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ARTICLE

Health insurance and fertility among low-income, childless, single women: evidence from the ACA Medicaid expansions

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Abstract

Expansions of Medicaid family planning services have been associated with decreases in pregnancy rates. Access to a broader range of medical, non-family planning services may influence pregnancy rates as well if the increased exposure to medical services spills over to other kinds of behaviour. Using a difference-in-difference approach, I examine the impact of the Affordable Care Act (ACA) Medicaid expansions on the propensity of low-income, single women to become single mothers. Previous expansions of Medicaid family planning services allow us to also investigate the influence of access to other medical services (i.e. non-family planning). I find that although access to contraceptives is associated with a reduction in the propensity of becoming a single mother among adult, low-income women, medical services beyond access to contraceptives can provide additional impacts.

Keywords: Affordable Care Act; Medicaid; pregnancy

JEL Classification: I12; I13; J13

1. Introduction

Unintended pregnancies in the United States may account for nearly one-third to one-half of all pregnancies (NCHS, 2005; Finer and Henshaw, 2006). Public concern to reduce unintended – or unplanned – pregnancies, especially among women without access to affordable and effective methods of contraception, has led to the implementation of policies that increase access to family planning services at reduced costs for low-income women. While the literature has been mixed regarding the effectiveness of such policies, there has been some statistical support for the claim that public access to more effective methods can reduce the percentage of unintended pregnancies, at least among certain demographic groups (Joyce and Kaestner, 1996; Joyce *et al.*, 1998; Kearney and Levine, 2009; DeLeire *et al.*, 2011).

In 2010, the Affordable Care Act (ACA) reformed the healthcare system to provide wider access to health insurance and medical services. One of the most contentional stipulations in the ACA was that insurers should provide family planning services, including contraceptives, at low cost and without co-pays. As such, the ACA would not only provide additional health care to millions of uninsured adults, but it would also allow women to have the ability to avoid unintended pregnancies. Those who could not obtain health insurance through their employers would be able to do it via exchanges. For low-income individuals (i.e. below 138 per cent of the poverty line), access to health care and family planning could be obtained through the expansion of Medicaid, previously available only to *very* low-income families.

In 2012, the Supreme Court ruled that states were able to voluntarily opt out of these expansions, not only leaving many low-income adults uninsured but also depriving them of cheap[er]

access to contraceptives. Indeed, the ACA mandated that individuals newly eligible for Medicaid coverage under the ACA expansions should also receive a benchmark set of ten essential benefits, including preventive services that would include all of the 18 FDA-approved contraceptive methods (Ranji *et al.*, 2016). Several studies have shown the ACA Medicaid expansions are positively associated with insurance coverage, access to family planning and contraceptives and improved health measures (Kominski *et al.*, 2017; Johnston *et al.*, 2018; Myerson *et al.*, 2020; Geiger *et al.*, 2021; Bellerose *et al.*, 2022).

Increased use of contraceptives could suggest that the expansions may have negatively affected births among women who became eligible. However, there are other ways in which the ACA expansions could have affected births among newly covered individuals. New access to public health insurance could make pregnancies cheaper. Better maternal health can result in higher conception and gestation rates (Gartner *et al.*, 2022). At the same time, it can affect decisions about work, which can influence the decision to have a child. On the one hand, the individual may choose to delay having kids, but on the other, if work was solely an option to obtain insurance, the person may now choose to stay at home and raise a child (Gartner *et al.*, 2022). Theoretically, it is not clear what the impact on births may be.

Moreover, there might be heterogeneous effects. Although from a policy perspective, access to health care and family planning services is important for *all* low-income individuals (e.g. men and women, married or unmarried, with or without children), there is a group for which access to contraceptives and other care may be of particular interest: low-income single women. Indeed, becoming a single mother while in poverty can have long-lasting socioeconomic consequences. While there have been some studies on the impact of the ACA on childbearing among different groups of women, in this paper I use a difference-in-difference (DiD) approach and American Community Survey (ACS) data from 2011 and 2017 to examine whether the ACA Medicaid expansions decreased the probability of having a first child among unmarried low-income women without children. As such, indirectly, I study the impact of the ACA Medicaid expansions on the propensity of becoming a single mother among low-income women.

To my knowledge, only a few studies are using a similar approach to studying the impact of Medicaid expansions on births among different groups of women, and the results have been mixed. Palmer (2020) and Gartner *et al.* (2022) used birth certificate data and found little overall influence of the ACA expansions on birth rates. Eliason *et al.* (2022*b*) used ACS data and found that it decreased recent births among lower-income women, with more noticeable effects on some subgroups.

The mixed results may be a byproduct of differences in both data and scope. Palmer (2020), for instance, focused on childless women but included women of all incomes. Eliason *et al.* (2022*b*), on the other hand, do limit the analysis to low-income women, but their focus on different subgroups does not pay much attention to live births for childless women.[1] Gartner *et al.* (2022) also focus on subgroups. Yet, there is limited specific attention to the impact on women that are both *low-income* and *childless*. By focusing on this group, I contribute to the literature by focusing on the potential impact of curbing single motherhood among low-income women, an important issue with salient policy implications. Furthermore, I contribute to the literature by studying whether any impact can be entirely attributed to the newly gained access to contraceptives. I do so by investigating if the ACA expansions provided an impact in states where family planning services were already available to low-income women.

2. Background and literature

Since the 1970s, there have been two major public sources of family planning services in the US. In 1970, the federal government passed Title X of the Public Health Service Act, which provided

[1]One of their analyses does look at a similar group, but they seem to group childless and women with one child together.

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funding to state and non-state organisations (e.g. planned parenthood) to extend family planning services to many uninsured and underinsured individuals across the country. Although popular at first, the federal funding of Title X has decreased dramatically since its inception, decreasing the amount of services available. In 1972, Medicaid, a major provider of health insurance for those with very low income, extended family planning services to its beneficiaries. Fast outpacing Title X, today Medicaid is the largest source of public family planning services in the country (Sonfield and Gold, 2011; Ranji *et al.*, 2016).

Beginning in the 1980s, and throughout the 1990s, the federal government allowed state Medicaid programmes to extend Medicaid family planning services to individuals who would not be eligible for these benefits under the stringent Medicaid requirements.[2] First, it allowed states to extend benefits to women who would lose eligibility after giving birth. Later, it also allowed for the expansion of Medicaid family planning services to low-income individuals whose incomes were too high to qualify for the full scope of Medicaid benefits.

Although the literature on the impact of improved access to affordable contraceptives is not conclusive, researchers have suggested that the introduction of contraceptives allowed individuals and couples to reduce uncertainty, delay pregnancy and allow women to use more time to invest in their education and their careers (Goldin and Katz, 2000, 2002; Michael, 2000; Bailey, 2006), helping with the empowerment of both single and married women (Chiappori and Oreffice, 2008). Frost and Lindberg (2013) find that many young, unmarried, childless women view contraceptives as a way to improve many aspects of their lives without having to alter their sexual activity. A great percentage of women in their sample reported that access to contraceptives has allowed them to avoid unintended pregnancies, take better care of themselves and their finances, complete their education and keep a job. As a consequence, it has been suggested that the availability of affordable contraceptives and the opportunity for abortions can significantly impact both birth rates and a country's demographics (Klerman, 1999; Levine *et al.*, 1999; Angrist and Evans, 2000; Ananat *et al.*, 2007; Peipert *et al.*, 2012). In the long run, it has been found that the availability of contraceptives in the US has improved not only the economic lives of their users but also those of their children in their adult life (Bailey, 2013).

