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Olivier Marie
University Rotterdam, Maastricht University, Tinbergen Institute, IZA, CEPR and CESifo

Esmée Zwiers
University of Amsterdam, Tinbergen Institute and IZA

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IZA – Institute of Labor Economics

Schaumburg-Lippe-Straße 5–9
53113 Bonn, Germany

Phone: +49-228-3894-0
Email: publications@iza.org

www.iza.org

ABSTRACT

Religious Barriers to Birth Control Access*

This paper presents new causal evidence on the "power" of oral contraceptives in shaping women's lives, leveraging the 1970 liberalization of the Pill for minors in the Netherlands and demand- and supply-side religious preferences that affected Pill take-up. We analyze administrative data to demonstrate that, after Pill liberalization, minors from less conservative areas were more likely to delay fertility/marriage and to accumulate human capital in the long run. We then show how these large effects were eliminated for women facing a higher share of gatekeepers – general practitioners and pharmacists – who were opposed to providing the Pill on religious grounds.

JEL Classification: I18, J12, J13, Z12

Keywords: birth control, religion, fertility, marriage, human capital, the Netherlands

Corresponding author:
Esmée Zwiers
University of Amsterdam
Science Park 904
1098 XH Amsterdam
Netherlands
E-mail: e.s.zwiers@uva.nl

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I. Introduction

Legal access to oral contraceptives has had dramatic effects on women's lives. Goldin and Katz (2002) were the first to document the powerful impact of the birth control pill on marital and educational outcomes of young college-educated women in the United States. Bailey (2006) followed by showing that the Pill enabled women to delay motherhood and increase their participation in the labor force. Other works show that pill liberalization in the United States increased the share of children with college-educated and non-divorced mothers (Ananat and Hungerman 2012), can account for part of the convergence of the gender gap in the 1980s and 1990s (Bailey, Hershbein, and Miller 2012), and allowed women to select into higher-paying occupations (Steingrimsdottir 2016). Granting women legal access to any technology that improves fertility control, including oral contraceptives, has always been met by strong religious resistance.[1]

Surprisingly little is known about how much moral opposition to birth control, and in particular the Pill, might affect those who could potentially benefit from its effects. Bailey (2006) does suggest moral opposition might matter when noting that higher Catholic parish membership in U.S. states is associated with delays in pill liberalization. Moreover, legal delays are not the only issue as de jure access may not guarantee de facto availability if moral preferences remain strong enough to prevent women from adopting certain birth control methods. These preferences can be driven by both *demand*, specifically, a woman's or her family's religious beliefs, or *supply*, specifically, the moral values of the technology providers. Surveys reveal that religious health professionals are less likely to provide (emergency) contraceptives and induced abortion (Spivack 1964; Rubin et al. 2006; Lawrence et al. 2010; Stulberg et al. 2011), demonstrating that the beliefs of those who grant access to birth control matter. These moral barriers are even sometimes legitimized as, for example, nine U.S. states have laws that allow health providers to refuse

[1] Affiliation with an evangelical Protestant church is the most predictive characteristic of an individual's opposition to abortion rights in the United States today. https://www.economist.com/graphic-detail/2022/05/07/religion-not-gender-is-the-best-predictor-of-views-on-abortion. In his 1968 encyclical Humanae Vitae (on Human Life), Pope Paul VI dedicated a section to "Unlawful Birth Control Methods," in which he reaffirmed the position of the Catholic church on abortion and oral contraceptives: they are "intrinsically wrong." He asked public authorities to not tolerate "any legislation which would introduce into the family those practices which are opposed to the natural law of God." https://www.vatican.va/content/paul-vi/en/encyclicals/documents/hf_p-vi_enc_25071968_humanae-vitae.html

contraceptive services, and six U.S. states explicitly allow pharmacists to refuse dispensing contraceptives.[2]

Our study is the first to consider how moral preferences surrounding the liberalization of the birth control pill might impact women's family formation, education, labor market outcomes, and wealth. The focus is on the Netherlands, where access to the Pill for minors (those aged below 21) was legalized in 1970. As the policy change was national it is not possible to separate out the policy change from other secular trends in social norms that could affect women's human capital formation over time. We therefore exploit that Orthodox Protestant women were less likely to adopt the Pill after its legalization, and we examine how strong demand-side preferences affected the extent to which young women benefitted from improved access to oral contraceptives. After finding that the benefits of the Pill on family formation and economic outcomes are large, we turn our focus to the additional effect of supply-side moral preferences by considering the religious beliefs of the "gatekeepers" (i.e., doctors and pharmacists) women faced locally when seeking to gain access to birth control. We show that the positive impacts of birth control liberalization on women's outcomes cancel out as more gatekeepers were morally opposed to providing the Pill.

This paper is the first to comprehensively study the short- and long-run impact of liberalizing access to oral contraceptives outside of the United States[3] and to exploit religious preferences to do so in general. Studying this question in the Dutch setting is of particular interest for several reasons. First, there is substantial local variation in religious beliefs and large (uncorrelated) variation in the religiousness of the technology gatekeepers that allows us to investigate moral preferences on both the demand and supply side. Second, induced abortion was only liberalized 14 years after oral contraceptives, making it possible to estimate a relatively pure, and potentially powerful, pill access policy effect. This is particularly relevant given the recent debate about the state-laws exploited for identification in U.S. papers. Myers (2017) argues that there were errors in the coding of these laws and that after correcting them, access to abortion, rather than access to the Pill, allowed women to delay family formation.[4] Third, our administrative registry data allow us to observe the fertility decisions of all women in the Netherlands along with information about

[2] The Guttmacher Institute documents the state policies in the United States regarding refusing health care services as of June 1st, 2022. https://www.guttmacher.org/state-policy/explore/refusing-provide-health-services

[3] Two papers have studied the price-sensitivity of oral contraceptives. In both Sweden (Gronqvist 2012) and Chile (Rau, Sarzosa, and Urzúa 2017), the take-up of contraceptives is highly elastic. Price is not an issue in our setting as the Pill was reimbursed by social security quickly after its liberalization.

[4] Myers (2017) also argues that some papers do not consider the time at which young women gained access to abortion.

their marriage, education, labor market, and (household) wealth outcomes up to four decades after access was gained. We can thus explore both short- and long-run effects for cohorts who are precisely defined in age and location at the time of the policy change. Finally, we use information on the self-reported religious affiliation of all health professionals in the Netherlands from the 1971 census. This crucially enables us to measure the supply-side moral preferences women were likely to encounter locally, precisely at the time of pill liberalization.

We first document in **Figure 1** that the birth rate for women of childbearing age (15–50) fell by 25 percent in the five years following pill liberalization. Most strikingly, the change in the birth rate to minors—the age-group for whom oral contraceptive access was previously most restricted—dropped by almost 45 percent in the same period. The declining trend in fertility coincided with a large increase in the take-up of the Pill. **Figure 2** documents how the contraceptive pill quickly became the most important birth control technology in the Netherlands after its liberalization in 1970. By 1975, more than 40 percent of women between the ages of 15 and 44 were using it. We also present evidence in appendix **Table A1** that liberalization coincided with a drastic reduction in unplanned pregnancies.[5] These three stylized facts do suggest that pill liberalization did impact women's ability to control their fertility decisions in the Netherlands. The policy we study was nationally implemented, and therefore we cannot simply compare women across cohorts depending on whether they had access to the Pill as a minor or not, as this would not account for multiple other secular trends that might change fertility decisions. We therefore exploit differences in moral preferences that impact Pill adoption probability to obtain causal estimates of the effect of its liberalization.

We first examine moral preferences on the demand side of the Pill. As individual religious affiliation is not available in the registry data, we proxy for demand-side moral preferences using area-level views about the Pill. Specifically, we use the local share of votes for political parties that were in favor of its liberalization at the election just prior to policy implementation. In the Netherlands, the parties representing Orthodox Protestants were fiercely opposed to contraception, while nondenominational parties and those representing Catholics and Liberal Protestants were in

[5] Vennix (1990) states that only 37 percent of women who gave birth just before the Pill became universally available (1966–1970) reported that their child's birth was definitively planned, whereas this was 69.5 percent for women giving birth from 1971–1975. Similarly, using numbers from a larger and more recent survey, we find that for women giving birth from 1966–1970, 27.8 percent reported that their child's birth was unplanned, whereas this was only 8.4 percent for women giving birth from 1971–1975 (**see Table A1**).

favor. In line with this, we document that women voting for Orthodox Protestant parties were about twice less likely to take up the Pill than those voting for any other political party. Our measure thus proxies the "average" moral views about oral contraceptives in an area that will affect the probability of take-up of the Pill when it becomes available. This includes the beliefs of the women themselves, but also the beliefs of their partners and parents. This measure is used in a continuous difference-in-difference framework in which we compare outcomes of women from areas with similar views about the Pill, who gained legal access just before or after their twenty-first birthday—the age before which pill use was categorically banned until 1970.

Our findings show that women who gained access to the Pill as minors in more liberal areas – that is, a one standard deviation higher vote share, or 10 precent, for pro-pill parties – were 12 percent less likely to become mothers as minors and had 6 percent fewer marriages before turning 21. These women were then 28 percent more likely to complete the higher education degrees that take the most time to finish (i.e., Medical Doctor (MD) or Juris Doctor (JD)). These increases in human capital investment translate, for those working, into large increases in the proportion working in high-paying jobs by their mid-50s. As only half of women are in the labor force at this age, we consider household wealth as an alternative measure of economic wellbeing. Here again, the positive long-run impact of the Pill is clear: women who grew up in areas with lower moral resistance to improved legal access were significantly more likely, whether they worked or not, to belong to households in the top quartile of the national wealth distribution.

We then investigate the additional impact that supply-side moral preferences may have had on women's outcomes, given area-level demand-side preferences. In the Netherlands, women could only obtain oral contraceptives with a doctor's script at a pharmacy. This implied that general practitioners (GPs) and pharmacists were essentially functioning as gatekeepers to the Pill. We first document that Orthodox Protestant and Catholic GPs were three times less likely to prescribe the Pill, particularly to young or unmarried women. We then use the 1971 Dutch census to identify the religious affiliation of health professionals (HPs, defined as GPs and pharmacists) in every Dutch municipality.

We demonstrate that there is a lot of area-level variation in moral views about the Pill and in the fraction of Orthodox Protestant and Catholic health professionals: there are liberal areas with a large share of gatekeepers opposed to the Pill on religious grounds, and vice versa. Importantly, this mismatch in moral views of local women and that of their health professionals is not driven

by any other access-related observable characteristics. We extend the baseline specification to a continuous triple difference-in-difference framework, that in addition to demand-side preferences also captures the local supply-side preferences (i.e., local share of health professionals opposed to the pill on religious grounds). Our analysis reveals that in places where it is harder to find a GP or pharmacist that is not opposed to the Pill on religious grounds, legal access had no impact on any of the main short- and long-run outcomes considered. This finding is robust to only using GPs' religiosity, assigning religious composition of closest municipality for women without any local HP, and restricting our sample to municipalities with at least three health professionals to choose from. All this evidence points to supply-side moral preferences effectively nullifying the positive effects of the liberalization of contraceptives for women living in these areas.

The paper contributes to the literature on the power of oral contraceptives (e.g., Goldin and Katz 2002; Bailey 2006; Ananat and Hungerman 2012; Bailey, Hershbein, and Miller 2012; Steingrimsdottir 2016) and other family planning technologies like abortion (e.g., Gruber, Levine and Staiger 1999; Donahue and Levitt 2001; Myers 2017), by providing new evidence from a new setting on the "power" of oral contraceptives in shaping women's outcomes decades after pill liberalization. This paper also more broadly relates to papers exploring the relationship between religion and fertility in economics. For example, earlier work by Munshi and Myaux (2006) shows that an individual's contraceptive use responds strongly to changes in contraceptive use in their own religious group. Beach and Hanlon (2019) show that religion played an important role in the historical fertility transition in the United Kingdom. Bassi and Rasul (2017) and Farina and Pathania (2020) find that papal visits, in Brazil and Italy respectively, impacted contraceptive use.

Finally, this paper also adds to the literature that shows that physicians make different choices when facing similar patients, resulting in differences in healthcare utilization and patient outcomes (Currie and MacLeod 2020; Fadlon and Van Parys 2020; Chan, Gentzkow and Yu 2022; Currie and Zhang 2022; Badinski et al. 2023). Our paper specifically adds to the literature on the role of physician beliefs in driving physician practice variation. These include Schnell (2017), who shows that physician altruism influences opioid prescribing, and Cutler et al. (2019) who show that geographical variation in physician practice styles can mostly be explained by physician beliefs about the most effective treatments. This paper adds to this literature by showing that physicians' religious beliefs matter. A physician's conservative beliefs about contraceptives can

have long-run consequences for women's fertility and marriage decisions, education, labor market outcomes, and wealth.

2. Institutional background

2.1 The Morality Law and the Development of the Dutch Pill

At the start of the nineteenth century, the Dutch government became increasingly concerned with and involved in moral wellbeing, leading to the introduction of the Morality Law (*Zedelijkheidswet* in Dutch) in 1911. The principal objective of the Morality Law was to legislate sexual activity to take place only within a marriage and for the sole purpose of reproduction. It contained provisions about contraceptive use, prostitution, and pornography (Hofstee 2012). Contraceptives were targeted because they could protect those in extramarital relationships from the consequences of their immoral behavior. The Morality Law prohibited individuals from openly displaying, offering, or proclaiming to have available any instrument that could prevent or interfere with a pregnancy on penalty of a prison sentence of at most two months, or a fine of 400 guilders (about 5,000 US dollars in 2022).[6] Penalties were three times more severe for displaying or recommending contraceptive methods to minors, defined as those below the age 21, meaning a prison sentence of at most six months or a fine of 1,200 guilders (Rensman 2006). These conservative laws stayed unchanged for almost six decades, in the background of the development and (medical) introduction of the contraceptive pill in the Netherlands.

The Dutch birth control pill, Lyndiol, was developed by pharmaceutical company Organon (around the same time as Enovid, the Pill developed in the United States). Lyndiol contained an artificial hormone, lynestrenol, that by 1957 could be used as an oral contraceptive for women. Due to conservative views on contraceptives Organon maintained secrecy around its development and production of Lyndiol (the "Pill"). The packaging and distribution of the pill was even outsourced to nunneries when the demand for the Pill later increased: packaging by secular factory workers could have tempted the workers to engage in immoral behavior, but nuns were considered less "corruptible" (Rensman 2006). The Dutch Pill became first available in pharmacies in 1963, but as a gynecological medicine that regulated the menstrual cycle with a side effect of causing

[6] There was one exception: contraceptives could be obtained from the Dutch Association for Sexual Reform (in Dutch: *Nederlandse Vereniging voor Seksuele Hervorming, NVSH*), but they could only sell to their members. The NVSH reached its peak number of members in 1965, which accounted for 1.66% of the Dutch population (Hofstee 2012).

temporary infertility. In reality, the primary purpose of the drug was to prevent pregnancies by suppressing ovulation. Lyndiol was only available on a doctor's script at the pharmacy. As a result, GPs, who were already assisting couples in planning periodic abstinence, acquired an even larger role in family planning (Hofstee 2012).

Even though the Pill was available beginning in 1963, the Morality Law still forbade promoting and making the Pill available because it was an instrument that could interfere with a pregnancy. Thus, in its first years, it was mainly prescribed to women in very fertile marriages who could experience negative health consequences from another pregnancy (Bekkering 1969). Young unmarried women commonly did not have access to the Pill in its early years.

2.2 The Repeal of the Morality Law and Access to the Pill

Views regarding contraceptives were evolving in the 1960s. Limiting population growth rose high on the political agenda, and this required family planning technologies (Hofstee 2012). Societal norms about family formation and the role of the woman in the household also started to change.[7] These factors eventually led to the repeal of the Morality Law in 1969. This repeal made it legal to provide information about contraceptives in speech or writing, and contraceptives were no longer age restricted.[8] The birth control pill became even more accessible with its inclusion in the Dutch National Health Service for low-income individuals (in Dutch: *Ziekenfonds*) in 1971 (Ketting and Schnabel 1980). However, as the Pill became more accessible, the role of "gatekeepers"—the general practitioners who had to recommend and prescribe the Pill and the pharmacists who had to dispense it—became enhanced.

[7] The 1950s were characterized by legal changes that gave more freedom to women. A law that made women legally "incapacitated" as soon as they married—making the husband the head of the household and in charge of all assets and children—was abolished in 1957 (Pegtel 2016). A practice that female public servants (and those employed in many large private firms) were fired after marriage was repealed two years earlier, in 1955 (Rensman 2003).

[8] The repeal of the Morality Law also improved access to other contraceptives like condoms and diaphragms, but we believe that the Pill was the most important contraceptive at the time. First, pill usage exploded after the repeal of the Morality Law (see **Figure 2)**. A survey by Vennix (1990) administered in 1986-1988 shows that the Pill was the most used contraceptive by Dutch women at 34.1 percent, compared to condoms at 10.3 percent and diaphragms at 0.2 percent. Second, the Pill was the most effective contraceptive: the Dutch Pill Lyndiol had a zero percent fail rate (Rice-Wray et al. 1966; Moses et al. 1969; Meer 2007) compared to an effectiveness of 15 percent for condoms and 16 for diaphragms around 2006 (Bailey 2006). Finally, unlike the use of condoms, women could take the Pill without their partner's knowledge, which is why we believe that the Pill was particularly important for women around that time.

Figure 1 reveals a large drop in the birth rate after the repeal of the Morality Law, particularly for minors for whom access to the Pill was liberalized the most.[9] There are two reasons why the Pill was most likely behind this large fertility effect in the Netherlands. First, **Figure 2** shows the fertility effect coincided with a huge increase in take-up of the Pill in the Netherlands: almost 40 percent of women aged 16–45 were using it by 1975[10]. This figure is much higher than the proportion using oral contraceptives in the United States in that same year, which was only about 16 percent doing so in similar cohorts.[11] Second, induced abortion was only legalized in the Netherlands in 1984 and, even though tolerated in exceptional cases, the practice remained uncommon over the course of the 1970s and mid-1980s (see **Figure A1**).[12] The strong take up of oral contraceptives is often proposed as the primary explanation for the relatively low abortion rate in the Netherlands by international standards (Ketting and Schnabel 1980; Ketting and Visser, 1994; Levels et al. 2012). This, again, stands in sharp contrast with the figures for the United States, where we see a large upsurge in the abortion rate starting in the 1970s.

