What is the impact of the expansion of Medicaid in 2014 on the abortion rate in the United State?

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Abstract

The Affordable Care Act (ACA) Medicaid expansion of 2014 allowed thousands of women to benefit from health insurance coverage for abortion. In this article we study the impact of this policy implemented in late 2014 on the abortion rate for women aged between 15 to 44 years old at the state level in the United States. This policy was not adopted by all fifty states, which allowed us to use a difference-in-difference method in order to see if the ACA had an impact on the abortion rate of women that lived in the states where the policy took place. Our results suggested that there is no significant impact of the policy on the abortion rate of women who lived in the states where the policy took place except when we control for some variables like age or the status of employment.

Keywords: Difference in difference, abortion rate, Medicaid expansion.

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1 Introduction

In 1965, Medicare and Medicaid were launched at the initiative of the Democrat president Lyndon Johnson in the United States. Medicare and Medicaid are the two public health care systems of the United States. Medicare is a health care system dedicated to old person aged 65 years old (and more) and disabled person. This federal fund program cover more than 45 millions person over the whole country. We will not focus on Medicare in this article, we are going to focus on women, abortion and the Medicaid expansion program. Medicaid is, like Medicare, a public federal fund health care system that allows people and households with the lowest incomes of the country (under the federal level of poverty) to get access to basic health care. Medicaid cover more than 45 millions of people over the country. Medicaid is governed at the state level which implies that each state of the US decides how much money they want to allocate to health care reimbursement. This can cause disparities at the state level, indeed, each state doesn't allocate the same amount, which leave hundreds of households with difficulties to get access to health care even with Medicaid.

Since its conception, Medicaid has undergone many expansions in policy and range of care, it was under the Obama's administration, particularly with the introduction of Obamacare in 2010, that we decided to work with data from 2010 to 2017. In 2014, a Medicaid policy was put in place. This policy was implemented in only a few states (16 states) and now allows the poorest families and individuals to be reimbursed up to 100% for medical care. Regarding abortions, the least privileged women can now be covered at 100% without restrictives conditions such as an abortion resulting from a rape and/or an incest. Abortion nowadays seems to be taken for granted in the eyes of the society, but it's not the case in all countries, specially in the United States where it was discussed for many years, not even regarding the age, the social background of the women or even the story of this abortion. Women's socioeconomic characteristics have consequences on abortion decisions, abortion rates and risky sexual behaviors. Regarding the disparities and inequalities between women's socioeconomic characteristics in the US, abortion doesn't imply the same consequences between a teenager and an adult for example. That's why this act also has consequences on a woman's life.

The main objective of our study is to understand the impact of this policy on the abortion rate of women in the United States after 2014. In order to fully apprehend the economical background of the outcome of the policy we have used a Difference-in-Difference method. The use of this method allowed us to see if the policy adopted in only a restrictive number of states had had a statistical impact on the abortion rate and see if the socio-economic background

of women is correlated with the disparities of abortion across states. We took into account age, income, ethnicity, education and employment as our main control variables. Of course, a large numbers of others control variables must be taken into account in order to have unbiased estimates and no omitted variables such as the social background of the women, risky behaviors, the use of pills, the place of living of women (individually), the political party of the states, the religious background or even the number of institutions where women can perform an abortion. Indeed, in some conservatives states, the number of abortion clinics is limited, which impact the decision for women to abort or not conditioning on the commute from their home to the clinic and the cost incurred by this decision. The cost may be economic but also psychological.

At our level we only had macroeconomics data for states and not microeconomics, individual-level data and health data. Our results suggest that we have no real statistical significance of this policy on the abortion rate in states where the policy was implemented. This can be due to the fact that since the 90's, the abortion rate of the United States for some states completely dropped (Biggs, Rocca, Brindis, Hirsch, Grossman, 2014) and this drop is essentially explained by the increased use of the pill and also the liberation of women's choice to bear a child. Indeed, it's a heavy consequence for their life to decide whether or not to keep a child. That's why in our results we find that for a certain range of age i.e. for the range 20-24 years old, the abortion rate is decreasing all else being equal. We also find the fact that being employed diminished the abortion rate in states were the policy was implemented. This can be explained by the fact that over the years, women became more and more educated, the use of a contraception become more and more accessible.

In this article, the second part is dedicated to the context and the institutional background of our subject. Part 3 links our research question with the literature previously made related to abortion in the United States. Part 4 describes the data we have used in order to properly estimate the impact of the 2014 Medicaid expansion on the abortion rate in the United States. Part 5 provides the methodology and the empirical analysis used for the Difference-in-Difference method. In Part 6 we mainly present our results, our estimations and we provide some robustness tests. In Part 7 we discuss the limitation of our subject and the problems we have encountered during this project. Finally, Part 8 concludes on the impact of the expansion of Medicaid on abortion rate of women.