According to the current research, the Medicaid family planning expansions of the 1980s and 1990s have been only partially successful in decreasing the rate of unintended pregnancies. As documented by Abramowitz (2018), the evidence on such effects varies by demographic group. Using data for women with less than a high-school degree in three states where these prior expansions occurred, Joyce and Kaestner (1996) found that these types of impacts are mainly concentrated among non-black women, reducing the probability of abortion by 2–5 percentage points. Joyce *et al.* (1998) find that income-based Medicaid expansions to pregnant women and their children increased birth rates among white women near the federal poverty line (FPL). Some contrasting results suggest that the extensions to pregnant women did not affect overall fertility rates significantly (Zavodny and Bitler, 2010; DeLeire *et al.*, 2011). With regards to income-based expansions of family planning services, several studies have found that the introduction of these expansions did reduce both the probability of pregnancy and the overall rates of birth and abortion (Mellor, 1998; Lindrooth and McCullough, 2007; Sonfield and Gold, 2011).[3] Kearney and Levine (2009) exploit the time variation in the implementation of these expansions in some states and find that it does reduce the birth rate, especially among teens. They also find an increase in the use of more effective contraceptives and a decrease in unprotected sex as a result of these expansions.

The ACA implemented, among other things, a series of mandates that would dramatically impact access to contraceptive methods. One mandate is that all private insurers should provide

[2]See Buchmueller *et al.* (2016) for an overview of the Medicaid programme in the United States.

[3]Gross *et al.* (2014) failed to find any evidence that emergency contraceptives (e.g. 'the morning-after' pill) had any effect on births or abortions.

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access to all methods without any out-of-pocket costs to the beneficiary. The ACA also allowed states to extend their Medicaid family planning services by permanently amending their programmes to forgo the need for renewal. Many states used these amendments, commonly known as the State Plan Amendments (SPA), to either replace the waivers implemented in the 1990s or to extend family planning services for the first time to low-income individuals. The ACA, however, also allowed states to expand the full scope of Medicaid benefits to single, childless adults with incomes up to 138 per cent of the FPL. By covering a wide range of medical services, this would also provide women in those states access to all the available forms of contraceptives available in states with waivers (currently known as SPAs), and in some instances, more. For the first time, single, childless, low-income women could have access to a wide variety of health care coverage, including contraceptives and other family planning services at no cost.

Yet, many low-income, single women in non-expansion states remain without access to health care and contraceptives, particularly in states without previous expansions of family planning services. Those with family incomes between 100 and 138 per cent of the FPL can still obtain health insurance using subsidies in the exchange markets, but this does not cover unmarried individuals with [family] income below 100 per cent of the FPL (Abramowitz, 2020).

As of January 2016, 31 states and DC have opted to expand the full scope of Medicaid benefits. Eighteen of those had also expanded family planning services via waivers and SPAs.[4] Among the states that have not expanded the full scope of Medicaid services under the ACA, nine states have previously extended Medicaid family planning services via income-based SPAs/waivers, and three more have done so under other eligibility criteria.[5] Wisconsin did not fully expand Medicaid under the ACA, but it provides Medicaid coverage to adults at or below the poverty line. The remaining states do not provide any health coverage to poor, single, childless women of reproductive age (Ranji *et al.*, 2016).

As pointed out by Abramowitz (2020), the ACA and the Medicaid expansions that accompanied it have been found to have increased the per cent of people insured, the utilisation of preventive care and primary care and the use of prescription drugs (Frean *et al.*, 2017; Sommers *et al.*, 2017). Examinations of the Medicaid expansions suggest an increase in coverage and utilisation (Frean *et al.*, 2017; Kaestner *et al.*, 2017; McMorrow *et al.*, 2017; Simon *et al.*, 2017; Benitez and Seiber, 2018; Courtemanche *et al.*, 2018); although the utilisation gain seems larger in urban areas (Benitez and Seiber, 2018). Among women of reproductive age, most of the gain in insurance coverage comes from single, childless women (Johnston *et al.*, 2018).

There is some evidence that increased access to health care coverage is also associated with an increased use of contraceptives, particularly among poor teenagers (Culwell and Feinglass, 2007; Miller *et al.*, 2013). Abramowitz (2018) and Heim *et al.* (2018) studied the impact of access to health insurance on fertility by exploiting the impact of the young adult provision in the ACA. The results point to a reduction in the probability of giving birth among those impacted by such provision, with increases in the use of hormonal contraceptives.[6]

A few studies have measured the effect of expanding the full scope of Medicaid services in specific states before the ACA. For example, several studies have found that the Massachusetts experiment prompted an increase in the use of contraceptives and helped reduce the probability of pregnancy among young unmarried women (Dennis *et al.*, 2009, 2012; Gold, 2009; Apostolova-Mihaylova and Yelowitz, 2018). However, one could question whether the lessons from the Massachusetts health care reform are generalisable to the entire United States population (Sommers *et al.*, 2017).

[4]Note that some of the income limits for the SPAs are above the 138% FPL threshold, serving a wider population.

[5]Typically if the woman loses Medicaid eligibility post-partum.

[6]Abramowitz (2016) finds that the provision also affects the marriage market for those impacted, which could also be a way in which the provision may have affected fertility.

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Mulligan (2015) finds that ACA contraceptive mandates, a more comprehensive policy, not only increased their use but also decreased abortion rates. However, Mulligan (2015) finds no effect on birth rates. Vlahiotis *et al.* (2015) find that the mandate mainly affected the use of long-acting reversible contraceptives, with little to no impact on refillable methods. The ACA Medicaid expansions did seem to have a positive impact on the use of contraceptives among some low-income women (Kilmer *et al.*, 2022; Eliason *et al.*, 2022*a*), and the generosity of Medicaid has been associated with a decrease in unintended pregnancies among those with less than a high-school degree (Geiger *et al.*, 2021).[7]

As mentioned in the introduction, a few studies using different datasets have found mixed results on the impact of the ACA expansions on birth rates (Palmer, 2020; Gartner *et al.*, 2022; Eliason *et al.*, 2022*b*). I follow this literature using state and time variation in the implementation of the ACA Medicaid expansions and measure whether the reform had any influence on childbearing among low-income, single, childless women of reproductive age, indirectly measuring the propensity to become a single mother. I exploit the fact that many states had already extended family planning services for these women to investigate whether any impacts are solely attributable to access to contraceptives, or if there are other potential mechanisms.

3. Methods and data

I use data on individual women from the ACS between 2011 and 2017. The ACS does not only provide a large sample but it also provides information on whether the respondents have given birth in the 12 months before the interview. It provides information on the state of residency, age, income – an important eligibility characteristic – and other socioeconomic characteristics.[8]

I restrict the sample to low-income, single women of reproductive age (between 15 and 44 years old) since this group's chances of avoiding pregnancy are the most likely to be affected by increased access to cheap family planning services.[9] I define low-income women as those with family incomes at or below the FPL. Although the Medicaid expansions are typically available to individuals with family income at or below 138 per cent of the FPL, women with incomes between 100 and 138 per cent of the FPL living in states without expansions can obtain subsidised health care through a separate provision of the ACA (Johnston *et al.*, 2018). Indeed, focusing on women at or below the FPL provides a cleaner identification of treated and untreated women, strengthening the assumption that women in both groups are similar.