2.3 Timing of the Repeal and Political Opposition

This paper exploits the repeal of the Morality Law to identify the effects of contraceptive access on women's fertility and economic outcomes. The repeal coincided with other societal changes that could also affect both outcomes, raising the question of its relative exogeneity. Importantly, there were a few political events that created unforeseen delay, implying that society was ready for the repeal a few years before the law was abolished. The coalition government in place beginning in April 1965 had committed to the repeal of the Morality Law and submitted two bills to parliament by September 1966 (Hofstee 2012). Before the bills could be discussed in parliament, a crisis arose due to budget disagreements—unrelated to the Morality Law—which led to a

[9] The birth rate for all women had already started to fall in the early 1960s, which coincides with the availability of the contraceptive pill for married women in the Netherlands who had reached their desired level of completed fertility.
[10] The numbers in **Figure 2** reflect the number of contraceptive pills bought each year relative to the number of women of fertile age in each country. This is a more accurate measure of take up across cohorts than the one often used that relies on women reporting to 'ever using' the Pill as it tends to become mechanically very large over time.
[11] One explanation for the low take-up of the Pill in the United States compared to the Netherlands could be the high costs of the Pill in the US (Bailey 2012). By contrast, the Pill became free for most individuals in the Netherlands after its inclusion in the National Health Insurance (the health insurance scheme for low-income individuals) in 1971.
[12] Induced abortion was allowed for medical reasons (until 1966 only to save the mother's life). By 1972, women could request an abortion at 11 clinics without having be found eligible on medical grounds. The abortion rate remained low by international standards despite the 1972 change (see **Figure A1**), and especially in comparison to the high take-up of oral contraceptives (see **Figure 2**).

collapse of the coalition government in November 1966, and new elections being held in February 1967. It would take until May 1969 before the bills were discussed in parliament again. The bills eventually passed in June 1969, almost three years after first raised for discussion (Rensman 2006).

A large majority of members of parliament voted in favor of the repeal of the Morality Law. This included those from the Catholic People's Party (in Dutch: *Katholieke Volkspartij*) which was in line with their 1967 election manifesto that stated that "the responsibility for determining the size of the family lies with the parents." The only parties who voted against the repeal were those linked to the Orthodox Protestant Church with strong Christian values and conservative moral norms: specifically, the Reformed Political Party (in Dutch: *Staatkundig Gereformeerde Partij* or SGP*)*, the Anti-Revolutionary Party (ARP), and the Farmers' Party (Hofstee 2012).[13] We refer to all three political parties together as "Orthodox Protestant parties" in the remainder of the paper. The division in parliament suggests that there were big differences in views about the desirability of making contraceptive access universal.

2.4 Demand-Side Moral Preferences

We investigate the impact of demand-side preferences by exploiting area-level variation in attitudes toward the Pill. Our assumption is that adoption was slower in areas with more-conservative religious views. As a proxy, we use the share of votes for the Orthodox Protestant parties that voted against the repeal of the Morality Law. Voting data comes from the Dutch Electoral Council (in Dutch: *Kiesraad*), which has collected and published all Dutch election results since 1848. We focus on the votes for the national parliamentary elections in 1967 and use the distribution of votes in this election at the municipality level. Turnout was almost universal because, at the time, voting was mandatory for individuals above the age of majority (including women). The ARP, the Farmers' Party, and the SGP, respectively received 2.0 percent, 9.6 percent, and 4.6 percent of votes nationally. **Figure 3** reports municipality-level variation in the proportion of votes for the Orthodox Protestant parties that voted against the repeal of the Morality Law.[14] It

[13] None of these parties specifically mentioned the potential repeal of the Morality Law in their 1967 manifestos. However, the ARP mentioned contraceptive access, stipulating that this should not be at the cost of "good morals, as well as the protection of youths." The SGP simply stated that its first principle was that "Government Policy [must] be in accordance with the Law of God, which implies strong actions against" all forms of "moral degeneration."

[14] We drop the two Catholic-majority provinces in the south of the Netherlands as there is very little variation in demand- and supply-side preferences in these areas (see **Section 4**).

shows a lot of variation in the share of votes ranges from 4 percent to 82 percent. It also quite clearly identifies the Dutch "Bible Belt," from the southwest to the northeast.[15]

A key assumption for using vote share as a proxy for the pill use probability is that oral contraceptives adoption is significantly different across political preferences. **Table 1** presents evidence from two sources to show that women voting for the Orthodox Protestant parties are much less likely to have used contraceptives and in particular the Pill. Our first source is a survey administered between 1986 and 1989, reported in Vennix (1990), which reveals that women voting for Orthodox Protestant parties were about half as likely to have been using the contraceptive pill compared to any other group, including those who voted for the party representing Catholics. Our second piece of evidence comes from the Family Planning Survey (1988–2008). Again, pill use was about twice as high for women not voting for Orthodox Protestant parties. This evidence confirms that Orthodox Protestants were by far the most resistant to adopting the Pill. On the contrary, there was a high level of take-up among Dutch Catholics.[16]

2.5 Moral Preferences on the Supply Side

To examine supply-side moral preferences, we exploit variation in the beliefs of gatekeepers at the time of the liberalization. The Pill was only available through a doctor's script at a pharmacy, and the general practitioner (GP) was the confidante responsible for guiding and informing patients about family planning practices. Hence, even as the pill was legally available for all women after the repeal of the Morality Law, access might still be restricted by GPs who did not want to prescribe it or pharmacists reluctant to dispense it. Differences in the likelihood of supplying otherwise legal contraceptive methods because of an individual's religion are not uncommon among health professionals as clearly illustrated by evidence from the United States.[17]

Moral preferences also played an important role when it came to accessing the contraceptive pill in the Netherlands. Both Orthodox Protestant *and* Catholic general practitioners (GPs) remained markedly more resistant to prescribing the Pill at the time of the liberalization than

[15] Panel (b) of **Figure A2** shows a map of the share of individuals who self-declared to be Orthodox Protestant in the 1971 census, which looks similar to **Figure 3**. The correlation between the share of votes for the Orthodox Protestant parties in 1967 and the share of individuals who self-reported being Orthodox Protestant in 1971 is 0.808 (**Table A8)**.
[16] This could be partially explained by large differences in "religious rigor" between those self-identifying as affiliated with either of these religions in the Netherlands: 54.4 percent of Orthodox Protestants report going to church at least once a week, while this is the case for only 14.7 percent for Catholics (see **Table A2**).
[17] See for example Spivack (1964), Rubin, Grumet, and Prine (2006), Lawrence, Rasinski, Yoon, and Curlin (2010), and Stulberg, Dude, Dahlquist, and Curlin (2012).

physicians from all other religious persuasions (Bekkering 1969). **Figure 4** uses a large survey from Bangma (1970) that investigated the attitudes of Dutch GPs towards the pill at the time of the repeal of the Morality Law to illustrate this. It compares physicians' opposition to the introduction of the Pill in general, and their opposition to prescribing the Pill to specific groups of women, depending on their own religiosity. Orthodox Protestant and Catholic doctors were 60 percent more likely to be "very opposed" to the use of the Pill as a contraceptive compared to other physicians (36.6 versus 22.5 percent). These differences were starker when GPs were asked to state if they would *never* prescribe the Pill to certain groups of women. Orthodox Protestant and Catholic doctors were about three times less likely to ever prescribe the Pill to unmarried women aged 25–30, unmarried mothers, or engaged women younger than 21.

It is interesting to see that Catholic physicians remained so opposed to the Pill when, as shown in **Table 1**, Catholic women were adopting it as their chosen birth control method as often as nonreligious women.[18] We argue that this stems from the very large generational and gender gap among Catholics in their views toward both the church and contraceptives that emerged at the time[19]. This divergence in views must have been especially large between the young women demanding the Pill and the much older (69 percent over 40) and almost exclusively male (87 percent) GPs prescribing it.

To measure the importance of supply-side barriers, we use the 1971 census to calculate the proportion of health professionals who were opposed to the Pill on religious grounds (Orthodox Protestant and Catholic GPs and pharmacists) in each municipality. This measure captures the beliefs of the average gatekeeper women would face when trying to access the Pill in the period surrounding its liberalization. Area dispersion in this measure is shown in **Figure 5a** and reveals large differences in the religiosity of the pool of health professionals women can choose from. Crucially, **Figure 5b** shows that there is considerable variation between doctors' religiosity and

[18] The reluctance to prescribe contraceptives by Catholic physicians could be related to Pope Paul VI's 1968 Humanae Vitae. The document included a directive "To Doctors and Nurses" to "fulfill the demands of their Christian vocation before any merely human interest" so that "when married couples ask for their advice, they may be in a position to give them right counsel and to point them in the proper direction." https://www.vatican.va/content/paul-vi/en/encyclicals/documents/hf_p-vi_enc_25071968_humanae-vitae.html

[19] Catholic men above age 40 were twice as likely to disapprove of the pill than Catholic women under age 30 (Hutjes 1974, 82, 168). These views can be linked to changes in religious rigor across generations: Catholics over 40 were about twice as likely to feel a strong attachment to their church than Catholics under 30 (authors' calculations based on Hutjes 1974, Table 8.6). This generational gap is confirmed in **Table A6**, which shows that younger Catholics became less likely than older generations to attend services. Interestingly, this drop is not observed for Protestants.

our measure of local demand-side resistance to pill adoption. Hence, we observe liberal areas with predominantly conservative health gatekeepers and areas for which the opposite is true.

This "mismatch" in area-level moral values toward the Pill and that of its health professionals is further explored in **Figure A5.** The figure shows there are some Orthodox Protestant health professionals in liberal areas, but more strikingly, that there are many Catholic gatekeepers practicing in municipalities unopposed to pill liberalization. This finding can be explained by general practitioners' high propensity to locate in areas close to the university they attended. Over the period of 1957 to 1981, 52–69 percent of GPs started practicing in the province that their university was in (Groenewegen 1985). This allocation mechanism creates a high mismatch for Catholic GPs given that there were no medical schools in the southern Netherlands until 1976. Consequently, any student interested in medicine from the two Catholic majority provinces had to move north to do so. This eventually strongly affected the location of practicing Catholic health professionals by moving them into areas with more liberal views about contraceptive use.

3. Identification: Within-Municipality, Across-Cohort Variation

So far, we showed that the repeal of the Morality Law in 1970 was followed by a large drop in births among minor women and coincided with a surge in uptake of the Pill. A fall in unplanned pregnancies in around the same period suggests the importance of improved fertility control as a mechanism. Given that the policy change was national, it is not possible to separate out the effect of the liberalization from other secular trends, including in social norms, that could have affected women's family formation and human capital formation by simply comparing younger and older cohorts. To causally estimate the impact of demand-side moral preferences on women's outcomes, we use that: (i) there was a lot of variation in the 1967 vote shares for Orthodox Protestant parties across the Netherlands,[20] and (ii) pill adoption was much lower among women voting for these parties.

[20] A potential concern is that only a change in norms can properly capture factors that could influence women's outcomes differently across areas over time instead of the vote-share in a specific election. First, there is no reason for such norm changes to differentially affect older and younger cohorts, which is the basis of our identification strategy. Second, we find a strong correlation of 0.98 (see **Table A8**) in the vote share for Orthodox Protestant parties in the elections of 1967 and 1971 at the municipality level. This is suggestive of sticky preferences at the area-level in this period. Indeed, using either vote share "for pill" in either election year (we will use 1967 throughout) does not make any difference to any of our results.

We use these two margins to implement a (continuous) difference-in-differences strategy, where variation *across* cohorts and *within* the same municipality is used. Practically this implies that the outcomes of minors are compared to those of slightly older women from areas with similar views about the Pill, assuming that adoption of the Pill is higher in less religiously conservative areas. The group of older women is considered untreated as they had reached the age of majority before the Pill became accessible to minors in 1970.[21] In practice, this means that we categorize women who were aged 16–20 in 1970 as "treated" (i.e., 1950–1954 birth cohorts) and compare their outcomes to that of "control" women from the same municipalities who were aged 21–26 in 1970 (i.e., 1944–1949 birth cohorts).

This approach should account for almost all area constant and time-varying factors that may differentially affect the fertility and subsequent life outcomes of minors, independently of changes in pill access. To visualize this, we compare characteristics of households in which these younger and older cohorts of women grew up, depending on their municipality's vote share in favor of the Pill. **Figure A3** shows this exercise for six outcomes that are measured for all household (heads) in the 1971 census: fertility and divorce (**Figure A3.1**); education and income (**Figure A3.2**); and housing value and access to a phone within the home (**Figure A3.3**). The left-hand-side graphs show that the share of votes in favor of the Pill is significantly correlated with *all* these household characteristics. This indicates that only comparing outcomes of women across municipalities would not be a good strategy. However, the right-hand-side graphs of **Figure A3** show that *none* of these characteristics are significantly different across municipalities when we consider how they have changed between older (control) and younger (treated) households.

One remaining identification concern is whether women's outcomes were already on different trajectories across areas before the repeal of the Morality Law. We answer this question below.

3.1. Econometric Specification: Continuous Difference-In-Differences

Our continuous difference-in-differences specification is shown in **Equation (1)**, which is estimated for various outcomes Y for individual i, who is born in municipality m, and cohort c.

[21] Note that women age 21 and over also experienced improved access to the Pill in our context, but that the change in access to the Pill in 1970 was more drastic for younger cohorts. First, the punishment for providing or recommending contraceptives to minors (women under the ages of 21) was much more severe. Second, "older" women in "fertile marriages" already could have gained access to the Pill from the mid-1960s. Finally, and most importantly, these slightly older cohorts never had the opportunity to obtain the Pill as a minor, and some of the birth and marriage outcomes (i.e., birth/marriage before age 21) would already be impacted by the time the Morality Law was repealed.

$$Y_{imc} = \beta After_{ic} * ShareForPill_{im} + YoB_{ic} + MunB_{im} + \varepsilon_{imc}. \quad (1)$$

The coefficient of interest, β, captures the treatment effect. The $After_{ic}$ dummy takes value 1 if woman *i* was a minor at time of pill liberalization (i.e., from birth cohorts $c \in \{1950,1954\}$), and zero otherwise (i.e., from one of five previous cohorts $c \in \{1944,1949\}$). This variable is interacted with the standardized vote share for parties in favor of pill liberalization, $ShareForPill_{im}$, in each municipality m where woman i was born.[22] The specification includes year of birth (YoB_{ic}) and municipality of birth ($MunB_{im}$) fixed effects to capture all cohort-specific and area-specific factors that may influence the outcomes we consider. All regressions are weighted by female municipality population to properly reflect the relative impact of each area given its size. Standard errors ε_{imc} are clustered at the municipality level—the level of group treatment—to account for potential serial correlation in unobservable factors that impact women's outcomes from the same areas similarly.

3.2. Robustness Specifications: Dropping Extremes, Pre-trends, and Permutations

We consider various alternative specifications that test the robustness of our findings and validate our continuous difference-in-differences approach. First, we test for common pre-trends to validate the difference-in-differences approach. This test reveals whether outcomes for women in different cohorts from relatively more or less liberal municipalities had been diverging *before* pill access was liberalized. If they were, then it would be erroneous to causally interpret any significant β coefficient from **Equation (1)**. We estimate **Equation (2),** where the treatment effect (φ_c) is estimated for all 11 cohorts (c).

$$Y_{imc} = \sum_{c=1944}^{1954} \varphi_c (YoB_{ic} * ShareForPill_{im}) + MunB_{im} + \xi_{imc}. \quad (2)$$

[22] Since the intensity of treatment is in terms of vote share for parties in favor of birth control liberalization (i,e,, *ShareForPill = 1* – share vote for three Orthodox Protestant parties), the β coefficient reflects the impact on outcomes of an *increase* in the probability that oral contraceptives are adopted by women in a specific municipality.

The common pre-trends assumption holds if the cohort-specific treatment effects are zero for women born in pre-policy cohorts (i.e., those born in 1944–1949 who were a minor before pill liberalization).[23] This exercise also examines two related temporal elements about the policy impact. First, it serves as a "placebo in time" by showing whether a policy impact is detected when artificially moving the liberalization of pill access to earlier years. Second, it shows the evolution of the policy impact over time. Pill adoption might not have been immediate among young women and its diffusion could have been even stronger for the youngest cohorts. This would be illustrated by increasing sizes for the estimated $\widehat{\varphi_c}s$ among women in the five post- treatment cohorts.

Second, we randomly assign treatment intensities across municipalities. We take an area's vote share for parties in favor of the Pill and arbitrarily assign this value to all women from another area. This can be considered a "placebo in place" and tests whether the results are indeed driven by the treatment intensity—*ShareForPill*—and not by other area-specific factors. This test suits the setting of this paper since we have almost as many different treatment intensities as we have municipalities. We perform this permutation test 500 times and check graphically how the resulting coefficients compare to our baseline estimates for different outcome variables.

Finally, we check the sensitivity of the results to excluding municipalities at the extremes of the *ShareForPill* distribution. This informs the importance of the contribution of very pro- or very anti-pill areas. If extremely liberal or extremely conservative municipalities are crucial to our results, the story would be about an "all or nothing" adoption of the Pill rather than gradients in the take-up probability as proxied by our continuous treatment.[24] We test this by dropping municipalities belonging to the top or bottom 10 percent and 25 percent of the vote in favor of pill distribution. The latter is particularly demanding as it will only use women born in the half of municipalities who have a relatively similar probability of using the Pill.

[23] We present the pre-trends for the five cohorts preceding the cohort that first gained access as minor for two reasons. First, these cohorts are most similar in age to those treated by pill liberalization as minors. Second, for older cohorts information on education is more often missing, and for these older cohorts we only observe labor market outcomes very late in life in the administrative data.

[24] This exercise also addresses the concerns about effect sizes depending on treatment intensity in continuous difference-in-difference designs raised by Callaway, Goodman-Bacon, and Sant'Anna (2021). Showing results for groups that received different doses of treatment will tell us whether this is an important issue in our setting.

4. Individual Data, Sample Selection, and Variable Definitions

Our main data sources are administrative registries of Statistics Netherlands.[25] We focus women who were born in the Netherlands and aged 16–26 in 1970. For any woman registered in a Dutch municipality by 1995, we observe her place of birth, marital history, and fertility far beyond prime childbearing ages. We assign our treatment intensity measure—vote share on parties that were in favor of the Pill—based on the woman's municipality of birth.[26] We drop the two Catholic-majority provinces in the south of the Netherlands as there is very little variation in religiosity in both demand-side and supply-side preferences in these areas.[27] After excluding women born in the Catholic south, we are left with a sample of 864,370 women born in 541 different municipalities.

In the short term we are interested in fertility and family formation. Using the child-parent registry an indicator is created for women who remained childless throughout her life. For women who had children, we generate variables for the number of children (i.e., completed fertility), age at first birth, and define a minor birth as a birth before age 21. The marital state registry has information on all past and present marriages and is used to determine whether a woman was ever married during her life. For those ever married, a variable is generated for age at first marriage. A minor marriage is defined as marriage before age 21, and a "shotgun wedding" is defined as a child born within seven months of the mother's first marriage date. The seven-month time window is chosen such that premature births are not accidentally captured as shotgun weddings.

In the longer term we are interested in outcomes related to education, work, and wealth. The highest obtained education registry started in 1999 and information of individuals who finished their degree before this time is inferred retrospectively from surveys. This implies that we observe educational outcomes for about 25 percent of our sample. A dummy for finishing a higher education degree (i.e., a general or vocational university degree in the Netherlands) is created. In the spirit of Goldin and Katz (2002), an indicator for women completing "long studies" is

[25] The registry data from Statistics Netherlands is available at a remote-access facility after signing a confidentiality agreement. **Appendix Section B.1 and B.2** describe the sample selection and variable definitions in detail.

[26] Place of birth is used to assign women to municipalities instead of place of birth of their first child for two reasons. First, we can observe own place of birth for all women, whereas place of birth of the first child cannot be observed for women who remained childless. Second, our treatment intensity may impact the probability of moving before starting family formation, and hence the place of birth of the first child can be considered as an outcome.

