effect of interest (also named gap) for the affected unit $j = 1$ in period t, with $t > T_0$, is defined as:

$$\propto_{1t} = Y_{1t} - Y_{1t}^{N}$$

[11] Using all the pre-intervention outcomes as separate predictors could cause all other covariates to become irrelevant (Kaul et al. 2017).

where Y_{1t} is observed and Y_{1t}^N is the counterfactual outcome that would occur if the unit was not exposed to the treatment, which is unobserved.

The SCM estimates the counterfactual Y_{1t}^N using a weighted average of the units in the donor pool:

$$\widehat{Y_{1t}^N} = \sum_{j=2}^{J+1} w_j Y_{jt}$$

W is a vector of non-negative weights that sum to one of all donors observations, $(w_{2,\ldots,} w_{J+1})$, with $\sum_{j=2}^{J+1} w_j = 1$ and $w_j \geq 0$.

The vector of optimal weights W^* is chosen so that the resulting synthetic control best reproduces the values of the predictors for the treated unit, i.e., to minimize the following problem:

$$\|X_1 - X_0 W\|_v = \sqrt{(X_1 - X_0 W)' V (X_1 - X_0 W)}$$

where V is a symmetric, diagonal matrix of non-negative components that represents the relative importance of the selected predictors. The values of V are selected to minimize the Mean Squared Prediction Error (MSPE) in the pre-treatment period,

$$\frac{1}{T_0}\sum_{t=1}^{T_0}\left(Y_{1t} - w_2(V)Y_{2t} - \ldots - w_{J+1}(V)Y_{J+1t}\right)^2$$

The weights of donors and predictors are jointly optimized during the pre-treatment period.[12]

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[12] Matrix V was estimated by nested optimization, a data-driven procedure of searching among all the nonnegative diagonal matrix V and sets of w-weights for the best fitting between Uruguay and a convex combination of the control units in terms of the pre-treatment values of the outcome variable. I use *allsynth*

Inference analysis is based on in-space placebos. These consist of taking each country from the donor pool and applying the SCM as if countries were affected by the reform. Applying this iterative mechanism, I obtain a permutation distribution of estimated placebo treatment effects for all countries in which no event occurred. Intuitively, the inferential exercise examines whether the estimated effect of the actual intervention is large relative to the distribution of estimated effects for untreated units.

In order to determine how many countries in the donor pool present an effect as large as that observed in the treated country, I compute the ratio between the post-intervention MSPE (average for $T_0 + 1$ to T) and pre-intervention MSPE (average for 1 to T_0).[13] Within this ratio, a higher numerator indicates greater impact and a lower denominator indicates better fit.

Let $R_j(T_0 + 1, T)$ be the post-intervention and $R_j(1, T_0)$ be the pre-intervention MSPE, with:

$$R_j(T_0 + 1, T) = \frac{1}{T - T_0} \sum_{t=T_0+1}^{T} \left(Y_{jt} - \widehat{Y_{jt}^{N}}\right)^2$$

$$R_j(1, T_0) = \frac{1}{T_0} \sum_{t=1}^{T_0} \left(Y_{jt} - \widehat{Y_{jt}^{N}}\right)^2$$

$$r_j = \frac{R_j(T_0 + 1, T)}{R_j(1, T_0)}$$

package in Stata (Wiltshire 2022) which is a wrapper for the *synth* command. I use the "nested" option of the *synth* command in all the reported estimates.

[13] Abadie et al. (2010) use the MSPE, while Abadie et al. (2015) and Abadie (2021) use the root of the MSPE. This does not affect the ranking. I present the MSPE as does the *allsynth* package for Stata (Wiltshire 2022).

After determining all the ratios r_j, a ranking from highest to lowest is created to compare the final results between countries. A p-value for the inferential procedure based on the permutation distribution of r_j is given by

$$p = \Pr(r_j \geq r_1) = \frac{1}{J+1} \sum_{j=1}^{J+1} I_+(r_j - r_1)$$

where $I_+(.)$ is an indicator function that returns one for nonnegative arguments and zero otherwise. The gap and its p-value for each post-treatment period can be obtained in a similar way.

3.2. Data and Sample

I construct an annual panel dataset of LAC countries for 2001-2019 combining multiple data sources. The post-treatment period starts in 2013: the reform was passed in December 2012, thus only births in the second half of 2013 were fully exposed (abortions affect fertility rates approximately six months later because termination is allowed until the 12th week of pregnancy).

The outcome of interest is AFR (live births per 1,000 women aged 15-19). The primary data source is the Global Sustainable Development Goals Indicators Database (SDG-UNSD). To fill in the missing values in this database I use Vital Statistics Records of each country when available. Otherwise, I use AFRs from the Health Information Platform for the Americas (PLISA-PAHO). Additionally, I estimate some missing values using linear interpolation. Table A1 in the Appendix provides detailed information.

I also use information on the legal status of abortion in LAC countries from The World's Abortion Laws (CRR) and identify reforms during the period of analysis based on Remez et al. (2020) and Singh et al. (2018).

Additionally, I consulted Religion by Country from the World Population Review which presents estimates of Christian population (Catholic, Protestant and Orthodox) for 2010.

The set of predictor variables includes the value of outcome variable in the year prior to the reform (2012). It also includes the average for the pre-intervention period of factors often associated with cross-country fertility differentials: logarithm of GDP per capita (PLISA-PAHO),[14] urbanization rate (PLISA-PAHO), unemployment rate (SDG-UNSD), share of births attended by skilled health personnel (SDG-UNSD) and share of Christian population (World Population Review).

The sample excludes those countries where abortion is broadly legal, i.e. permitted upon request (Cuba, Guyana and Puerto Rico) or on socioeconomic grounds (Barbados, Belize and Saint Vincent and Grenadines). I additionally discard those countries which reformed abortion laws in the period (Saint Lucia, Colombia and Chile)[15] and Mexico because abortion laws are determined at the state level (Table 1). Although Nicaragua also reformed its abortion legislation in 2006, it restricted the legal grounds; hence I include Nicaragua in the donor pool. Finally, I exclude Grenada because unemployment information is missing. The donor pool includes the remaining 22 LAC countries: Antigua and Barbuda, Argentina, Bahamas, Bolivia, Brazil, Costa Rica, Dominica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, Saint Kitts and Nevis, Suriname, Trinidad and Tobago, and Venezuela.

[14] GDP per capita is the Gross Domestic Product per capita, international U$S, PPP adjusted, from PLISA-PAHO. In the case of Venezuela, the series was complete only up to 2011. I completed it using the annual growth rate of GDP per capita from SDG-UNSD.

[15] It is worth noting that none of them change from restrictive abortion laws to a broadly legal status of abortion. Argentina and Colombia legalized pregnancy termination in December 2020 and February 2022, outside the period of analysis.

4. Results

Figure 5 plots the trends in AFR in Uruguay and the donor pool (simple and population-weighted average). AFR averaged from the donor pool differs markedly from the level of the Uruguayan rate before abortion reform: in 2012, AFR in Uruguay was about 18% (15%) lower than the population-weighted (simple) average of the rest of LAC countries. This suggests that the averaged donor pool may not provide a suitable comparison group. Hence, I use the SCM to estimate the counterfactual scenario.