Although married women and those with private insurance may have also been impacted by the expansions in some direct and indirect ways, I attempt to isolate the impact by focusing on those who become newly eligible to receive Medicaid. As such, from the group of single women at or below the FPL, I drop those who responded 'yes' to being covered by private insurance. In addition, since women with other children may have had prior access to Medicaid through other channels, I only include women who are either childless or who have given birth to their first child within the 12 months prior to the ACS interview. I use this information to construct the fertility measure. Note that the ACS does not provide information on abortions. As such, estimated reductions in the probability of giving birth are only indirect measures of increases in the use of contraceptives. While increases in abortions may contribute to decreases in fertility rates, some trends indicate that abortions have been on the decline (Abramowitz, 2018).

[7]Along other margins, studies that have found that the ACA has also decreased the number of people claiming SSI benefits (Chatterji and Li, 2016), with no sufficient statistical evidence pointing to an increase in risky behaviours (Cotti *et al.*, 2017; Simon *et al.*, 2017; Courtemanche *et al.*, 2018).

[8]The ACS data were used for convenience and because age and income are easily identifiable in a continuous way. Additionally, there are fewer missing observations because the Census imputes missing values. Note that other publicly available datasets provide similar information on recent births, race, income and marital status (e.g. Pregnancy Risk Assessment Monitoring System (PRAMS)). Future research could see if the results replicate using. Yet, note that PRAMS reports income in intervals, making it less convenient to calculate the woman's income relative to the federal poverty line.

[9]A supplementary flow chart in the appendix synthesises the selection of the sample.

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Declines in abortion rates would suggest that any decreases in births found are mostly due to increases in access to contraceptives.

Methodologically, measuring behavioural outcomes correctly using individual-level data is always challenging because one cannot observe many individual characteristics. In this case, I cannot observe individual preferences for becoming a mother and/or views on contraceptives. Quasi-experimental approaches, in which individuals of similar characteristics are assigned into two groups (treated and untreated), help alleviate these concerns. I follow the literature and employ a DiD approach using repeated cross-sections in which I compare women in states that expanded Medicaid to women in states that opted out of the expansions (the control group). While DiD estimations use strong assumptions, DiD estimates to investigate the impact of Medicaid expansions have been widely used within this context.[10]. Yet, as it is customary, I examine the validity of those assumptions below. Similar to other studies of Medicaid expansions, the data seem to significantly reduce these concerns.

In this sample, I cannot observe pregnancy or abortion. I only observe whether the individual gave birth in a particular year. To account for the 9-month gestation period, I drop the implementation year from the analysis. This also helps alleviate concerns about the timing of the interview, a known problem when using ACS data in a DiD framework. I use a linear probability model in a general DiD regression equation to estimate the impact of the expansion on the probability of giving birth for the first time:

$$y_{ist} = \alpha + \beta_1\, Expansion_s + \beta_2\, Post_t + \beta_3(Post_t \times Expansion_s) + \beta_6 Z_{ist} + \varepsilon_{ist} \tag{1}$$

where y_{ist} is an indicator variable that takes the value of 1 if the woman i in state s at year t has given birth to her *first* child within the last 12 months and 0 otherwise. $Post_t$ (i.e. implementation) is a dummy variable equal to 1 for all individuals in the post-implementation period and 0 otherwise. Similarly, $Expansion_s$ (i.e. treatment) takes the value of 1 if the individual i lives in a state that expanded Medicaid. Accordingly, β_1 captures the average difference in the probability of pregnancy between women in states who opted in and those in states who opted out of the expansions during the period before the reform. Similarly, β_2 measures the change in the probability of childbearing among women in the control group between pre- and post-periods. β_3 is the parameter of interest, measuring the impact of the policy. It measures the estimated difference in the propensity of giving birth between women in the expansion states and women in the non-expansion states during the post-implementation period, after accounting for other possible behavioural changes.[11]

The regression also includes a set of individual-specific characteristics to account for the possibility of systematic individual differences. One challenge when identifying the impact of the expansion using the ACS sub-sample of women in the estimation of the model is that only a few observed individual characteristics are truly exogenous. As a result, the preferred specification only includes controls for race and age, two truly exogenous variables.[12] I also include state

[10]These include Johnston *et al.* (2018); Eliason *et al.* (2022*b*); Gartner *et al.* (2022) and others mentioned in the background section.

[11]The estimated coefficient for β_3 can also be interpreted as the difference in the probability of giving birth between women in the expansion states during the post-implementation period relative to women in those same states during the pre-implementation period.

[12]Although some of the traditional controls can be endogenous, questioning their inclusion on the right-hand side, I have also estimated the model including other controls: a dummy that indicates whether the individual has been a food stamp recipient, the woman's income (as a per cent of the FPL to account for her proximity to the eligibility threshold), whether the woman speaks English, and dummies for the level of education. A metro area dummy is also included in such an estimation. These estimates are available upon request.

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dummies to account for state-specific characteristics that could affect pregnancy rates in each state.[13] Time dummies are also included to account for common shocks that could affect overall fertility rates which could ultimately confound the estimated impact of the policy. Since teenagers may be able to obtain health services through SCHIP (State's Children Health Insurance Program), and previous research has found different results for different age groups, I estimate the model separately for teenagers and non-teenagers.[14]

According to Bertrand *et al.* (2004), I use White standard errors clustered at the state level, and weight all observations using census population weights. While many of the expansions were implemented in 2014, some states expanded Medicaid later in the sample. For most states, I am able to capture 3 years before and 3 years after the implementation. For states that expanded Medicaid after 2014, the post-implementation period is shorter due to data availability. Of note, some recent literature has shown that the estimates from a DiD with two-way fixed effects with varying treatment timing are a weighted average of several comparisons, potentially providing biased estimates (Goodman-Bacon, 2021). In the sensitivity analysis, I re-estimated the regression, dropping states that implemented the expansions after 2014.

Other concerns include the income eligibility thresholds imposed by the reform. Individuals close to the threshold may adjust their working hours to become eligible. For example, individuals in non-expansion states that are close to the 100 per cent threshold may work more to access subsidies. In expansion states, individuals just above 138 per cent of the FPL may work a little less to have access to Medicaid. Although the literature has found that these expansions had no impact on labour market outcomes (see e.g. Kaestner *et al.*, 2017), this could be a concern. Yet if the individuals crossing the threshold are those with high risks of pregnancy, then having these individuals cross the threshold would only increase the overall differences in the probability of giving birth among poor women between expansion and non-expansion states. In the sensitivity analysis, I also check the robustness of the initial estimates by expanding the sample to include women with incomes up to 138 per cent of the FPL. This not only helps me capture those individuals, but it also allows me to explore whether health care subsidies through the marketplaces – available to those between 100 and 138 per cent of the FPL in non-expansion states – partially offset the difference observed as a result of the expansions.

Finally, and as mentioned before, it is not clear, *a priori*, what the impact of the expansions could be. In addition, there are several channels through which the law may impact the decision to become a mother, and disentangling these is a difficult task. However, the institutional setup of these expansions allows me to explore the marginal role of newly gained access to care. Before these expansions, some states had already expanded Medicaid family planning services to low-income women. Some of the states that expanded the full scope of Medicaid services under the ACA had prior family planning expansions, and some did not. This unique setup allows me to examine if there is an impact among states that had previously expanded family planning services. Since most contraceptive methods were already available under the prior expansions (i.e. waivers/SPAs), any observed impact in this group of states can be driven by additional factors, other than the access to contraceptives.

Thus, I re-estimate the model by limiting the sample to women in states without prior expansions of family planning services, and then again only using women in states with prior family planning expansions. Any impacts in states with prior income-based family planning expansions may be attributed to factors such as better employment options due to better health, better information from primary doctors or even information about the availability of contraceptives – driven by the publicity received by the reform and the contraceptive provisions. Kearney and Levine (2009) refer to such potential drivers as 'spillover' effects.