[27] In North Brabant and Limburg, the Catholic People's Party received 90.7 percent of votes in the 1967 election, and over three-quarters of health professionals self-identified as Catholic in the 1971 census. Panel (a) of **Figure A2** shows the share of Catholics in all municipalities and confirms that these two provinces are almost entirely Catholic. Our results remain significant and are only somewhat smaller given the reduction in treatment intensity compared to the main analysis when including these two provinces.

generated, which includes a degree in law or medicine (medical school, dental medicine, or veterinary medicine). These degrees require a larger time investment—and are thus more prone to disruption in case of birth or marriage—before one can start practicing.[28]

Administrative data on labor market and wealth outcomes is available from 1999. We consider labor market participation and earnings of women at age 55—the earliest age at which we can observe earnings for women in all birth cohorts—to get a picture of labor market participation before most women enter retirement. The labor market outcomes are scaled in terms of full-time equivalent (FTE)[29] as women in the Netherlands have a high propensity to work part time (Boeri and Van Ours 2021). Given a relatively low labor market participation of Dutch women at age 55, we also explore the effects of contraceptive access on a woman's household wealth. This includes all assets (i.e., household's bank balance, savings balance, stocks and bonds, house value, and the value of a business) owned by the household minus the debts. Household wealth therefore depends on a broader culmination of life choices (including choice of spouse) and may paint a more accurate picture of overall prosperity. As the data on household wealth is available from 2006, we focus on mean wealth for women in our sample at ages 60–62.

5. Impact of Pill Access on Women's Outcomes

5.1 Short-Run Impact: Fertility and Marriage

Table 2 reports the continuous difference-in-differences estimates—the βs from **Equation (1)**—of the impact of a one standard deviation increase in the vote share in favor of the Pill (about 10 percent) in a woman's municipality of birth for treated cohorts. These point estimates can be put into perspective relative to the mean of the dependent variable for the untreated cohorts, also shown in the table. These estimates are interpreted in terms of a relative percentage effect size, which is reported in the second row from the bottom of the table.

Having access to the Pill as a minor did not have a large effect on women's completed fertility. Women are 2 percent more likely to remain childless for a one standard deviation increase in treatment intensity, but the number of children born per woman remains unchanged. However,

[28] A law degree takes three to four years in the Netherlands, whereas a medical degree typically takes about six years. Given that individuals must complete occupational training of at least two years before they start practicing as a lawyer, we classify a law degree as a long study.

[29] Unfortunately, the information on work hours (full-time equivalents, FTE) is only available from 2001. Therefore, we take earnings and FTE at age 56 for the 1945 birth cohort and at age 57 for the 1947 birth cohort.

we find that pill access led to a significant delay in the timing of giving births among treated cohorts. This is true in terms of average age at first birth, but in particular for early fertility decisions. Women born in a municipality with a 10 percent higher share of votes in favor of the Pill experienced a 12 percent drop in their probability of becoming mothers before the age of 21.

Access to birth control did not change the likelihood of marriage much—which was almost universal among women from these cohorts—but it did significantly affect the timing of family formation decisions. On average women married later, and again this effect is stronger at younger ages. Women in 10 percent more liberal areas were 6 percent less likely to marry as minors. They were also 1.9 percent less likely to end up in "shotgun weddings," an indicator of unions being hurried by fertility circumstances. The resulting marital unions appear to have been neither stronger nor weaker, with divorce rates only decreasing slightly.

5.2 Long-Run Impacts: Education, Work, and Wealth

Delays in fertility and marriage decisions from pill access improvements could have enabled women to increase investments in their human capital. **Table 3** shows that women in treated cohorts were significantly more likely to complete higher education degrees that require a larger time investment. Women born in 10 percent more liberal municipalities were 28.6 percent more likely to obtain a Medical or Juris Doctor (MD or JD) degree. Note that the effect size is particularly large given the low baseline, as less than 1 percent of women in untreated cohorts completed such degrees before the liberalization.

The small but significant negative impact on labor force participation reported in column 3 of **Table 3** is somewhat unexpected. However, less than half of women in our cohorts are working by age 55 and only very few work full time. For those in the workforce, average wages earned per hour (FTE) do not at first appear to be very different, but they are much more likely to be in the top of the earnings distribution. This is perhaps not surprising given that the education effects are concentrated in long and prestigious degrees. Hence, women with more access to the Pill as minors seem to have been more likely to either choose not to work or to only do so if the rewards were high. Not being economically active might be an optimal decision for many women at this age—even after having invested more in human capital earlier in life— especially if their household wealth level permits it.

We investigate possible wealth effects by using high-quality information available for most Dutch households and report results using various measures in **Table 4**. Again, the impact of pill access as a minor in the long run does not seem to be linear as no average increase in wealth is detectable. There is however a significant increase in the probability for (more) treated women of being in households located in the top quartile of the wealth distribution, and this holds for women who are active in the labor market and those who are not. This first evidence on a pill access effect on wealth is potentially important as it would explain why its impact on labor market outcomes has not been overwhelming so far, despite strong consistent positive education findings.[30] These wealth outcomes are measured at the household level, which is in part determined by partner choice, and therefore these results reinforce the importance of oral contraceptives on delaying and improving mating decisions.[31] Overall, our finding point to a large positive effects of liberalizing oral contraceptives on women's outcomes in a context where abortion, which was only legalized in 1984 in the Netherlands, does not interfere with our identification of a pure pill-effect.[32]

5.3 Robustness and Validity Checks

To check the validity of our identification approach we present results from three sets of robustness exercises. The first test addresses the critical common pre-trends assumption for difference-in-differences designs. We estimate the cohort-specific policy impacts of getting access to the Pill—the φ_c of **Equation (2)**—and plot these for four key outcomes in **Figure 6**: minor mother (top left),

[30] Bailey (2006) finds that pill liberalization in the U.S. led a higher labor force participation of women aged 26–35 but not for earlier ages, which is consistent with increased human capital investment in women's early 20s. Bailey does not find labor market participation effects for women over 35. Bailey, Hershbein and Miller (2012) show that pill access in the U.S. negatively impacts women's wages in their early 20s but positively impacts wages in their 30s and 40s (an hourly wage premium of 8 percent). Hence, detecting labor market returns for women stemming from improved pill access is sensitive to context and age at which this outcome is measured.

[31] We also examined the effects of pill liberalization on a woman's partner (results available on request). For a 10 percent higher vote share for pro-Pill parties, the first marriage partner is about 1.6 percent older (effect of 0.424, standard deviation of 0.053, and baseline of 25.3). We find no significant effects on educational and labor market outcomes for a woman's partner at age 55. Given that women on average marry older men (the mean age difference in for untreated women in our sample is 2.3 years), information on educational outcomes is available for even fewer partners than for women in our sample. Similarly, their partners may, because they are older, be more likely to have exited the labor force by the time we can observe them in the earnings data. Therefore, we cannot say much about the effects of the pill liberalization on "partner quality," apart from our estimates on household wealth.

[32] As abortion was still tolerated in certain exceptional circumstances (e.g. risk to mother's health) in this period, we test if the location of the 10 authorized abortion clinics located across the Netherlands has any impact our findings. First, we find that a municipality's share of "votes for pill" is not correlated with the distance to the closest clinic (correlation coefficient of –0.053). Second, we find that adding an interaction term to Equation (1) between the continuous difference-in-difference estimator and the distance to the closest abortion clinic did not find a differential impact on fertility.

minor marriage (top right), higher education completion (bottom left), and whether the household is in the top quartile of wealth distribution (bottom right). The graphs show that there is no clear pre-policy pattern for the untreated cohorts, specifically, birth cohorts 1944–1949, on the left side of the red dashed line, who were 21 or older at the time of pill liberalization. For the treated cohorts of women for whom the Pill was liberalized when they were minors, we observe clear deviating trends in most outcomes depending on the share of votes for parties in favor of the Pill in the woman's municipality of birth. This observed difference strongly increases the younger the women were at the time of the liberalization.[33]

In addition to confirming the common trend hypothesis, these graphs are informative on two other aspects of the policy impact. The first relates to what would happen when artificially moving pill access to years before 1970, such that older cohorts would be considered as treated. This does not yield any significant results and serves as a visual "placebo in time" test. The second is that the policy impact is mostly more pronounced as treated cohorts are younger at the time of the liberalization. This could be for two reasons: (i) because pill take-up for a given age group (e.g., nineteen-year-olds) increases more strongly over time in more liberal municipalities, and/or (ii) because changes in pill access have a larger impact for women at younger ages. Both these explanations are consistent with the pattern displayed in these graphs but they cannot be separated.

A second exercise is a "placebo in place." If our proxy for social norms—vote share in favor of the Pill—is not the main driver behind our findings, then we could detect significant coefficients when arbitrarily exchanging treatment intensities across areas. In that case, area-specific factors, rather than our treatment intensity measure, would be responsible for our results. Since our treatment is continuous, we can do this permutation many times and still assign a new value of the pro-pill vote share distribution (i.e., without replacement) to a municipality. We do this test 500 times and present the resulting estimated coefficients as a density graph next to our main estimate (red, solid line). **Figure A4** shows the results of this permutation test for the same four outcomes as reported before. It confirms that the vote share in favor of the Pill in a woman's municipality of birth is crucial to identifying our effects. For three of the four outcomes—minor birth, minor marriage, and being in the top quartile of the wealth distribution—there is not a single iteration in which the random allocation of social norms yields estimates that are larger than those in the "real"

[33] The pattern for higher education completion is noisier, which is probably caused by the much lower number of observations (we observe education for only about 25 percent of women in our sample).

allocation of social norms. For higher education completion, this is the case in 15 out of 500 permutations, an extremely low occurrence that might partly be explained by the smaller sample size this estimation is based on (about one-quarter of the sample of women than we have for the other outcomes). We believe this final "placebo in place" provides strong evidence that social norms in an area were critical to a woman's likelihood of adopting the Pill and benefiting from its effects in both the short and long run.

Finally, we drop areas at the extremes of the share for pill distribution. These results are reported in three appendix tables for the short- and long-run outcomes, first when excluding municipalities at the top and bottom 10 percent, and then for excluding municipalities at the top and bottom 25 percent (**Tables A3, A4, and A5**). All results are stable, if somewhat larger, but not statistically different from the main analysis. This indicates that impact is not just identified from municipalities that are extremely conservative or liberal, and that a gradient in area-level acceptance of oral contraceptives is important post-liberalization. This is a policy-relevant finding, but also an econometrically pertinent one given the continuous nature of our treatment measure.

6. The Additional Impact of Supply-Side Moral Preferences

6.1 The Influence of Gatekeepers Opposed to the Pill on Religious Grounds

We now turn to the possibility that, even if a woman had wanted to use the Pill to improve fertility control, gatekeepers might have prevented this from happening because of their own moral beliefs. To gauge how much gatekeepers' own religious beliefs matter for actual access to the contraceptive pill, we identify the proportion of religious health professionals in each municipality. This measure reflects the average willingness of health professionals in the area to provide women with oral contraceptives. We do not know which provider the woman ends up seeing—a choice that is in any case endogenous—but argue that women are more likely to match with a doctor who is unwilling to prescribe in areas where more health professionals are morally opposed to the use of contraceptives. This area-level "willingness to prescribe" measure is similar to those in papers where area-level prescribing measures instrument for the patient's likelihood to receive medication as the patient is more likely to match with a high-prescribing provider (Currie and MacLeod 2017, 2020; Cuddy and Currie 2020, Currie and Zwiers 2021).

A potential concern is whether women could consult pro-pill doctors outside their municipality of residence. This is possible as, in our setting, individuals were free to choose their general practitioner. Still, in practice, most patients would register with their closest GPs so they would be nearby in case of emergency. More importantly, traveling to another area to find a prescribing physician or pharmacist who stocks oral contraceptives is costly and would reduce the probability of pill take-up for the marginal woman.[34]

Using data from the 1971 full count census[35] we define health professionals (HPs) as pharmacists and general practitioners (GPs), as these two professions were the gatekeepers for accessing the Pill: the GP was responsible of proposing and prescribing the Pill and the pharmacist oversaw stocking it. A total of 5,261 practicing health professionals can be identified: 4,326 GPs and 935 pharmacists in the Netherlands in 1971, excluding the southern provinces. **Table A7** shows the religious affiliation of the Dutch population compared to the health professionals. In our sample of health professionals, 38.2 percent were not religious, 16.8 percent were Catholic, and 9.8 percent were Orthodox Protestant. Compared to the full population, health professionals were more likely to be nonreligious and less likely to be Catholic. We focus on health professionals who were most opposed to the Pill, that is, Orthodox Protestant and Catholic HPs.

The proportion of health professionals who are opposed to the Pill on religious grounds is calculated by dividing the number of HPs from either of these two religions by the total number of HPs in each municipality. Women in our sample faced on average 23.1 percent gatekeepers in their birth municipality (with a standard deviation across municipalities of 7.3 percent) who were opposed to the Pill on religious grounds. This measure captures the probability of women encountering a gatekeeper who was morally opposed to the Pill in 1971. As previously illustrated in **Figure 5a,** there was considerable variation in the religiosity of the pool of health professionals women could choose from across areas. **Figure 5b** also showed that there was substantial variation between HPs' preferences for contraceptives and votes in favor of the pill in the areas they serve. Hence, there are many liberal areas with predominantly Catholic or Orthodox Protestant HPs.

[34] To test whether distance to a municipality with more prescribing GPs or pharmacists matters for take-up probability, we looked at the effects of this margin on women's long- and short-run outcomes. We find significant (inverse) effects of interacting distance to the proportion of nonreligious HPs in the nearest town for women with no HPs—at all or willing to prescribe—in their own municipality. This suggests that traveling costs are relevant and we will take this into account in a robustness check as these will matter to women who live in municipalities without any HPs.

[35] See **Appendix Section B.3** for a detailed description of the set-up of the census data.

A final concern about the validity of this measure capturing demand-side access restrictions driven by HPs' beliefs is that it could be correlated with other municipality characteristics that affect access to health services. We check for this possibility using information from the 1971 census and relate our anti-pill HP measure to: (i) number of GPs and pharmacists, (ii) education and income (to check whether certain types of HPs are more present in richer more educated areas), and (iii) distance to hospital and number of nurses living locally (to see whether access to an alternative to local HPs was easier). We show in **Figures A6.1, A6.2, and A6.3** respectively that none of these measures of health access are correlated with the proportion of HPs who self-identify as Catholic or Orthodox Protestant.

6.2 Estimating Supply-Side Moral Barriers

We test the impact of gatekeepers' beliefs on a woman's likelihood of experiencing the short- and long-run benefits of legal access to the Pill. We run the specification of **Equation (1)** while adding an interaction between the (continuous) difference-in-differences estimator (i.e., $After_{ic} * ShareForPill_{im}$) with the share of health professionals in each municipality who are opposed on to the Pill on religious grounds (i.e., the proportion of HPs who are either Orthodox Protestant or Catholic in each municipality), or $PropRelHP_{im}$ in **Equation (3)** below.

$$Y_{imc} = \beta_2 After_{ic} * ShareForPill_{im} + \delta PropRelHP_{im} * After_{ic} * ShareForPill_{im} + \gamma After_{ic} * PropRelHP_{im} + YoB_{ic} + MunB_{im} + \varepsilon_{imc}. \quad (3)$$

This informs us about the *additional effect* of the increased probability of facing gatekeepers opposed to the Pill on religious grounds, which is captured by the triple interaction. Note that, we interpret this triple interaction term *conditional on the level of area social norms* that would have made a woman more or less likely to take up the Pill, which is itself captured by the main difference-in-differences interaction.[36]

[36] The estimated γ coefficients that result from the interaction between $After_{ic}$ and $PropRelHP_{im}$capture the impact of having a higher proportion of HPs opposed to the Pill on religious grounds *independent of area-level social norms*. These are not the relevant measure of the *additional impact of gatekeepers* above and beyond social norms that will influence take-up, which we seek to measure in our context. We still report these coefficients to document how facing religious HPs in general influenced women's outcomes post pill liberalization.

We first estimate **Equation (3)** by using the standardized share (i.e., a mean of zero and a standard deviation of one) of pill-opposed HPs and present the resulting estimate, $\hat{\delta}$, along with the associated difference-in-differences coefficients, $\hat{\beta}_2$, for four of our main outcomes of interest in **Table 5**: minor birth, minor marriage, completing 'long studies', and belonging to a household in the top quartile of the wealth distribution by age 60.

The estimated additional effect of having relatively more gatekeepers morally opposed to oral contraceptives in a municipality at the time of pill liberalization is always of an opposite sign to the impact of demand side Pill adoption linked to area-level social norms, which itself remains large and significant[37]. Concretely, it means that, for the probability of marrying as a minor, a one standard deviation increase (+7 percent) in the proportion of local HPs who are Orthodox Protestant or Catholic reduces the potential impact of pill access (–1.8 percent for 10 percent more votes for pill) by more than half (+1 percent). Although statistically accurate, this interpretation might not be the best way to understand the impact of gatekeepers who are opposed to the Pill on religious grounds on attenuating the effects of the Pill. First, it is not straightforward to interpret the size of a triple interaction with two continuous variables, and second, important non-linearities may not be properly captured.

For this reason, we present results where $PropRelHP_{im}$ in **Equation (3)** is replaced by an indicator of which tercile of the religious gatekeeper distribution a municipality belongs to: the first tercile (from zero to 21 percent); the second tercile (from 21 to 28 percent); and the third tercile (from 28 percent or 100 percent). The estimated coefficients we obtain are reported in **Figure 7** for the same four outcomes as earlier, with their respective 95 percent confidence intervals. These graphs are very revealing: while there is often no significant difference in estimated pill impact for the first two terciles of the distribution, when more than a third of HPs are either Catholic or Orthodox Protestant, the effects of pill access are almost entirely wiped out regardless of which outcome is considered.

These findings are unchanged when dropping pharmacists so that we only consider the impact of general practitioners who were opposed to the Pill on religious grounds (**Table A9, panel A** and **Figure A7.1**) or when allocating the share of gatekeepers opposed on religious grounds from

[37] The estimated coefficients for γ, the impact on outcomes of having more religious HPs in a Municipality, unconditional on area level social norms, is as one might expect always of the opposite sign of the main pill effect.

the closest municipality for municipalities without HPs (**Table A9, panel B** and **Figure A7.2**).[38] We do one last test for whether this effect is partially driven by areas where women do not have much local choice in the health professionals to consult to get access to oral contraceptives. We produce results for the impact of the proportion of HPs who were opposed to prescribing the Pill on religious grounds, restricting our sample to municipalities with at least three active physicians or pharmacists. The results from this robustness check are reported in **Table A9, panel C** for the continuous triple interaction coefficients and **Figure A7.3** for the graphical tercile decomposition. Both reveal that the morally opposed gatekeeper's capacity to cancel any potential pill effect is the same, even when more options are locally available.