4.1. Main Results

Table 2 compare the actual and synthetic values of each predictor variable before reform implementation, as well as with the simple and population-weighted average of the 22 donor pool countries. Columns 1-4 show that the synthetic Uruguay performs better, in reproducing the pre-treatment values of Uruguay in the predictor variables, than the simple average of countries in the donor pool. However, the population-weighted average of the donor pool is closer in terms of GDP per capita, urbanization and births attended by skilled personnel.

The comparison of Uruguay with its synthetic control indicates a reasonable balance of predictors prior to the reform, except in the case of urban and Christian population. The predictor weights associated to those variables (column 5, Table 2) are very small, which indicates that, given the other predictor variables, they do not have substantial power predicting the AFR in Uruguay before the abortion reform. Abadie et al. (2010) suggest this explains the discrepancy between Uruguay and its synthetic control in terms of urban and Christian population. Moreover, birth attention by qualified personnel and GDP per capita also show very low predictor weights. Two variables account for 95% of the predictive power: the unemployment rate (62.5%) and the lagged value of outcome (32.5%).

Table 3 contains the weights that the SCM assigned to each country in the donor pool to construct the synthetic unit that best reproduces the levels of AFR of Uruguay in the pre-reform years. The synthetic control for Uruguay is a weighted average which includes Dominica (0.57), Venezuela (0.23), Suriname (0.12) and Haiti (0.08). All other countries in the donor pool are assigned zero weights. While Dominica and Venezuela allow abortion only when the woman's life is at risk (category 2), in Haiti and Suriname abortion is completely banned (category 1).

Of all the donor pool member countries, the AFRs of Suriname (55.7) and Haiti (62.8) in the year prior to the reform (2012) are the closest to Uruguay's value (59.9). In addition, Suriname and Uruguay are both the two countries with the lowest share of Christians in the donor pool (51.4 in Suriname and 57.8 in Uruguay). Dominica and Venezuela differ from Uruguay in terms of AFR in 2012 (42.9 and 94.5 respectively) but are similar in other predictor variables. The proportion of births attended by skilled personnel in the pre-reform period in Dominica (99.3) is close to that of Uruguay (99.6), as is its unemployment rate (11 in Dominica versus 10.8 in Uruguay). Venezuela has a very similar logarithm of GDP per capita (9.5 in Venezuela versus 9.6 in Uruguay)[16] and is also the third country with the largest urban population in the donor group, after Uruguay and Argentina (88 and 93.6 in Venezuela and Uruguay respectively).

Figure 6 plots the main results. In Panel a, the solid line depicts the evolution of the AFR in Uruguay while the dashed line denotes the synthetic counterfactual scenario. In contrast to AFR averaged from the donor pool (shown in Figure 5), AFR in the synthetic Uruguay very closely tracks the trajectory of this variable in Uruguay for the pre-reform period. After the policy, the two curves separate and adolescent fertility in Uruguay is smaller

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[16] The pre-intervention average GDP per capita was 13,009 international U$S PPP adjusted in Uruguay and 14,612 in Venezuela.

than its synthetic counterpart, except in the first year of implementation (2013). This is quite reasonable since only births in the second half of 2013 were fully exposed. Since 2014, a negative effect can be seen that increases over time.

The estimate of the effect of abortion reform on adolescent fertility is the gap or difference between AFR in Uruguay and in its synthetic counterpart after the passage of the law. While adolescent fertility in the synthetic Uruguay continued on its moderate downward trend after the reform, the real Uruguay experienced a sharp decline. The discrepancy between the two lines suggests a large negative effect of abortion liberalization on adolescent fertility. Panel b in Figure 6 plots the yearly gaps in AFR between Uruguay and its synthetic version. During the pre-intervention period, it fluctuates around zero. After the policy, it shows a negative impact (except in the first year as discussed above). The magnitude of the estimated impact of abortion legalization is substantial. AFR was reduced between 2013 and 2019 by an average of 8.3 births per 1,000 girls aged 15-19, a decline of almost 15% with respect to the synthetic Uruguay.

I analyze the statistical significance of the estimated effect conducting an in-space placebo analysis, by permutation of the treatment to the 22 countries in the donor pool. In Figure 7 (Panel a), the grey lines show the gap in AFR between each country in the donor pool and its respective synthetic control, and the black line denotes the gap estimated for Uruguay. The estimated gap for Uruguay during the 2013-2019 period is larger relative to the distribution of the gaps for the countries in the donor pool.

A large post-intervention MSPE is not indicative of a large effect of the intervention if the synthetic unit does not closely reproduce the pre-intervention outcome of interest. In the case of Uruguay, Figure 7 (Panel a) suggests SCM provides a good fit for AFR prior to the pregnancy termination law. The pre-reform MSPE in Uruguay (the average of the squared discrepancies between AFR in Uruguay and in its synthetic control during 2001-2012) is 2.82. However, Figure 7 (Panel a) also suggests that pre-reform AFRs for some countries in the donor pool cannot be well reproduced by a convex combination of AFRs in other countries (i.e. some countries in the donor pool present a large pre-intervention MSPE indicating poor fit).

Thus, I compute for each country the ratios r_j between the post-reform and pre-reform MSPE. Panel b in Figure 7 shows the post-reform MSPE is almost 50 times larger than the pre-reform in Uruguay. No other country in the donor pool achieves such a large ratio.

I compute the p-value for the inferential procedure based on the permutation distribution of r_j. If one were to assign the intervention at random in the data, the probability of obtaining a MSPE ratio as large as Uruguay's is 1/23=0.04. Recall that the results suggest that AFR was reduced between 2013 and 2019 by an average of 8.3 births per 1,000 girls aged 15-19, a decline of almost 15% with respect to the synthetic control unit. The p-value indicates the estimated effect is significant at the 5% level.

Finally, Table 4 shows the gap is negative (except in the first year) and increasing in absolute value for each post-treatment period; but according the p-value only the last three years are significant.

AFR in the hypothetical absence of reform would be 53 births per 1,000 women aged 15-19 in 2019, comparable with that of the LAC region, whereas the actual level (32 per 1,000) is comparable to that of southern and western Asia.

4.2. Robustness Tests

In order to analyze the robustness of the effect, I conduct two tests recommended by Abadie et al. (2015).

First, I conduct a placebo-in-time test by reassigning the time when the abortion bill was passed. Figure 8 compares the abortion reform effect estimated above to different placebo effects obtained reassigning the abortion reform in my data to periods before the law actually was passed. I assume four alternative reform dates: 2012, 2011, 2010 and 2009.[17] Figure 8 does not show any evidence that there would be any effect prior to the abortion reform.

