Do all roads lead to the same destination? Proximity to abortion providers, abortion decisions and conditions in Portugal*

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Abstract

Portugal legalized abortion in 2007, making it available through the National Health Service (NHS) free-of-charge. This paper analyzes how variations in proximity to an abortion provider affect the probability of aborting and the conditions under which abortions occur, namely when, where, and how. We find suggestive evidence that there are fewer abortions among women living further away from a provider relative to women living closer. We also find evidence that *(i)* these women abort later, *(ii)* are more likely to be referred by public hospitals to private clinics and, consequently, *(iii)* have an increased risk of aborting surgically, an invasive procedure which is more costly than the medical method.

JEL Codes: I11, I12, J13

Keywords: Abortion Access; Abortion Care; Family planning.

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1. INTRODUCTION

Women undergoing unsafe abortion are at a higher risk of having health problems or even dying (Grimes et al. 2006). The World Health Organization (WHO) has defined the elimination of unsafe abortion as one of its top five priorities of its global reproductive health strategy (WHO 2004). Legalizing abortion was shown to be an effective way to decrease maternal mortality and morbidity (Clarke and Mühlrad 2021), and, indeed, since 2007, when Portugal made abortion legal and fully subsidized, there has been a decrease in the number of abortion-related deaths. Between 2001 and 2007, there were, on average, two deaths per year – out of an estimated number of 20,000 yearly illegal abortions –while, between 2008 and 2014, a total of two deaths were registered in seven years – for this period, the annual number of abortions ranged between 16,762 and 20,480 (Vicente 2020). However, the legal status of abortion is not the only dimension of access at stake. As Grimes et al. (2006) point out: "enabling abortion legislation is necessary but not sufficient: a new law might not translate into widespread access to safe services" (p. 6).

One important dimension is the actual distance to a provider, which can be seen as the physical, logistical, and emotional cost faced by women when traveling to an abortion facility (Kimport 2022). Increases in this cost render abortion more difficult to obtain, and thus, likely influence not only whether women abort (Kane and Staiger 1996), but also the conditions under which they abort, namely when (Bitler and Zavodny 2001; Lindo et al. 2020), where, and how. This is, of course, relevant for the well-being of women. In fact, not being able to abort can lead to worse present and future financial and economic conditions (Miller et al. 2020). Furthermore, when a woman is able to abort, "any delay increases the risk of complications" (Cates et al. 1977:268). Given that later abortions are more demanding in terms of logistics and training of healthcare professionals (Harris 2008), delays may also reduce the number of available abortion providers. In addition, as medically induced abortions lose efficiency after the ninth week of pregnancy (Winikoff et al. 2008), delays may lead to the use of surgical abortion, a less time-consuming method but an invasive and more costly procedure.[1]

The role of proximity to abortion services in affecting whether women abort is a growing topic in applied economics. Quast et al. (2017), Fischer et al. (2018), Lindo et al. (2020), Venator and Fletcher (2021), and Myers (2021) document that the number of abortions in U.S. counties fell in response to increases in the travel distance to the nearest provider. However, there is not much research on how proximity affects when, where, or how women abort. To the best of our knowledge, only Lindo et al. (2020) address how being close to a provider affects when abortions occur.

In this paper, not only do we analyze the association between proximity to a provider and whether and when women abort, but we also consider how proximity affects other characteristics of abortions such as where they take place – with a public hospital or a private clinic – and how they are performed – and the use of a medical or surgical method.

To measure proximity, we use the travel time from the women's municipality of residence to the nearest abortion provider. In Portugal, travel times to the nearest abortion provider have varied over time due to the shutdowns and openings of abortion services. To examine how changes in travel time affect abortion decisions and conditions, we use individual-level data from birth records and abortion registries to compile a dataset of all pregnancies occurring in Portugal between 2008 and 2016. It contains information on the number of weeks of gestation of each pregnancy and women's socioeconomic characteristics, including their municipality of residence. Together with the information on the location of abortion providers throughout time, this allows us to compute the travel time from the center of each municipality to the nearest abortion provider. We find that living far away from a provider is associated with fewer

[1] The Portuguese General-Directorate of Health recommends the use of the surgical method to terminate pregnancies above nine weeks of gestation (DGS 2007a).

abortions in the area of residence and also with aborting later. Moreover, these late abortions appear to be caused by late arrivals to abortion care. For abortion services, it may prove challenging to accommodate women at later gestational ages, within the legal time limits, and to use the medical method since it is more time-consuming than the surgical procedure but non-invasive and less costly.[2] The challenge is particularly difficult for public hospitals, which are chronically short of healthcare professionals who are not conscientious objectors (Oliveira da Silva 2009). As a consequence, they have the incentive to refer women to private clinics that predominantly use the surgical method. We provide evidence of this mechanism by showing that longer trips to a provider are associated both with a higher likelihood of being referred from a public hospital to a private clinic and with a greater risk of having a surgical abortion. Although abortion supply might be partially determined by demand, in the Discussion section, we show that our results are unlikely to be driven by the endogeneity of the travel time to the nearest abortion provider. Finally, even though women living far away are at a higher risk of having the more costly surgical abortion, a back-of-the-envelope calculation suggests that providing proximity abortion services through the NHS would only save a limited amount of public money. However, this would reduce the individual burden of having to undergo a late and invasive abortion.

This paper contributes to the economic literature studying how abortion access, in particular proximity, affects abortion rates. Theoretically, decreased access to abortion should reduce the number of abortions through two different channels (Kane and Staiger 1996; Levine and Staiger 2002). On the one hand, pregnant women may decide to carry their pregnancy to term, as abortion becomes too costly. On the other hand, women may exert more effort to avoid

[2] For medical abortions, women need to make two to three visits to the doctor: one to take the mifepristone, and another, 48 hours later, to take Misoprostol. If abortion did not take place during the second visit, a third visit is required to check if abortion was successful (DGS 2007b). As for surgical abortions, women only need to make one trip to the doctor. However, as it is a surgical procedure, it demands more hospital resources, namely an operating room and an anesthesiologist (DGS 2007c).

pregnancy, leading to fewer pregnancies and, consequently, fewer abortions (Kane and Staiger 1996; Levine and Staiger 2002). Both theoretical predictions find support in empirical studies, most of which rely on natural experiments conducted in the USA as a source of exogenous variations in abortion access. Cook et al. (1999) take advantage of North Carolina's intermittent reimbursement of abortion procedures throughout the year – that randomly left some women uncovered – to show that unexpected funding restrictions reduce the number of abortions. Quast et al. (2017), Fischer et al. (2018), Lindo et al. (2020), and Venator and Fletcher (2021) exploit restrictive abortion laws that led to drastic reductions in the number of abortion clinics in Texas and Wisconsin and show that increasing the distance to an abortion provider reduces abortion rates. Recently, Myers (2021) used variation in distances to the nearest provider across the entire United States to find similar impacts to the ones found for Texas and Wisconsin. In our paper, we explore a setting where, unlike the United States, a universal health care system provides abortions free-of-charge and where traveling is the only tangible cost faced by women. In Portugal, the time constraint is particularly relevant since the legal gestational age limit for abortion is only ten weeks, the lowest among high-income countries (Popinchalk and Sedgh 2019). To our knowledge, together with Brooks and Zohar (2021),[3] this is also one of the few papers using non-US data to examine how abortion access affects the number of abortions.

Our paper also contributes to the literature on how barriers to abortion affect its timing. The intuition is that women with deprived access may need more time to reach abortion services, hence delaying abortions (Lindo et al. 2020). For the United States, a number of state-specific studies find that women abort later when facing mandatory reflection periods (Joyce and Kaestner 2001; Lindo and Pineda-Torres 2019), or the need to obtain parental consent (Joyce and Kaestner 2001), or congested abortion services (Lindo et al. 2020; Kelly 2020). However,

[3] Brooks and Zohar (2021) examine how expanding access to free abortion in Israel affected abortion rates. They find that abortions increased in response to this policy, while the probability to become pregnant was not affected.

it is unclear how proximity affects abortion timing (Lindo et al. 2020). In the present paper, we find suggestive evidence that living far away from a provider leads women to abort later. As far as we know, we are the first to examine how access affects abortion timing in a European country. We also look at the consequences that these delays cause in other aspects of the abortion process, namely where – being referred to a private clinic by a public hospital – and how women abort – medical or surgical method – which has not been tackled so far in the literature.

The structure of the paper is the following: Section 2 provides institutional background on the legal framework and distribution of abortion services in Portugal; Section 3 presents the empirical strategy; Section 4 introduces and describes the data; Section 5 provides the results, and Section 6 presents the discussion and some conclusions.

2. INSTITUTIONAL BACKGROUND

Before dwelling on how proximity to a provider affects the decision to abort and the conditions under which abortions occur, we must point out that in Portugal, abortion on request only became legal in 2007 (Law 16/07). The Portuguese law is quite restrictive compared to its European counterparts: it has the lowest gestational age limit among high-income countries (Popinchalk and Sedgh 2019) – ten weeks of pregnancy – and it requires a mandatory reflection period of three days, as well as parental consent for minors below the age of 16.

Upon legalization, there was a swift effort to generalize access to abortion services, either public or private. A key factor for that rapid expansion was the provision of abortions free-of-charge within the pre-existing public maternity network of the NHS, which is of universal access (Simões et al. 2017). To that end, the law determined that all public hospitals with a gynecology or obstetrics department should provide abortion services (Portaria741-A/2007).

According to the standard procedure, to access public abortion, women should first contact primary care services, which should refer these women to the regional specialized public hospital. However, it is admissible that women bypass this system and access hospital services directly (Simões et al. 2017).

However, as 85% of gynecologists in Portugal were conscientious objectors (Oliveira da Silva 2009), some hospitals could not provide abortion services, undermining the local supply of abortion and leading to discrepancies in the geographical distribution of providers, which, as we show in Figure 1, varied across time.

If public hospitals do not have abortion services or cannot promptly provide them within the legal limit of ten weeks of gestational age, hospitals must redirect women living in the area they cover toward another provider – either a public hospital or a certified private clinic. In that case, the cost of the abortion is directly paid by the hospital first contacted by the woman to that which performed the abortion – at a set price, defined by law, depending on the abortion method. Overall, in the NHS, the financing of abortion procedures, outsourced or not, is provided through each hospital's fixed budget. Hospital budgets are set according to the hospital's cost history, use, and complexity indicators (Simões et al. 2017). Women may also directly access private providers, but, in this case, they must pay for the abortion procedure themselves.

3. EMPIRICAL STRATEGY

The first goal of this paper is to understand how proximity affects the probability that women abort. As previously mentioned, travel time to the nearest abortion provider impacts the likelihood that a woman aborts on two margins: the probability of becoming pregnant and the probability of aborting once pregnant. Given that we do not have individual-level data for all fertile females in Portugal, but only for pregnant women, to estimate how variations in travel time affect the probability that any woman aborts, we conduct an analysis on the number of yearly abortions at the municipality level – the lowest geographical aggregation level at our disposal. Then, using individual data on all pregnancies, we examine how travel time affects the probability that a pregnant woman aborts. Finally, we focus exclusively on women who abort to assess how proximity affects the conditions under which abortion occurs, namely when, where, and how.

3.1. Number of abortions in municipalities

We start by examining how travel time affects the number of abortions among all women at the municipality-level. As some municipalities had no abortions in a number of years – this is mainly the case for abortions among teens, as can be seen in Figure B1 (online appendix) – we use a Poisson pseudo-maximum likelihood estimator.[4,5] We estimate the model below:

$$N^{o}Abortions_{mt} = \beta_1 Time_{mt} + X_{mt}\beta_2 + \varphi_m + \zeta_t + u_{mt} \tag{1}$$

where $N^{o}Abortions_{mt}$ is the number of abortions among women living in municipality m, in year t. $Time_{mt}$ is the travel time between the centroid of the nearest municipality with an abortion provider and the centroid of municipality m in year t. X_{mt} is a vector of time-varying municipal controls. φ_m and ζ_t are municipal and year fixed-effects, respectively. u_{mt} is the error term. We use the number of fertile women or alternatively the number of teens – for the teens' analysis – as the exposure variable of the Fixed Effects Poisson model, which has its coefficient restricted

[4] The recent literature on abortion access and rates at the local level uses the Poisson pseudo-maximum likelihood estimator (Lindo et al. 2020; Fischer et al. 2018; Venator and Fletcher 2021) as, unlike other count models with fixed effects, it does not suffer from the incidental parameters problem (Cameron and Trivedi 2005).

[5] One problem of the Poisson model is that if the variance is larger than the expected value, there is a risk of underestimating the standard errors. Nevertheless, as Lindo et al. (2020) note, “while the possibility of overdispersion is the main theoretical argument that might favor alternative models, overdispersion is corrected by calculating sandwiched standard errors (Cameron and Trivedi 2005)” (p. 1148), which is what we do here.

to one.[6] The coefficient of interest is β_1, which we expect to carry a negative sign, as increases in travel time should make abortion more costly, leading women to either carry their pregnancies to term or to avoid becoming pregnant at all.

One potential concern with this analysis is the possibility that changes in abortion supply could be driven by changes in demand. In the discussion, we show that these concerns are unlikely to hold. In short, if providers' openings and closures are driven by demand, then past abortion rates should predict the opening or closure of clinics. We find no evidence of this in our data. In fact, given that most gynecologists are conscientious objectors, changes in supply are likely caused by changes in the composition of hospitals' medical staff. This will only pose a threat to identification if changes in the share of conscientious objectors within hospitals correlate with local trends in social norms and if changes in social norms correlate with variations in abortion demand. In that regard, we conduct event studies and show that our proxies for local social norms are stable before the openings or closures of abortion providers. Furthermore, the number of abortions in municipalities appears to be orthogonal to these proxies, which we use as controls in all regressions throughout this paper.