[13]When I estimate the model without state dummies I obtain both qualitatively and quantitatively similar results.

[14]Although I control for race, I do not re-estimate the model by race. I leave that analysis for future research.

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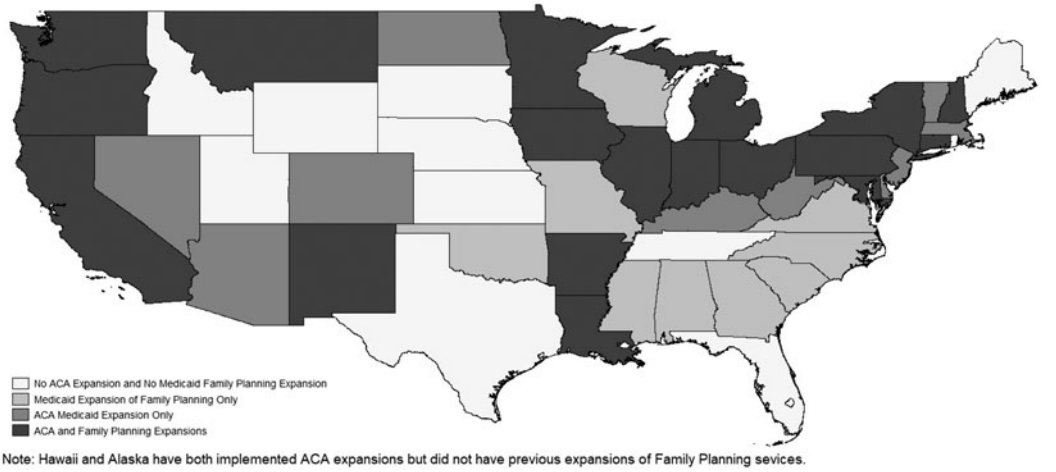

Figure 1. State decisions on Medicaid ACA and family planning expansions as of 2016.

Figure 1 shows the set of Medicaid expansions by state.[15] States in black are those that had prior [income-based] expansions of family planning services and also expanded the full scope of Medicaid services under the ACA. Similarly, those in light grey are those that had prior expansions but did not expand Medicaid under the ACA. Those in dark grey expanded Medicaid under the ACA, but had no previous income-based expansions of family planning services. Those in white have not had any of these income-based expansions.

In Table 1, I provide descriptive statistics to summarise the data. The full sample of women with incomes at or below the FPL without access to private insurance contains 372,376 single women between 15 and 44 years of age. As mentioned above, all of these women are either childless or have given birth to their first child within the 12 months prior to the survey interview. The average woman in this sample is approximately 22 years of age. Sixty per cent are white, and only about 9 per cent have some type of college degree. Approximately 35 per cent live in metro areas and almost all of them speak English. As shown, the majority of women remained childless with only approximately 4.7 per cent of women in this group becoming mothers in the 12 months prior to the interview.

In the sample, the percentage of women who gave birth to their first child in Medicaid expansion states before the implementation period is 4.91 per cent. In non-expansion states, this rate is slightly higher at 5.30 per cent. After the ACA Medicaid expansions, this rate decreases by 0.90 percentage points in expansion states, and 0.66 percentage points in non-expansion states. Although not conclusively, these summary statistics would suggest that the new access to Medicaid could have played a role in further reducing births.

Before estimating the model in equation (1), I check whether the women in the sample of states that expanded Medicaid are comparable to the sample of women in the states that opted out of the expansion (see Table 2). Except for the percentage of people living in a metro area, there are no major differences between the two samples. This suggests that along dimensions that could influence becoming a first-time mother, women in both groups are very similar, providing additional validity to the treatment/control assumption in the DiD estimator.

[15]This map is analogous to that of Figure 6 in Ranji *et al.* (2016), but I have re-codified some of the states according to the data provided by the Guttmacher Institute in Sonfield and Gold (2011).

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Table 1. Descriptive statistics: women at or below 100 per cent of FPL

Variables	Mean	S.Dev.	Min	Max
Age	22.72	7.723	15	44
White	0.596	0.491	0	1
Bachelor's degree	0.0428	0.202	0	1
Associate's degree	0.0346	0.183	0	1
Master's degree	0.00747	0.0861	0	1
Professional or doctorate degree	0.00242	0.0491	0	1
Food stamp (SNAP) recipient	0.389	0.487	0	1
Speaks English	0.991	0.0959	0	1
Metro area	0.361	0.480	0	1
Income as % of poverty line	0.156	0.265	0	1
Childbirth in last year	0.0469	0.211	0	1
Non-expansion state (pre-treatment)	0.0530	0.2241	0	1
Expansion state (pre-treatment)	0.0491	0.2162	0	1
Non-expansion state (post-treatment)	0.0464	0.2105	0	1
Expansion state (post-treatment)	0.0401	0.1961	0	1
Number of observations	372,376			

Sample from the American Community Survey (ACS) including 3 years before and after the policy implementation. The sample includes single women, at or below the federal poverty line, lacking private insurance who were either childless or gave birth for the first time across US states and DC between the ages of 15 and 44. Teenage women are those between the ages of 15 and 19. Adult women are those between the ages of 20 and 44.

Table 2. Descriptive statistics: expansion versus non expansion states

Variables	Expansion states	Non-expansion states
Age	22.45	22.88
White	0.608	0.588
Bachelor's degree	0.033	0.048
Associate's degree	0.032	0.036
Master's degree	0.005	0.008
Professional or doctorate degree	0.002	0.003
Food stamp (SNAP) recipient	0.396	0.383
Speaks English	0.991	0.991
Metro area	0.242	0.437
Income as % of poverty line	0.151	0.159
Number of observations	145.626	226,750

Sample from the American Community Survey (ACS) including 3 years before and after the policy implementation. The sample includes single women, at or below the federal poverty line, lacking private insurance who were either childless or gave birth for the first time across US states and DC between the ages of 15 and 44. Teenage women are those between the ages of 15 and 19. Adult women are those between the ages of 20 and 44.

But the identification of the DiD estimation relies on some other important assumptions. One of the most important ones is the parallel trend assumption. Figure 2 displays the proportion of women giving birth to their first child by year. The horizontal axis is a normalised measure of

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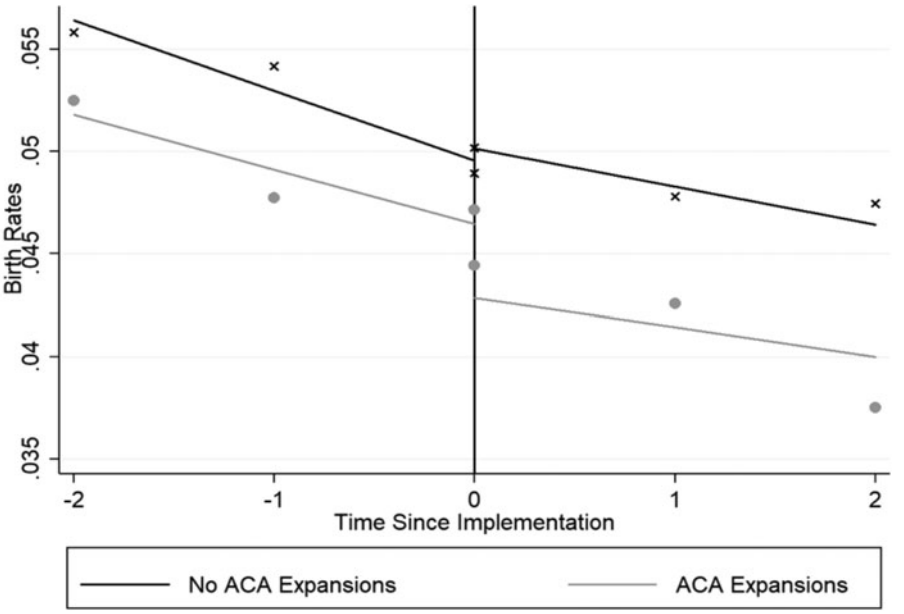