The picture that emerges is of a very large and negative impact of gatekeepers' beliefs on the ability of women to properly benefit from the life-changing advantages of birth control technology. This further highlights the importance of considering differences between de jure and de facto legal access to contraceptive methods, especially when the beliefs of third parties are involved. These beliefs may have significant long-term consequences for those who are meant to benefit. Religious opposition to abortion has been studied substantially in the past (e.g., Stulberg et al. (2011) for the United States, and Autorino et al. (2020) for Italy). However, our results are, to our knowledge, the first that clearly document that religious opposition also plays a big role when it comes to the contraceptive pill, a far less controversial birth control method. Gatekeepers have the power to annihilate the very large positive impact that the Pill can have on women's lives.

7. Concluding Remarks

This paper studies the impact of the liberalization of the Pill in the Netherlands and confirms the powerful impact that the availability of birth control can have on a woman's short- and long-run life outcomes. Our results highlight important heterogeneities driven by demand- and supply- side moral preferences that show how the potential benefits of pill liberalization were not universally distributed across women. Minors who grew up in areas that were less opposed on religious grounds were more likely to adopt the Pill. This translated into significant delays in fertility and mating decisions, which enabled them to obtain educational degrees with longer qualifications periods, such as medicine and law. Increased human capital accumulation produced more high

[38] Note that the distance to the closest municipality with at least one HP for those women living in municipalities without an HP is very small. The mean distance is 3.5 km with a standard deviation of 2.0.

earners among those who chose to work, and it lifted women (regardless of whether women chose to work) toward the top of the household wealth distribution.

These findings are the first to document the life-changing effects of pill access outside the United States. They are also the first to exploit religious margins that affect take-up to do so. Importantly, this is in a context in which abortion was not officially fully liberalized until much later and only very seldomly used by Dutch women—partly because of a very high take-up of oral contraceptives— which is why we believe we are measuring a relatively pure effect of the power of the Pill. The heterogeneity across demand-side moral preferences that we document suggests that existing studies that exploit changes in legal pill access in the U.S. probably only estimate a lower bound of the true effect of the Pill on women's outcomes.

Differences in the nature of the treatment, the age of affected women, empirical strategy, and outcomes measured make it difficult to compare findings between the U.S. and the Netherlands. Still, we can make rough comparisons for some key outcomes that were studied in both settings. In the Netherlands, a woman born in a 10 percent more liberal community became 6 percent less likely to marry as a minor, and 12 percent fewer women experienced a birth by age 21. The Dutch marriage impact is between those of Goldin and Katz (2002)—5 percent fewer marriages by age 22—and Myers (2017)—19 percent fewer marriages by age 19—for the United States, which makes them comparable given the different ages at which the outcome is measured. Our estimated effect on delayed fertility is close to Bailey (2006)—14 percent fewer births by age 22 for the United States. The most comparable education outcome is that of "long studies" by Goldin and Katz (2002), which, as in our context, report an almost doubling of the graduation rate of females for medical and juris doctor degrees in the United States as a result of access to the Pill.[39] Overall, our estimates for the strong impact of oral contraceptives on women's lives in the Netherlands are not very different from those found for the United States.

If these life-changing impacts of de jure pill availability were important, they were not felt equally by all women as de facto access remained restricted due to gatekeepers' beliefs. The religious affiliation of health professionals—the suppliers of the Pill—in the municipality where women were born mattered considerably. We show that if more than a third of them were either

[39] These might at first seem like huge increases, but in both countries, the baselines are very low: 1.4 percent in the United States and 0.7% in the Dutch context.

Orthodox Protestant or Catholic, it was unlikely that a young woman was able to experience any of the benefits from pill access that those in equally liberal areas but with fewer religious gatekeepers did. This holds true for fertility, marriage, education, and wealth outcomes. These new results on morally opposed gatekeepers' offsetting the impact of birth control access policies are important for many reasons. First, it means that average pill effect estimates are probably lower bounds of the potential true effect of how much pill use could have altered women's lives, and not only in our context. Second, while this finding is linked to moral norms of health practitioners half a century ago, the influence of religious beliefs of health professionals on delivering legally available birth control methods—especially abortion—is still hotly debated around the world. Third, our gatekeeper findings have important implications for current and future birth control policies that will likely be more effective if access is independent of third parties who may hinder a woman's right to choose. The importance of moral barriers to birth control access uncovered in this paper may become especially relevant for U.S. women in a post-Roe world.

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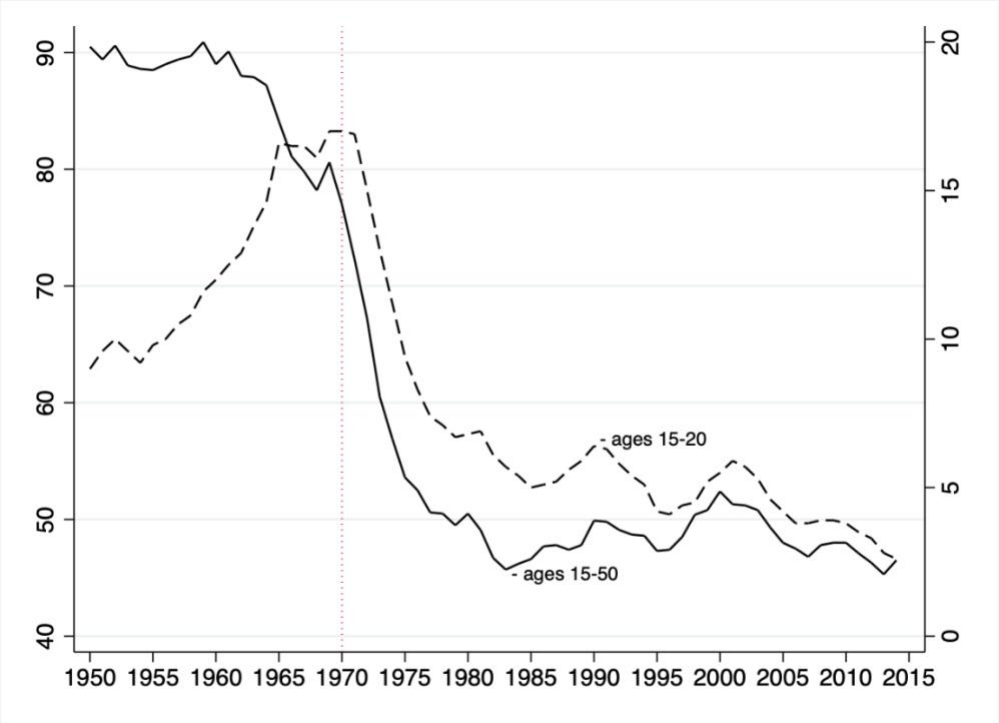
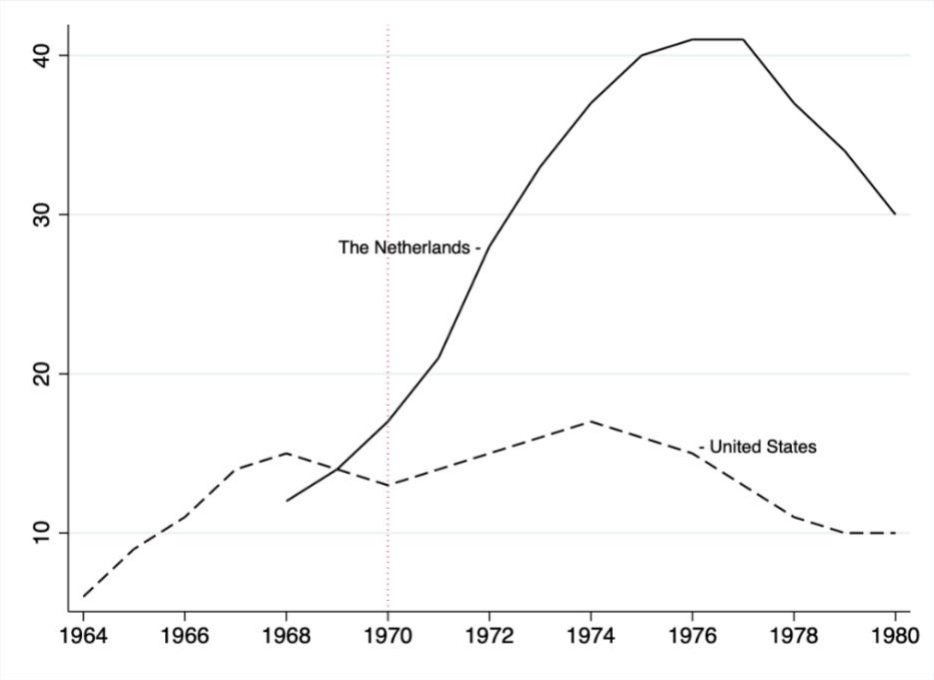
Tables and Figures

Figure 1. Birth Rate and Teenage Birth Rate, Netherlands 1950–2014



Notes: Number of births per 1000 women for 1950–2014 in the Netherlands, for women ages 15–50 years old (left axis) and women ages 15–20 years old (right axis). The vertical dotted red line marks 1970, the year when pill access was liberalized in the Netherlands. Source: CBS Statline, statline.cbs.nl

Figure 2. Percentage of Women Buying Oral Contraceptives: the Netherlands and the US

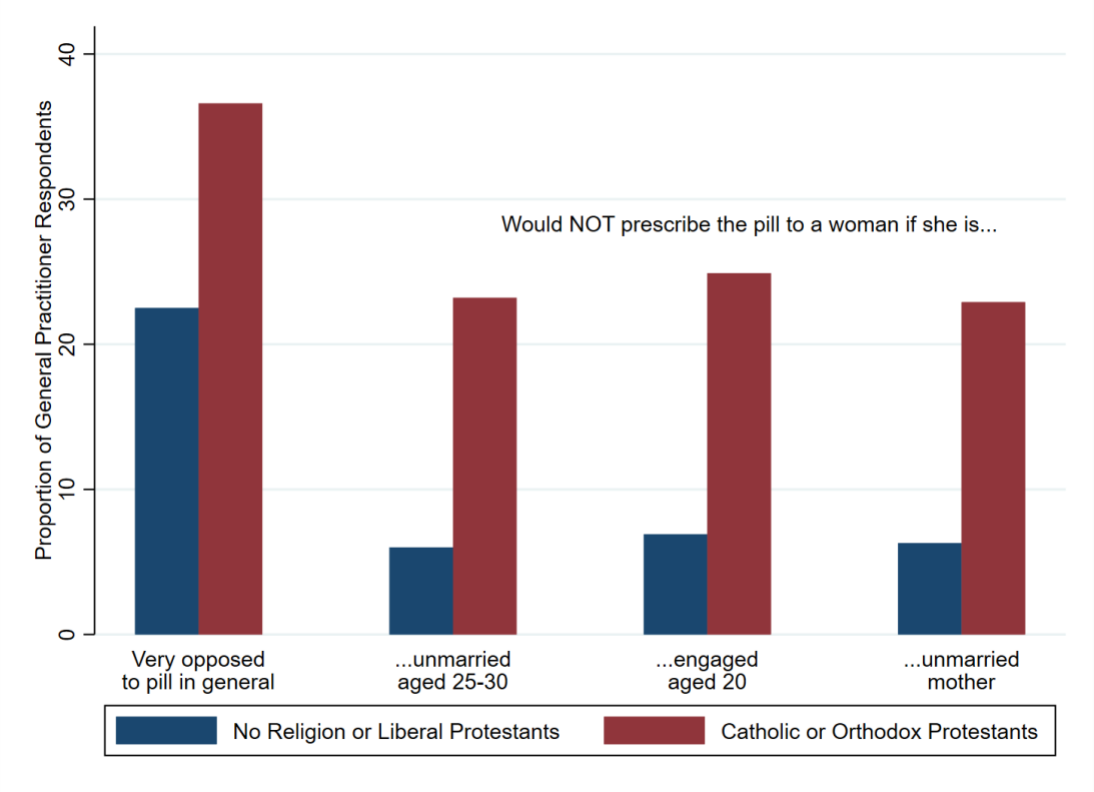


Notes: Estimated number of oral contraceptives bought in pharmacies each year relative to number of women aged 15–44 in each country. Source: Compiled by author using data from Figures 2 and 3 in Population Reports (1988).

Figure 3. The Dutch Bible Belt: Share of Votes for Orthodox Protestant Parties that Campaigned Against Pill Liberalization Legislation in the 1967 Parliamentary Elections

Notes: Municipality-level proportion of votes at the 1967 election for the three parties who were against the repeal of the Morality Laws: i.e., the Anti-Revolutionary Party (ARP), the Reformed Political Party (SGP), and the Farmers' Party. in the Netherlands, excluding provinces of Noord-Brabant and Limburg. Source: Authors' calculations using data from the Dutch Election Council: https://www.verkiezingsuitslagen.nl/verkiezingen/detail/TK19670215

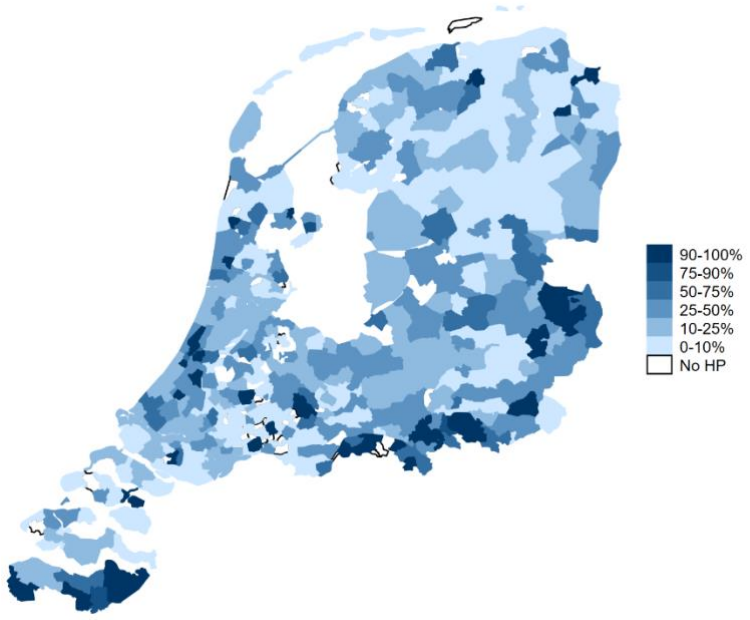
Figure 4. Physicians' Opposition to the Pill by Religious Affiliation



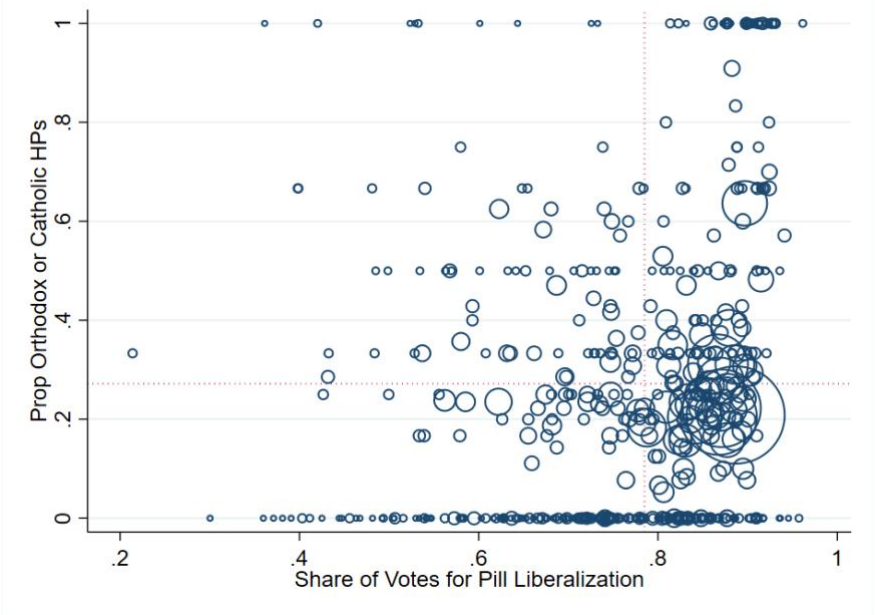
Notes: Authors' calculations based on Bangma (1970). Survey administered among 528 general practitioners in 1969, about 12 percent of the total number of GPs in that year (Centraal Bureau voor de Statistiek, 1994, 265). The first column shows the percentage of GPs who stated they were very opposed to the use of the Pill as a contraceptive method, and the second, third, and fourth columns show the percentage of GPs who would never prescribe the Pill to: unmarried women aged 25–30, engaged women older than 20, and unmarried mothers.

Figure 5. Variation in the Proportion of Religious Health Professionals

(a) Municipality-level regional variation

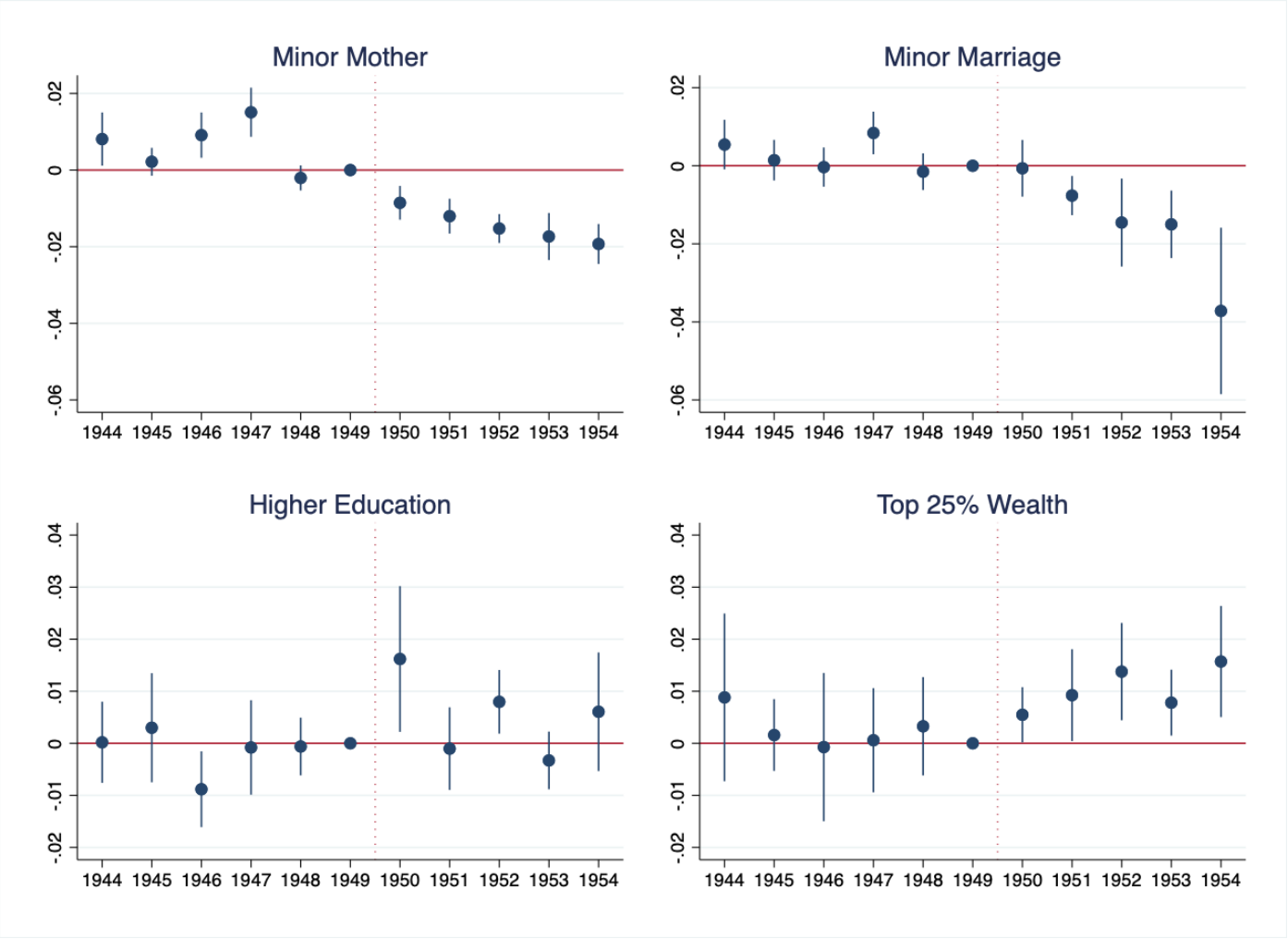


(b) Proportion of religious health professionals and share of votes in favor of the Pill