Finally, one could also worry that women's migration patterns are determined by their likelihood to abort and by the local level of abortion supply. As we later discuss, this is unlikely, given that most abortion services locate within public hospitals. Thus, even women who think they will never abort may still need to use a hospital with an abortion service to access other types of medical care. Furthermore, when we restrict our analysis to teenagers, who probably do not choose where to live, the results are similar to the ones in the main analysis. Also, the

[6] As Lindo et al. (2020), we also estimated the above model by OLS, using an Inverse Hyperbolic Sine Transformation of the dependent variable. As evidenced in Table C1 (online appendix) the results are robust to this change, both in magnitude and in statistical significance.

fact that the magnitude of internal migration flows in Portugal is small further attenuates our concerns that residential sorting may threaten the validity of our results.

3.2. Probability to abort, once pregnant

As a second step, employing individual-level data on births and abortions, we analyze how travel time affects the decision to abort using the following linear probability model, clustering the standard errors at the municipality level:

$$Abortion_{imt} = \alpha_0 + \alpha_1\, Time_{mt} + X_{imt}\, \alpha_2 + \varphi_m + \zeta_t + \varepsilon_{imt} \qquad (2)$$

where $Abortion_{imt}$ is a dummy variable equal to one if the pregnant woman i living in municipality m and conceiving her pregnancy at year t aborts and 0 otherwise. $Time_{mt}$ is the travel time between the nearest abortion provider and the town hall of municipality m where woman i lives, at the year of the conception of her pregnancy t. X_{imt} is a vector of individual controls, and ε_{imt} is the error term. The parameter we are interested in is α_1. We expect α_1 to carry a negative sign for the reasons mentioned above, as long distances could dissuade women from aborting.

3.3. Conditions under which abortion takes place

Finally, we analyze how travel time affects the conditions under which abortion takes place. Using data restricted to women who aborted, we estimate the model below by OLS, again clustering the standard errors at the municipality level:

$$Y_{imt} = \lambda_0 + \lambda_1 Time_{mt} + X_{imt}\, \lambda_2 + \varphi_m + \zeta_t + v_{imt} \qquad (3)$$

where Y_{imt} stands for the six different outcomes we study.

First, we examine four outcomes related to the timing of abortion, namely: i) the gestational age at the moment when women make the first contact with abortion care, ii) the number of waiting days between that moment and the abortion intervention, iii) the gestational age at the time of abortion, and iv) the probability of having an abortion after nine weeks of pregnancy, a turning point in the quality of care, as it increases the risk of complications and the use of the surgical method. In fact, over nine weeks of pregnancy the General Directorate of Health (DGS) recommends the use of the surgical method to abort (DGS, 2007a), as the efficiency of medical abortion decreases overtime (Winikoff et al. 2008). Second, we analyze where abortions occur, namely, v) the probability of being referred by a public hospital to a private clinic. Third and last, we examine how travel time affects the abortion method, namely, vi) having a surgical abortion, which is invasive, unlike the medical method. We expect the main coefficient of interest, λ_1, to be positive for these different outcomes.

4. DATA

4.1. Data sources

To carry out our investigation on the relationship between proximity and abortion decisions and conditions, ideally, we would have individual-level data for all women of fertile age, containing information on their family planning decisions, socioeconomic profile, and place of residence. Although individual-level data for all women does not exist, we have access to administrative data on all women giving birth or aborting,[7] which allows us to build a dataset of all pregnancies in Portugal between 2008 and 2016. Data on abortions were provided by the DGS (2020), and data on births originate from birth records at Civil Registers, subsequently compiled by Statistics Portugal (2020a). Both the abortion and birth datasets contain detailed information on pregnant women, particularly their socioeconomic characteristics and municipality of residence, which is crucial to measure proximity to an abortion provider.

[7] Miscarriages or involuntary abortions are not included in the abortion data.

To obtain the location of abortion providers for each year of the analysis, we construct a list of the abortion services operating in Portugal and the bordering regions of Spain – that women living in Portugal may potentially use. This information is provided by the DGS and the Spanish Ministry of Health, respectively, in annual reports on abortion registers (DGS 2010-2017; Sanidad 2009-2018). For Portugal, these reports disclose the number of abortions that each provider performed. We only consider a provider to have been in operation if it performed at least five abortions in a given year. Our results are robust to considering other thresholds, namely, having had at least one or ten abortions in a given year – see Tables C2 to C7 (online appendix). Using the name of the hospital or clinic provided in the reports, we identify the coordinates where that abortion facility is based. Because of the 2018 General Data Protection Regulation, the DGS stopped publishing the number of abortions per provider in their annual reports. Since the report of 2017 was only published in 2018, we do not have information on the providers operating from 2017 onwards, and we can only conduct our analysis on the 2008-2016 period.

We also gather data to characterize the socioeconomic and demographic characteristics of municipalities. The data on regional-level per capita Gross Domestic Product (GDP), municipality population by age and gender, marriages, and divorces per municipality come from Statistics Portugal (2020b, 2020c, 2020d, 2020e). In addition, data on the number of people receiving unemployment benefits originate from the Portuguese Employment Office (IEFP 2008-2017).

4.2. Variables

Proximity to the nearest provider is at the core of our analysis and is measured by the travel time to the nearest abortion provider. Not knowing the exact coordinates where women live, we assume that they all live in the populational centroid of their municipality of residence, which is proxied by the coordinates of the town hall. We then compute travel times to the coordinates of the nearest abortion provider for each of the 278 municipalities in mainland Portugal between 2008 and 2016. We also calculated the travel time between each municipality and the closest Spanish municipality with a private abortion clinic – see section A.1 in the online appendix for more information on the travel time to Spanish providers' data. To compute these travel times, we use the Stata user-written GEOROUTE command (Weber and Péclat 2017). According to the specifications, travel time is introduced in the regressions either as a linear variable or as a categorical variable to account for possible non-linear effects. In the latter case, we consider three travel time bins, namely, living in a municipality *i*) within 30 minutes of an abortion provider; *ii*) between 30 minutes and one hour, and *iii*) more than one hour away from the nearest abortion provider – see Figure B2 in the online appendix for the distribution of municipalities across time bins.

When examining how travel time to the nearest provider affects the number of abortions at the municipality level, we control for the age structure of the population, using the share of all age groups of fertile-age women in the overall population.[8] We also control for the economic conditions in the municipality of residence. These are proxied by the number of persons receiving unemployment benefits as a percentage of the active population in the municipality (aged 15 to 65) and by the GDP per capita growth rate in Purchasing Power Standards of the NUTS III region. Additionally, as our analysis covers a nine-year period, we consider potential changes in social norms within municipalities. As a proxy of the level of conservatism, we control for the number of marriages, divorces, catholic marriages, and catholic divorces per thousand inhabitants in the municipality.

To explore how proximity affects the probability of aborting, conditional on being pregnant, we build a dataset of all pregnancies in Portugal. To do so, we need to make the socioeconomic

[8] Each age group is defined on the basis of a five-year interval.

controls compatible in the abortion and birth data. We aggregate the more refined information regarding marital status (married, single, widowed, divorced, and separated) and cohabitation status (living with or without a partner) contained in the abortion dataset to match the cruder information provided in the birth dataset (birth within-wedlock, out-of-wedlock with cohabitation of parents, out-of-wedlock without cohabitation of parents). Moreover, we harmonize the classification of occupations and activity status across both datasets by creating a new occupation variable with nine classes – see section A.2 in the online appendix for details on the harmonization of occupations. The additional controls we include in our analysis are directly comparable across datasets and hence require no harmonization. Specifically, we also control for women's municipality of residence, age, educational level (illiterate, knows how to read/write, primary school, lower middle school, higher middle school, high-school, and college), number of previous children, and nationality (Portuguese or Foreign). Finally, we use the number of weeks of pregnancy to estimate the date of the start of the pregnancy for both births and abortions. This aspect is critical to computing the time each woman had to travel to the nearest abortion provider at a stage of her pregnancy in which she could legally abort.[9]

Finally, in the analysis of how proximity affects the conditions under which abortion occurs, we control for the aforementioned socioeconomic variables. The fact that we only consider women who aborted enables us to use the original occupation variable contained in the abortion data as well as the more refined marital status and cohabitation variables. Nevertheless, in Table C8 (online appendix), we also provide the results we obtain using the coarser controls used to estimate the probability of aborting once pregnant. In addition, we also control for the previous

[9] Data on the number of weeks of pregnancy is directly comparable across data-sets, from 2010 onwards. In the birth dataset, for years 2008 and 2009, the number of weeks of gestation is a categorical variable, with each category defined on the basis of a five-week interval. We assume births were delivered at the mid-point of those intervals.

number of abortions, as women who already underwent an abortion may be more experienced with the procedure.

It should be noted that in our individual-level analysis – on the probability to abort, once pregnant and on the conditions under which abortion takes place – we exclude outliers, namely women who are pregnant after age 60 (190 observations) – who should not be fertile anymore. We note that the 60-year-old cutoff is a conservative threshold since between 55 and 60 years old we only have one pregnant woman in our data.[10] Regarding the number of children, we discard women with more than 15 children (three observations) and women who aborted more than 15 times (five observations). In addition, we drop women with a negative estimated number of completed weeks of pregnancy at the time of access to abortion services. We also exclude observations of births and abortions with missing information on any control variable. Our final samples contain 737,838 observations in the birth dataset and 152,124 observations in the abortion dataset for the time period ranging from 2008 to 2016.

4.3. Descriptive statistics

In our set-up, it is essential that travel time varies within municipalities across time for its effect to be identified, as our preferred specifications have municipality fixed-effects that capture all time-invariant features of municipalities. In Portugal, between 2008 and 2016, travel times from municipalities to their nearest abortion provider varied, as illustrated by Figure 1. These variations in travel time are primarily due to the shutdowns and openings of public abortion providers – that represent the vast majority of abortion providers (online appendix Figure B3). The most staggering variation occurred in the south of Portugal, where the shutdown of a

[10] The remaining 189 observations are most likely due to misscoding of the age variable. For example, there was one women with 1419 years of age.

provider in 2011 – later reversed in 2015 – led to increases by more than one hour in travel time for several municipalities (Figure 1).

Tables D1 and D2 (online appendix) present summary statistics of the variables we use in the municipal-level analysis;[11] while Tables D3, D4, and D5 (online appendix) provide the descriptive statistics of the pregnant women considered in the individual-level analysis. As we can see in Table D3 (online appendix), between 2008 and 2016, 17% of pregnant women aborted. Out of these abortions, 84% occurred among women living within 30 minutes of an abortion provider, 13% among those residing between 30 and 60 minutes, and 3% among women living over one hour away from an abortion provider. Upon arrival at an abortion provider, the average gestational age was 6.58 weeks, while it was 7.32 weeks at the time of the abortion. On average, women waited for 8.25 days between their first contact with abortion care and abortion, with 5% of them aborting above nine weeks of gestation. Most abortions occurred in an NHS hospital (69%) and are medically induced (68%). The proportion of abortions referred to private clinics increases from 21% – among women living within 30 minutes of a provider – to 37% – among women living over one hour away. Similarly, the proportion of surgical abortions increases from 31% among women living within 30 minutes from an abortion provider to 44% for those facing travel time over one hour. Finally, 97% of all abortions in the NHS were medically induced, whereas, in the private sector, surgical abortions represented 97%.

[11] The size of Portuguese municipalities varies widely. They range between 1721 square kilometers (Odemira) to eight (São Joao da Pesqueira). The average size is 315 square kilometers. For population statistics see Table D1 (online appendix).

5. RESULTS

5.1. Distance to an abortion provider, number of abortions and the probability to abort

We start by examining how travel times to the nearest provider affect the number of abortions at the municipality level. In the regressions displayed in panel a of Table 1, the dependent variable is the number of abortions by all women in fertile age – 15 to 49 years old.

All regressions include municipality fixed effects. Odd columns of Table 1 regress the number of abortions on a linear measure of travel time, while even columns use travel time as a categorical variable. In this case, the reference category is municipalities within 30 minutes of an abortion provider. The regressions in columns 3 and 4 introduce municipal time-varying controls, and columns 5 and 6 add Administrative-Health-Region-by-year fixed-effects – see Figure B4 (online appendix) for a map of the divisions of administrative health regions. Across all linear specifications, we observe a negative – although insignificant – relationship between travel time to the nearest provider and the number of abortions in a municipality.

In the regressions using travel time categories, we find that municipalities that are over one hour away from an abortion provider experience fewer abortions, with the gap ranging from 10.9 (column 4) to 8.7% (column 6) according to the specification, always significant at least at the 5% level.[12] This suggests that long travel times to the nearest provider are associated with a reduced probability of abortion. A threat to this interpretation would be that women living far away from a Portuguese provider would abort in Spain since we have no data on abortions in this country. However, this appears not to be the case, as our results are robust to excluding municipalities closer to a Spanish abortion clinic than to a Portuguese one – see online appendix Table C9.

[12] Percent effects are computed in the following way: $(e^{\beta} - 1) \times 100$.

As mentioned above, women may not abort either because they avoid pregnancy or because they carry their pregnancy to term. To test the latter possibility, we examine the decision to abort, once pregnant, using individual-level data. As Table 2 shows, we find no evidence of an association between travel time and the probability to abort, conditionally on being pregnant.

Overall, these results suggest that municipalities located further away from an abortion provider experience fewer abortions possibly because women adapt their contraceptive effort or sexual activity to their level of access to abortion to avoid becoming pregnant.

5.2. Proximity and the conditions under which abortion takes place

In the section above, we provided evidence that pregnant women living far away from a provider are not less likely to abort. Nevertheless, proximity may still affect the conditions under which abortion takes place.