Second, I leave out one of the four donor countries that received a positive weight (Dominica, Haiti, Suriname and Venezuela) from the donor pool and iteratively re-estimate the model, generating four additional synthetic controls to compare with the original. By excluding countries that received a positive weight I can evaluate to what extent my results are driven by any particular control country. Figure 9 shows that the leave-one-out synthetics closely matches the original synthetic Uruguay which includes all four donor countries, verifying the robustness of my estimates. Although the effect is reduced, except when I remove Haiti, it is still negative.

4.3. Discussion

The results indicate that abortion legalization in Uruguay reduced AFR by nearly 15% compared to the synthetic control unit. However, I cannot rule out the possibility that my results may be affected by other important events occurring simultaneously with or after abortion reform. In recent years, several governments in the region, including Uruguay, have taken steps to tackle unintended adolescent pregnancy. Unfortunately, data on this issue is scarce and not standardized to include in my estimations.

[17] The data about share of Christian population correspond to 2010. When assuming the reform was in $t = 2009$ and $t = 2010$, I reassign the share of Christians to $t - 1$, i.e. 2008 and 2009 respectively.

This paper provides new evidence supporting the findings of Cabella and Velázquez (2022) for Uruguay. The abortion reform significantly reduced adolescent fertility, but the estimated effect here is larger (15% versus 4%). One possible reason for this difference is that Cabella and Velázquez (2022) were able to account for a program offering free-of-charge five-year contraceptive implants launched in 2015. Ceni et al. (2021) and Antón et al. (2023) found that this program played a key role in the sharp decline of AFR. Although Cabella and Velázquez (2022) find that the availability of implants is significant in explaining reduction of adolescent fertility, this does not significantly change the estimated effect of abortion reform. This suggests that my estimates are not biased by the omission of the variable related to contraceptive implant program.

The differing evidence with my results may be due to differences in the period analyzed and estimation strategy. First, I have extended the analysis to include more years prior to the reform because SCM benefits from a larger number of pre-treatment periods. I have also added an additional year after the reform, 2019. By restricting the post-reform period to 2013-2018, the results indicate that AFR was reduced by an average of 6.1 births per 1,000 girls aged 15-19, a decline of less than 11% with respect to the synthetic unit in the same period. Although the effect is reduced, it is still higher than that found by Cabella and Velázquez (2022). Second, the authors exploit state[18] and time variation in legal abortions by adult women, to capture differences in the actual provision of services once decriminalization has been passed. Instead, this paper exploits between-country variation comparing adolescent fertility trend of Uruguay with LAC countries with restrictive abortion laws, capturing the impact of change in the legal status. These reasons help to

[18] Uruguay is organized as a unitary state. The country is divided into 19 states, named departments.

explain why Cabella and Velázquez (2022) found a smaller effect of abortion legalization on adolescent fertility.

An important point is the assumption of no interference between units when using SCM. The outcome should be independent across countries, i.e. abortion reform in Uruguay should not affect AFRs in donor pool countries. This assumption is quite reasonable since the abortion law is applicable only to Uruguayan nationals or legal residents for more than one year, which rules out the possibility of traveling to access abortion. Furthermore, it is unlikely that the reform has prompted migration of women from other countries.

Despite these caveats, the paper provides valuable insights to better understand whether the sharp decline in adolescent fertility in Uruguay was triggered by the abortion reform.

5. Conclusion

Uruguay liberalized abortion in late 2012 allowing for pregnancy termination upon request up to 12 weeks of gestation in the health system with all associated costs covered. In the following years, AFR in Uruguay fell by more than half. In this paper, I have tried to establish a causality relationship between both. I use a combination of LAC countries with restrictive abortion laws to construct a synthetic control unit for Uruguay that resembles as much as possible the actual evolution of AFR before the reform.

Results show that the legalization of abortion in Uruguay had a large effect on reducing adolescent fertility. AFR was reduced between 2013 and 2019 by an average of 8.3 births per 1,000 girls aged 15-19, a decline of almost 15% with respect to the synthetic control unit. The p-value based on in-space placebos indicates the estimated effect is significant at the 5% level. This conclusion holds after conducting the robustness checks recommended for this non-experimental methodology: in-time placebo test and a leave-one-out test.

At the time of writing this paper, women's access to safe and legal abortion faces serious threats in the United States. Given its global influence, this may affect local policies, limiting rights and increasing avoidable deaths and complications from unsafe abortions. My results also anticipate that any setback in access to safe and legal abortion could reverse recent progress in reducing adolescent fertility, after decades of stagnation. This is particularly relevant for LAC, which has the highest rate of unintended adolescent pregnancy in any world region (Sully et al. 2020) and the second highest AFR in the world (United Nations 2022).

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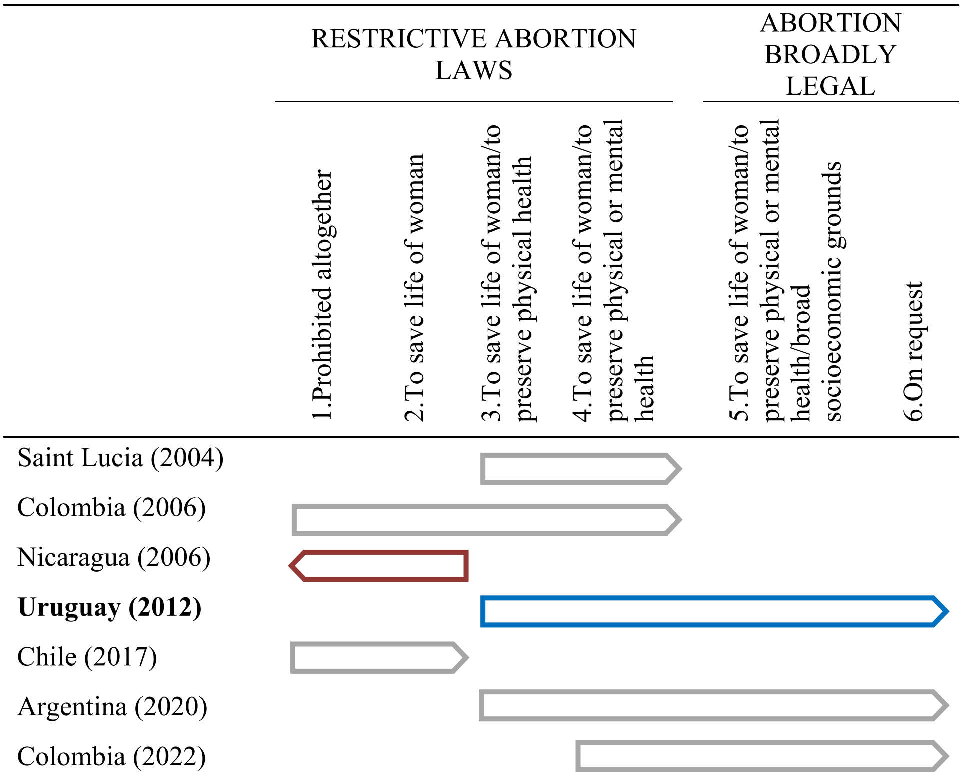
Tables

Table 1. LAC countries that have changed legal status of abortion since 2000



Notes: Abortion laws are determined at the state level in Mexico. Abortion was legalized in Mexico City in 2007, in Oaxaca in 2019 and in Colima, Hidalgo and Veracruz in 2021. Furthermore, in September 2021 the Mexican Supreme Court of Justice declared unconstitutional the total criminalization of abortion, although Mexican states are still in the process of reforming their laws to comply with the Supreme Court's decision.
Source: own elaboration based on Remez et al. (2020); Singh et al. (2018); The World's Abortion Laws (CRR).