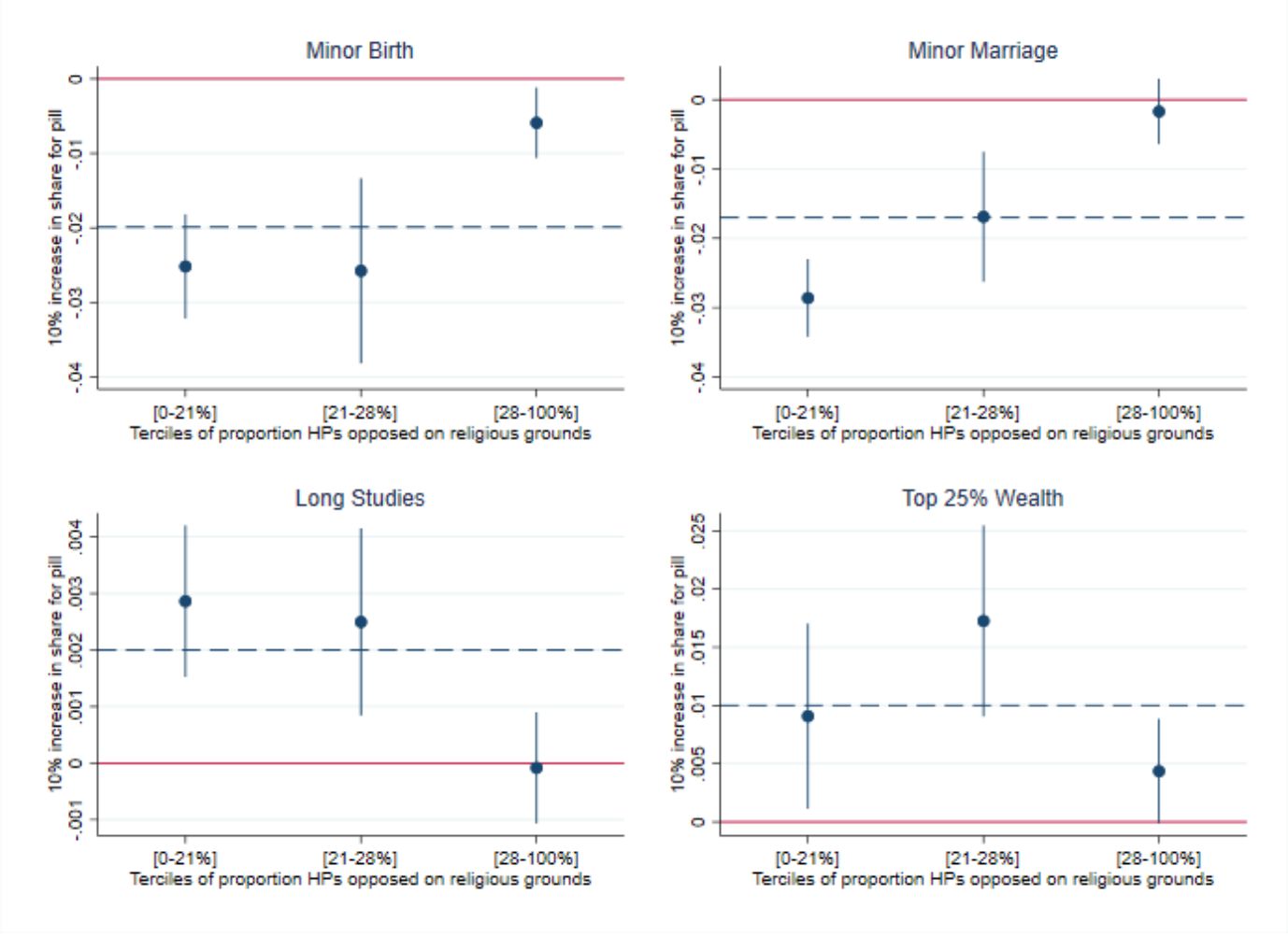
Notes: Panel (a) shows regional variation in the proportion of health professionals opposed to the Pill on religious grounds. Authors' own calculations based on the 1971 census of the proportion of general practitioners and pharmacists who were Orthodox Protestant or Catholic. Panel (b) shows the proportion of Orthodox Protestant and Catholic health professionals by the share of votes on parties in favor of the Pill. Weighted by the number of health professionals in each municipality, which is shown by the size of the dot.

Figure 6. Cohort-Specific Policy Effect: Minor Births/Marriage, Higher Education, and Top 25% of Wealth



Notes: The graphs plot the point estimates and 95 percent confidence intervals for the coefficients that are estimated using **Equation (2)** and show 11 policy estimates φ_c, which show the impact of a one standard deviation increase in the vote share in favor of the Pill (about 10 percent) for each birth cohort in our sample (akin to a common trend assumption in a difference-in-differences setting). The cohorts from 1950 and later were exposed to the Pill as a minor and hence treated (and therefore we expect to see an effect starting from these birth cohorts), whereas the cohorts of 1944–1949 did not have access to the Pill as a minor and thus are considered untreated (and therefore we expect a zero effect for these birth cohorts).

Figure 7. The Additional Effect of Gatekeepers Who Were Opposed to the Pill on Religious Grounds, by Tercile



Notes: Estimated by OLS. Figures plot the additional effect of HPs opposed to the Pill on religious grounds (in terciles) on top of the social norms in an area (i.e., a triple interaction with our difference-in-differences estimator: $After_{ic} * ShareForPill_{im}$). *ShareForPill* is standardized with a mean of zero and a standard deviation of one. One standard deviation in *ShareForPill* is about 10 percent. The proportion of HPs opposed to the Pill on religious grounds (with a mean of 23.1 and a standard deviation of 7.3%) is divided into terciles: 0–21 percent, 21–28 percent, and 28–100 percent. All specifications are restricted to municipalities with at least one HP and are weighted by the number of HPs in every municipality. Robust standard errors are clustered at the municipality level.

Table 1. Contraceptive Use by Political Party Affiliation

	No contraceptives	Contraceptive pill	N
Panel A: *Vennix (1986–1989)*			
Orthodox Protestant parties	42.3%	15.4%	26
Catholic People's Party (and successors)	19.0%	28.3%	226
Nondenominational parties	17.0%	34.9%	665
No party	20.2%	28.7%	248
Panel B: *Family Planning Survey (1988–2008)*			
Orthodox Protestant parties	42.1%	27.9%	423
Catholic People's Party (and successors)	22.7%	48.8%	1,645
Nondenominational parties	17.2%	50.7%	4,056
No party	20.4%	54.8%	2,589

Notes: The Catholic People's Party ceased to exist in 1980, and a new party for Christian Democrats (the Christian Democratic Appeal, or CDA) was founded from the Catholic People's Party (KVP), the Anti-Revolutionary Party (ARP), and the Christian Historical Union (CHU). Panel A: Authors' calculations based on Table 36 (page 35) from Vennix (1990). The survey was initiated by the Dutch Ministry of Health and executed by NISSO (Nederlands Instituut voor Sociaal Seksuologisch Onderzoek) between 1986 and 1989; it has information on 1,165 individuals. Vennix refers to the Orthodox Protestant parties as "small right." The group of nondenominational parties includes the Labor Party (PvdA), the Conservative-Liberal Party (VVD), the Social-Liberal Party (D66), and small left-wing parties. Source Panel B: Authors' calculations based on the 1988–2008 waves (8,713 respondents) of the Family Planning Survey (Onderzoek Gezinsvorming, executed by Centraal Bureau voor de Statistiek and available at DANS). The group of nondenominational parties includes the Labor Party (PvdA), the Conservative-Liberal Party (VVD), the Social-Liberal Party (D66), and the Green Party (GroenLinks).

Table 2. Short-Run Outcomes: Fertility and Family Formation

	Fertility				Family Formation				
	Childless	# of children	Age 1st birth	Mother < 21	Ever married	Age 1st marriage	Marriage < 21	Shotgun wedding	Ever divorced
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Minor 1970*	.003*	.000	.260***	-.020***	-.005***	.320***	-.018***	-.003*	-.003**
Share for Pill	(.002)	(.004)	(.039)	(.003)	(.001)	(.093)	(.004)	(.002)	(.001)
Cohort F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mun. F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean dep var	.136	1.91	24.6	.167	.941	23.0	.301	.161	.239
Effect size	+2.2%	-	+1.1%	-12.0%	-0.5%	+1.4%	-6.0%	-1.9%	-1.3%
N	864,370	864,370	735,204	735,204	864,370	805,870	805,870	727,201	805,870

Notes: Estimated by OLS. *ShareForPill* is standardized with a mean and standard deviation of one. One standard deviation in *ShareForPill* is about 10 percent. All specifications are weighted by the cohort-municipality number of women. Robust standard errors clustered at the municipality level are in parentheses. Shotgun wedding is a dummy indicating that a child is born within seven months after a woman married. The sample size is different across the different columns. Columns 1, 2, and 5 use the full sample of women; in columns 3 and 4 we focus on women who ever had a child; in columns 6, 7, and 9 we focus on women who were ever married; in column 8 we restrict the sample to women who were ever married and ever had a child. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3. Long-Run Outcomes: Education and Work

	Education		**Work** (age 55)				
	Higher educ.	Long studies	Working (FTE)	Log Wage (FTE)	% Rank wage	Top 25% wages	Top 10% wages
	(1)	(2)	(3)	(4)	(5)	(7)	(8)
Minor 1970*	.006	.002***	-.005***	-.005	.370*	.023***	.014***
Share for Pill	(.004)	(.000)	(.001)	(.004)	(.208)	(.006)	(.003)
Cohort F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mun. F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean dep var	.174	.007	.268	€29k	50.0	.250	.100
Effect size	-	+28.6%	-1.9%	-	+3.7%	+9.2%	+14.0%
N	218,119	218,119	864,370	405,066	405,513	405,513	405,513

Notes: Estimated by OLS. *ShareForPill* is standardized with a mean and standard deviation of one. One standard deviation in *ShareForPill* is about 10 percent. All specifications are weighted by cohort-municipality number of women. Robust standard errors clustered at the municipality level are in parentheses. Higher Educ. is a dummy indicating that a woman obtained a university degree. Long studies is a dummy indicating that a woman completed the longest forms of higher education (i.e., Medical Doctor or Juris Doctor degree). Working and (log) wages are determined at age 55 and are expressed as "full time equivalent" as part-time work is very common among Dutch women. Wage results are also presented in terms of position of each woman in the distribution of all working women (per exact percentile rank and belonging to the top quartile or decile). The sample sizes are different across outcome variables because educational outcomes are only observed for about a quarter of the women in our sample and wages are conditional on working, which is only the case for about half of women in these cohorts at that age. More details can be found in the Data Appendix. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4. Long-Run Outcomes: Wealth

	Wealth (age 60-62)							
	All				**Not working at 55**		**Working at 55**	
	Log wealth	% Rank wealth	Top 25% wealth	Top 10% wealth	Top 25% wealth	Top 10% wealth	Top 25% wealth	Top 10% wealth
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Minor 1970*	.018	.145	.009***	.002	.009***	.001	.004**	.001
Share for Pill	(.012)	(.201)	(.003)	(.002)	(.003)	(.003)	(.002)	(.002)
Cohort F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mun. F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean dep var	€302k	50.0	.250	.100	.250	.100	.250	.100
Effect size	-	-	+3.6%	-	+3.6%	-	+1.6%	-
N	758,024	810,525	810,525	810,525	413,196	413,196	397,329	397,329

Notes: Estimated by OLS. *ShareForPill* is standardized with a mean and standard deviation of one. One standard deviation in *ShareForPill* is about 10 percent. All specifications are weighted by cohort-municipality number of women. Robust standard errors clustered at the municipality level are in parentheses. We have information of household wealth (at age 60-62) for 94 percent of women considered in our main analysis sample. More details can be found in the Data Appendix. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5. The Additional Effects of Gatekeepers Who Were Opposed to the Pill on Religious Grounds

	(1) Minor Mother (Birth < 21)	(2) Minor Marriage (Wedding < 21)	(3) Long Studies (MD or JD)	(4) Top 25% of Wealth Dist.
Minor 1970*Share for Pill (i.e., DiD_{Treat})	-.020***	-.018***	.002***	.010***
	(.003)	(.003)	(.001)	(.003)
DiD_{Treat}*Prop. Religious Health Professionals	.007***	.010***	-.001***	-.003
	(.002)	(.002)	(.000)	(.002)
After*Prop. Religious Health Professionals	.011***	.015***	-.001***	-.005**
	(.002)	(.003)	(.000)	(.002)
Cohort F.E.	Yes	Yes	Yes	Yes
Mun. F.E.	Yes	Yes	Yes	Yes
Sample Size	731,184	801,549	217,113	806,178

Notes: Estimated by OLS. *ShareForPill* is standardized with a mean zero and a standard deviation of one. One standard deviation in *ShareForPill* is about 10 percent. The mean proportion of religious HPs that women have access to is 23.1 percent, with a standard deviation of 7.3 percent. We also standardize this measure with a mean of zero and a standard deviation of one. All specifications are estimated for municipalities with at least one HP and are weighted by the number of HPs. Robust standard errors are clustered at the municipality level and are in parentheses.

Appendix A: Additional Tables and Figures (For Online Publication)

Table A1. Percentage of Unplanned Pregnancies Over Time

***Panel A**: Vennix (1986–1989)*

	1966–1970	1971–1975	1976–1980	1981–1985	1986–1988
Planned pregnancy	37.0%	69.5%	80.3%	81.5%	92.7%
Kind of planned	18.5%	10.4%	7.3%	7.7%	1.6%
Kind of unplanned	16.7%	11.7%	6.4%	7.7%	3.3%
Unplanned pregnancy	27.8%	8.4%	6.0%	3.1%	2.4%
N	54	154	234	286	123

***Panel B**: Family Planning Survey (1988–2008)*

	1969–1971	1972–1974	1975–1977	1978–1980
Unplanned pregnancy	45.4%	24.0%	18.5%	15.2%
N	97	245	406	533

Notes: Panel A comes from Vennix (1990), Table 54, page 71. Based on a survey that was initiated by the Dutch Ministry of Health and executed by NISSO (Nederlands Instituut voor Sociaal Seksuologisch Onderzoek) between 1986 and 1989. Panel B is based on the authors' calculations using the 1988–2008 waves (8,713 respondents) of the Family Planning Survey (Onderzoek Gezinsvorming, executed by Centraal Bureau voor de Statistiek, and available at DANS).

Table A2. Church Attendance by Religious Denomination.

	Catholics	Liberal Protestants	Orthodox Protestants	Other Religions	All
Every Week or More	14.7%	22.3%	54.4%	51.2%	24.9%
At Least Once a Month	17.5%	16.1%	18.1%	11.3%	16.8
At Least Once a Year	34.4%	20.2%	11.3%	12.9%	26.0%
Almost Never	33.3%	41.4%	16.2%	24.7%	32.3%
Observations	2,769	1,280	728	381	5,158

Notes: Authors' calculations based on the Labor Supply Panel 1985–2000 (in Dutch: Arbeidsaanbodpanel, made available by Sociaal en Cultureel Planbureau (2016), and available at DANS).

Table A3. Fertility and Family Formation, Dropping Municipalities at Top and Bottom of Vote Distribution

	(1) Childless	(2) # of children	(3) Age 1st birth	(4) Mother < 21	(5) Ever married	(6) Age 1st marriage	(7) Marriage < 21	(8) Shotgun wedding	(9) Ever divorced
Panel A: *Excluding municipalities with 10% highest and lowest vote share*									
Minor 1970*	.001	.002	.306***	-.024***	-.005***	.402***	-.021***	-.003	-.005***
Share for Pill	(.002)	(.006)	(.053)	(.004)	(.002)	(.129)	(.006)	(.003)	(.002)
Mean dep var	.137	1.90	24.6	.166	.941	23.0	.302	.159	.243
Effect size	-	-	+1.2%	-14.5%	-0.5%	+1.7%	-7.0%	-	-2.1%
N	817,209	817,209	693,487	693,487	817,209	761,286	761,286	685,699	761,286
Panel B: *Excluding municipalities with 25% highest and lowest vote share*									
Minor 1970*	.003***	-.001	.228***	-.016***	-.005***	.261***	-.015***	-.002	-.002
Share for Pill	(.001)	(.003)	(.020)	(.002)	(.000)	(.032)	(.002)	(.001)	(.001)
Mean dep var	.130	1.96	24.6	.159	.943	23.0	.290	.161	.220
Effect size	+2.3%	-	+0.9%	-10.1%	-0.5%	+1.1%	-5.2%	-	-
N	428,204	428,204	367,437	367,437	428,204	400,314	400,314	363,675	400,314

Notes: Estimated by OLS. We exclude in Panel A the municipalities in the top and bottom 10 percent of the *ShareForPill* distribution (456 municipalities remaining) and in Panel B the municipalities with *ShareForPill* in the top and bottom 25 percent of the *ShareForPill* distribution (377 municipalities remaining). *ShareForPill* is standardized with a mean of zero and a standard deviation of one. One standard deviation in *ShareForPill* is about 10 percent. All specifications contain birth cohort and municipality fixed effects and are weighted by cohort-municipality number of women. Robust standard errors clustered at the municipality level are in parentheses. Shotgun wedding is a dummy indicating that a child is born within seven months of a woman's marriage. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A4. Education and Work, Dropping Municipalities at Top and Bottom of Vote Distribution

	Education		**Work** (age 55)				
	Higher educ.	Long studies	Working (FTE)	Log Wage (FTE)	% Rank wage	Top 25% wages	Top 10% wages
	(1)	(2)	(3)	(4)	(5)	(7)	(8)
Panel A: *Excluding municipalities with 10% highest and lowest vote share*							
Minor 1970* Share for Pill	.008	.002***	-.007***	-.001	.498*	.028***	.017***
	(.006)	(.001)	(.002)	(.005)	(.284)	(.008)	(.004)
Mean dep var	.176	.007	.270	€29k	50.0	.250	.100
Effect size	-	+28.6%	-2.6%	-	+5.0%	+11.2%	+17.0%
N	206,753	206,753	817,209	385,615	386,041	386,041	386,041
Panel B: *Excluding municipalities with 25% highest and lowest vote share*							
Minor 1970* Share for Pill	.005***	.001***	-.004***	-.009***	.154	.017***	.011***
	(.002)	(.000)	(.001)	(.003)	(.136)	(.003)	(.002)
Mean dep var	.165	.006	.258	€28k	50.0	.250	.100
Effect size	+3.0%	+16.7%	-1.6%	-0.9%	-	+6.8%	+11%
N	106,930	106,930	428,204	196,905	197,151	197,151	197,151