We first analyze the timing of abortion. It arguably depends both on when women request an abortion and on the waiting time to get it. In columns 1 and 2 of Table 3, we estimate equation (3) for the number of weeks pregnant at the time of the first contact with abortion care. We find that an increase by 15 minutes in the travel time to the nearest provider is associated with an increase in the gestational age by 0.06 weeks at the time of the first contact with abortion care. This corresponds to approximately half a day (statistically significant at the 1% level). We also find evidence that this association may be non-linear. Women who live between 30 minutes and one hour away from the nearest abortion service arrive one and a half day later in the course of their pregnancy than women living within 30 minutes of a provider; women living over one hour away arrive two and a half days later in the course of their pregnancy than the reference group (column 2). However, we do not observe any association between travel time and the number of waiting days between the first contact with abortion care and abortion (columns 5 and 6). This suggests that the delays in aborting that we observe (columns 3 and 4) are due to a longer time-period before accessing abortion care rather than afterwards – consistent with what we find in columns 1 and 2.

In columns 7 and 8, we analyze how travel time affects the probability of having an abortion beyond nine weeks of pregnancy – which we refer to as late abortions. We find that a 15-minute increase in travel time is associated with an increase by 0.75 percentage points in the probability of having a late abortion, significant at the 5% level. This represents an increase in the risk of having a late abortion by 15%.[13] Turning to column 8, where we split travel time in bins, we find that, relative to living within 30 minutes away from a provider, women living between 30 minutes and one hour away have a 102% higher probability to abort after nine weeks of gestation, while women living over one hour away have a 104% higher probability of late abortion. Both estimates are significant at the 1% level.

These delays can have repercussions at other stages of the abortion process, namely, on where and how abortions occur. Public hospitals attending women near the legal gestational age limit may encounter difficulties providing abortion in due time. We find evidence of this in columns (9) and (10), where we consider the probability of being referred to a private clinic by the NHS when one wants to abort. This probability increases indeed with the travel time to an abortion provider, whatever the specification we use.

As mentioned before, private clinics almost exclusively perform surgical abortions. The increased likelihood of referral by the NHS to private clinics, together with the higher probability of aborting after nine weeks of pregnancy, can arguably lead women who live further away from a provider to be more prone to surgical abortion. Our findings are consistent with this mechanism. In column 11, we find that an increase by 15 minutes in travel time is associated with an increase by 6.4 percentage points – i.e. a 30% increase – in the probability

[13] This percentage is computed as follows: (point estimate × 15*min* × 100)⁄(%Women having late abortions) = (0.0005 × 15*min* × 100)⁄5 = 15%

of having a surgical abortion, significant at the 1% level. When exploring possible non-linear effects, we find that living between 30 and 60 minutes away from a provider is associated with a 97% increase in the probability of having a surgical abortion, while living over one hour away is associated with a 124% increase.

These findings suggest that living far away from a provider does not prevent pregnant women from aborting but makes it more difficult. It takes more time for them to reach an abortion provider, making them more likely to have a late abortion. This leads them, in turn, to be referred by the NHS to private clinics and eventually have a surgical rather than a less invasive medical abortion.

6. DISCUSSION AND CONCLUSION

In this paper, we provide evidence that proximity to abortion services is an important dimension of abortion access that affects the decision of aborting and the conditions under which abortions occur. However, one could be concerned by the fact that changes in proximity are not random. In what follows, we discuss whether such changes are likely to be endogenous. We also provide a back-of-the-envelope estimate of the potential savings that the NHS could make by providing proximity abortion care to all women in Portugal. We conclude with a brief overview of our findings and potential avenues for future research.

6.1. Causal interpretation of the estimates

Our estimates of the likelihood that any woman aborts (section 5.1) and of the probability to abort conditionally on being pregnant (section 5.2) could suffer from endogeneity biases. The first worry is that variations in abortion demand may determine variations in abortion supply. This would generate an upward bias in our estimates of the effect of travel time to the nearest abortion provider on the number of abortions in municipalities and the probability to abort, once pregnant. We show, in what follows, that we do not find evidence of this in our data. If providers reacted to demand, past variations in the abortion rate should predict the opening or closure of a provider. To test for this, we construct a provider region-by-year panel by aggregating the number of abortions occurring within each provider's region of influence, which we define as all municipalities that, at some point in time, were closer to that provider than to any other. We then define a dummy variable equal to 1 if the provider status changed from open to closed or the other way round, and 0 otherwise. We regress this dummy variable on the absolute value of the variation in the abortion rate – the number of abortions per 10,000 fertile women – in the provider's region. We find no evidence that variations in the regional abortion rate predict opening or closure of abortion providers, even when controlling for two lagged values of our variable of interest – see Table C10 (online appendix). The event studies presented in section E (Figures E1 and E2 in the online appendix) further support this conclusion. This suggests that the provision of abortion services does not change in reaction to demand.

The real limitation in providing abortion services is the availability of doctors and nurses since most gynecologists in Portugal are conscientious objectors (Oliveira da Silva 2009).[14] This raises the concern that changes in norms may simultaneously affect abortion demand and supply. If conscientious objectors choose to work in growingly conservative areas where abortion demand is decreasing, then our estimates of the effect of travel time on the number of abortions will again be upward biased. However, we find no evidence of this in our data. In the event studies that we conduct in section E of the online appendix (Figures E3 and E4), we do not observe any changes in social norms – which we proxy by the number of marriages,

[14] Even in areas with high abortion demand, such as Lisbon, it is difficult to open abortion services due to the lack of non-conscientious objecting medical staff. For example, Lisbon's Hospital university, one of the largest hospitals in Portugal, had to stop providing abortions for one month due to lack of specialized nurses willing to perform abortions. https://www.publico.pt/2018/01/12/sociedade/noticia/hospital-santa-maria-encaminha-abortos-para-clinica-privada-por-falta-de-enfermeiros-1799111

divorces, catholic marriages, and catholic divorces per thousand inhabitant – before the closures or openings of abortion providers. Furthermore, to test whether these proxies of social norms are correlated with local abortion rates, we regress the number of abortions in municipalities on municipality fixed effects only. We then extract the residuals and regress them on all the control variables we use in the municipality-level analysis. As evidenced in Table C11, the number of abortions appears to be uncorrelated with our proxies of the local level of conservatism.

The other potential source of bias is residential sorting. If women who believe they will never abort choose to live further away from an abortion center, we will not be able to tell apart the effects of travel time to the nearest abortion provider from those of preferences. However, since most abortion centers are located within hospitals that provide a variety of health care services in addition to abortion, this is highly unlikely. As a matter of fact, women may still have to go to a hospital because of other health conditions even if they exclude that they will ever need an abortion.

Another way to infer to which extent residential sorting is affecting our estimates is to focus our analysis on teen women – aged 15 to 19 – since most of them still live with their parents and hence do not choose where to live. The similarities both in sign and statistical significance of our preferred specification – see column 6 of Table C12 in the online appendix – between the estimates obtained using the overall and the teen samples suggest that residential sorting is unlikely to affect our estimates.

Last, the 2011 Census shows that from 2005 to 2011, only 8.5% of Portuguese families migrated across Portuguese municipalities (Gomes et al. 2019). Hence, in 2016 most Portuguese women resided in the same municipality where they lived in 2008. As abortion was only legalized in Portugal in 2007 by referendum, it is doubtful that women chose their home location based on the expectation of how far their house would become from a legal abortion provider, in case the "Yes" vote would win in the referendum.

A last concern about selection could arise if the preferred abortion timings or methods of women who do not abort because they became too far from a provider differ from those who abort. However, if selection is the mechanism driving our results because longer travel times reduce the number of women who abort, we should observe a change in the share of late or surgical abortions but no positive effect on the overall number of late and surgical abortions. To check for this, in line with Kelly (2020), we regress the number of abortions in each municipality according to referral type, gestational age, and method on our measures of travel time to an abortion provider. We find that longer travel times increase the number of late and surgical abortions in municipalities – see Table C13 (online appendix). This suggests that selection does not drive the effects of travel time on abortion conditions.

6.2. Medical vs. Surgical abortion costs: back of the envelope calculation

We now discuss how our results may contribute to assess the efficiency of the current organization and financing of abortion care in Portugal.

Our findings suggest that women who live further away from a provider are more likely to abort late, be referred by the NHS to a private clinic, and have a surgical abortion. As mentioned in section 2, the NHS can outsource abortions to private clinics. Surgical abortions are more costly to provide and are reimbursed at a higher rate than medical abortions. As living further away from a provider increases the risk of having a surgical abortion, it is interesting to estimate how much the NHS would spend on abortion procedures in a hypothetical scenario where no woman would be more than 30 minutes away from an abortion service, as compared to what it currently spends.

Bringing women closer to an abortion provider would have increased the number of abortions in Portugal. According to our estimates, in that scenario, municipalities over one hour away from a provider would have had 8.7% more abortions between 2008 and 2016, i.e. 457 additional abortions. Thus, the total number of abortions would have been 152,581 instead of 152,124. As 92% of women access abortion care through the public services, this would have resulted in 140,375 women accessing abortion through the NHS, instead of 140,207.

In parallel, bringing women closer to abortion providers would reduce the risk of aborting surgically. As shown in Table D3 (online appendix), 26% of women who accessed public abortion services and lived within 30 minutes of a provider had a surgical abortion. Transporting this proportion to our hypothetical scenario, there would have been a total of 36,498 surgical abortions instead of 38,603 (respectively, 103,878 medical abortions instead of 102,265). Therefore, in our scenario, the NHS would have paid for 2,106 fewer surgical abortions and 1,613 more medical abortions. Assuming an average cost of 400 euros per surgical procedure and 300 euros per medical abortion,[15] this would have translated into a reduction in abortion spending by 358,450 euros over nine years.

If expanding abortion services required building new facilities or recruiting professionals in the NHS, the costs of making all women within 30 minutes of a provider likely exceeded the potential savings. The 358,450 euros saved on abortion costs indeed do not even allow employing one more entry-level general practitioner (GP) over ten years.[16] Nevertheless, to promote equitable access to abortion, the NHS could take advantage of its already existing primary care network since, according to the WHO, medical abortions are not demanding in

[15] Between 2008 and 2016 the reimbursement rates of surgical abortions ranged from 368 to 444 euros, while medical abortions were reimbursed at a rate ranging from 283 to 368 euros (Portaria n.8781-A/200; Portaria n.163/2013; Portaria n.20/2014; Portaria n.234/2015).

[16]As of 2012, entry-level specialized doctors in the public sector earn a gross annual income of 38,447.36 euros (Acordo Coletivo de Trabalho n.5/2012).

terms of expertise or equipment and can be provided by nurses and GPs (WHO 2012). In fact, this solution has already been implemented in three health care centers in Portugal.[17]

6.3. Conclusion

This paper shows that proximity to an abortion provider is likely to affect women's family planning decisions. We show that Portuguese municipalities that are more than one hour away from the nearest provider have 8.7% fewer abortions than municipalities located within 30 minutes. Since we do not find any effect of travel times to abortion providers on the probability of aborting once pregnant. Thus, the reduction in the number of abortions we observe is possibly due to women increasing their contraceptive effort or decreasing their sexual activity when abortion access decreases. This is consistent with the findings by Miller and Valente (2016), who document that increases in the local supply of abortion services in Nepal led to decreases in the use of modern contraceptives. Nevertheless, for Texas, Fischer et al. (2018) do not find an impact of distance to an abortion provider on the sales of emergency contraceptives and condoms. However, as condoms and emergency contraceptives only represent 23% of the contraceptive methods used worldwide (UNDESA 2019), it would be interesting to further explore how proximity to an abortion provider in a high-income country affects the use of alternative contraceptive methods.

We also document that proximity affects the conditions under which abortions occur. We show that women living further away from a provider abort later in their pregnancies and that this delay is caused by their later arrivals at abortion services, possibly due to ignorance of how to access them. Late abortions make it difficult for public hospitals to provide abortions within the legal gestational age limit of 10 weeks, forcing them to outsource abortions to private clinics, where 97% of abortions are surgical. This likely explains why we find that women

[17] In the health care centers of Amarante, Penafiel, and Viana do Castelo.

living further away from providers are more likely to be referred to private clinics and to have a surgical abortion.

Finally, a back-of-the-envelope calculation indicates that the NHS can only expect limited savings on abortion spending from providing proximity abortion care to all women in Portugal. However, this would allow women to escape invasive surgical abortions, thereby improving their health-related welfare.

Recently, the COVID-19 pandemic has disrupted healthcare provision globally, and abortion care was no exception. This led some countries to relax abortion legislation – such as gestational age limits, mandatory reflection periods, or even enabling women to abort from home – while others did not or even made abortion more difficult to access (Moreau et al., 2020). This natural experiment will provide a valuable opportunity to investigate how varying access to abortion impacts abortion decisions and conditions in the context of deprived access to healthcare facilities.