Table 2. Predictor means in the pre-reform period and Weight of predictors (***V*** matrix)

Variables	Uruguay (1)	Synthetic Uruguay (2)	Donor Pool Average: Simple (3)	Donor Pool Average: Population-weighted (4)	Variable Weights (5)
Adolescent Fertility Rate (2012), live births per 1,000 girls aged 15-19	59.9	58.1	68.7	70.8	32.5%
GDP per capita, international U$S PPP adjusted, natural logarithm	9.5	9.1	9.1	9.2	0.004%
Share of urban population, %	93.6	70.1	62.1	77.4	0.06%
Unemployment rate, %	10.8	10.6	7.1	7.9	62.5%
Share of births attended by skilled health staff, %	99.6	92.0	90.3	94.0	2.7%
Share of Christian population, %	57.8	71.8	83.4	89.4	2.2%

Notes: Variables are averaged for the 2001-2012 period, except adolescent fertility rate that refers to the year prior to the reform (2012). I use total population in order to compute population-weighted average.
Source: Author’s estimations.

Table 3. Country weights of Synthetic Uruguay

Country	Weight	Country	Weight
Antigua & Barbuda	0.00	Haiti	0.08
Argentina	0.00	Honduras	0.00
Bahamas	0.00	Jamaica	0.00
Bolivia	0.00	Nicaragua	0.00
Brazil	0.00	Panama	0.00
Costa Rica	0.00	Paraguay	0.00
Dominica	0.57	Peru	0.00
Dominican Republic	0.00	St Kitts & Nevis	0.00
Ecuador	0.00	Suriname	0.12
El Salvador	0.00	Trinidad & Tobago	0.00
Guatemala	0.00	Venezuela	0.23

Source: Author's estimations.

Table 4. Gap between adolescent fertility rate in Uruguay and the Synthetic Control, 2013-2019

Year	2013	2014	2015	2016	2017	2018	2019	Average
Gap	2.2	-0.2	-1.8	-7.4	-12.1	-17.2	-21.4	-8.3
P-value	0.39	0.57	0.65	0.17	0.09	0.04	0.04	0.04

Notes: the estimated effect or gap presents the difference between adolescent fertility rate in Uruguay and its synthetic version (live births per 1,000 women aged 15-19).
Source: Author's estimations.

Figures

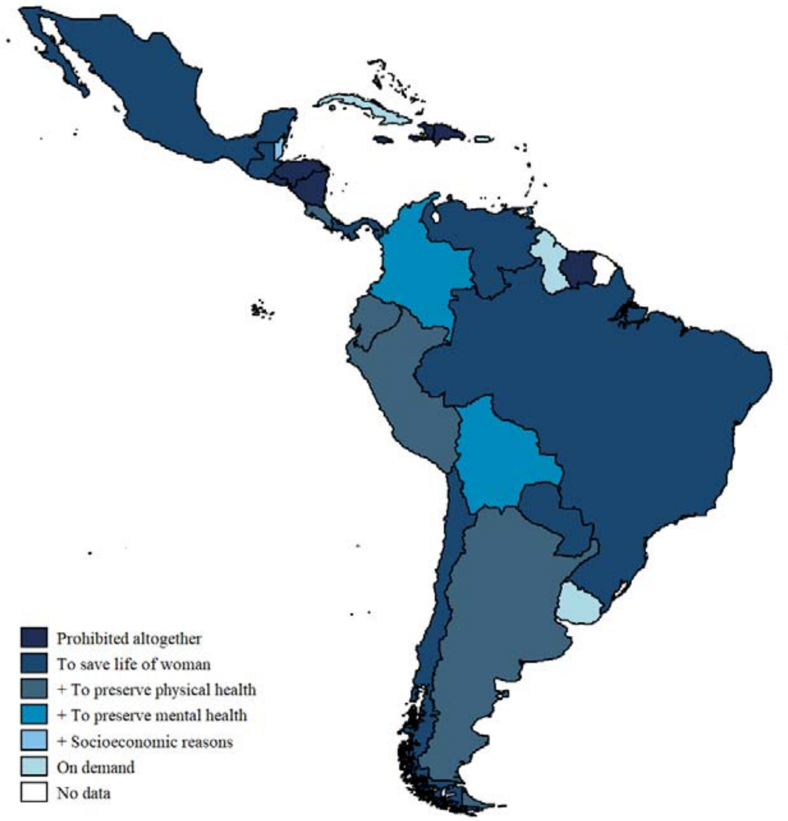


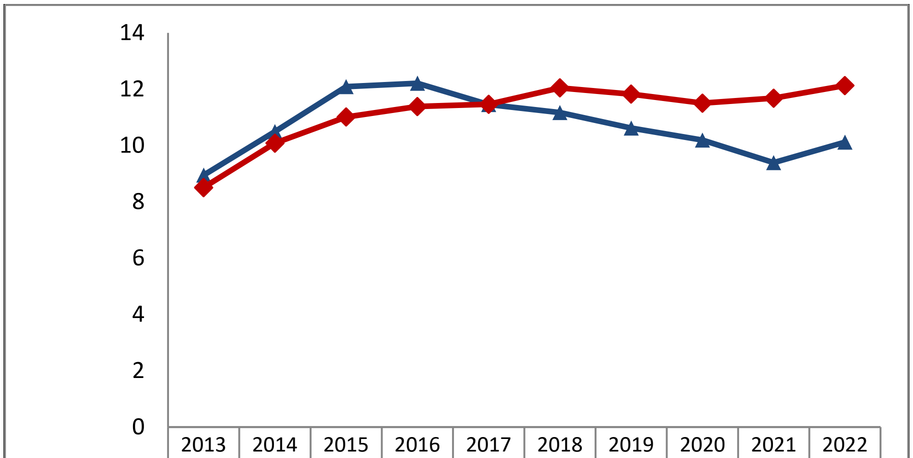
Figure 1. Legal status of abortion in LAC countries as of December 2019

Notes: Some countries also allow abortion in cases of rape (Argentina explicitly since a 2012 Supreme Court decision, Barbados, Bolivia, Brazil, Chile, Colombia, Mexico, Panama, Saint Lucia, Saint Vincent and the Grenadines), incest (Barbados, Bolivia, Colombia, Saint Lucia, Saint Vincent and the Grenadines) or fetal anomaly (Barbados, Belize, Chile, Colombia, Mexico, Panama, Saint Vincent and the Grenadines). In April 2021 -after the period of analysis- the Constitutional Court of Ecuador decided to decriminalize abortion in case of rape.