Figure 2. Proportion of low-income, single, women giving birth to first child.
Note: The figures capture 3 years prior and post-implementation period. For illustration purposes, the zero line represents the time right before and right after implementation.

time since implementation. To get a better sense of the validity of the assumption, I show the linear trends during the pre- and post-implementation periods. Although the birth rates of first-born children among low-income single women were trending downwards before the implementation period, the linear fitted trends show that in both groups they are behaving similarly, providing reasonable confidence in the DiD approach and the parallel trend assumption.[16] Of note, although the formal results are presented below, the picture suggests a decline in first live births due to the expansions.

For completeness, I show an event study in Figure 3, and conduct a pre-policy trend test. Although not perfect, the event study shows, for the most part, no statistically significant difference during the pre-treatment period. Most differences are observed after Medicaid was expanded. The results shown in Figure 3 help alleviate concerns that trends could have still diverged in the absence of the policy, and there is a statistically significant difference 2 years prior to the policy implementation. In a former test for pre-policy trends, I find that the difference in outcomes during the pre-implementation period has a coefficient of 0.0026 (p-value = 0.217) when using all states, and 0.0016 (p-value = 0.428) when excluding the states that expanded Medicaid after 2014. Although the DiD has been widely used in the analysis of Medicaid expansions in the literature, these tests, taken together, help improve confidence in this method for this specific research question.

In the sensitivity analysis, I provide one additional estimation to help gain confidence in the DiD estimates. Instead of using the actual implementation year, I conduct the analysis using year −2 as a placebo test. I specifically choose this year since it showed statistical differences in the event study.

[16]Note that many studies using difference-in-difference rely on pre-implementation trends for as little as three years. See for example Kaestner *et al.* (2017).

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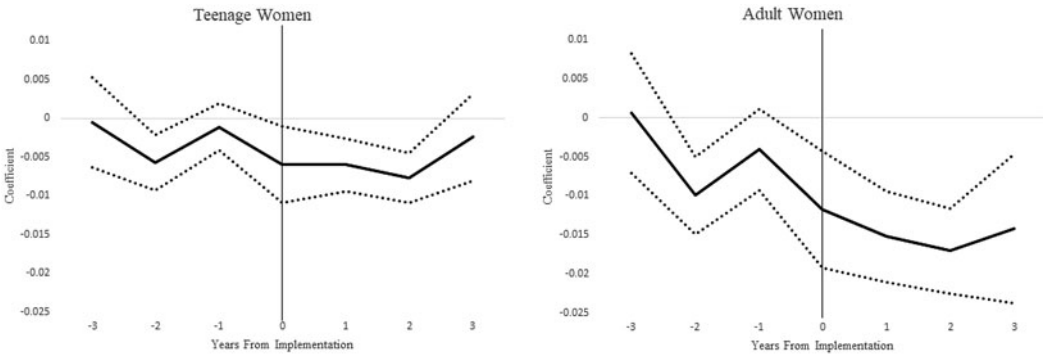

Figure 3. Event study: estimated coefficients and 95 per cent confidence intervals.

4. Results

In Table 3, I present the estimates from equation (1). Although in a traditional DiD estimator the treatment and control groups are comparable in any other dimensions, I follow the literature and in one specification I add individual exogenous characteristics that may potentially influence the propensity to give birth.[17] While these results suggest a reduction in the propensity to give birth to a firstborn among women who gained access to Medicaid through the expansions, the estimated differences are not statistically indistinguishable from zero. As shown, while the DiD estimates suggest that the expansion of Medicaid services under the ACA had no differential effect on teens, there is statistical evidence suggesting that it helped further reduce the propensity of giving birth to a first child among adult single women. Note that the sample sizes are similar for both teens and adults, reducing concerns about the sample size driving the statistical significance.

Many of the states that expanded Medicaid services under the ACA, however, had already expanded family planning services to many of these women. Naturally, one may be concerned that births in many of those states may have been trending downwards at faster rates. Some of the observed impacts may be driven by these states' prior efforts to curb unintended pregnancies, rather than by the ACA expansions. As mentioned before, I split the sample into states with and without prior expansions of Medicaid family planning services. Although there is a small correlation between states that expanded Medicaid under the ACA and the states that expanded their family planning services through waivers (i.e. SPAs), many of the states with prior expansions did not expand the full scope of Medicaid services under the ACA. Similarly, of all the states without prior income expansions of family planning services, some did and some did not expand Medicaid under the ACA. By analysing these two groups separately, I am not only able to reduce some of the potential identification problems due to the comparability of the treatment and control groups, but I am also able to shed some light on the possible mechanisms through which the policy might have impacted the observed reduction in the proportion of first live births among this group of women.

Table 4 displays the results obtained when I discriminate between states that had not implemented any prior income expansions of Medicaid's family planning services. The results on the DiD estimates are consistent with those in Table 3; concentrated among adult women. As shown, once one controls for age and race, there seems to be some statistical evidence – albeit weaker at a 10 per cent significance level – that the ACA expansions helped reduce first live births among

[17]Other variables in Table 2 may also be thought to affect the outcome variable as well. However, many of those variables may be endogenous. For completeness, I also estimate the model using these other economic variables. The results are available upon request.

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Table 3. State Medicaid expansions on the propensity of pregnancy: by age group

	All women		Teenage women		Adult women	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Expanded Medicaid (treatment)	−0.0058***	−0.0042***	−0.0044***	−0.0029**	−0.0039*	−0.0039*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Year's after expansion (implementation)	−0.0089	−0.0089	−0.0247	−0.0244	0.0049	0.0049
	(0.006)	(0.006)	(0.016)	(0.016)	(0.007)	(0.007)
Treatment × implementation (DID)	−0.0026	−0.0028	0.0028	0.0023	−0.0108***	−0.0108***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
White		−0.0053***		−0.0038**		−0.0040
		(0.002)		(0.002)		(0.002)
Age		0.0006***		0.0128***		−0.0040***
		(0.000)		(0.001)		(0.000)
Constant	0.0693***	0.0579***	0.0461***	−0.1691***	0.2058***	0.2058***
	(0.002)	(0.003)	(0.002)	(0.015)	(0.011)	(0.011)
Observations	372,376	372,376	177,900	177,900	194,476	194,476
State dummies	Yes	Yes	Yes	Yes		
Time dummies	Yes	Yes	Yes	Yes		

The sample used in the regressions is restricted to low-income, single women lacking private insurance who were either childless or gave birth for the first time across US states and DC between the ages of 15 and 44. Teenage women are those between the ages of 15 and 19. Adult women are those between the ages of 20 and 44. Robust standard errors clustered at the state level in parentheses.