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Figure 1 Provision of abortion across municipalities and travel time to the nearest abortion provider

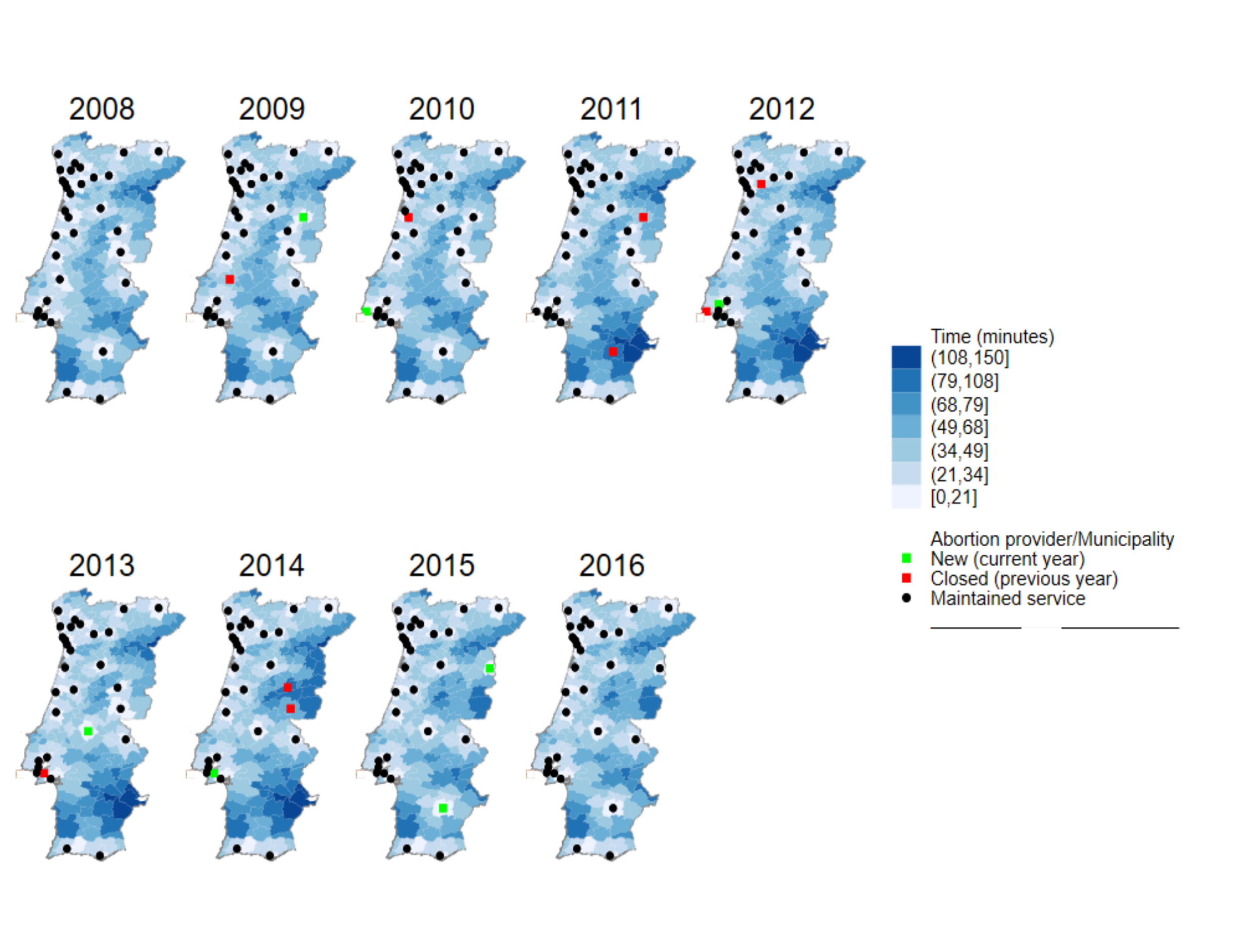


Table 1 Number of abortions and access to abortion

	Number of abortions in municipality					
	(1)	(2)	(3)	(4)	(5)	(6)
Linear travel time						
Travel time (min.)	-0.0009		-0.0010		-0.0006	
	(0.0006)		(0.0006)		(0.0007)	
Bins of travel time						
(Ref: within 30min.)						
30 to 60min.		0.0124		-0.0062		0.0258
		(0.0411)		(0.0431)		(0.0446)
Over 60min.		-0.1162***		-0.1427***		-0.0908**
		(0.0348)		(0.0363)		(0.0419)
Observations	2,502	2,502	2,502	2,502	2,502	2,502
Municipalities	278	278	278	278	278	278
Wald χ^2	1.922	13.319	44.442	57.529	47.049	51.286
Prob > χ^2	0.166	0.001	0.000	0.000	0.000	0.000
Municipal FE	Yes	Yes	Yes	Yes	Yes	Yes
Includes controls	No	No	Yes	Yes	Yes	Yes
Administrative-Health-Region-by-year FE	No	No	No	No	Yes	Yes

Notes: All regressions were estimated by Poisson quasi-maximum likelihood. All regressions have year and municipal fixed effects. Odd columns present access linearly, while even columns present access categorically. Columns 3-4 introduce time-varying control variables namely the share of all age groups of fertile-age women in the overall population, the insured unemployment rate, the growth rate of the NUTS III region's GDP, the number of marriages, divorces, catholic marriages, and catholic divorces per thousand inhabitants in the municipality. Columns 5-6 have Administrative-Health-Region-by-year fixed effects. Robust standard errors in parenthesis. * p <.1; ** p <.05; *** p <.01

Table 2 Probability of abortion and access

	Probability of aborting	
	(1)	(2)
Linear travel time		
Travel time (min.)	0.0000	
	(0.0001)	
Bins of travel time		
(Ref: within 30min.)		
30 to 60min.		0.0042
		(0.0059)
Over 60min.		-0.0037
		(0.0055)
R^2	0.4155	0.4155
Observations	889,962	889,962

Notes: All regressions were estimated by OLS. All regressions have Administrative-Health-Region-by-year and municipal fixed effects and have year of age, occupation, education, number of children, nationality, and cohabitation dummies. All regressions also control for namely the share of all age groups of fertile-age women in the overall population, the insured unemployment rate, the growth rate of the NUTS III region's GDP, the number of marriages, divorces, catholic marriages, and catholic divorces per thousand inhabitants in the municipality. Column 1 presents access linearly, while even column 2 presents access categorically. Robust standard errors in parenthesis.

Table 3 Conditions under which abortion occurs and abortion access

	Number of weeks pregnant				No. of waiting days		Having abortion over 9 weeks		NHS referral to private clinic		Having surgical abortion	
	First contact with services		Abortion intervention				Yes		Yes		Yes	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Linear travel time												
Travel time in min.	0.0037***		0.0039***		0.0038		0.0005**		0.0071***		0.0064***	
	(0.0012)		(0.0011)		(0.0051)		(0.0002)		(0.0011)		(0.0010)	
Bins of travel time												
(Ref: within 30min.)												
30 to 60min.		0.2161***		0.2398***		0.1720		0.0511***		0.3631***		0.2995***
		(0.0497)		(0.0402)		(0.2532)		(0.0092)		(0.0686)		(0.0590)
Over 60min.		0.3651***		0.3539***		0.1463		0.0552***		0.4323***		0.3845***
		(0.0532)		(0.0445)		(0.3238)		(0.0096)		(0.1106)		(0.1040)
R^2	0.0653	0.0655	0.0897	0.0899	0.1138	0.1138	0.0403	0.0404	0.7504	0.7498	0.5999	0.5990
Observations	152,124	152,124	152,124	152,124	152,124	152,124	152,124	152,124	140,868	140,868	152,124	152,124

Notes: All regressions were estimated by OLS. All regressions have Administrative-Health-Region-by-year and municipal fixed effects and have year of age, occupation, education, number of children, number of previous abortions, nationality, and cohabitation dummies. All regressions also control the share of all age groups of fertile-age women in the overall population, the insured unemployment rate, the growth rate of the NUTS III region's GDP, the number of marriages, divorces, catholic marriages, and catholic divorces per thousand inhabitants in the municipality. Odd columns present access linearly, while even columns present access categorically. Robust standard errors in parenthesis. * p <.1 ; ** p <.05; *** p <.01

ONLINE APPENDIX

A Data Appendix

A.1 Details on how we compute travel time to nearest Spanish abortion provider.

To compute travel time to the nearest Spanish provider we only consider Spanish private clinics as most abortions in Spain occur in the private sector – 91.9% in 2014 (Sanidad 2009-2018). Also, women living in Portugal are unlikely to follow the Spanish National Health System referral path since abortions abroad are not covered by the national health insurance neither in Portugal nor in Spain. For the period under study, the closest Spanish municipalities with a private abortion clinic were always Badajoz, Vigo, Huelva, Leon, Valladolid, or Salamanca, so that there is no variation in the travel time to the nearest Spanish municipality with an abortion provider.

A.2 Birth and abortion data harmonization

In this section, we explain how we modified the occupation variables to harmonize the abortion and births datasets. To do so, we created a variable with nine classes, namely: 1- Armed Forces Occupations (ISCO-08 major group 0); 2- Managers (ISCO-08 major group 1); 3- Professionals (ISCO-08 major group 2); 4- Technicians and associate professionals (ISCO-08 major group 3); 5- Clerical support workers, service and sales workers, and other services (ISCO-08 major groups 4 and 5); 6- Skilled agricultural, forestry and fishery workers, craft and related trades workers, plant and machine operators and assemblers (ISCO-08 major groups 6, 7, and 8); 7- Elementary occupations (ISCO-08 major group 9); 8- Unemployed; 9- Non Active. While the birth data had information on activity status (employed, unemployed and searching for a new job, unemployed and searching for a first job, not active) and occupation – each major group of the International Standard Classification of Occupations (ISCO-08) –, in the abortion data this information is coded in a single variable in which some of the ISCO-08 major groups are merged (group 4 merged with group 5 and groups 6, 7, and 8 merged) while being unemployed, being a student, and being a non-remunerated domestic worker are separate categories.