Countries that allow abortion without restriction as to reason have gestational age limits (generally the first trimester); for legal abortions in categories 2 through 5, gestational age limits differ by prescribed grounds. In Mexico, the legality of abortion is determined at the state level, and the legal categorization listed here reflects the status for most women as of December 2019. Subsequent changes are not included: (i) In 2021, abortion was legalized in Colima, Hidalgo and Veracruz; (ii) In September 2021 the Mexican Supreme Court of Justice declared unconstitutional the total criminalization of abortion, although Mexican states are still in the process of reforming their laws to comply with the Supreme Court's decision.

The figure presents the legal situation in force as of December 2019. Subsequent changes are not included: (i) In December 2020, the Argentine Congress passed a bill allowing pregnancy termination; (ii) In February 2022, the Constitutional Court of Colombia decriminalized abortion. These place Argentina and Colombia in category 6.

Source: own elaboration based on Remez et al. (2020); Singh et al. (2018); The World's Abortion Laws (CRR).



	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
15-19	8.9	10.5	12.1	12.2	11.5	11.2	10.6	10.2	9.4	10.1
	1,200	1,404	1,603	1,597	1,476	1,421	1,335	1,265	1,148	1,218
Total	8.5	10.1	11.0	11.4	11.5	12.1	11.8	11.5	11.7	12.1
	7,171	8,537	9,362	9,719	9,830	10,373	10,210	9,952	10,111	10,505

Figure 2. Legal abortion rates (Uruguay, 2013–2022)

Notes: The figure presents legal abortion rates, the total number of legal abortions per 1,000 women aged 15-49 (red line) and the number of legal abortions among teenagers per 1,000 women aged 15-19 (blue line). The table below also includes the number of legal abortions for the total and for girls aged 15-19.

Source: Author's calculations using information about legal abortions provided by the Ministry of Health and mid-year population estimates (Office of National Statistics of Uruguay, 2013 Revision).

Figure 3. Evolution of the adolescent fertility rate by country (LAC countries, 2001-2019)

Source: SDG-UNSD, Vital Statistics Records of each country when available at the respective Office of National Statistics, and PLISA-PAHO. Table A1 in the Appendix provides detailed information.

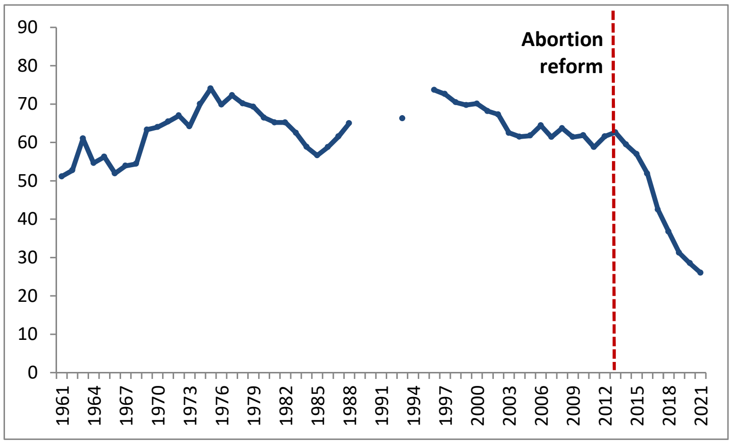


Figure 4. Evolution of the adolescent fertility rate (Uruguay, 1961–2021)
Source: Vital Statistics, Ministry of Health and the Office of National Statistics.

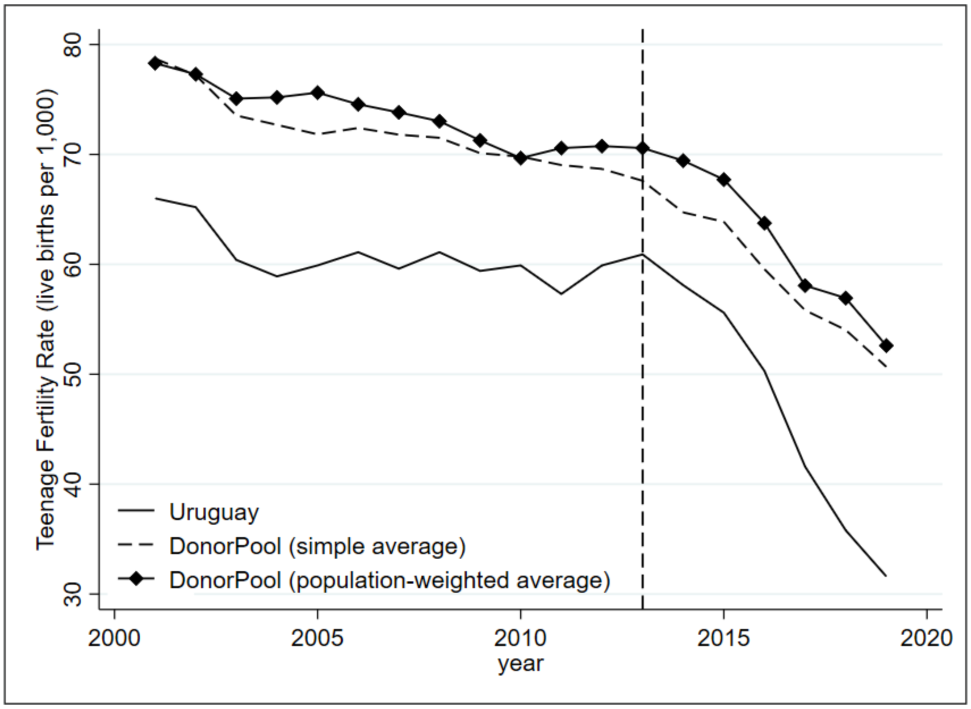


Figure 5. Adolescent fertility rate: Uruguay vs. the donor pool, 2001-2019

Notes: Donor Pool presents the average for Antigua and Barbuda, Argentina, Bahamas, Bolivia, Brazil, Costa Rica, Dominica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, Saint Kitts and Nevis, Suriname, Trinidad and Tobago, and Venezuela. I use total population in order to compute population-weighted average.

Source: SDG-UNSD, Vital Statistics Records of each country when available at the respective Office of National Statistics, and PLISA-PAHO. Table A1 in the Appendix provides detailed information.