Table 4. ACA Medicaid expansions on the propensity of pregnancy: women at or below FPL

	All women		Teenage women		Adult women	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: states without prior expansions						
Expanded Medicaid (treatment)	0.0192***	0.0154***	−0.0164***	−0.0250***	0.0503***	0.0421***
	(0.001)	(0.002)	(0.001)	(0.002)	(0.004)	(0.004)
Year's after expansion (implementation)	−0.0419***	−0.0420***	−0.1402***	−0.1389***	0.0592***	0.0553***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.007)	(0.007)
Treatment × implementation (DID)	−0.0014	−0.0015	0.0038	0.0035	−0.0092**	−0.0101**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.005)
White		−0.0080***		−0.0066**		−0.0065*
		(0.003)		(0.003)		(0.003)
Age		0.0007***		0.0135***		−0.0040***
		(0.000)		(0.001)		(0.000)
Constant	0.0472***	0.0386***	0.0381***	−0.1794***	0.0526***	0.1701***
	(0.003)	(0.003)	(0.003)	(0.011)	(0.003)	(0.009)
Observations	125,578		62,075		63,503	
Panel B: states with prior expansions only						
Expanded Medicaid (treatment)	−0.0142***	−0.0135***	−0.0161***	−0.0150***	−0.0141***	−0.0141***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)
Year's after expansion (implementation)	−0.0059	−0.0058	−0.0100**	−0.0097**	−0.0005	−0.0022
	(0.004)	(0.004)	(0.004)	(0.004)	(0.006)	(0.006)
Treatment × implementation (DID)	−0.0022	−0.0023	0.0017	0.0010	−0.0084	−0.0089*
	(0.003)	(0.003)	(0.004)	(0.004)	(0.005)	(0.005)

(*Continued*)

Table 4. (*Continued.*)

	All women		Teenage women		Adult women	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
White		−0.0040*		−0.0024		−0.0029
		(0.002)		(0.002)		(0.003)
Age		0.0006***		0.0125***		−0.0040***
		(0.000)		(0.001)		(0.001)
Constant	0.0697***	0.0584***	0.0442***	−0.1661***	0.0942***	0.2077***
	(0.002)	(0.005)	(0.002)	(0.022)	(0.004)	(0.017)
Observations	246,798		115,825		130,973	

The sample used in the regressions is restricted to low-income, single women lacking private insurance who were either childless or gave birth for the first time across US states and DC between the ages of 15 and 44. Teenage women are those between the ages of 15 and 19. Adult women are those between the ages of 20 and 44. Robust standard errors clustered at the state level in parentheses.

women in states with prior family planning expansions, suggesting that the impact may not be solely explained by the newly gained access to contraceptives.

But the ACA Medicaid expansions extended coverage to adults with incomes up to 138 per cent of the FPL. Individuals below the FPL in *non-expansion* states were not eligible for any coverage. However, individuals in those same non-expansion states with incomes between 100 and 138 per cent of the FPL became eligible to obtain health care coverage using government subsidies through the exchange programme. If the exchanges were as effective as Medicaid in providing coverage, and this coverage also translated into higher utilisation of contraceptives, one may observe a different impact when one includes women above the poverty line but below 138 per cent of the FPL.

In addition, while some of the literature has found little evidence of work effort changes as a result of the Medicaid expansions, one may still be concerned with selection issues around the income cut-off. For example, women with incomes slightly below the FPL in states where Medicaid was not expanded had an incentive to increase work and earnings to gain access to the exchanges and their corresponding ACA subsidies. The results are shown in Table 5. Except for adding statistical significance to the coefficient for states with prior family planning expansions, the results are consistent with those observed above.

In the following section, I conduct a few other estimations to further check the sensitivity and robustness of the main results.

5. Sensitivity analysis

As mentioned before, recent findings in the DiD literature suggest that the estimates of two-way fixed effects when there is time variation in the treatment could be biased. In the sample above, five of the expansion states did not expand Medicaid until later. To reduce concerns associated with the differences in timing, I re-estimate the results for the main sample of women at or below the FPL, but dropping the five states that expanded Medicaid after 2014. For brevity, in Table 6 I only show the estimated DiD coefficients.

Again, the results are consistent with the initial estimates, although not statistically significant among women in states with prior expansions of family planning services. While it is known in the literature that the longer the period, especially during the pre-implementation period, the estimates become less reliable given that one is more likely to violate the common trend assumption, IPUMS USA provides ACS data for several years before the ACA Medicaid Expansions. I check whether the results are robust to the use of a longer pre-implementation period, and to alleviate concerns about parallel trends I include group-specific linear time trends. These results are presented in Table 7. Once one allows for a longer pre-implementation period, the estimated impact is still negative, although only statistically significant for women in states in which family planning expansions were already available.

One concern with these types of estimates is whether one is truly observing the impact of treatment. One way to check is by conducting a falsification/placebo test. I can do it in two different ways. One, I can re-estimate the model using a sample of women who were not impacted by the expansions. Another is using a placebo year. In Table 8, I show the results for both. Panel A contains estimates on a sample of single, childless women with incomes between 250 and 400 per cent of the FPL, a group of women that was not impacted by the Medicaid expansions. While this sample of women may have been affected by the ACA through the exchange subsidies, at this income level, the subsidies were a nationwide policy. I find no sufficient statistical evidence suggesting an association between Medicaid expansions and fertility among these women. However, one must note that the lack of statistical evidence could come from having a much smaller sample, which yields larger standard errors. As such, I also estimate the model using a placebo year. In panel B, I provide the estimates by using 2012 as the expansion year and, again, 3 years for the pre- and post-implementation periods. I purposely choose 2012 since

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Table 5. ACA Medicaid expansions on the propensity of pregnancy: women at or below 138 per cent of FPL

	All women		Teenage women		Adult women	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: all states						
Expanded Medicaid (treatment)	−0.0047***	−0.0030**	−0.0042***	−0.0028**	−0.0073***	−0.0019
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Year's after expansion (implementation)	−0.0091	−0.0091	−0.0244	−0.0240	0.0047	0.0033
	(0.006)	(0.006)	(0.016)	(0.016)	(0.008)	(0.008)
Treatment × implementation (DID)	−0.0033*	−0.0035*	0.0024	0.0020	−0.0108***	−0.0112***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
White		−0.0052***		−0.0035**		−0.0050**
		(0.002)		(0.002)		(0.002)
Age		0.0004***		0.0127***		−0.0038***
		(0.000)		(0.001)		(0.000)
Constant	0.0675***	0.0601***	0.0455***	−0.1677***	0.0862***	0.1965***
	(0.002)	(0.003)	(0.002)	(0.014)	(0.002)	(0.011)
Observations	404,869		181,100		223,769	
Panel B: states without prior expansions						
Expanded Medicaid (treatment)	0.0166***	0.0126***	−0.0143***	−0.0219***	0.0396***	0.0329***
	(0.001)	(0.002)	(0.002)	(0.003)	(0.003)	(0.004)
Year's after expansion (implementation)	−0.0404***	−0.0404***	−0.1385***	−0.1372***	0.0477***	0.0453***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.007)	(0.007)
Treatment × implementation (DID)	−0.0021	−0.0022	0.0034	0.0032	−0.0093**	−0.0103**
	(0.002)	(0.002)	(0.003)	(0.003)	(0.004)	(0.004)
White		−0.0082***		−0.0065**		−0.0077**
		(0.003)		(0.003)		(0.004)

Age		0.0005***		0.0132***		−0.0038***
		(0.000)		(0.001)		(0.000)
Constant	0.0455***	0.0411***	0.0370***	−0.1763***	0.0505***	0.1625***
	(0.003)	(0.003)	(0.003)	(0.011)	(0.003)	(0.008)
Observations	136,499		63,202		73,297	
Panel C: states with prior expansions only						
Expanded Medicaid (treatment)	−0.0135***	−0.0129***	−0.0158***	−0.0151***	−0.0132***	−0.0135***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Year's after expansion (implementation)	−0.0068	−0.0067	−0.0101**	−0.0095**	−0.0024	−0.0036
	(0.005)	(0.005)	(0.004)	(0.004)	(0.007)	(0.007)
Treatment × implementation (DID)	−0.0024	−0.0026	0.0012	0.0006	−0.0081*	−0.0086**
	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
White		−0.0038*		−0.0020		−0.0037
		(0.002)		(0.002)		(0.003)
Age		0.0004**		0.0125***		−0.0039***
		(0.000)		(0.001)		(0.000)
Constant	0.0681***	0.0609***	0.0435***	−0.1665***	0.0892***	0.1995***
	(0.002)	(0.005)	(0.002)	(0.021)	(0.003)	(0.016)
Observations	268,370		117,898		150,472	

The sample used in the regressions is restricted to low-income, single women lacking private insurance who were either childless or gave birth for the first time across US states and DC between the ages of 15 and 44. Teenage women are those between the ages of 15 and 19. Adult women are those between the ages of 20 and 44. Robust standard errors clustered at the state level in parentheses.