B Descriptive statistics: figures

Figure B1 Number of municipalities with zero abortions

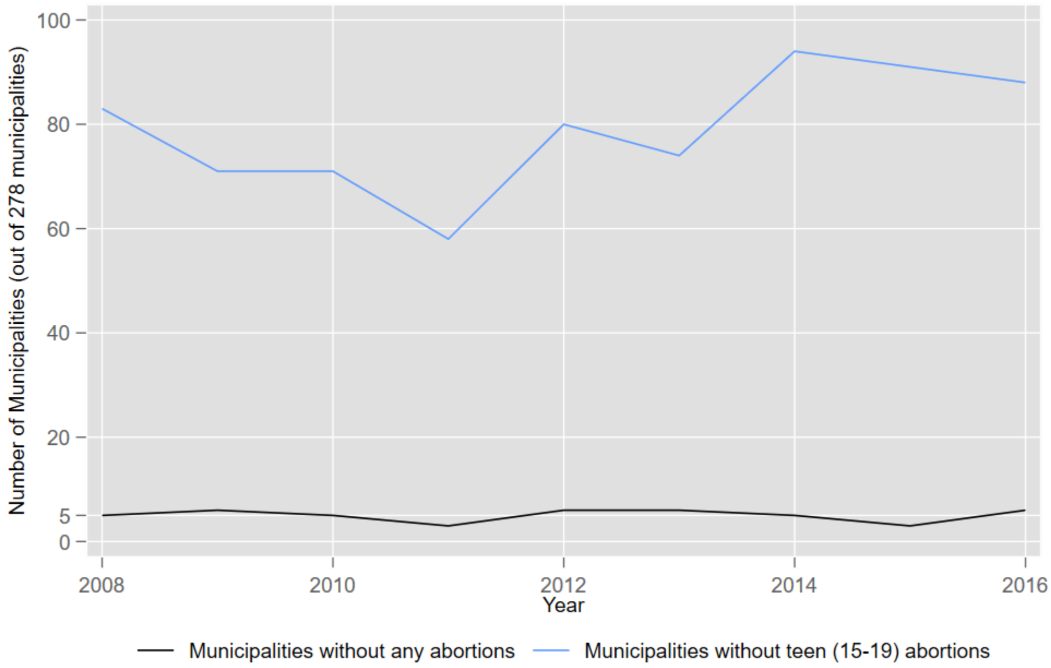


Figure B2 Number of municipalities by travel time bin

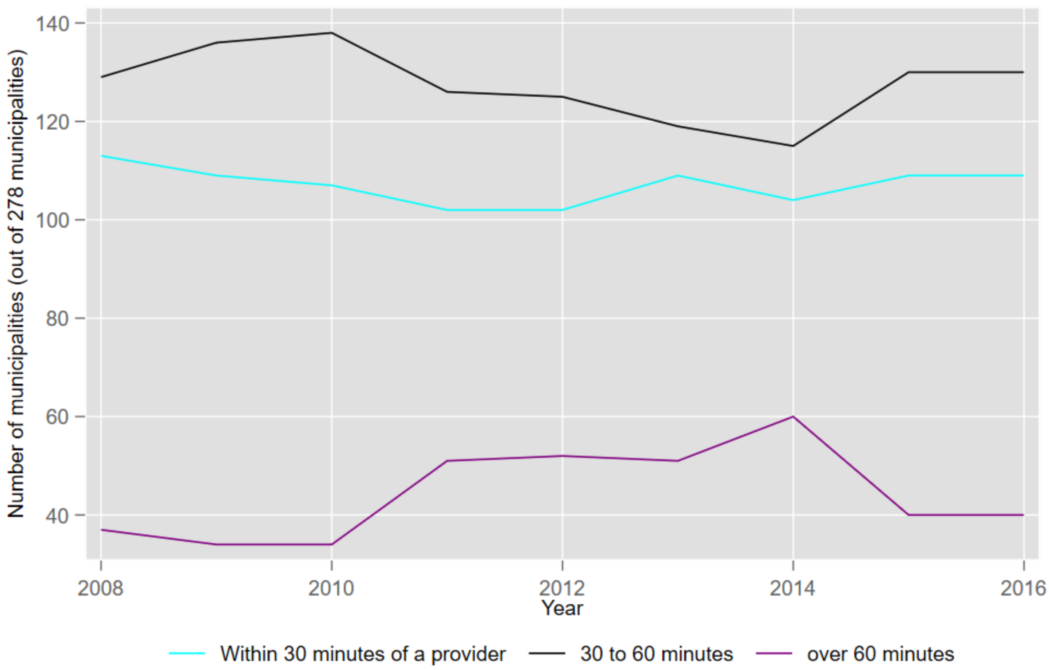


Figure B3 Number of providers by type of abortion provider

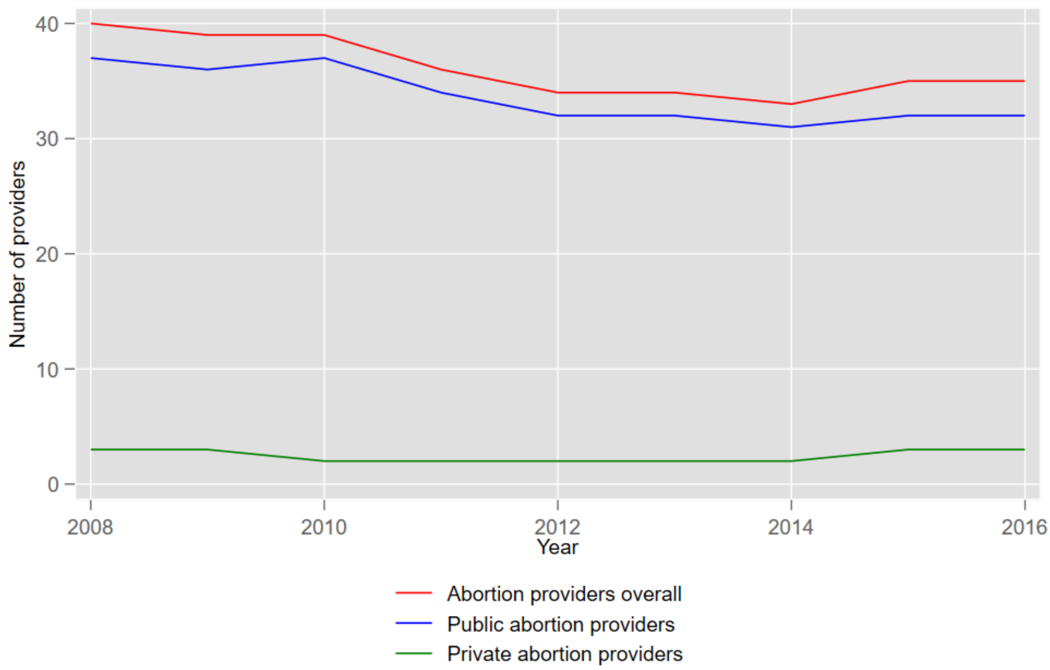
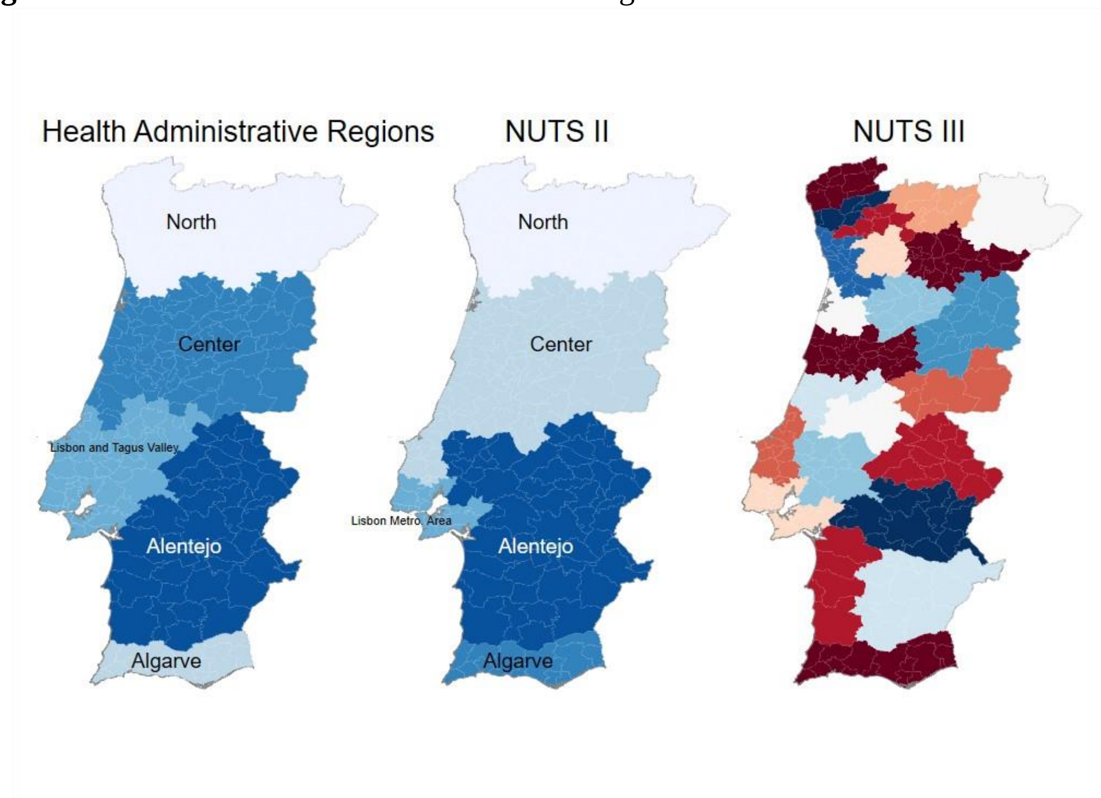


Figure B4 Division of the administrative health regions



C Robustness checks

Table C1 Abortion rate and access to abortion: Inverse Hyperbolic Sine Transformation as in Lindo et al. (2020)

	$\log\left(\frac{No.Abortions \times \sqrt{No.Abortions^2+1}}{No.Women}\right)$					
	(1)	(2)	(3)	(4)	(5)	(6)
Linear travel time						
Travel time (min.)	-0.0011		-0.0014**		-0.0009	
	(0.0007)		(0.0007)		(0.0008)	
Bins of travel time						
(Ref: within 30 min.)						
30 to 60 min.		-0.0167		-0.0427		-0.0030
		(0.0436)		(0.0450)		(0.0478)
Over 60 min.		-0.1050**		-0.1384***		-0.0813*
		(0.0427)		(0.0437)		(0.0485)
Observations	2,502	2,502	2,502	2,502	2,502	2,502
Municipalities	278	278	278	278	278	278
R^2	0.893	0. 893	0. 895	0. 895	0. 898	0. 898
Municipal FE	Yes	Yes	Yes	Yes	Yes	Yes
Includes controls	No	No	Yes	Yes	Yes	Yes
Administrative-Health-Region-by-year FE	No	No	No	No	Yes	Yes

Notes: All regressions were estimated by OLS. All regressions have year and municipal fixed effects. Odd columns present access linearly, while even columns present access categorically. Columns 3-4 introduce time-varying control variables namely the share of all age groups of fertile-age women in the overall population, the insured unemployment rate, the growth rate of the NUTS III region's GDP, the number of marriages, divorces, catholic marriages, and catholic divorces per thousand inhabitants in the municipality. Columns 5-6 have Administrative-Health-Region-by-year fixed effects. Robust standard errors in parenthesis. * p <.1; ** p <.05; *** p <.01

Table C2 Abortion rate and access to abortion: Criteria of open provider = at least 1 abortion

	Number of abortions in municipality					
	(1)	(2)	(3)	(4)	(5)	(6)
Linear travel time						
Travel time (min.)	-0.0008		-0.0009		-0.0004	
	(0.0006)		(0.0006)		(0.0007)	
Bins of travel time						
(Ref: within 30 min.)						
30 to 60 min.		0.0058		-0.0102		0.0158
		(0.0350)		(0.0363)		(0.0381)
Over 60 min.		-0.1177 ***		-0.1403***		-0.0886**
		(0.0331)		(0.0345)		(0.0396)
Observations	2,502	2,502	2,502	2,502	2,502	2,502
Municipalities	278	278	278	278	278	278
Wald χ^2	1.589	14.491	44.190	58.315	46.938	51.540
Prob > χ^2	0.207	0.001	0.000	0.000	0.000	0.000
Municipal FE	Yes	Yes	Yes	Yes	Yes	Yes
Includes controls	No	No	Yes	Yes	Yes	Yes
Administrative-Health-Region-by-year FE	No	No	No	No	Yes	Yes

Notes: All regressions were estimated by Poisson quasi-maximum likelihood. All regressions have year and municipal fixed effects. Odd columns present access linearly, while even columns present access categorically. Columns 3-4 introduce time-varying control variables namely the share of all age groups of fertile-age women in the overall population, the insured unemployment rate, the growth rate of the NUTS III region's GDP, the number of marriages, divorces, catholic marriages, and catholic divorces per thousand inhabitants in the municipality. Columns 5-6 have Administrative-Health-Region-by-year fixed effects. Robust standard errors in parenthesis. * p <.1; ** p <.05; *** p <.01

Table C3 Abortion rate and access to abortion: Criteria of open provider = at least 10 abortions

	Number of abortions in municipality					
	(1)	(2)	(3)	(4)	(5)	(6)
Linear travel time						
Travel time (min.)	-0.0008		-0.0009		-0.0005	
	(0.0006)		(0.0006)		(0.0007)	
Bins of travel time						
(Ref: within 30 min.)						
30 to 60 min.		0.0121		-0.0046		0.0276
		(0.0407)		(0.0426)		(0.0441)
Over 60 min.		-0.1063***		-0.1326***		-0.0831**
		(0.0339)		(0.0360)		(0.0401)
Observations	2,502	2,502	2,502	2,502	2,502	2,502
Municipalities	278	278	278	278	278	278
Wald χ^2	1.712	11.982	44.227	55.557	47.012	50.879
Prob > χ^2	0.191	0.003	0.000	0.000	0.000	0.000
Municipal FE	Yes	Yes	Yes	Yes	Yes	Yes
Includes controls	No	No	Yes	Yes	Yes	Yes
Administrative-Health-Region-by-year FE	No	No	No	No	Yes	Yes

Notes: All regressions were estimated by Poisson quasi-maximum likelihood. All regressions have year and municipal fixed effects. Odd columns present access linearly, while even columns present access categorically. Columns 3-4 introduce time-varying control variables namely the share of all age groups of fertile-age women in the overall population, the insured unemployment rate, the growth rate of the NUTS III region's GDP, the number of marriages, divorces, catholic marriages, and catholic divorces per thousand inhabitants in the municipality. Columns 5-6 have Administrative-Health-Region-by-year fixed effects. Robust standard errors in parenthesis. * p <.1; ** p <.05; *** p <.01

Table C4 Probability of abortion and access: Criteria of open provider = at least 1 abortion

	Probability of aborting	
	(1)	(2)
Linear travel time		
Travel time (min.)	0.0001	
	(0.0001)	
Bins of travel time		
(Ref: within 30 min.)		
30 to 60 min.		0.0039
		(0.0050)
Over 60 min.		-0.0025
		(0.0053)
R^2	0.4155	0.4155
Observations	889,962	889,962

Notes: All regressions were estimated by OLS. All regressions have Administrative-Health-Region-by-year and municipal fixed effects and have year of age, occupation, education, number of children, nationality, and cohabitation dummies. All regressions also control for namely the share of all age groups of fertile-age women in the overall population, the insured unemployment rate, the growth rate of the NUTS III region's GDP, the number of marriages, divorces, catholic marriages, and catholic divorces per thousand inhabitants in the municipality. Column 1 presents access linearly, while even column 2 presents access categorically. Robust standard errors in parenthesis.

Table C5 Probability of abortion and access: Criteria of open provider = at least 10 abortions

	Probability of aborting	
	(1)	(2)
Linear travel time		
Travel time (min.)	0.0000	
	(0.0001)	
Bins of travel time		
(Ref: within 30 min.)		
30 to 60 min.		0.0044
		(0.0058)
Over 60 min.		-0.0028
		(0.0051)
R^2	0.4155	0.4155
Observations	889,962	889,962

Notes: All regressions were estimated by OLS. All regressions have Administrative-Health-Region-by-year and municipal fixed effects and have year of age, occupation, education, number of children, nationality, and cohabitation dummies. All regressions also control for namely the share of all age groups of fertile-age women in the overall population, the insured unemployment rate, the growth rate of the NUTS III region's GDP, the number of marriages, divorces, catholic marriages, and catholic divorces per thousand inhabitants in the municipality. Column 1 presents access linearly, while even column 2 presents access categorically. Robust standard errors in parenthesis.

Table C6 Conditions under which abortion occurs and abortion access: Criteria of open provider = at least 1 abortion

	Number of weeks pregnant				No. of waiting days		Having abortion over 9 weeks		NHS referral to private clinic		Having surgical abortion	
	First contact with services		Abortion intervention				Yes		Yes		Yes	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Linear travel time												
Travel time in min.	0.0034***		0.0034***		0.0027		0.0005**		0.0070***		0.0063***	
	(0.0012)		(0.0011)		(0.0048)		(0.0002)		(0.0011)		(0.0010)	
Bins of travel time												
(Ref: within 30 min.)												
30 to 60 min.		0.1680***		0.1949***		0.1745		0.0457***		0.3001***		0.2457***
		(0.0499)		(0.0480)		(0.2099)		(0.0090)		(0.0693)		(0.0590)
Over 60 min.		0.3219***		0.2957***		0.0118		0.0530***		0.4131***		0.3703***
		(0.0589)		(0.0498)		(0.3110)		(0.0099)		(0.1081)		(0.1018)
R^2	0.0653	0.0654	0.0897	0.0898	0.1138	0.1138	0.0403	0.0404	0.7504	0.7491	0.5999	0.5986
Observations	152,124	152,124	152,124	152,124	152,124	152,124	152,124	152,124	140,868	140,868	152,124	152,124

Notes: All regressions were estimated by OLS. All regressions have Administrative-Health-Region-by-year and municipal fixed effects and have year of age, occupation, education, number of children, number of previous abortions, nationality, and cohabitation dummies. All regressions also control the share of all age groups of fertile-age women in the overall population, the insured unemployment rate, the growth rate of the NUTS III region's GDP, the number of marriages, divorces, catholic marriages, and catholic divorces per thousand inhabitants in the municipality. Odd columns present access linearly, while even columns present access categorically. Robust standard errors in parenthesis. * p <.1 ; ** p <.05; *** p <.01

Table C7 Conditions under which abortion occurs and abortion access: Criteria of open provider = at least 10 abortions