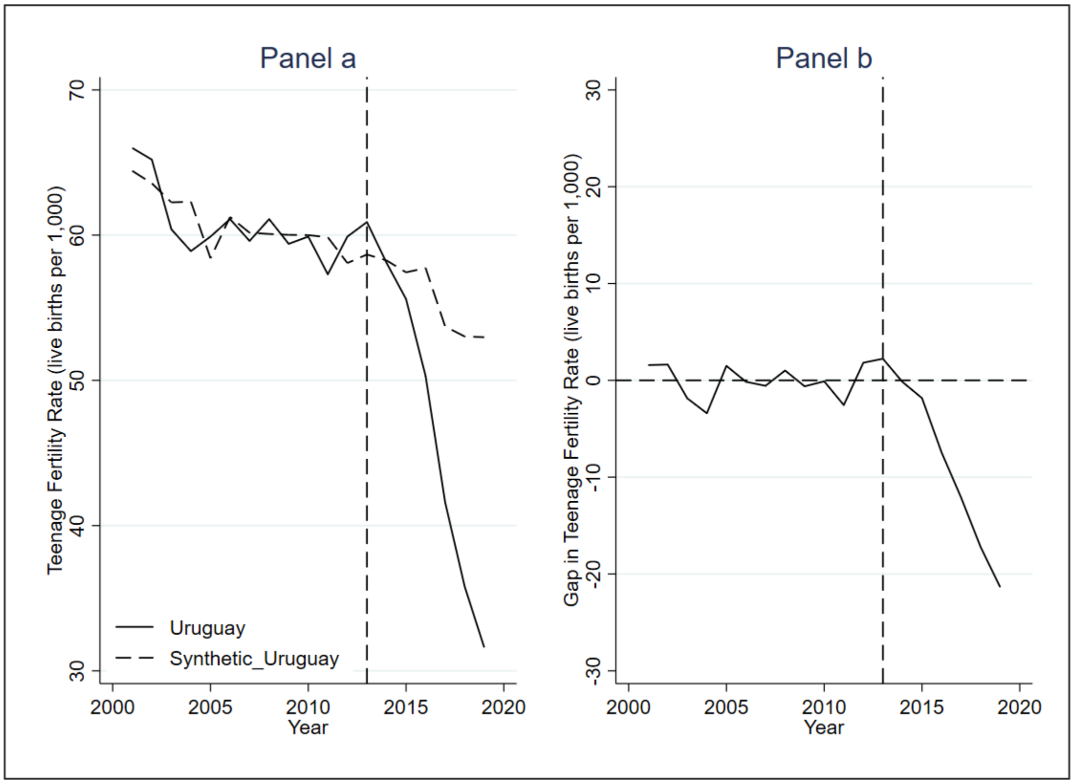


Figure 6. Main results
Panel a. Adolescent fertility rate: Uruguay vs. Synthetic Control, 2001-2019
Panel b. Adolescent fertility gap between Uruguay and Synthetic Control, 2001-2019
Notes: The synthetic control for Uruguay is a weighted average which includes Dominica (.57), Venezuela (.23), Suriname (.12) and Haiti (.08).
Source: Author's estimations.

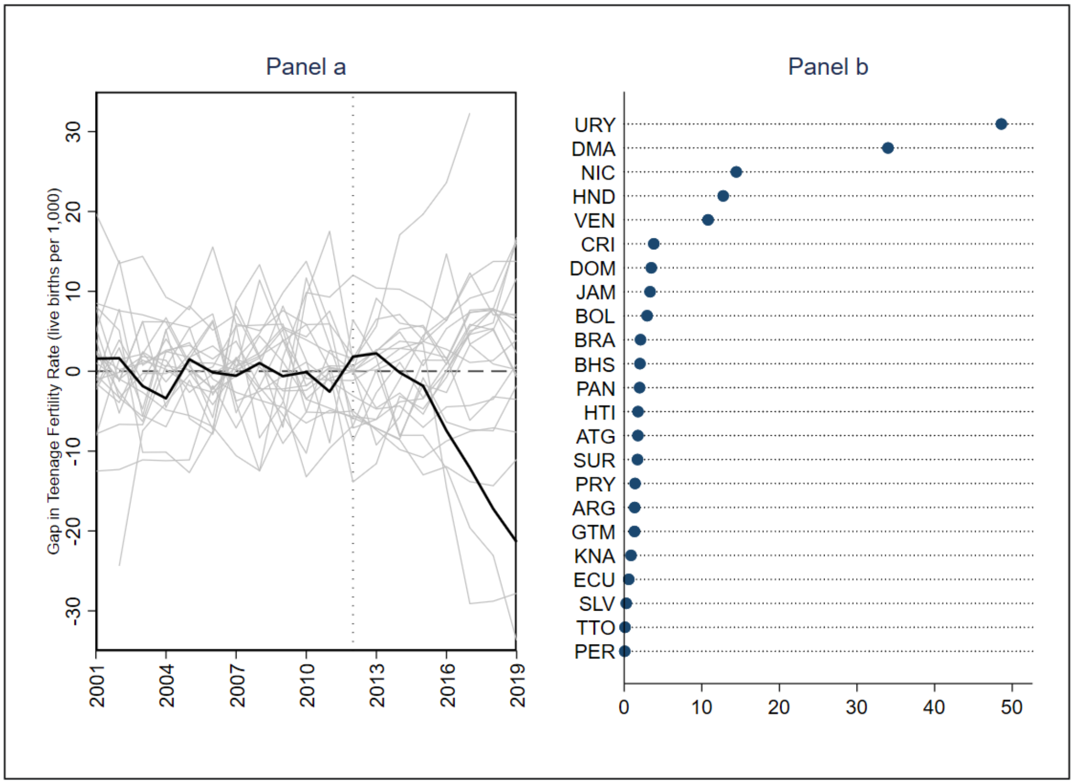


Figure 7. In-space placebo analysis
Panel a. Adolescent fertility gap between each country in the donor pool and its respective Synthetic Control, 2001-2019
Panel b. Ratio of Post-reform MSPE to Pre-reform MSPE (r_j): Uruguay and Control Countries

Notes:
Panel a: The grey lines represent the placebos, while the black line shows the gap estimated for Uruguay.
Panel b: MSPE is the Mean Squared Prediction Error. I use the ISO alpha-3 codes for countries.
Source: Author's estimations.