Table 6. ACA Medicaid expansions on the propensity of pregnancy: excluding late expanders

	All women		Teenage women		Adult women	
Variables	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: all states						
Treatment × implementation (DID)	−0.0016	−0.0018	0.0033	0.0029	−0.0097***	−0.0097***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
Observations	350,087		167,533		182,554	
Panel B: states without prior expansions						
Treatment × implementation (DID)	−0.0013	−0.0014	0.0037	0.0033	−0.0089*	−0.0098**
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.005)
Observations	124,795		61,684		63,111	
Panel C: states with prior expansions only						
Treatment × implementation (DID)	−0.0009	−0.0011	0.0023	0.0018	−0.0068	−0.0075
	(0.003)	(0.003)	(0.004)	(0.004)	(0.005)	(0.005)
Observations	225,292		105,849		119,443	

Regressions are estimated using a linear probability model and population weights, and in all instances include year and state dummies. The sample used in the regressions is restricted to low-income, single women lacking private insurance who were either childless or gave birth for the first time across US states and DC between the ages of 15 and 44. Teenage women are those between the ages of 15 and 19. Adult women are those between the ages of 20 and 44. Robust standard errors clustered at the state level in parentheses. Late expanders include Montana, Louisiana, Indiana, Pennsylvania and Alaska.

this is the year in which we see statistical differences in the event study. In all cases, the estimated DiD coefficients are statistically indistinguishable from zero and positive in some cases. While neither one of these two approaches is perfect, together they provide some additional validity to the results found.

6. Discussion

As stated before, *a priori*, it is not clear whether one should expect a negative or a positive impact. Unlike the prior expansions, the ACA Medicaid expansions provided more than simply access to more contraceptives. These expansions provided health coverage to low-income women, decreasing some of the costs associated with having a child. Some of the studies mentioned in the background section have found that health insurance coverage increased due to the ACA Medicaid expansions. As Table 9 below shows, a similar DiD estimate for this sample of women suggests that these expansions not only increased health coverage through insurance but that this uptake was driven by a shift from private insurance to public insurance. The table shows the DiD estimates on the proportion of people with insurance, either public or private. Note that because we are including women with private insurance, the sample is reasonably larger. Otherwise, the sample still contains women with the same socio-economic characteristics as those in the main analysis.

Panel A of the table contains the results on the overall propensity of being insured – publicly or privately. Panel B shows the DiD estimates when examining the propensity of women to have public insurance (i.e. those covered by Medicaid, Medical Assistance or any other kind of government-assistance plan), and panel C shows the impact of the expansion on the propensity

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Table 7. Difference-in-difference estimate using a longer pre-implementation period with time trends

	All women	Teenage women	Adult women
Panel A: full sample			
All states	−0.0086**	0.0034	−0.0220***
	(0.004)	(0.004)	(0.006)
Observations	499,960	240,926	259,034
No prior expansions states	−0.0017	0.0056	−0.0106
	(0.005)	(0.004)	(0.009)
Observations	165,758	82,547	83,211
Prior expansions states	−0.0093	0.0016	−0.0217**
	(0.006)	(0.007)	(0.009)
Observations	334,202	158,379	175,823
Panel B: excluding late expanders			
All states	−0.0071*	0.0044	−0.0203***
	(0.004)	(0.004)	(0.006)
Observations	461,145	222,488	238,657
No prior expansions states	−0.0016	0.0053	−0.0100
	(0.005)	(0.004)	(0.009)
Observations	164,157	81,701	82,456
Prior expansions states	−0.0077	0.0028	−0.0201**
	(0.006)	(0.007)	(0.009)
Observations	296,988	140,787	156,201

Regressions are estimated using a linear probability model and population weights, and in all instances include year and state dummies. The sample used in the regressions is restricted to low-income, single women lacking private insurance who were either childless or gave birth for the first time across US states and DC between the ages of 15 and 44. Teenage women are those between the ages of 15 and 19. Adult women are those between the ages of 20 and 44. Robust standard errors clustered at the state level in parentheses. Late expanders include Montana, Louisiana, Indiana, Pennsylvania and Alaska.

to carry public insurance, conditional on having insurance. Again, here I allow for a longer pre-implementation period and include linear trends as controls. As shown, although there seems to be a statistically significant increase in the propensity of being insured driven by states with prior family planning expansions, the results in panels B and C suggest that there was an increase in the propensity of being publicly insured in all the states that expanded Medicaid under the ACA. Moreover, this increase in public insurance is observed even when I restrict the sample to those who report being insured. Averaged across individuals, this suggests that, out of those who have insurance, the fraction with public insurance increased with the expansions. Of note, in some instances, the increase is also evident among teen women. For the most part, this is consistent with other findings in the literature, with increases in insurance close to 16 per cent.

Taking all results into account, there is statistical evidence that the Medicaid expansions did seem to increase the proportion of low-income women with public insurance, which was accompanied by a decrease in their propensity to give birth among single women. Moreover, since the data are limited to women without any other children, the results show potential for these expansions to decrease the chances among low-income women to become single mothers, an important policy question. While I and other researchers have pointed out the difficulties in explaining the causal channels through which the expansions might have affected the birth rate, the results

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Table 8. Difference-in-difference estimates: falsification of results

	All women	Teenage women	Adult women
Panel A: women between 250 and 400% of FPL			
All states	−0.0087	0.0750	−0.0103
	(0.006)	(0.049)	(0.006)
Observations	17,623	394	17,229
States without prior expansions	−0.0015	0.1277	−0.0052
	(0.008)	(0.077)	(0.009)
Observations	6186	163	6023
States with prior expansions	−0.0107	0.0249	−0.0108
	(0.011)	(0.071)	(0.012)
Observations	11,437	231	11,206
Panel B: 2012 as the expansion year			
All states	0.0024	−0.0003	0.0038
	(0.002)	(0.003)	(0.003)
Observations	318,269	153,460	164,809
States without prior expansions	−0.0002	−0.0035	0.0030
	(0.004)	(0.005)	(0.005)
Observations	105,123	52,210	52,913
States with prior expansions	0.0038	−0.0004	0.0060
	(0.003)	(0.004)	(0.004)
Observations	213,146	101,250	111,896

Regressions are estimated using a linear probability model and population weights, and in all instances include year and state dummies. The sample used in the regressions is restricted to low-income, single women lacking private insurance who were either childless or gave birth for the first time across US states and DC between the ages of 15 and 44. Teenage women are those between the ages of 15 and 19. Adult women are those between the ages of 20 and 44. Robust standard errors clustered at the state level in parentheses.

suggest that newly gained access to contraceptives may not be the only mechanism. Access to other services associated with health care coverage seems to provide additional effects, another implication policymakers in non-expansion states may consider important.