	Number of weeks pregnant				No. of waiting days		Having abortion over 9 weeks		NHS referral to private clinic		Having surgical abortion	
	First contact with services		Abortion intervention				Yes		Yes		Yes	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Linear travel time												
Travel time in min.	0.0034***		0.0037***		0.0049		0.0005**		0.0067***		0.0061***	
	(0.0011)		(0.0011)		(0.0048)		(0.0002)		(0.0010)		(0.0009)	
Bins of travel time												
(Ref: within 30 min.)												
30 to 60 min.		0.2135***		0.2320***		0.1335		0.0504***		0.3573***		0.2947***
		(0.0494)		(0.0405)		(0.2536)		(0.0092)		(0.0679)		(0.0584)
Over 60 min.		0.3324***		0.3413***		0.2519		0.0527***		0.4154***		0.3701***
		(0.0582)		(0.0449)		(0.3057)		(0.0094)		(0.1008)		(0.0950)
R^2	0.0653	0.0654	0.0201	0.0899	0.1138	0.1138	0.0403	0.0404	0.7502	0.7497	0.5998	0.5990
Observations	152,124	152,124	152,124	152,124	152,124	152,124	152,124	152,124	152,124	152,124	152,124	152,124

Notes: All regressions were estimated by OLS. All regressions have Administrative-Health-Region-by-year and municipal fixed effects and have year of age, occupation, education, number of children, number of previous abortions, nationality, and cohabitation dummies. All regressions also control the share of all age groups of fertile-age women in the overall population, the insured unemployment rate, the growth rate of the NUTS III region's GDP, the number of marriages, divorces, catholic marriages, and catholic divorces per thousand inhabitants in the municipality. Odd columns present access linearly, while even columns present access categorically. Robust standard errors in parenthesis. * p <.1 ; ** p <.05; *** p <.01

Table C8 Conditions under which abortion occurs and abortion access: Same controls as probability of abortion analysis

	Number of weeks pregnant				No. of waiting days		Having abortion over 9 weeks		NHS referral to private clinic		Having surgical abortion	
	First contact with services		Abortion intervention				Yes		Yes		Yes	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Linear travel time												
Travel time in min.	0.0037***		0.0039***		0.0038		0.0005**		0.0071***		0.0064***	
	(0.0012)		(0.0011)		(0.0051)		(0.0002)		(0.0011)		(0.0010)	
Bins of travel time												
(Ref: within 30 min.)												
30 to 60 min.		0.2138***		0.2374***		0.1732		0.0504***		0.3631***		0.3003***
		(0.0490)		(0.0401)		(0.2532)		(0.0091)		(0.0687)		(0.0591)
Over 60 min.		0.3648***		0.3530***		0.1439		0.0548***		0.4320***		0.3837***
		(0.0531)		(0.0447)		(0.3235)		(0.0097)		(0.1107)		(0.1042)
R^2	0.0649	0.0650	0.0893	0.0894	0.1137	0.1137	0.0399	0.0400	0.0634	0.0572	0.5993	0.5984
Observations	152,124	152,124	152,124	152,124	152,124	152,124	152,124	152,124	140,868	140,868	152,124	152,124

Notes: All regressions were estimated by OLS. All regressions have Administrative-Health-Region-by-year and municipal fixed effects and have year of age, occupation, education, number of children, nationality, and cohabitation dummies. All regressions also control the share of all age groups of fertile-age women in the overall population, the insured unemployment rate, the growth rate of the NUTS III region's GDP, the number of marriages, divorces, catholic marriages, and catholic divorces per thousand inhabitants in the municipality. Odd columns present access linearly, while even columns present access categorically. Robust standard errors in parenthesis. * p <.1 ; ** p <.05; *** p <.01

Table C9 Abortion rate and access to abortion: Excluding municipalities closer to a Spanish than to a Portuguese abortion provider

	Number of abortions in municipality					
	(1)	(2)	(3)	(4)	(5)	(6)
Linear travel time						
Travel time (min.)	-0.0006		-0.0008		-0.0003	
	(0.0007)		(0.0007)		(0.0008)	
Bins of travel time						
(Ref: within 30 min.)						
30 to 60 min.		0.0046		-0.0139		0.0197
		(0.0422)		(0.0443)		(0.0458)
Over 60 min.		-0.1033***		-0.1296***		-0.0715*
		(0.0347)		(0.0362)		(0.0425)
Observations	2,359	2,359	2,359	2,359	2,359	2,359
Municipalities	265	265	265	265	265	265
Wald χ^2	0.839	9.772	43.116	53.851	47.317	49.609
Prob > χ^2	0.360	0.008	0.000	0.000	0.000	0.000
Municipal FE	Yes	Yes	Yes	Yes	Yes	Yes
Includes controls	No	No	Yes	Yes	Yes	Yes
Administrative-Health-Region-by-year FE	No	No	No	No	Yes	Yes

Notes: All regressions were estimated by Poisson quasi-maximum likelihood. All regressions have year and municipal fixed effects. Odd columns present access linearly, while even columns present access categorically. Columns 3-4 introduce time-varying control variables namely the share of all age groups of fertile-age women in the overall population, the insured unemployment rate, the growth rate of the NUTS III region's GDP, the number of marriages, divorces, catholic marriages, and catholic divorces per thousand inhabitants in the municipality. Columns 5-6 have Administrative-Health-Region-by-year fixed effects. Robust standard errors in parenthesis. * p <.1 ; ** p <.05; *** p <.01

Table C10 Abortion supply and variations in abortion rates

	Probability of change in abortion provision status (equal to 1 if opened or closed and 0 otherwise)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel a: No year or Provider's Region Fixed Effects							
Absolute value of the variation in the abortion rate							
Between year T-1 and T	0.2758			0.1948	-0.2228*		-0.2165
	(0.2567)			(0.2474)	(0.1350)		(0.1440)
Between year T-2 and T-1		0.0207		-0.0191		-0.0200	-0.0157
		(0.0632)		(0.0539)		(0.0575)	(0.0637)
Between year T-3 and T-2			-0.1268		-0.1227	-0.1161	-0.1195
			(0.0932)		(0.0917)	(0.0965)	(0.0951)
R^2	0.0206	0.0001	0.0057	0.0099	0.0123	0.0066	0.0124
Observations	296	259	222	259	222	222	222
Panel b: With Provider's Region Fixed Effects							
Absolute value of the variation in the abortion rate							
Between year T-1 and T	0.2895			0.2681	-0.1830		-0.1794
	(0.2587)			(0.2569)	(0.1585)		(0.1599)
Between year T-2 and T-1		0.0159		0.0069		-0.0307	-0.0197
		(0.0577)		(0.0575)		(0.0652)	(0.0676)
Between year T-3 and T-2			-0.1331		-0.1505	-0.1329	-0.1500
			(0.1142)		(0.1201)	(0.1153)	(0.1210)
R^2	0.0217	0.0001	0.0059	0.0202	0.0097	0.0062	0.0098
Observations	296	259	222	259	222	222	222
Panel c: With Year and Provider's Region Fixed Effects							
Absolute value of the variation in the abortion rate							
Between year T-1 and T	0.2879			0.2614	-0.1944		-0.1869
	(0.2549)			(0.2621)	(0.1574)		(0.1563)
Between year T-2 and T-1		-0.0233		-0.0193		-0.0717	-0.0638
		(0.0710)		(0.0712)		(0.0869)	(0.0906)
Between year T-3 and T-2			-0.1679		-0.1916	-0.1709	-0.1934
			(0.1221)		(0.1593)	(0.1248)	(0.1323)
R^2	0.0347	0.0182	0.0266	0.0355	0.0306	0.0281	0.0318
Observations	296	259	222	259	222	222	222

Notes: All regressions were estimated by OLS. Robust standard errors in parenthesis. The panel on which this regressions are estimated is composed of 37 municipalities that had an abortion provider between 2008 and 2016. The variable of interest is the absolute value of the variation of the abortion rate in the region of influence of each municipality that ever had an abortion provider. We define the region covered by each provider as the set of municipalities that, at some point between 2008 and 2016, were closer to that provider than to any other abortion service in Portugal. Hence, it is possible that one municipality is considered to be in the region of influence of more than one provider. $^*p<0.1$

Table C11 Correlation between abortions and controls

Outcome:	Residuals of regression: *NºAbortions*$_{mt}$ = *Municipality FE* + u_{mt}	
	Coefficients	SD
Demographic controls		
Share of age group of fertile-age women in the overall population,		
15 to 19 y.o.	-334.9287**	(145.2920)
20 to 24 y.o.	163.5330	(150.4547)
25 to 29 y.o.	172.8405	(145.4979)
30 to 34 y.o.	125.1238	(127.9992)
35 to 39 y.o.	309.6899**	(122.6369)
40 to 54 y.o.	-629.7197***	(127.6717)
45 to 49 y.o.	168.5323	(132.6122)
Economic controls		
Unemplyment rate	26.3293*	(15.1699)
GDP per capita growth (NUTS III)	-23.3659**	(10.0316)
Controls for social norms		
Marriages (*per* 1000 inhabitants)	-0.7062	(0.7458)
Catholic marriages (*per* 1000 inhabitants)	0.5679	(1.0438)
Divorces (*per* 1000 inhabitants)	-0.2048	(1.0950)
Catholic divorces (*per* 1000 inhabitants)	1.7435	(1.3994)
Observations	2502	
Municipalities	278	
R^2	0.027	

Notes: The first regression was estimated by Poisson quasi-maximum likelihood, with the number of fertile women in the municipality as the exposure variable. The regression of the residuals on the controls was estimated by OLS. * p <.1; ** p <.05; *** p <.01

Table C12 Number of abortions and access to abortion: Teenagers (15 to 19 years of age)

	Number of abortions in municipality					
	(1)	(2)	(3)	(4)	(5)	(6)
Linear travel time						
Travel time (min.)	-0.0012		-0.0012		-0.0024*	
	(0.0012)		(0.0012)		(0.0014)	
Bins of travel time						
(Ref: within 30 min.)						
30 to 60 min.		-0.0488		-0.0656		-0.0624
		(0.0853)		(0.0854)		(0.0876)
Over 60 min.		-0.0873		-0.1084		-0.2008*
		(0.0931)		(0.0935)		(0.1104)
Observations	2,439	2,439	2,439	2,439	2,439	2,439
Municipalities	271	271	271	271	271	271
Wald χ^2	0.916	0. 959	35.052	34.924	42.131	41.859
Prob > χ^2	0.338	0.001	0.000	0.000	0.000	0.000
Municipal FE	Yes	Yes	Yes	Yes	Yes	Yes
Includes controls	No	No	Yes	Yes	Yes	Yes
Administrative-Health-Region-by-year FE	No	No	No	No	Yes	Yes

Notes: All regressions were estimated by Poisson quasi-maximum likelihood. All regressions have year and municipal fixed effects. Odd columns present access linearly, while even columns present access categorically. Columns 3-4 introduce time-varying control variables namely the share of all age groups of fertile-age women in the overall population, the insured unemployment rate, the growth rate of the NUTS III region's GDP, the number of marriages, divorces, catholic marriages, and catholic divorces per thousand inhabitants in the municipality. Columns 5-6 have Administrative-Health-Region-by-year fixed effects. Municipal fixed effects reduce the sample of municipalities to 271 as 9 municipalities never had abortions among teens. Robust standard errors in parenthesis. * p <.1; ** p <.05; *** p <.01

Table C13 Conditions under which abortion occurs and abortion access – municipal-level analysis

	Abortions below 7 weeks		Abortions between 7 and 9 weeks		Abortions over 9 weeks		NHS referral to private clinic		Surgical abortions		Medical abortions	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Linear travel time												
Travel time in min.	-0.0023**		0.0019**		0.0055		0.0250***		0.0185***		-0.0153***	
	(0.0009)		(0.0009)		(0.0036)		(0.0040)		(0.0024)		(0.0025)	
Bins of travel time												
(Ref: within 30min.)												
30 to 60min.		-0.0028		0.0481		0.4059		0.8513***		0.5715***		-0.5904***
		(0.0484)		(0.0608)		(0.2766)		(0.1346)		(0.0958)		(0.1327)
Over 60min.		-0.2280***		0.01429**		0.9175***		1.7985***		1.2662***		-0.8131***
		(0.0528)		(0.0656)		(0.2532)		(0.2877)		(0.1714)		(0.1551
Observations	2502	2502	2502	2502	2046	2046	1458	1458	2232	2232	2502	2502
Municipalities	278	278	278	278	231	231	162	162	248	248	278	278
Wald χ^2	33.735	50.397	39.144	42.057	57.193	68.363	113.834	105.852	170.256	141.567	107.280	104.101
Prob > χ^2	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: All regressions were estimated by Poisson quasi-maximum likelihood. All regressions have: *i)* municipal fixed effects; *ii)* time-varying control variables namely the share of all age groups of fertile-age women in the overall population, the insured unemployment rate, the growth rate of the NUTS III region's GDP, the number of marriages, divorces, catholic marriages, and catholic divorces per thousand inhabitants in the municipality; and ; *iii)* Administrative-Health-Region-by-year fixed effects. Robust standard errors in parenthesis * p <.1; ** p <.05; *** p <.01

D Descriptive statistics: Tables

Table D1 Descriptive statistics of municipalities

Variable	Panel	Mean	SD	Min	Max	Observations
Abortion access						
Travel time (minutes)	Overall	39.25	23.61	1.38	159.68	N = 2502
	Between Municipalities		21.51			Municipalities = 278
	Within Municipalities		9.81			Years = 9
Abortions						
Overall number in municipality	Overall	63.08	183.39	0	2,700	N = 2502
	Between Municipalities		182.16			Municipalities = 278
	Within Municipalities		23.58			Years = 9
Number in municipality (15 to 19 teens)	Overall	6.90	20.17	0	298	N = 2502
	Between Municipalities		19.77			Municipalities = 278
	Within Municipalities		4.16			Years = 9
Demographics						
Fertile women to population ratio	Overall	21.72	2.61	12.44	27.84	N = 2502
	Between Municipalities		2.57			Municipalities = 278
	Within Municipalities		0.51			Years = 9
Teens to population ratio	Overall	2.52	0.39	1.14	3.82	N = 2502
	Between Municipalities		0.36			Municipalities = 278
	Within Municipalities		0.15			Years = 9
Population (thousands)	Overall	35.82	57.45	1.69	550.93	N = 2502
	Between Municipalities		57.52			Municipalities = 278
	Within Municipalities		1.50			Years = 9
Economy						
Municipal unemployment rate	Overall	7.93	2.57	2.01	18.81	N = 2502
	Between Municipalities		2.09			Municipalities = 278
	Within Municipalities		1.49			Years = 9
NUTSIII GDP per capita (thousand euros)	Overall	18.24	3.97	11.75	32.89	N = 2502
	Between Municipalities		3.83			Municipalities = 278
	Within Municipalities		1.06			Years = 9