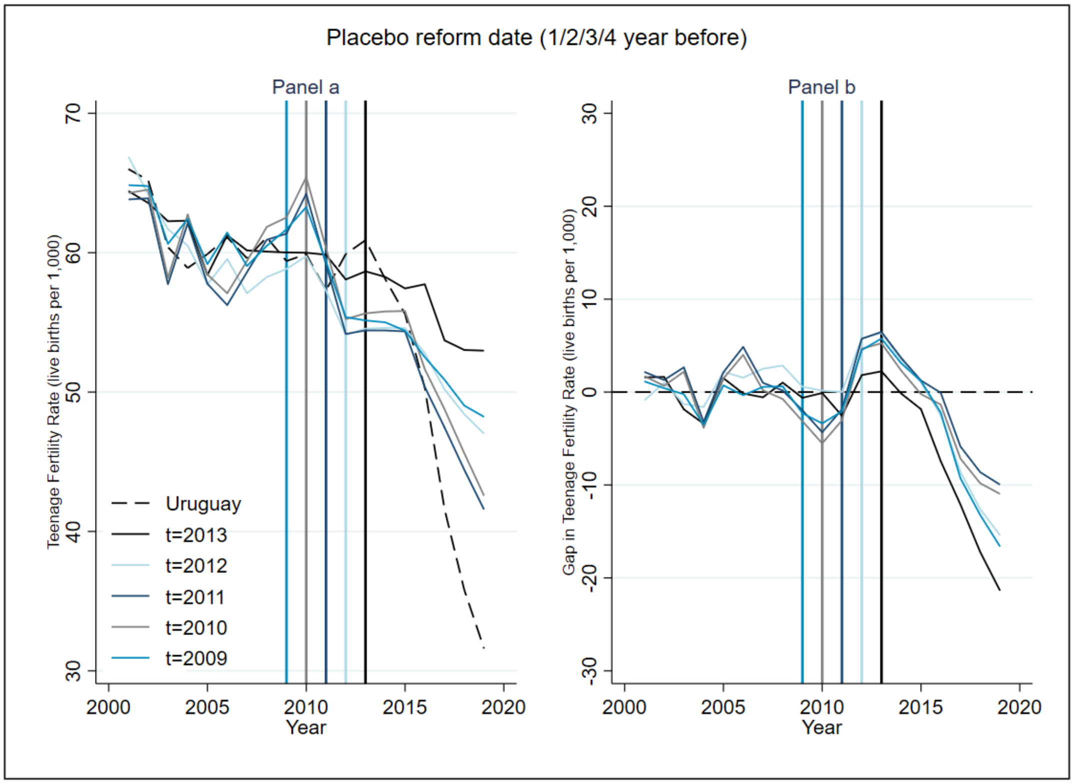


Figure 8. Placebo-in-time test

Notes: Uruguay vs. Synthetic Control and placebo Synthetic Control assuming reform date 2009, 2010, 2011 and 2012. Panel a depicts adolescent fertility rate (live births per 1,000 women aged 15-19) and Panel b depicts Gap or estimated effect in adolescent fertility rate.

Source: Author’s estimations.

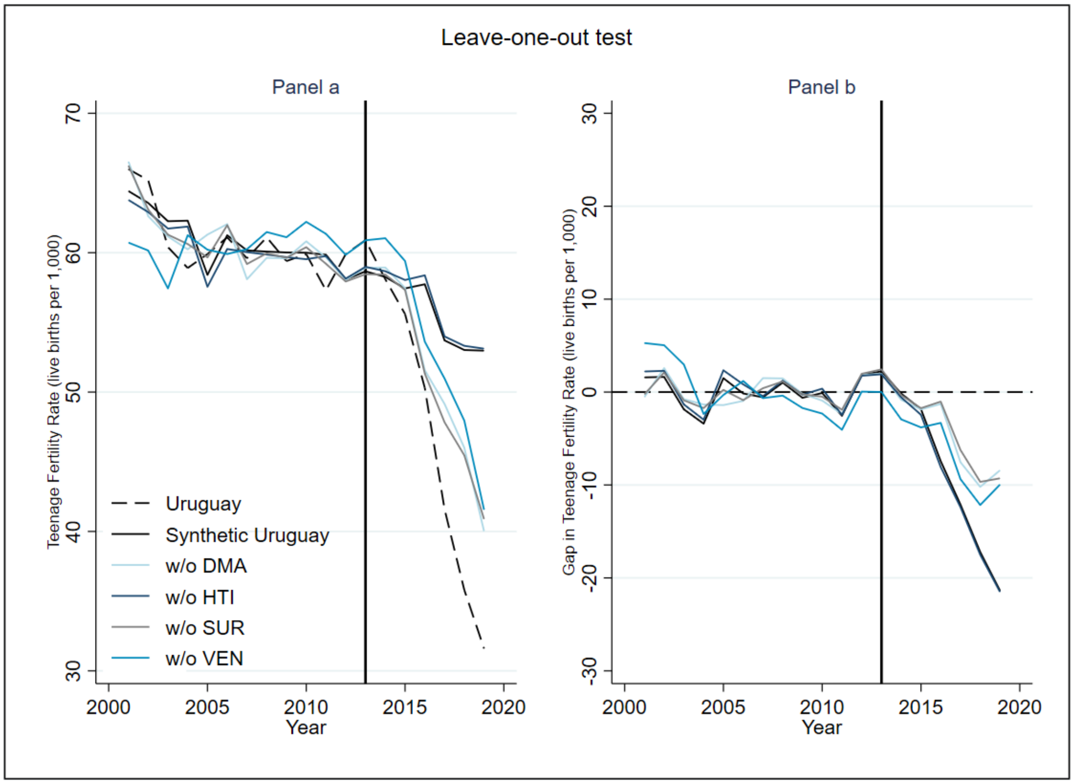


Figure 9. Leave-one-out analysis

Notes: Uruguay vs. Synthetic Control and placebo Synthetic Control estimated without (w/o) Dominica (DMA), Haiti (HTI), Suriname (SUR) and Venezuela (VEN). Panel a depicts adolescent fertility rate (live births per 1,000 women aged 15-19) and Panel b depicts Gap or estimated effect in adolescent fertility rate. Source: Author's estimations.