Notes: Estimated by OLS. We exclude in Panel A the municipalities in the top and bottom 10 percent of the *ShareForPill* distribution (456 municipalities remaining) and in Panel B the municipalities with *ShareForPill* in the top and bottom 25 percent of the *ShareForPill* distribution (377 municipalities remaining). *ShareForPill* is standardized with a mean of zero and a standard deviation of one. One standard deviation in *ShareForPill* is about 10 percent. All specifications contain birth cohort and municipality fixed effects and are weighted by cohort-municipality number of women. Robust standard errors clustered at the municipality level are in parentheses. Higher Educ. is a dummy indicating that a woman finished higher professional or university education. Long studies is a dummy indicating that a woman completed a Medical Doctor or Juris Doctor degree. Working and (log) wages are determined at age 55 and are expressed as "full-time equivalent" as part-time work is very common among Dutch women. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A5. Wealth, Dropping Municipalities at Top and Bottom of Vote Distribution

	Wealth (age 60-62)							
	All				**Not working at 55**		**Working at 55**	
	Log wealth	% Rank wealth	Top 25% wealth	Top 10% wealth	Top 25% wealth	Top 10% wealth	Top 25% wealth	Top 10% wealth
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: *Excluding municipalities with 10% highest and 10% lowest vote share*								
Minor 1970*	.019	.208	.011***	.001	.011**	-.000	.007**	.000
Share for Pill	(.018)	(.291)	(.004)	(.003)	(.005)	(.004)	(.003)	(.002)
Mean dep var	€301k	50.0	.250	.100	.250	.100	.250	.100
Effect size	-	-	+4.4%	-	+4.4%	-	+2.8%	
N	715,168	765,760	765,760	765,760	387,566	387,566	378,194	378,194
Panel B: *Excluding municipalities with 25% highest and 25% lowest vote share*								
Minor 1970*	.013**	.126	.008***	.003**	.008***	.001	.004**	.002**
Share for Pill	(.005)	(.097)	(.002)	(.001)	(.002)	(.001)	(.002)	(.001)
Mean dep var	€310k	50.0	.250	.100	.250	.100	.250	.100
Effect size	+1.3%	-	+3.2%	+3.0%	+3.2%	-	+1.6%	+2.0%
N	378,336	402,334	402,334	402,334	209,088	209,088	193,256	193,256

Notes: Estimated by OLS. We exclude in Panel A the municipalities in the top and bottom 10% of the *ShareForPill* distribution (456 municipalities remaining) and in Panel B the municipalities with *ShareForPill* in the top and bottom 25% of the *ShareForPill* distribution (377 municipalities remaining). *ShareForPill* is standardized with a mean of zero and a standard deviation of one. One standard deviation in *ShareForPill* is about 10 percent. All specifications contain birth cohort and municipality fixed effects and are weighted by cohort-municipality number of women. Robust standard errors clustered at the municipality level are in parentheses. We have information of household wealth (at age 60-62) for 94 percent of women considered in our main analysis sample. More details can be found in the Data Appendix. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A6. Percentage of Individuals Going to Church Once a Month by Religion and Age

	Aged 18–39	Aged 40+
Catholic	22.9	42.1
Liberal Protestants	37.0	39.5
Orthodox Protestants	70.7	74.6

Notes: Authors' calculations based on the Labor Supply Panel 1985–2000 (in Dutch: Arbeidsaanbodpanel, made available by Sociaal en Cultureel Planbureau (2016), and available at DANS).

Table A7. Percentage of Individuals by Religious Affiliation in 1971 Dutch Census, Full Population and by Occupation (i.e., Health Professionals: General Practitioners or Pharmacists)

	Dutch Population	Health Professionals	General Practitioners	Pharmacists
No religion	28.6	38.2	36.9	44.1
Orthodox Protestants	11.5	9.8	10.8	5.1
Catholic	27.2	16.8	17.1	15.6
Liberal Protestant	28.7	25.5	26.4	21.4
Other	3.9	9.8	8.9	13.8
Observations	10,233,915	5,261	4,326	935

Notes: Authors' calculations based on the 1971 census. All columns exclude individuals living in the two southern provinces of the Netherlands (Noord-Brabant and Limburg) because they are principally Catholic. Health professionals are defined as general practitioners and pharmacists. An explanation of the set-up of the religion variable in provided in **Appendix B.3**.

Table A8. Correlations Between Municipality-Level Characteristics

	(1)	(2)	(3)	(4)	(5)	(6)
(1) Share against '67	1.000					
(2) Share against '71	0.980	1.000				
(3) Prop. Orthodox	0.808	0.837	1.000			
(4) Number of HPs	-0.366	-0.382	-0.317	1.000		
(5) Prop. of HPs opposed on religious grounds	-0.108	-0.118	-0.111	-0.153	1.000	
(6.) Total population	-0.360	-0.369	-0.309	0.989	-0.154	1.000

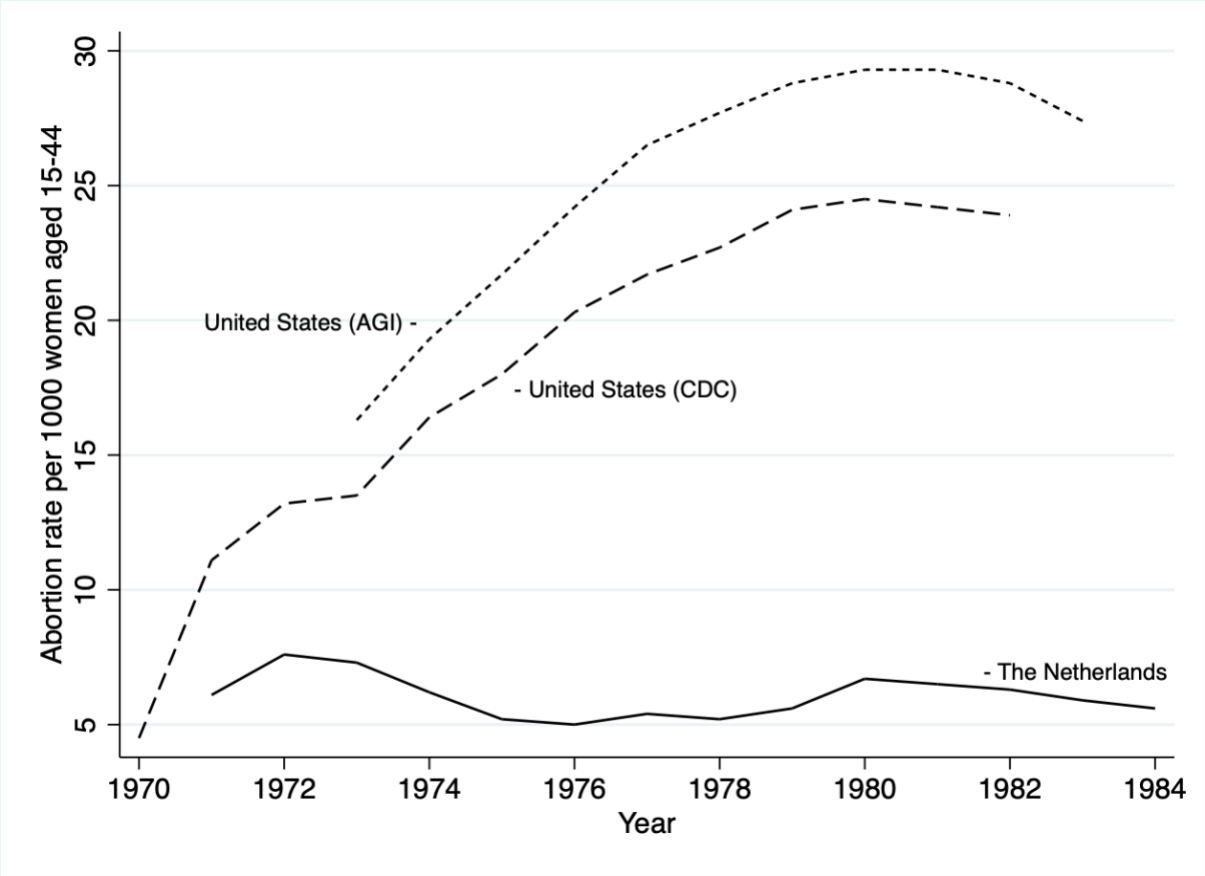
Notes: Authors' calculations based on election data from the 1967 and 1971 national parliamentary elections and from the 1971 census. Correlations are calculated at the municipality level and exclude municipalities located in the southern provinces of Noord-Brabant and Limburg. Share against '67 is the share of votes for parties who were against the liberalization of the Pill in the 1967 national parliamentary elections at the municipality level; share against '71 is the share of votes for parties who were against the liberalization of the Pill in the 1971 parliamentary elections at the municipality level; proportion Orthodox is the proportion of individuals in a municipality who declare that they were Orthodox Protestant in the 1971 census; number of HPs is the number of pharmacists and general practitioners in each municipality; the proportion of HPs opposed on religious grounds captures the proportion of HPs that were Orthodox Protestant or Catholic at the municipality level; and total population is the total municipal population as calculated in the 1971 census.

Table A9. Robustness: Additional Effect of Gatekeepers Who Were Opposed to the Pill on Religious Grounds

	(1) Mother < 21	(2) Marriage < 21	(3) Long studies	(4) Top 25% wealth
Panel A: *Only using GPs opposed on religious grounds (i.e., not pharmacists)*				
Minor 1970*Share for	-.019***	-.017***	.002***	.009***
Pill (i.e., DiD_{Treat})	(.002)	(.003)	(.001)	(.003)
DiD_{Treat}*	.007***	.010***	-.001**	-.003
% Religious GPs	(.001)	(.002)	(.000)	(.002)
After*Prop. Religious	.011***	.015***	-.002**	-.006**
GPs	(.002)	(.002)	(.000)	(.002)
N	731,135	801,494	217,109	806,126
Panel B: *Including municipalities without HPs (i.e., assign closest town proportion of HPs opposed on religious grounds)*				
Minor 1970*Share for	-.019***	-.018***	.002***	.009***
Pill (i.e., DiD_{Treat})	(.002)	(.003)	(.001)	(.003)
DiD_{Treat}*	.007***	.009***	-.001***	-.003
% Religious HPs	(.002)	(.002)	(.000)	(.002)
After*Prop. Religious	.011***	.015***	-.001***	-.005**
Health Professionals	(.002)	(.002)	(.000)	(.002)
N	735,204	805,870	218,119	810,525
Panel C: *Restricting to municipalities with at least three HPs*				
Minor 1970*Share for	-.020***	-.018***	.002***	.010***
Pill (i.e., DiD_{Treat})	(.003)	(.003)	(.001)	(.003)
DiD_{Treat}*	.008***	.011***	-.001***	-.003
% Religious HPs	(.002)	(.003)	(.000)	(.002)
After*Prop. Religious	.011***	.014***	-.001***	-.005**
Health Professionals	(.003)	(.003)	(.001)	(.002)
N	676,793	743,140	202,332	747,559

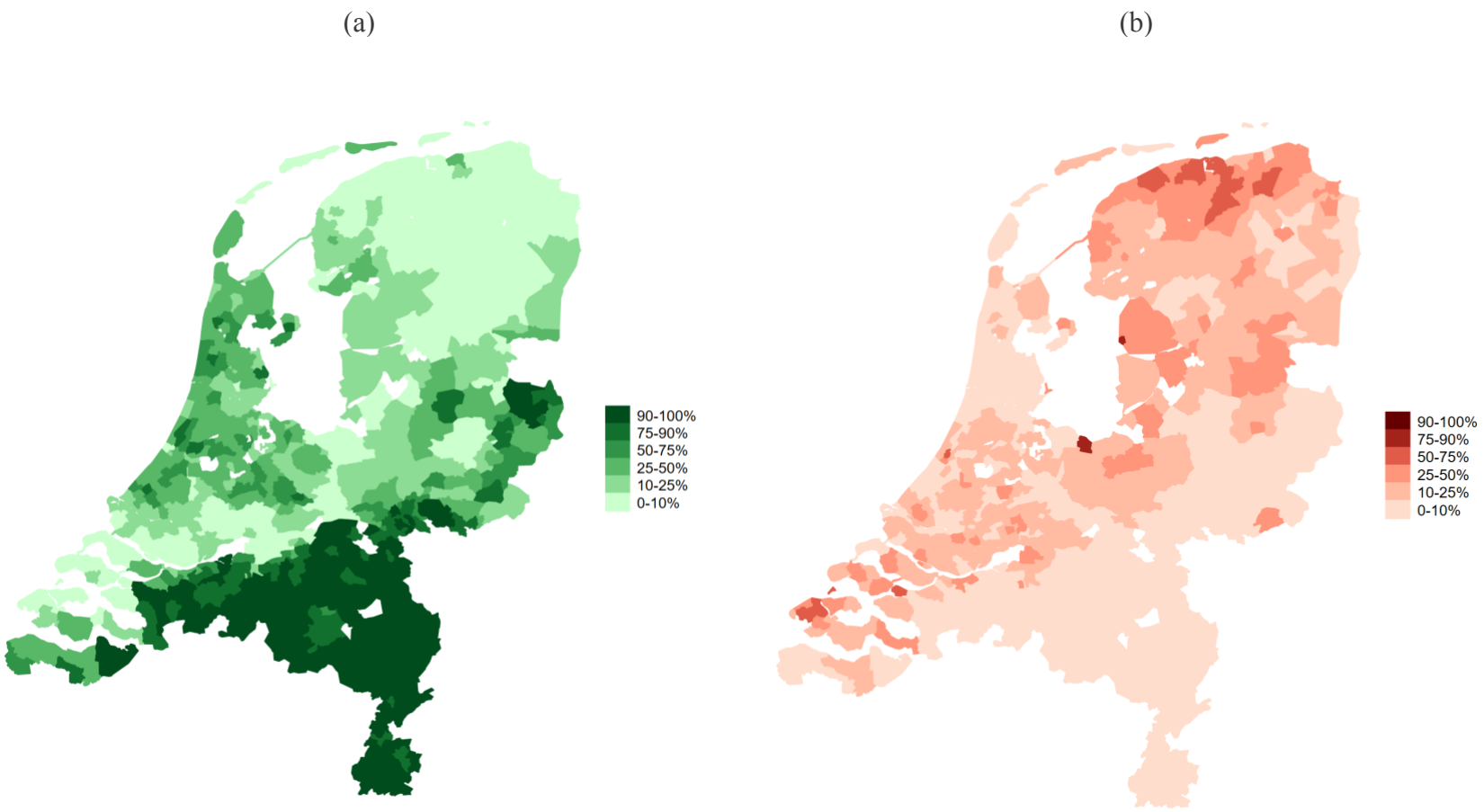
Notes: Estimated by OLS. *ShareForPill* is standardized with a mean of zero and a standard deviation of one. One standard deviation in *ShareForPill* is about 10 percent. Panel A: the mean proportion of GPs opposed on religious grounds that women have access to is 23.9 percent, with a standard deviation of 7.5 percent. Panel B: The mean proportion of religiously opposed HPs in the municipality closest to you is 23.1 percent with a standard deviation of 7.5 percent. Panel C: the mean proportion of religiously opposed HPs (when restricting to municipalities with at least three HPs) is 23.1 percent with a standard deviation of 7.2 percent. We also standardize this measure with mean zero and standard deviation one. We also standardize this measure with a mean of zero and a standard deviation of one. All specifications are estimated for municipalities with at least one GP and are weighted by the number of GPs. Robust standard errors are clustered at the municipality level and are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Figure A1. Abortion Rate per 1,000 Women Aged 15–44 in the Netherlands and the US, 1970–1984



Notes: The numbers for the United States and the numbers for the Netherlands 1973–1984 come from Tietze and Henshaw (1986), Table 2, pages 30–42. The numbers for the United States originate from the Alan Guttmacher Institute (AGI) and the Center for Disease Control (CDC). The CDC estimates are lower than the AGI estimates because the CDC obtains its data from state health departments, whereas the AGI uses active outreach. As several states do not require the reporting of abortions, some require reporting only from certain types of facilities, and some may be less rigorous in enforcing reporting abortions, the numbers for the CDC are about 15–18 percent lower than those of the AGI. Note that this source incorrectly states abortions per 100 women, but this should be per 1,000 women. The Dutch numbers for 1971 and 1972 are retrieved from Ketting and Schnabel (1980).

Figure A2. Proportion of Catholics and Orthodox Protestants by Municipality in 1971



Notes: Author's calculations based on the 1971 census. Panel (a) shows the proportion of individuals who declare that they are Catholic at the municipality level. Panel (b) shows the proportion of individuals who declare that they are Orthodox Protestant at the municipality level. An explanation of the set-up of the religion variable in provided in **Appendix B.3**.