Table D1 (continued)

Proxies for social norms						
Marriages (*per* 1000 inhabitants)	Overall	2.70	0.91	0	7.12	N = 2502
	Between Municipalities		0.64			Municipalities = 278
	Within Municipalities		0.65			Years = 9
Catholic marriages (*per* 1000 inhabitants)	Overall	1.19	0.66	0	3.93	N = 2502
	Between Municipalities		0.50			Municipalities = 278
	Within Municipalities		0.43			Years = 9
Divorces (*per* 1000 inhabitants)	Overall	1.99	0.67	0	5.38	N = 2502
	Between Municipalities		0.51			Municipalities = 278
	Within Municipalities		0.43			Years = 9
Catholic divorces (*per* 1000 inhabitants)	Overall	1.23	0.49	0	3.12	N = 2502
	Between Municipalities		0.36			Municipalities = 278
	Within Municipalities		0.34			Years = 9

Table D2 Abortion rates per travel time bin

Abortion rates (per 10000 fertile women)	Travel time to nearest provider							
	Within 30 minutes		*30 to 60 minutes*		*Over 60 minutes*		*Total*	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Overall	6.228	3.992	4.659	2.642	4.785	2.611	5.283	3.310
For teens aged 15 to 19	6.278	5.308	4.439	5.038	4.446	5.466	5.149	5.286
Below 7 weeks of gestation	3.735	2.446	2.922	1.880	2.953	1.811	3.240	2.142
Between 7 and 9 weeks	2.256	1.919	1.584	1.308	1.667	1.392	1.856	1.614
Between 9 and 10 weeks	0.237	0.389	0.153	0.318	0.166	0.382	0.187	0.359
Referred from NHS to Private	0.611	2.500	0.913	1.917	1.368	2.603	0.861	2.152
Surgical abortions	0.968	2.504	1.159	2.097	1.600	2.702	1.154	2.368
Medical abortions	5.241	3.347	3.472	2.716	3.158	2.515	4.105	3.082

Table D3 Descriptive statistics of pregnant women – outcome variables

	Travel time to nearest provider											
	Within 30 minutes			*30 to 60 minutes*			*Over 60 minutes*			*Total*		
	No.	Col (%)	Row (%)	No.	Col (%)	Row (%)	No.	Col (%)	Row (%)	No.	Col (%)	Row (%)
Pregnancy outcomes												
Births	586,266	82	79	120,483	86	16	31,089	86	4	737,838	83	100
Abortions	127,783	18	84	19,088	14	13	5,253	14	3	152,124	17	100
Total	714,049	100	80	139,571	100	16	36,342	100	4	889,962	100	100
Weeks pregnant												
Less than seven	71,014	56	84	10,915	57	13	3,078	59	4	85,007	56	100
From seven to nine	50,319	39	84	7,317	38	12	1,930	37	3	59,566	39	100
From nine to ten	6,450	5	85	856	4	11	245	5	3	7,551	5	100
Total	127,783	100	84	19,088	100	13	5,253	100	3	152,124	100	100
Type of provider												
Private clinic - own initiative	10,334	8	87	1,252	7	11	331	6	3	11,917	8	100
Private clinic - NHS referral	27,318	21	77	6,172	32	17	1,950	37	6	35,440	23	100
NHS Hospital	90,131	71	86	11,664	61	11	2,972	57	3	104,767	69	100
Total	127,783	100	84	19,088	100	13	5,253	100	3	152,124	100	100
Method												
Medical abortion	88,346	69	86	11,612	61	11	2,965	56	3	102,923	68	100
Surgical abortion	39,437	31	80	7,476	39	15	2,288	44	5	49,201	32	100
Total	127,783	100	84	19,088	100	13	5,253	100	3	152,124	100	100
Method (Among women accessing to services through the NHS)												
Medical abortion	87,749	74	86	11,560	65	11	2,956	60	3	102,265	73	100
Surgical abortion	30,294	26	78	6,332	35	16	1,977	40	5	38,603	27	100
Total	118,043	100	84	17,892	100	13	4,933	100	4	140,868	100	100
Method (Abortions performed in the NHS)												
Medical abortion	87,163	97	86	11,496	99	11	2,934	99	3	101,593	97	100
Surgical abortion	2,968	3	94	168	1	5	38	1	1	3,174	3	100
Total	90,131	100	86	11,664	100	11	2,972	100	3	104,767	100	100
Method (Abortions performed in private clinics)												
Medical abortion	1,183	3	89	116	2	9	31	1	2	1,330	3	100
Surgical abortion	36,469	97	79	7,308	98	16	2,250	99	5	46,027	97	100
Total	37,652	100	80	7,424	100	16	2,281	100	5	47,357	100	100
		Mean	SD		Mean	SD		Mean	SD		Mean	SD
Weeks pregnant at:												
Time of access		6.57	1.53		6.59	1.50		6.67	1.46		6.58	1.52
Time of abortion		7.32	1.37		7.30	1.32		7.29	1.29		7.32	1.36
Waiting days		8.31	4.69		8.07	4.62		7.53	4.32		8.25	4.67
Travel time (minutes)		13.57	8.77		40.5	7.72		75.35	16.25		20.31	17.53

Table D4 Descriptive statistics of women giving birth – control variables

	Mean	SD	No.	Travel time to nearest provider								
				Within 30 minutes			*30 to 60 minutes*			*Over 60 minutes*		
				No.	Col (%)	Row (%)	No.	Col (%)	Row (%)	No.	Col (%)	Row (%)
Age	30.7	5.6										
Less than 15			389	299	0	77	59	0	15	31	0	8
15 to 19			23,821	18,630	3	78	3,889	3	16	1,302	4	5
20 to 24			84,607	66,076	11	78	14,513	12	17	4,018	13	5
25 to 29			180,857	141,211	24	78	31,521	26	17	8,125	26	4
30 to 34			257,129	205,144	35	80	41,673	35	16	10,312	33	4
35 to 39			156,499	126,807	22	81	23,736	20	15	5,956	19	4
Over 40			34,536	28,099	5	81	5,092	4	15	1,345	4	4
Total			737,838	589,010	100	79	121,757	100	16	27,071	100	4
Education												
Illiterate			2,279	1,561	0	68	406	0	18	312	1	14
Reads/writes			1,213	829	0	68	243	0	20	141	0	12
Primary school			25,667	19,882	3	77	4,332	4	17	1,453	5	6
Lower middle school			69,482	56,090	10	81	10,750	9	15	2,642	8	4
Higher middle school			150,023	117,344	20	78	26,405	22	18	6,274	20	4
High school			225,444	172,516	29	77	42,188	35	19	10,740	35	5
College			263,730	218,044	37	83	36,159	30	14	9,527	31	4
Total			737,838	586,266	100	79	120,483	100	16	31,089	100	4
Occupation												
Agriculture (ISCO08:6-8)			50,689	40,662	7	80	8,491	7	17	1,536	5	3
Armed Forces (ISCO08:0)			2,414	1,866	0	77	470	0	19	78	0	3
Services (ISCO-08:4-5)			196,498	154,285	26	79	33,590	28	17	8,623	28	4
Unskilled (ISCO-08:9)			43,572	33,841	6	78	7,906	7	18	1,825	6	4
Managers (ISCO-08:1)			22,121	18,390	3	83	3,139	3	14	592	2	3
Professionals (ISCO-08:2)			137,461	114,311	19	83	18,269	15	13	4,881	16	4
Technicians (ISCO-08:3)			69,247	56,795	10	82	10,135	8	15	2,317	7	3
Not active			115,657	86,888	15	75	22,172	18	19	6,597	21	6
Unemployed			100,179	79,228	14	79	16,311	14	16	4,640	15	5
Total			737,838	586,266	100	79	120,483	100	16	31,089	100	4

Table D4 (continued)

	Mean	SD	No.	Travel time to nearest provider								
				Within 30 minutes			*30 to 60 minutes*			*Over 60 minutes*		
				No.	Col (%)	Row (%)	No.	Col (%)	Row (%)	No.	Col (%)	Row (%)
Nationality												
Portuguese			696,362	549,973	89	79	115,971	93	17	30,418	94	4
Other			76,830	66,173	11	86	8,616	7	11	2,041	6	3
Total			737,838	586,266	100	79	120,483	100	16	31,089	100	4
Cohabitation /Civil Status												
Married			396,432	314,871	54	79	66,679	55	17	14,882	48	4
Not married, with partner			96,288	191,682	33	78	40,710	34	17	12,726	41	5
Not married, no partner			245,118	79,713	14	83	13,094	11	14	3,481	11	4
Total			737,838	586,266	100	79	120,483	100	16	31,089	100	4
Previous children	0.1	0.5										
0			666,839	529,904	90	79	109,177	91	16	27,758	89	4
1			48,665	38,808	7	80	7,666	6	16	2,191	7	5
2			16,439	12,900	2	78	2,684	2	16	855	3	5
3			4,261	3,331	1	78	717	1	17	213	1	5
4			1,131	915	0	81	170	0	15	46	0	4
More than 4			503	408	0	81	69	0	14	26	0	5
Total			737,838	586,266	100	79	120,483	100	16	31,089	100	4

Table D5 Descriptive statistics of women who aborted – control variables

	Mean	SD	No.	Travel time to nearest provider: Within 30 minutes No.	Col (%)	Row (%)	30 to 60 minutes No.	Col (%)	Row (%)	Over 60 minutes No.	Col (%)	Row (%)
Age	28.5	7.3										
Less than 15			640	536	0	84	79	0	12	25	0	4
15 to 19			16,499	13,957	11	85	1,998	10	12	544	10	3
20 to 24			34,559	29,502	23	85	3,926	21	11	1,131	22	3
25 to 29			32,908	27,930	22	85	3,881	20	12	1,097	21	3
30 to 34			30,956	25,851	20	84	4,042	21	13	1,063	20	3
35 to 39			25,134	20,767	16	83	3,415	18	14	952	18	3
Over 40			11,422	9,234	7	81	1,747	9	15	441	8	4
Total			152,124	127,783	100	84	19,088	100	13	5,253	100	3
Education												
Illiterate			418	344	0	82	52	0	12	22	0	5
Reads/writes			307	248	0	81	44	0	14	15	0	5
Primary school			6,147	5,123	4	83	807	4	13	217	4	4
Lower middle school			18,751	15,404	12	82	2,645	14	14	702	13	4
Higher middle school			41,032	34,205	27	83	5,372	28	13	1,455	28	4
High school			54,342	45,691	36	84	6,750	35	12	1,901	36	3
College			31,127	26,768	21	86	3,418	18	11	941	18	3
Total			152,124	127,783	100	84	19,088	100	13	5,253	100	3
Occupation												
Agriculture (ISCO08:6-8)			23,926	19,679	15	82	3,454	18	14	793	17	3
Armed Forces (ISCO08:0)			827	705	1	85	110	1	13	12	0	2
Services (ISCO-08:4-5)			16,621	14,154	11	85	2,013	10	12	454	10	3
Unskilled (ISCO-08:9)			27,892	23,558	18	84	3,605	19	13	729	16	3
Managers (ISCO-08:1)			1,520	1,357	1	89	134	1	9	29	1	2
Professionals (ISCO-08:2)			10,628	9,183	7	86	1,152	6	11	293	6	3
Technicians (ISCO-08:3)			11,664	10,036	8	86	1,312	7	11	316	7	3
Domestic worker			3,445	2,662	2	77	634	3	18	149	3	4
Student			25,554	21,768	17	85	2,996	15	12	790	17	3
Unemployed			30,047	24,921	20	83	4,039	21	13	1,087	23	4
Total			152,124	127,783	100	84	19,088	100	13	5,253	100	3

Table D5 (continued)

	Mean	SD	No.	Within 30 minutes No.	Within 30 minutes Col (%)	Within 30 minutes Row (%)	30 to 60 minutes No.	30 to 60 minutes Col (%)	30 to 60 minutes Row (%)	Over 60 minutes No.	Over 60 minutes Col (%)	Over 60 minutes Row (%)
Nationality												
Portuguese			125,483	104,010	81	83	16,802	88	13	4,671	89	4
Other			26,641	23,773	19	89	2,286	12	9	582	11	2
Total			152,124	127,783	100	84	19,088	100	13	5,253	100	3
Civil Status												
Married			37,375	30,118	24	81	5,727	30	15	1,530	29	4
Divorced			11,317	9,168	7	81	1,743	9	15	406	8	4
Separated			2,263	1,890	1	84	295	2	13	78	1	3
Single			100,518	86,098	67	86	11,208	59	11	3,212	61	3
Widow			651	509	0	78	115	1	18	27	1	4
Total			152,124	127,783	100	84	19,088	100	13	5,253	100	3
Cohabitation												
Lives with partner			74,954	61,528	48	82	10,513	55	14	2,913	55	4
Lives without partner			77,170	66,255	52	86	8,575	45	11	2,340	45	3
Total			152,124	127,783	100	84	19,088	100	13	5,253	100	3
Previous children	1.0	1.0										
0			61,676	52,725	41	85	7,006	37	11	1,945	37	3
1			44,694	37,767	30	85	5,386	28	12	1,541	29	3
2			33,630	27,365	21	81	4,962	26	15	1,303	25	4
3			8,959	7,271	6	81	1,330	7	15	358	7	4
4			2,247	1,892	1	84	281	1	13	74	1	3
More than 4			918	763	0	83	123	0	13	32	0	4
Total			152,124	127,783	100	84	19,088	100	13	5,253	100	3
Previous abortions	0.4	0.7										
0			112,079	93,180	73	83	14,845	78	13	4,054	77	4
1			30,607	26,306	21	86	3,354	18	11	947	18	3
2			6,887	6,050	5	88	651	3	9	186	4	3
3			1,676	1,482	1	88	153	1	9	41	1	2
4			503	454	0	90	39	0	8	10	0	2
More than 4			176	142	0	81	23	0	13	11	0	6
Total			152,124	127,783	100	84	19,088	100	13	5,253	100	3

E Event Studies

To better understand if openings and closures of abortion providers are driven by abortion demand or broader social forces, we conduct event studies which are displayed in Figures E1 to E4 below.