Appendix

Table A1. Evolution of the adolescent fertility rate by country (LAC countries, 2001-2019)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Antigua & Barbuda	66.8	63.6 [b]	60.4 [b]	57.2 [b]	54.0 [b]	50.8 [b]	47.6	59.2	49.7	41.4	39.5	37.7	34.6	31.8	37.7	31.1	28.8	27.7	31.6
Argentina	60.3	60.7	56.8	62.9	62.8	61.8	63.0	65.4	65.8	68.2	66.9	64.8	66.6	67.0	65.1	57.0	54.4	49.9	40.9
Bahamas	50.8	46.9	45.6	46.4	43.0	37.3	40.4	39.8	34.0	35.9	33.1	32.0	29.0	25.7 [b]	22.3 [a]	21.2 [a]	17.7 [a]	16.9 [a]	16.4 [a]
Barbados	62.8	55.3	50.5	48.3 [b]	46.2	45.8	49.7	47.3 [d]	46.4 [d]	45.5 [d]	44.6 [d]	43.6 [d]	42.7 [d]	40.9 [d]	39.0 [d]	37.2 [d]	35.4 [d]	33.6 [d]	31.1 [d]
Bolivia	84.4 [d]	84.0	94.4	91.7 [b]	89.0	87.6	86.9 [d]	86.0 [d]	84.1 [d]	82.2 [d]	80.4 [d]	77.9	76.0 [d]	74.4 [d]	71.0	69.4 [d]	67.7 [d]	66.1 [d]	65.1 [d]
Brazil	78.4	75.2	73.7	73.3	73.9	70.9	68.5	67.3	64.6	62.2	63.1	63.0	63.1	63.4	61.7	58.6	52.7	52.5	49.1
Belize	93.3 [d]	90.4	93.3 [b]	96.2	88.8 [b]	81.5	78.0	73.3 [b]	68.7 [b]	64.0	70.1 [b]	76.1 [b]	82.2	74.0	66.3	69.2	64.3	65.4	58.2
Chile	60.6	55.9	50.7	49.2	50.4	52.7	54.8	56.5	55.9	53.5	52.3	51.6	48.4	46.1	40.6	33.4	26.4	22.6	18.5 [a]
Colombia	81.7	92.0	90.4	80.5	96.2	90.6 [b]	85.0	83.5	83.8 [b]	84.0	72.6	75.2	71.6	74.6	64.9	62.0	61.0	60.5	57.9
Costa Rica	76.7	70.3	70.8	69.3	66.2	65.6	68.0	70.9	68.7	62.8	65.4	67.1	61.6	59.8	55.9	53.2	52.5	50.4	40.9
Cuba	48.3	47.9	48.9	44.9	43.3	41.0	43.9	50.8	53.5	54.3	56.8	51.7	51.3	48.9	52.5	48.7	51.5	53.3	52.4
Dominica	49.7	48.1	48.4	47.8	42.5	47.1	46.3 [d]	45.5 [d]	44.8 [d]	44.0 [d]	43.5 [d]	42.9 [d]	42.4 [d]	41.9 [d]	41.4 [d]	41.1 [d]	40.9 [d]	40.6 [d]	40.3 [d]
Dominican Republic	116.2	109.4	102.2 [b]	95.0	92.4	101.9	96.2	94.6 [b]	93.0	93.1	90.0	89.8	89.5	90.1 [b]	90.6	70.8 [b]	51.0	50.1 [c]	47.7 [c]
Ecuador	100.9	99.6	74.7	71.8	69.5	76.8	91.6	93.7	86.6	83.7	84.0	84.0	72.9	72.3	76.5	69.7	71.1	69.5	63.5
El Salvador	100.1	86.4	81.9	87.7	89.0	89.4	89.4	82.6 [b]	75.7	65.4	67.1	69.0	74.0	64.7	69.7	58.9	55.6	51.8	47.8 [c]
Grenada	63.9 [d]	61.5 [d]	59.2 [d]	57.1 [d]	55.1 [d]	53.0 [d]	51.1 [d]	49.0 [d]	47.4 [d]	45.8 [d]	44.1 [d]	42.5 [d]	40.9	35.9	34.6 [d]	33.3 [d]	32.0 [d]	30.7 [d]	29.7 [d]
Guatemala	114.0	120.5	99.8	96.1	98.6 [b]	101.0	98.0	93.7 [b]	89.3 [b]	85.0	89.4	93.5	91.7	84.8	81.2	78.9	78.2	77.4	71.7
Guyana	94.8	84.1	90.4	81.2	89.1 [b]	97.0	101.3	94.6 [b]	87.9	84.0	81.0 [b]	78.0	73.7	78.6 [b]	83.4	76.8 [b]	70.3	64.9	63.6 [d]
Haiti	71.0 [d]	70.0 [d]	69.0	68.1	71.8 [b]	75.5	63.9	64.4 [b]	65.0	66.1	64.4 [b]	62.8 [b]	61.1 [b]	59.4	54.8	53.6 [d]	52.5 [d]	51.3 [d]	50.6 [d]
Honduras	112.7 [d]	110.3 [d]	108.0	101.8	104.9 [b]	108.1	96.6	97.8 [b]	99.0	100.6	91.7	110.0	103.0	88.7	88.5 [a]	81.8 [a]	75.3 [a]	70.7 [a]	53.6 [a]
Jamaica	74.1	79.0	63.5	62.4	66.2	60.5	72.0	58.2	57.3	70.0	61.3 [b]	52.5	50.8	45.5 [a]	43.8 [a]	39.8 [a]	36.5 [a]	34.4 [a]	36.6 [a]
Mexico	90.3	87.7	84.0	64.8	75.8	74.9	69.5	75.2	74.5	74.9	77.0	77.0	76.1	62.7	65.4	62.5	62.0	70.5	66.1 [c]
Nicaragua	104.5	111.8	110.2 [b]	108.5	106.0	102.3	104.7	99.7	92.0	110.1	109.2 [a]	111.2 [a]	108.6 [a]	105.8 [a]	108.2 [a]	105.4 [a]	107.6 [a]	106.1 [a]	99.1 [a]
Panama	89.3	84.3	77.5	84.9	83.8	84.8	80.4	83.2	84.7	82.0	88.7	81.0	91.1	86.0	84.3	79.2	75.9	74.1	67.8
Paraguay	65.8 [d]	65.0	64.2 [b]	63.3 [b]	62.5 [b]	61.7	63.0	61.8	75.0	77.5 [b]	80.0 [b]	82.5	79.3 [b]	76.0	72.0	65.4 [c]	66.8 [c]	60.7 [c]	54.8 [c]
Peru	36.4	47.7 [b]	59.0	61.5 [b]	64.0	63.0	69.0	67.4	68.4	61.1	64.2	65.0	65.0	61.0 [b]	57.0 [b]	53.0	44.0	44.4	40.5 [a]
Puerto Rico	68.6	63.2	60.4	62.3	61.1	60.1	57.9	56.1	56.5	51.4	51.7	48.8	44.6	40.4	33.9	29.6	27.6	21.5	21.9
St Kitts & Nevis	74.1	62.5 [d]	65.9 [d]	52.6 [d]	56.1 [d]	59.4 [d]	46.1	46.3 [d]	45.5 [d]	44.7 [d]	44.0 [d]	43.1 [d]	42.4 [d]	41.7 [d]	40.8 [d]	40.1 [d]	39.4 [d]	38.5 [d]	37.8 [d]
St Lucia	66.8 [d]	63.4	57.8	57.8	50.7	47.6	52.0	45.3	43.6	39.7	38.8	37.5	37.7	42.3	36.8	32.1	29.8	31.1	28.5
St Vincent & the Grenadines	72.3	75.1	71.5	65.0	63.0	64.1 [b]	65.3 [b]	66.4	72.7	67.4	64.1	67.0	63.4	66.5	57.0	54.6	52.3	48.3	47.2
Suriname	74.3	76.2	65.2	69.8	60.8	61.0	64.1	67.9 [b]	71.8 [b]	75.6	65.7 [b]	55.7	56.2	57.6	61.1	59.6	56.7	53.9	55.8
Trinidad & Tobago	38.3	34.6	34.5	35.2	31.9	35.5	33.3	37.9	38.0	35.0 [b]	32.0	30.8 [b]	29.7 [b]	28.5 [a]	26.0 [a]	23.9 [a]	18.8 [a]	18.2 [a]	20.3 [a]
Uruguay	66.0 [a]	65.2 [a]	60.4 [a]	58.9 [a]	59.9 [a]	61.1 [a]	59.6 [a]	61.1 [a]	59.4 [a]	59.9 [a]	57.3 [a]	59.9 [a]	60.9 [a]	58.1 [a]	55.6 [a]	50.3 [a]	41.6 [a]	35.8 [a]	31.6 [a]
Venezuela	92.9	92.5	92.1	91.7	91.3	90.9	90.5	89.9	89.4	88.9	95.2	94.5	98.6	98.0	95.5	98.6	83.8	83.3 [d]	83.0 [d]

Source: SDG-UNSD.
a) Vital Statistics Records, Office of National Statistics.
b) Imputed data using linear interpolation.
c) Imputed data using variation in data from Vital Statistics Records, Office of National Statistics.
d) Imputed data using variation in data from PLISA-PAHO.