7. Limitations

Theoretically, there are several ways in which access to Medicaid may have impacted births, and the impacts can go in different directions. The most direct way is through access to contraceptives, which is associated with lower births. However, there also seems to be an impact in states that had already expanded access to family planning.

While it has been hypothesised that access to care can increase the propensity of conception due to better maternal health and/or lower costs of not working to care for a baby, it can also decrease the propensity since better health can also drive women into the labour force, making them more likely to delay having children. Access to a healthcare professional can also help them get access to more information about contraceptives, changing the demand side. Yet, the ACA expansions may have also changed the supply side. States that expanded Medicaid may have also experienced an increase in clinics, including those providing family planning services, including access to abortion – although a limited exploratory analysis in Eliason *et al.* (2022*b*) suggests no impact on abortions.

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Table 9. Difference-in-difference estimate of ACA Medicaid expansions on insurance

	All women	Teenage women	Adult women
Panel A: propensity of being insured			
All states	0.0220	0.0009	0.0467**
	(0.013)	(0.011)	(0.018)
Observations	1,332,267	772,746	559,521
No prior expansions states	0.0097	−0.0088	0.0351
	(0.016)	(0.010)	(0.027)
Observations	432,501	255,150	177,351
Prior expansions states	0.0310*	0.0153	0.0510**
	(0.015)	(0.012)	(0.020)
Observations	899,766	517,596	382,170
Panel B: propensity of having public insurance			
All states	0.0560***	0.0284***	0.0914***
	(0.013)	(0.011)	(0.018)
Observations 1,332,267	772,746	559,521	
No prior expansions states	0.0559***	0.0233*	0.1009***
	(0.015)	(0.012)	(0.025)
Observations	432,501	255,150	177,351
Prior expansions states	0.0557***	0.0338**	0.0837***
	(0.016)	(0.014)	(0.022)
Observations	899,766	517,596	382,170
Panel C: public insurance, conditional on insurance			
All states	0.0951***	0.0313	0.1589***
	(0.026)	(0.021)	(0.035)
Observations	541,108	267,929	273,179
No prior expansions states	0.0806**	0.0174	0.1466***
	(0.032)	(0.024)	(0.050)
Observations	178,153	90,604	87,549
Prior expansions states	0.0983***	0.0530**	0.1497***
	(0.030)	(0.024)	(0.040)
Observations	362,955	177,325	185,630

Regressions are estimated using a linear probability model and population weights, and in all instances include year and state dummies. The sample used in the regressions is restricted to low-income (⩽100 per cent of FPL), single women who were either childless or gave birth for the first time across US states and DC between the ages of 15 and 44. Teenage women are those between the ages of 15 and 19. Adult women are those between the ages of 20 and 44. The outcome variable in panel A is whether a woman has either public or private insurance, in panel B simply whether the individual has public insurance (out of the whole sample), and in panel C whether the individual woman has public insurance (out of the sample of those with insurance). Robust standard errors clustered at the state level in parentheses.

Furthermore, although the list of contraceptives provided under the family planning expansions was comprehensive, the ACA expansions may have also increased the number of contraceptives provided, including more effective ones. Unfortunately, the exact mechanisms for which health insurance coverage can help decrease births among this particularly vulnerable group of women are still difficult to isolate in these data.

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At least, the lack of a statistical impact on teenagers suggests that there is reason to think that the decrease was perhaps associated with actually increased access to care and not the publicity that contraceptives received during the ACA debates. Although there has been plenty of work analysing the impact of the ACA expansions on some of these outcomes, investigating these factors in more detail seems like a good pursuit for future research.

8. Concluding remarks

Access to affordable health care is a common concern among politicians in the United States and around the world. One growing concern has been the availability of affordable contraceptives for women at all income levels. Previous literature has highlighted the importance of such access as it has helped with the economic empowerment of women throughout history. When women are better able to control their fertility without interfering with their sexual lives, women can better plan for their future, dedicate more time to education and prepare themselves better for future motherhood. Recent literature has found some evidence that providing access to family planning services has helped reduce fertility among different groups of women. From a policy perspective, providing this access to low-income women can be of particular importance. Indeed, reducing the number of live births among low-income, single women can not only help these women economically, but it can also save taxpayers' money in the future.

This study provides initial evidence that access to Medicaid helped to further reduce the probability of giving birth to a first child among single adult women at or below the poverty line. While birth rates among these women were already trending downward, the evidence suggests an additional decrease in states that expanded Medicaid under the ACA. Measured at the mean annual rate in the control group during the pre-implementation period (approximately 5.3 per cent), the post-policy period saw a decrease in the probability of birth in states that expanded Medicaid by approximately 1.1 percentage points. These numbers suggest an impact magnitude slightly larger than the other work on this topic, which may underscore the increased potential impact on this particular group of low-income, single women.

Like any empirical analysis, the results can be sensitive. However, taken as a whole, there is evidence that access to contraceptives, along with other healthcare services can play a role. Indeed, even in states where contraceptives were available and affordable through prior Medicaid family planning services, access to care can potentially change the behaviour of women, in this case reducing the propensity to have a child and become single mothers. The results herein should be considered by those policymakers who are interested in reducing single motherhood. According to these results, although access to contraceptives can help, expanding medical services to low-income women can potentially help further.

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Appendix

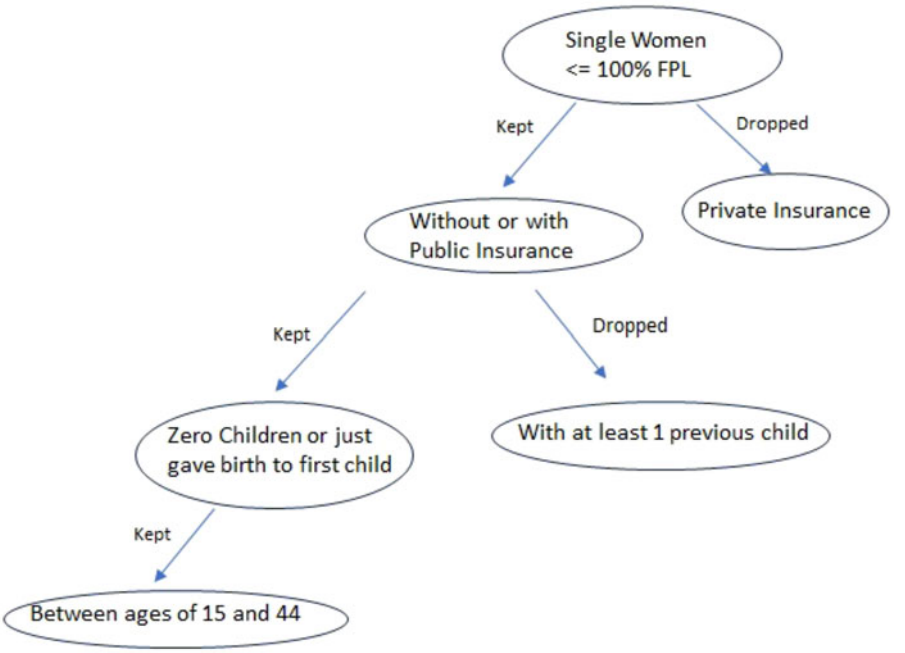

Figure A1. Definition of sample used in the analysis.

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