In this analysis, we use the abortion rate of the region of influence of a provider – which is defined as the set of municipalities to which that provider was, at some point in time, the closest abortion provider – as an outcome and estimate the model described below by OLS:

$$Log(Y_{rt}) = \sum_{i=-Pre}^{-2} \alpha_i T_{rti} + \sum_{i=0}^{Post} \alpha_i T_{rti} + X_{rt}\beta + \varphi_r + \zeta_t + u_{rt}$$

Where $\boldsymbol{Y_{rt}}$ is either the abortion rate or one of our four proxies for social norms (number of marriages, divorces, catholic marriages, and catholic divorces per thousand inhabitants) and $\boldsymbol{T_{rti}}$ is a dummy equal to one for the region of provider $\boldsymbol{r}$, in year $\boldsymbol{t}$, which is $\boldsymbol{i}$ years away from the event (opening or closure of provider). $\boldsymbol{X_{rt}}$ is a vector of time-varying characteristics of the provider's region of influence, namely: the share of all age groups of fertile-age women in the overall population, the insured unemployment rate, the growth rate of the NUTS III region's GDP. If the outcome variable is the abortion rate, we also include as controls the number of marriages, divorces, catholic marriages, and catholic divorces per thousand inhabitants. $\boldsymbol{\varphi_r}$ and $\boldsymbol{\zeta_t}$ are provider's region of influence and year fixed-effects, respectively. $\boldsymbol{u_{rt}}$ is the error term.

As shown in Figures E1 to E4, we find no evidence that there were systematic differences in abortion rates or changes in social norms prior to the closures or openings of abortion providers.

Figure E1 Abortion rate before and after clinic closure

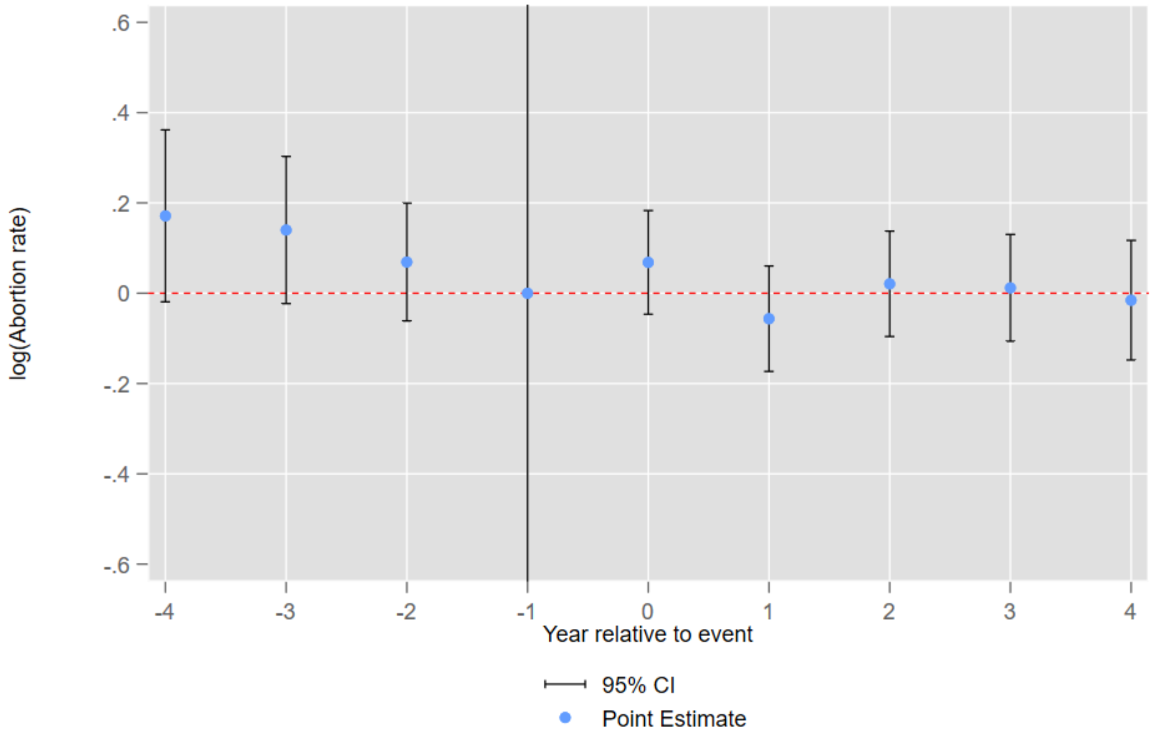


Figure E2 Abortion rate before and after clinic opening

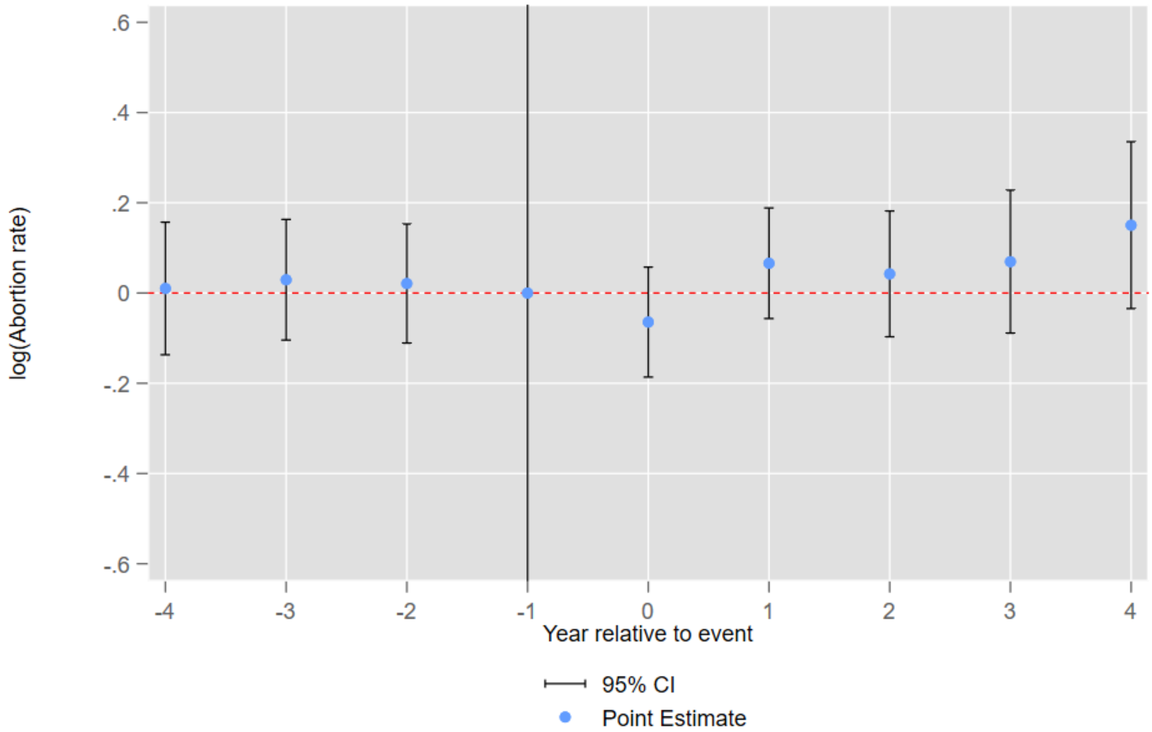
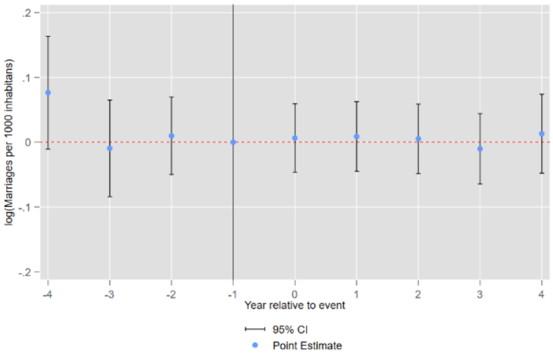
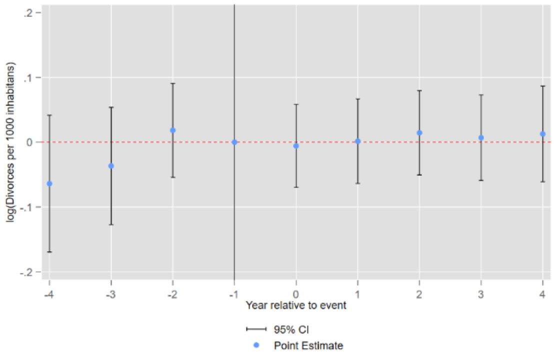


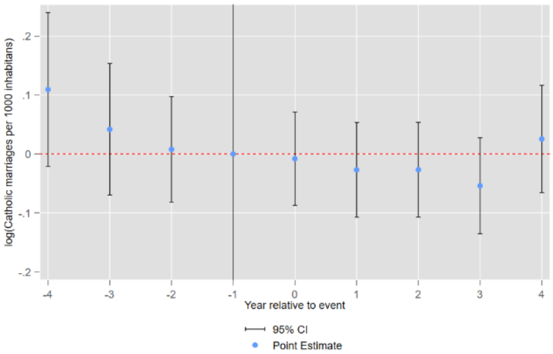
Figure E3 Percentage of catholic marriages before and after clinic closure



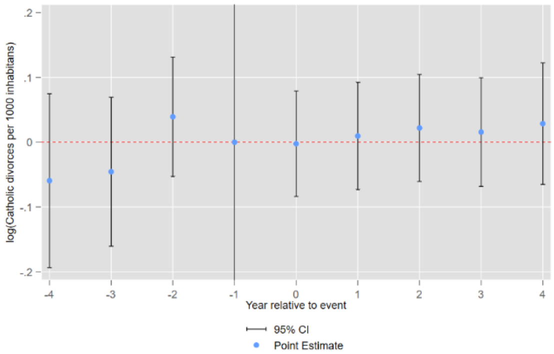
Panel a Marriages in the population



Panel b Divorces in the population

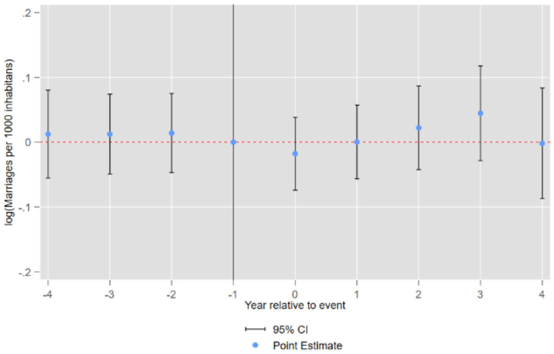


Panel c Catholic marriages in the population

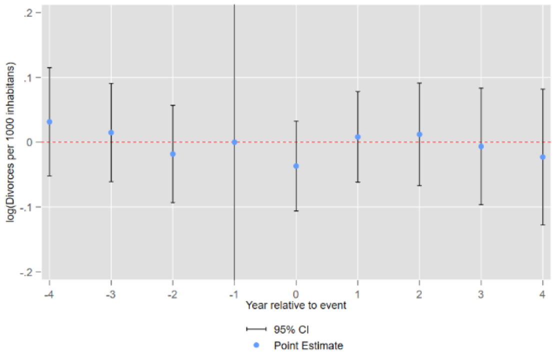


Panel d Catholic divorces in the population

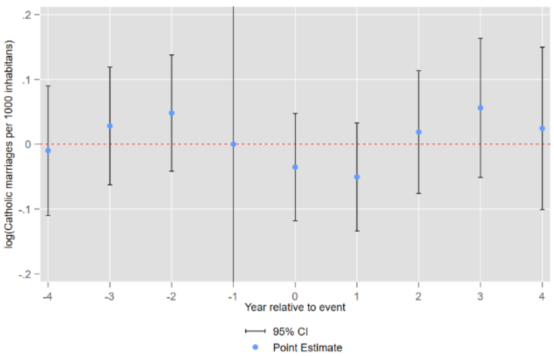
Figure E4 Percentage of catholic marriages before and after clinic opening



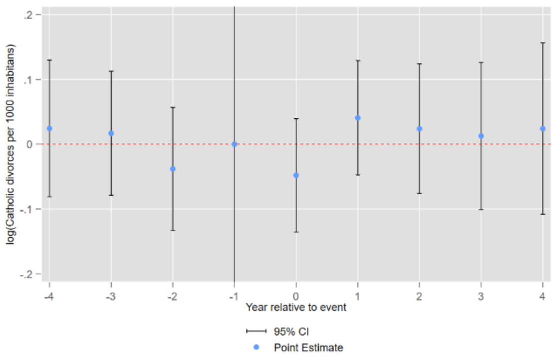
Panel a Marriages in the population



Panel b Divorces in the population



Panel c Catholic marriages in the population



Panel d Catholic divorces in the population