Figure A3. Census Household Characteristics and Municipality's Share of Votes for Pill: Level (Left-Hand-Side Graphs) and Mean Difference Across Cohorts (Right-Hand-Side Graphs)

Figure A3.1: Fertility and Marriage

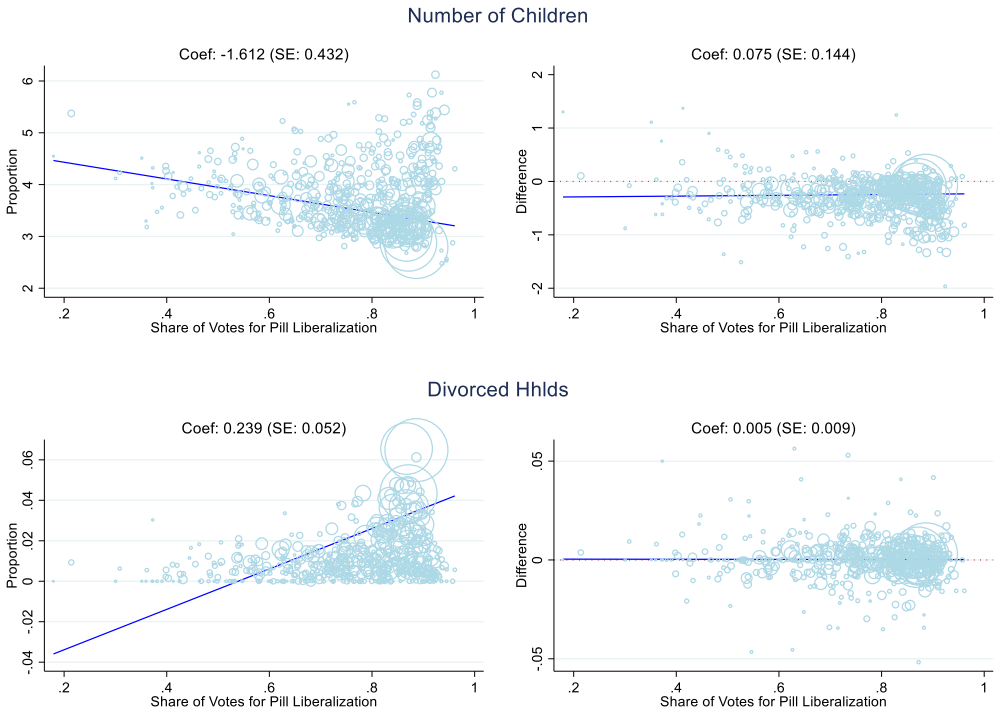


Figure A3.2: Education and Income

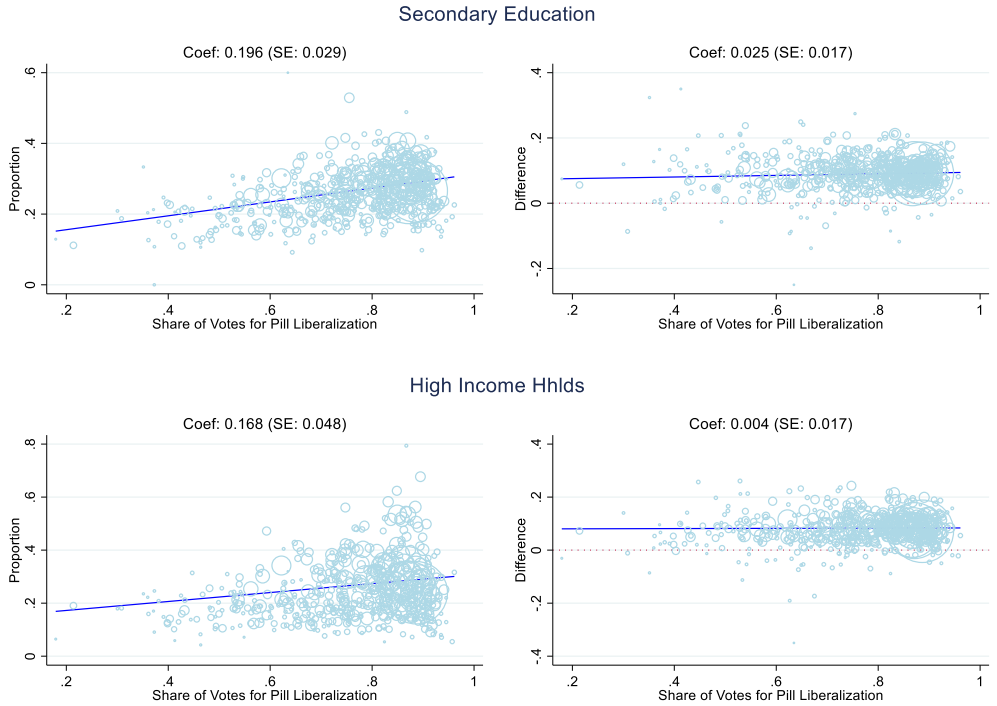
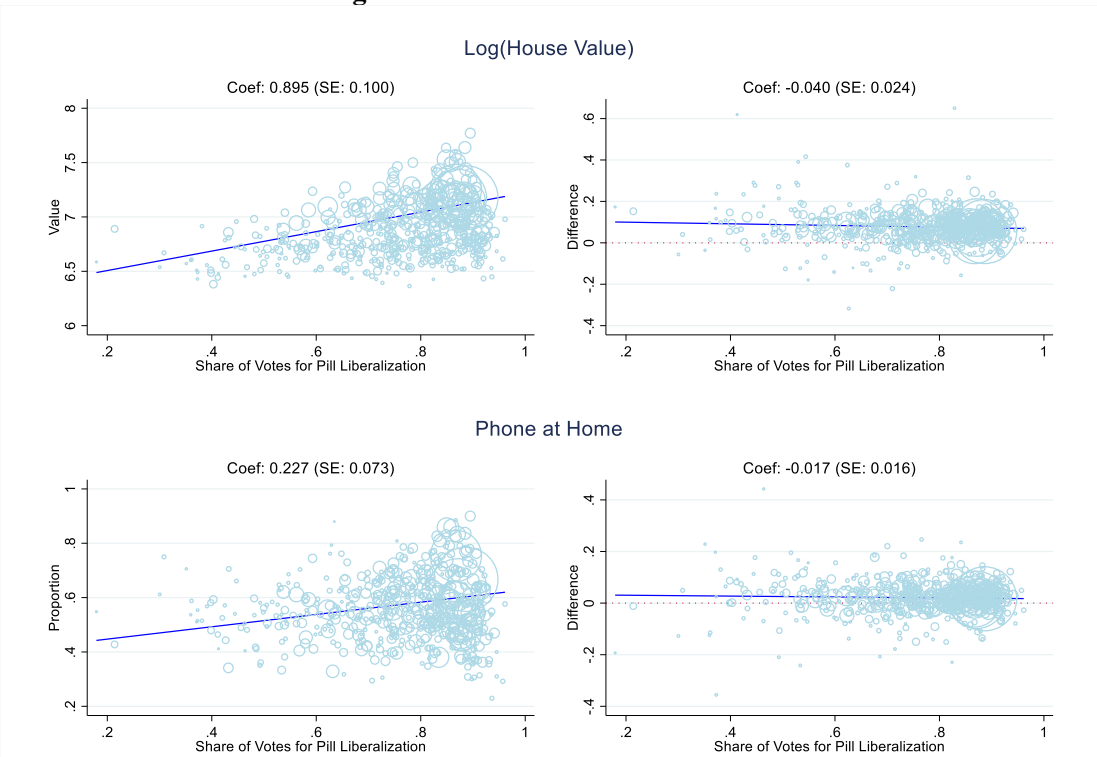


Figure A3. Continued

Figure A3.3: House Value and Phone



Notes: The graphs above plot the mean value in a municipality of various household characteristics from the 1971 census against the vote share for parties in favor of pill liberalization in the 1967 parliamentary elections in that same municipality. We restrict the census sample to households with a head who reports to ever having had a child and is from a cohort that was statistically most likely to be the parent of a woman born between 1944 and 1954 (i.e., with a head aged 46–61 in 1971). Note here that we do not use actual age of a child present in a household because a significant number of the older women from this sample had already formed their own household by the time of the 1971 census and we thus would not observe the characteristics of the household they grew up in. The typical parent of a woman born in 1944–1949 (control women) was aged 46–55 in 1971 and the typical parent for a woman born in 1950–1954 (treated women) was aged 52 and 61 in 1971. The graphs on the left shows the mean values of each characteristic for all selected households in a municipality and the graphs on the right show the mean value of the difference between the treated and control households within a municipality of these characteristics. The circles reflect the population size of each municipality, which also serves as weights, and the blue lines reflect the fitted value of the correlation with the slope coefficient and standard errors reported above each graph. **Figure A3.1** reports the total number of children born to a head of household and the proportion of household in which the head ever divorced. **Figure A3.2** reports the proportion of household heads who completed secondary education and the proportion of household heads classified as high income in the census (income higher than 16,000 a year, which encompasses the two highest income groups and applies to 7 percent of household heads). **Figures A3.3** reports the logarithmic value of the house or apartment the household lives in and the proportion of households that declare having a phone at home.

Figure A4. Random Assignment of Municipality Votes for Pill; 500 Permutations

Notes: Densities of point estimates that are retrieved by 500 permutations of randomly assigning the instrument (*ShareForPill*) to other municipalities, without replacement. The value of the instrument is randomly assigned at the municipality level, implying that all women in municipality A will now receive a value of the instrument of a different randomly chosen municipality. The figures plot the estimated point estimates for four outcomes: whether the woman became a mother before age 21, whether the woman married before age 21, whether the woman obtained a university degrees, and whether the woman ended up in the top 25% of the wealth distribution by age 60. The red line reflects the estimate in our main specification; only the specification for higher education contains some cases in which the estimated coefficients in the permutations are larger than our estimate in our main specification. However, this occurs only 15 out of 500 times and is likely caused by the smaller sample size for this outcome variable (about a quarter of the full sample).

Figure A5. Share of Votes for Parties in Favor of Pill Liberalization and the Proportion of Orthodox Protestant (Top Graph) or Catholic (Bottom Graph) Health Professionals (HPs)

Notes: Variation in the proportion of religious health professionals (HPs) by the share of votes for parties in favor of pill liberalization. The top graph shows the proportion of HPs who were Orthodox Protestant and the bottom graph the proportion of HPs who were Catholic. The circles are weighted by the number of health professionals in each municipality, which is indicated by the size of each circle. The vertical dotted line indicates the median vote share for parties in favor of the Pill in the 1967 elections (0.785) at the municipality level. The horizontal dotted line represents the median proportion of HPs who self-declared to be Orthodox Protestant (0.103) or Catholic (0.168) at the municipality level in the 1971 census.

Figure A6. Differences in Municipality Characteristics by Proportion of Health Professionals Who Were Opposed to the Pill on Religious Grounds

Figure A6.1: Number of GPs and Pharmacists per 1,000 Population

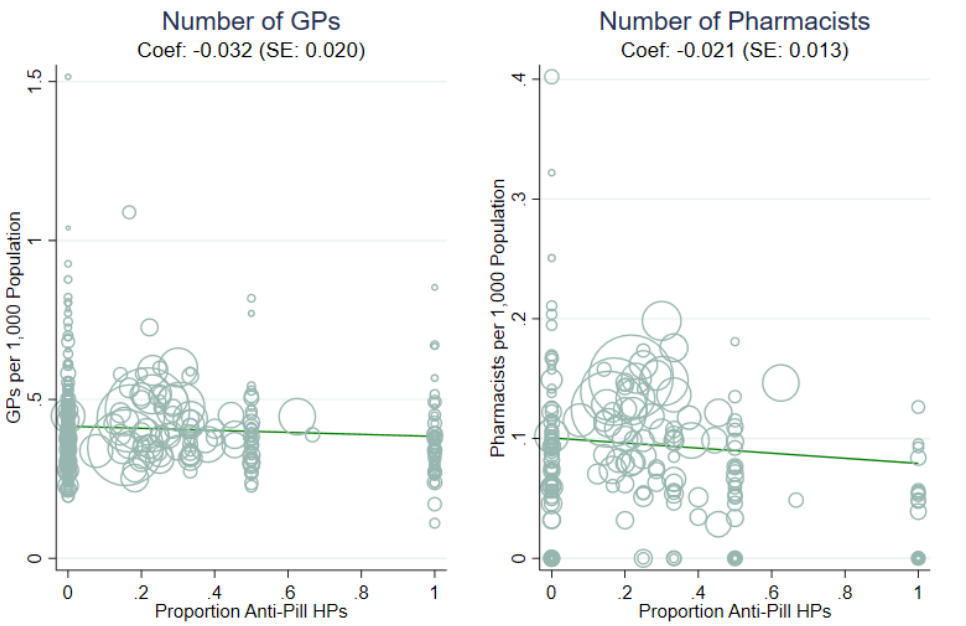


Figure A6.2: Proportion of Household Heads with Secondary Education and High Income

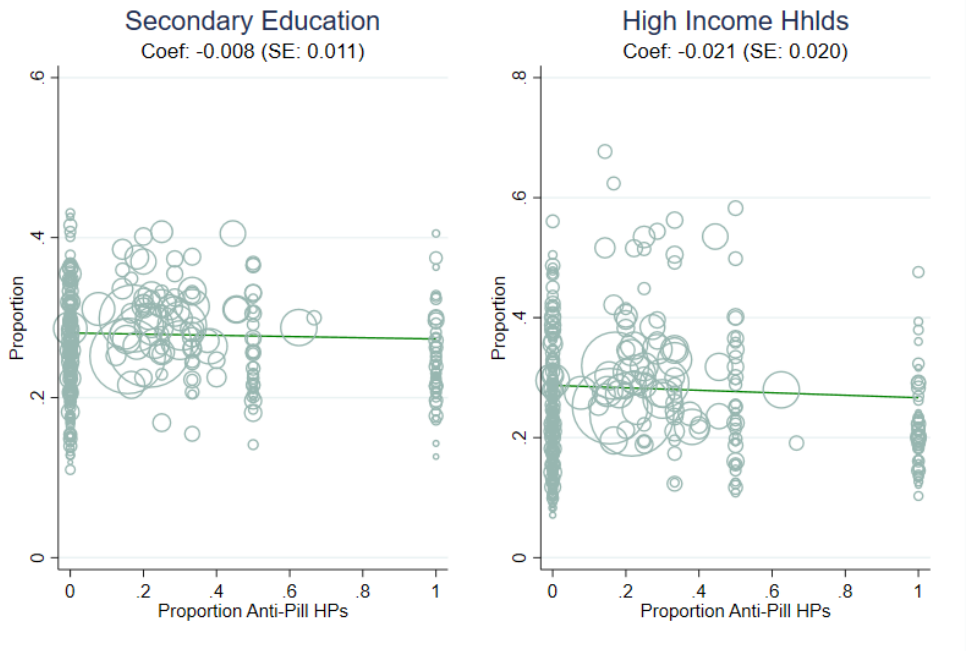
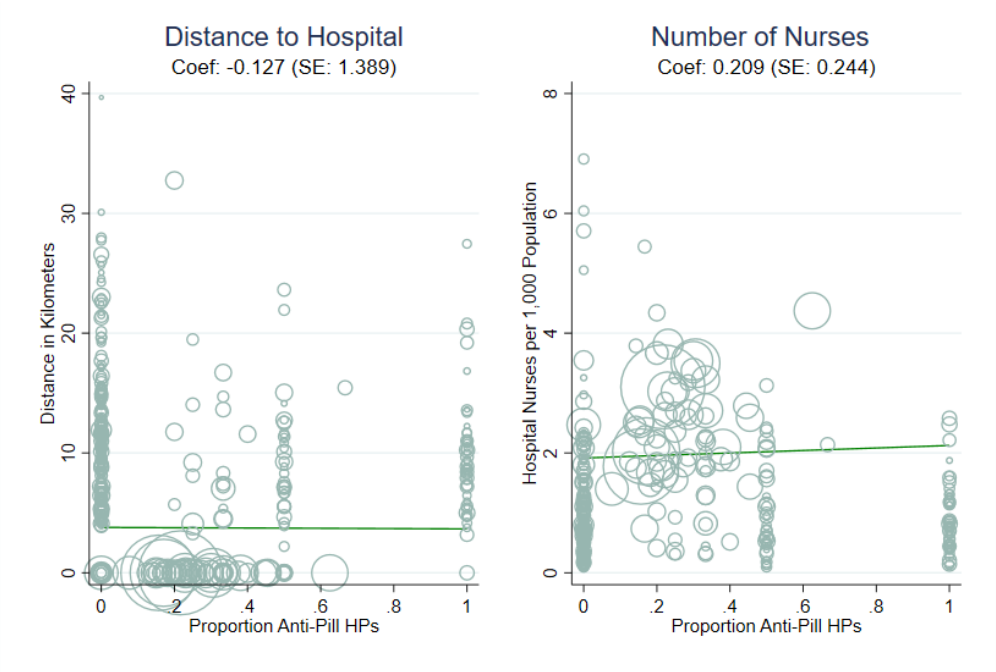


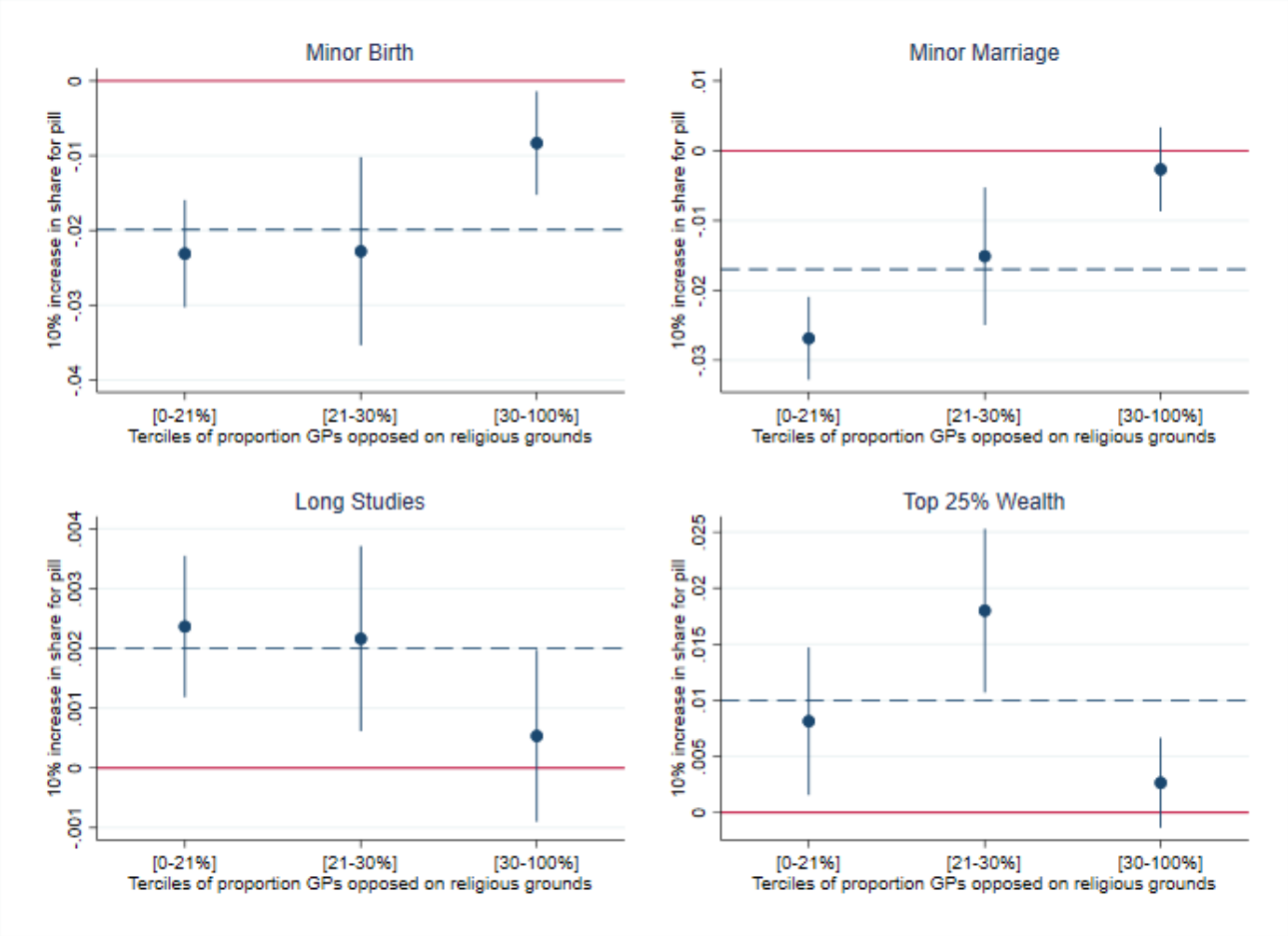
Figure A6. Continued

Figure A6.3: Distance to Hospital and Number of Nurses



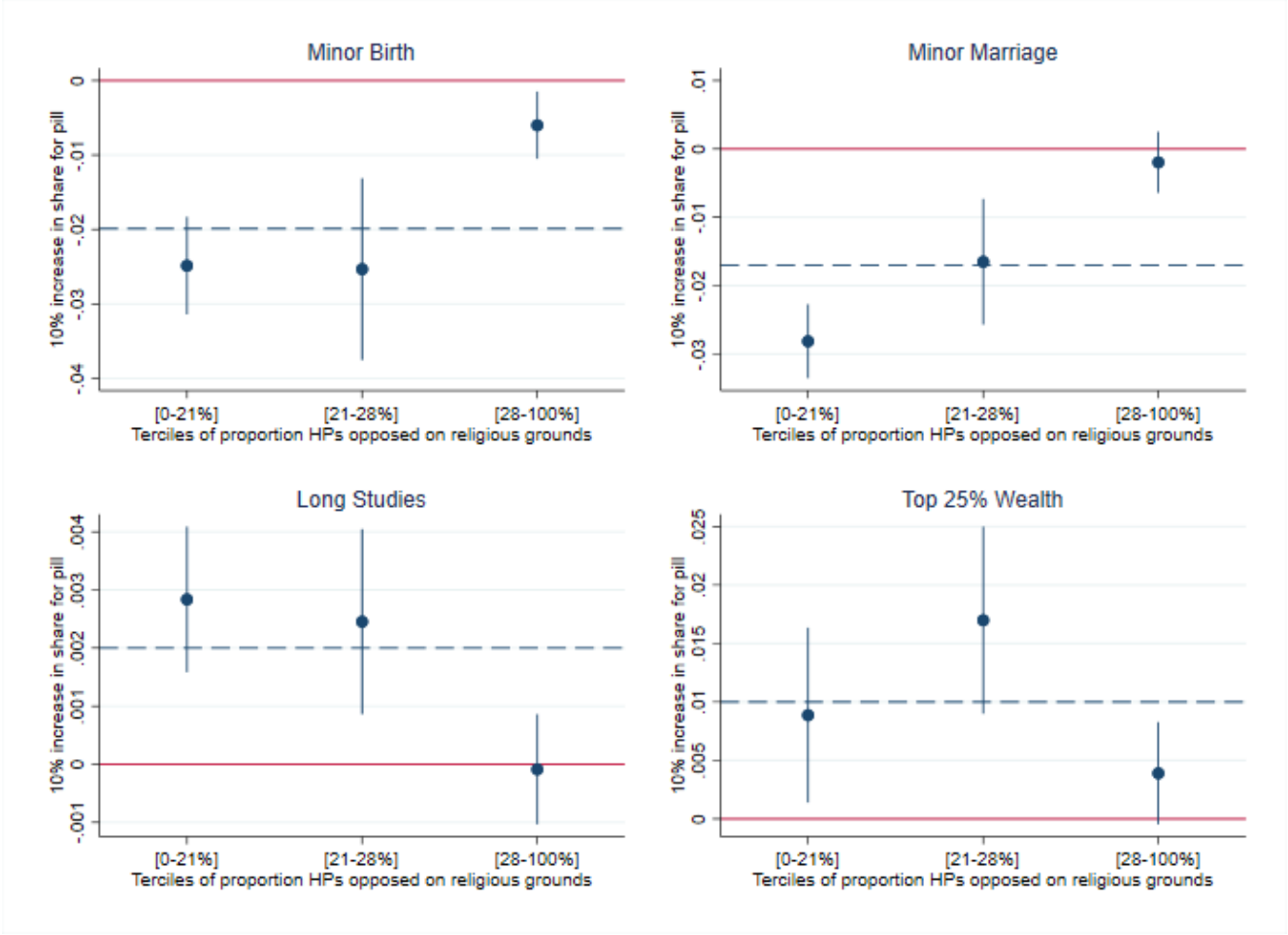
Notes: The graphs above plot the mean value in a municipality of various characteristics extracted from the 1971 Census against the proportion of health professionals (HPs) classified as "anti-pill" (i.e., self-identify as Catholic or Orthodox Protestant in the census) in the same municipality. The hollow circles reflect the total number of HPs in each municipality, which also serve as weights, and the lines represent the fitted value of the correlation with the slope coefficient and standard errors reported above each graph. **Figure A6.1** reports the number of general practitioners (GPs) and pharmacists per 1,000 population in each municipality, in the left and right graphs respectively. **Figure A6.2** reports the proportion of household heads who have completed secondary education and the proportion of household heads that are classified as high income in each municipality, left and right graphs respectively. **Figure A6.3** reports the distance in kilometers to the nearest (mid-size) hospital and the number of nurses per 1,000 population in each municipality, in the left and right graphs respectively.

Figure A7.1 The Additional Effect of Gatekeepers Who Were Opposed to the Pill on Religious Grounds, by Tercile, Only Using General Practitioners (i.e., Excluding Pharmacists)



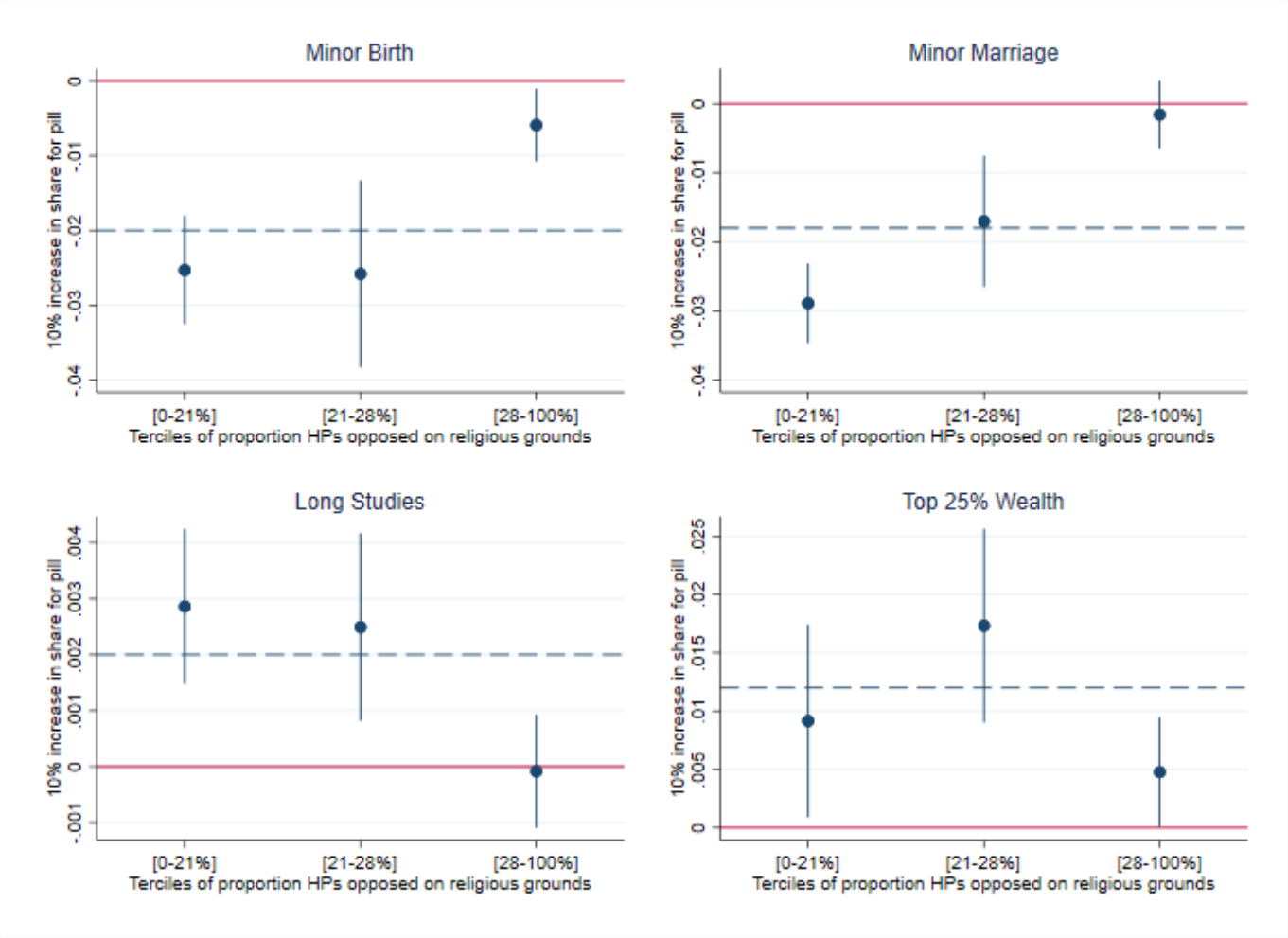
Notes: Estimated by OLS. Figures plot the additional effect of GPs who were opposed to the Pill on religious grounds (in terciles) on top of the social norms in an area (i.e., a triple interaction with our difference-in-differences estimator: $After_{ic} * ShareForPill_{im}$). *ShareForPill* is standardized with a mean of zero and a standard deviation of one. One standard deviation in *ShareForPill* is about 10 percent. The proportion of GPs opposed on religious grounds (with a mean of 23.9 and a standard deviation of 7.5 percent) is divided into terciles: 0–21 percent, 21–30 percent, and 30–100 percent. All specifications are restricted to municipalities with at least one GP and are weighted by the number of GPs in every municipality. Robust standard errors are clustered at the municipality level.

Figure A7.2 The Additional Effect of Gatekeepers Who Were Opposed to the Pill on Religious Grounds, by Tercile, Including Municipalities Without an HP, by Tercile.



Notes: Estimated by OLS. Figures plot the additional effect of HPs who are opposed to the Pill on religious grounds (in terciles) on top of the social norms in an area (i.e., a triple interaction with our difference-in-differences estimator:$After_{ic} * ShareForPill_{im}$). *ShareForPill* is standardized with a mean of zero and a standard deviation of one. One standard deviation in *ShareForPill* is about 10 percent. The proportion of HPs who were opposed on religious grounds (with a mean of 23.1 and a standard deviation of 7.5 percent) is divided into terciles: 0–21 percent, 21–28 percent, and 28–100 percent. We assign the proportion of HPs who were opposed on religious grounds in the closest municipality for municipalities without an HP. All specifications are weighted by the number of HPs in the (closest) municipality. Robust standard errors are clustered at the municipality level.

Figure A7.3 The Additional Effect of Gatekeepers Who Were Opposed to the Pill on Religious Grounds, by Tercile, Restricting to Municipalities With At Least Three HPs, by Tercile



Notes: Estimated by OLS. Figures plot the additional effect of HPs opposed to the Pill on religious grounds (in terciles) on top of the social norms in an area (i.e., a triple interaction with our difference-in-differences estimator: $After_{ic} * ShareForPill_{im}$). *ShareForPill* is standardized with a mean of zero and a standard deviation of one. One standard deviation in *ShareForPill* is about 10 percent. The proportion of HPs opposed on religious grounds (with a mean of 23.1 and a standard deviation of 7.3 percent) is divided into terciles: 0–21 percent, 21–28 percent, and 28–100 percent. We drop 320 municipalities with fewer than three HPs. All specifications are weighted by the number of HPs in the municipality. Robust standard errors are clustered at the municipality level.

Appendix B: Data Appendix (For Online Publication)

B.1 Construction of sample

We use administrative data from Statistics Netherlands, which contains information on all individuals who were registered in a Dutch municipality by 1995.[1] We start with the registry of persons (*GBAPERSOONTAB*) and select all women who were between ages 16 and 26 in 1970, and hence were born in the Netherlands between 1944 and 1954, which gives us a sample of 1,138,451 individuals. We then match these women to their municipality of birth using the place of birth file (*VRLGBAGEBOORTEGEMEENTE*).

Note that the Netherlands has changed municipal boundaries over time, primarily through merging already existing municipalities. To be able to match our instrument (votes for parties opposing the Pill in 1967) to the woman's municipality of birth, we need to consider the restructuring of municipalities.[2] We take these changes into account and assign the new municipal codes to women born in municipalities that changed. In cases in which municipalities split, we aggregate to larger units (e.g., if municipality X splits and half goes to municipality A and half to municipality B, we aggregate to one larger unit comprising both municipality A and B). We drop 22,267 women for whom we cannot identify their municipality of birth or cannot determine the vote shares opposing the Pill in 1967.

The parent-child registry (*KINDOUDERTAB*) is used link the women in our sample to their children so we can determine outcomes like age at first birth, as well as completed fertility (the youngest women in our sample were age 65 in 2018, implying that we observe them long past their prime childbearing ages). We drop 493 women for whom age at first birth is lower than 12 years of age. We are left with 1,115,691 women who were born in the Netherlands and were between the ages of 16 and 26 in 1970. Given the small variation in voting patterns in the southern provinces of the Netherlands (Noord-Brabant and Limburg) we drop women born in the south, which leaves us with a final sample of 864,370 individuals.

[1] The administrative data from Statistics Netherlands is available at a remote-access facility after signing a confidentiality agreement.

[2] See "*Gebieden: Overzicht vanaf 1830*", available at www.statline.cbs.nl for an overview of changes in municipal boundaries in the Netherlands up until today.

B.2 Construction of outcome variables

Using the parent-child register we generate a measure indicating that a woman remained childless throughout her life, and a measure for the total number of children per woman (i.e., completed fertility). For the 735,204 women who ever had a child, we create a variable for age at first birth, and we define a minor birth as a birth to an individual less than 21 years of age (the age of majority in the Netherlands at that time).

The marital state register (*GBABURGERLIJKSTESTAATBUS*) contains information on all present and past marriages for individuals registered in a Dutch municipality from 1995. An indicator for whether the woman was ever married in her lifetime (again this implies before 2019) is generated. For the 805,870 women who ever got married, we generate a variable for age at first marriage, and we define a minor marriage as a marriage when the individual is younger than 21 years of age. Finally, for the 727,201 women who ever got married and ever had a child, we define a shotgun marriage as one in which the child was born within seven months of the mother's marriage date. The seven-month time window (instead of eight or nine months) is chosen so premature births are not accidentally captured.

In the long term we are interested in the effects of birth control technology on the women's human capital formation. We add information from the registry with information on the individual's highest level of education (*HOOGSTEOPLTAB*). This registry has limitations as the collection of educational records only started in 1999, and any degrees that were obtained earlier were retrospectively inferred from surveys. This means that information on educational outcomes is only available for 218,119 women (about 25% of the sample). We examine whether birth control technology allowed women to invest in degrees with longer qualification periods; to this end we create an indicator variable that takes the value one if the woman completed a university degree, whether in general or technical education. We also add a variable indicating that a woman finished a long-duration degree in law or medicine (medical school, dental medicine, or veterinary medicine).

The data on yearly earnings from paid employment (*BAANPRSJAARBEDRAGBUS*) and self-employment (*ZELFSTANDIGENTAB*) is available from 1999, which means that age 55 is the earliest age at which labor market outcomes can be observed for cohorts 1944–1954. The measure of labor force participation at age 55 is continuous and represents the labor force participation in terms of FTEs and only corresponds to working in paid employment (such measure does not exist

for self-employment). One FTE represents a full-time job (eight hours a day, and five days a week), but given that Dutch women often work part-time it is important to take hours worked into consideration. For women with non-zero income in both paid and self-employment, a variable for earnings at age 55 is created. Given that information on part-time work is only available from 2001 onwards, we take the labor market outcomes at age 56 for birth cohort 1945, and at age 57 for birth cohort 1946.

Finally, we are interested in how access to the Pill at young ages affects the accumulation of household wealth. Information on household wealth (*VEHTAB*) is available only from 2006, when the oldest birth cohort was aged 62. We determine mean household wealth at ages 60–62 for the women in the sample. This implies that for women born in 1944, household wealth is only observed at age 62, but for women born in 1946, household wealth is observed at ages 60–62 in which case the mean is taken over these years. The measure of household wealth includes all assets owned by the household minus the debts. Assets include the household's savings, stocks and bonds, the value of their house, and the value of their business. The wealth outcomes are not observed for individuals who were not living in the Netherlands at the ages of 60–62 or for individuals living in institutional households. For wealth and earnings outcomes, we restrict our sample to individuals for whom we observe wealth ages 60–62, which gives a sample of 810,525 individuals or 94 percent of the main sample of analysis.

B.3 Construction of census data on health professionals

The 1971 full count census is used to identify the proportion of religious health professionals in each municipality. The 1971 census contains information on 13,133,333 individuals; we drop 73,216 individuals for whom it is unknown how their outcomes were registered, and 3,588 individuals without a fixed place of residence (in total 0.3% of the sample), which leaves 13,056,529 observations and 10,233,915 when excluding the southern provinces.

Health professionals (HPs) are defined as pharmacists and general practitioners (GPs) as those were the key professionals who could provide women access to the birth control pill. In total, we can identify 1,120 pharmacists and 5,265 GPs in the Netherlands in 1971, which is like the numbers reported by Statistics Netherlands for 1971, namely 4,504 GPs and 1,084 pharmacists (Centraal Bureau voor de Statistiek, 1994, 265). We exclude health professionals in the southern provinces, which gives us a total of 5,261 health professionals (4,326 GPs and 935 pharmacists).

To determine the proportion of religious health professionals in each municipality, we use the religion variable that is available in the census. Religion was elicited for 95.6 percent of individuals and imputed for those for whom it was not elicited. Despite this, **Table B1** shows that the distribution of religion is very similar in the samples in which religion was and was not elicited, for both the full population and the sample of HPs. Hence, it is unlikely that this will present any bias in the setting up of our religious health professional measure.

We use the religion (*kg*) variable and define Catholics as individuals reporting to be a member of the Roman Catholic, Old Catholic, or Free Catholic church (codes 10, 59, and 63); we define Orthodox Protestants as individuals who report to be a member of the Reformed Church, the Free Reformed Church, the Christian Reformed Church, the Reformed Association, or the Old Reformed Association (codes 30, 31, 32, 33, and 34); we define Liberal Protestants as people who report to be a member of the Dutch Reformed Church (code 20). All remaining religions are grouped under "Other," and those who report that they are not religious are defined as such (code 1).

Table B1: Distribution of Religion, Depending on the Elicitation of Religion

	All	All - religion elicited	HPs	HPs – religion elicited
No religion	28.58	28.25	38.17	37.62
Reformatory	11.52	11.73	9.81	10.25
Catholic	27.22	27.34	16.80	16.28
Liberal Protestants	28.74	29.02	25.47	25.96
Other	3.94	3.66	9.75	9.88
N	10,233,915	9,781,219	5,261	4,827

Notes: Authors' calculations based on the 1971 census. The first column includes all individuals in the 1971 population census excluding the southern provinces of Noord-Brabant and Limburg. The sample of HPs includes general practitioners and pharmacists. The table compares the distribution of religion for individuals for whom religion was elicited and for those for whom religion was not elicited.

Health professionals are assigned to municipalities based on the municipality in which they live in 1971. The census also elicited information on the municipality in which individuals were working, but this information is missing for about 1 percent of the HPs in our sample. This seems like a small number overall, but it may affect our access measure. At the same time, we know from the census that about 92 percent of health professionals do not commute to a different municipality

for work. As a robustness check, we calculate the proportion of religious health professionals (any religion versus no religion) using municipality of work, and the proportion of religious HPs by restricting to HPs who do not commute. These measures are very highly correlated with the measure on municipality of residence, with Pearson correlation coefficients of 0.9977 and 0.9982 respectively.