2 Context

It's in 1973 that the Supreme Court of the United States ruled in the Roe v. Wade trial that women won the human's right to make their own decision on whether or not they choose to abort a foetus. Since 1973, women can have control over their bodies. This law had made it possible for them to be free from the burden that can represent an unintended pregnancy. Indeed, it has not only economical consequences on the life of a women but also psychological and medical consequences. Until then, abortions where performed illegally, and not always under proper conditions which could lead to medical complications such as diseases or death (Myers, 2022). It has been proven that the right to abort in some states of the US has boost economic growth and prosperity. As a matter of fact, having a child in a women's life is costly, it can represents several years of reduction of labor supply. Then, the legalization of abortion allowed women to increase their labor supply and so to contribute to economic growth (E. Bloom, Canning, Fink, E. Finlay, 2009)

This almost 50 years old law was suspended in June 2022 in some States of the US. It was the case in Arizona where women now cannot abort legally even in the case of a rape and/or an incest. The medical staff in a case of an illegal abortion risk a 5-year prison sentence. These states re-established a 19th century law that prohibits human and specially women's right to own their bodies. This very restrictive law pushed us to learn more about abortion's rights in the USA. It was under Obama's government that a public health insurance expansion took place called the « Affordable Care Act » (ACA). The ACA was first implemented in March 2010. ACA was addressed to the poorest households and individuals of the US by extending Medicaid to people who earns 138% below the Federal Poverty Level (FPL). The FDL is a measure of income made each year which allows administrations to classify individuals and households and actually know if they can benefit from certain programs such as ACA. This public health insurance system allowed thousands of individuals who lived under the poverty rate to have access to basic health care including access to pills for teenagers and young women and access to legal abortion without restrictions i.e. abortion which doesn't result from a rape and/or an incest. The reproductive rights of women has been a war since almost two centuries and the 22's rule puts us back in the 19th century. That's why nowadays the question of abortion in the United States is often discussed and studied.

3 Link to the literature

The literature on this subject is very much relevant today given the waves of demonstrations to block the anti-abortion laws from passing in 2022. A lot of microeconomic literature has acknowledged the importance of abortion on women's life and specially at the psychological and economical level. Indeed, allowing abortion has permit to millions of women to increased their human capital, increased their labor supply and control their fertility as they wanted (E. Bloom, Canning, Fink, E. Finlay, 2009).

Nevertheless, with the introduction of the Medicaid system and its expansion, not only a thousands of households could finally take benefits from reimbursed health care up to 100% but also the poorest women and teenagers could finally abort in safe places and be covered up to 100% of the total medical care required for an abortion and the use of contraception. Biggs, Rocca, Brindis, Hirsch and Grossman (2015) have found that despite the Medicaid expansion in extending the access to abortion, there were a decline in the abortion rate in Iowa which corroborates with our findings. As we'll see later in this article, the fact there is no statistical evidence on the abortion rate after the expansion of Medicaid could be explained by several factors such as omitted variables or the fact that there were an increasing demand for contraception which leads to a decrease of fertility among women and so a decreasing demand for abortions.

Regardless of our findings and the previous literature on the fact that the increasing use of contraception led to a diminishing number of abortion in the US (Dreweke, 2016), Marie Harvey, E. Gibbs, P. Oakley (2020) found that for a certain type of women, specially for the poorest women, the ones whose incomes are under 185% of the the federal poverty level, the Medicaid expansion on abortion actually had a positive and significant impact on the abortion rate in Oregon. They didn't use a Diff-in-Diff approach but a Logit Regression. They used individual-level micro data. They found that the Medicaid-financed abortion increased from 13.4 abortions per 1000 women in 2008 to 16.3 abortions per 1000 women in 2016. They also found that the Medicaid coverage for abortions increased from 11.5% in 2008 to 31.7% in 2016 which confirm our hypothesis that the Medicaid expansion became a better support for women, provided safe places for women to abort and has helped women to gain in « reproductive autonomy ».

As previously said in introduction, some omitted variables could have possibly biased our estimates. We only had access to macroeconomics data and not individual level data which made our estimates not significant. We could however link this with the previous literature. M. Bearak, Lagasse Burke, K Jones (2017), found that allowing abortion enabled women to control their fertility. However, spacial disparities exist and persist in the USA which make fertility

among women unequal. They found at the national level that women aged 15-44 years in 2014 had to travel a median distance of 24km to reach the closest abortion clinic. This could possibly cause endogeneity in our research because, women who are the most disadvantaged, are the one who live in rural area et so the one's who live far from an abortion clinic. Furthermore, the closest abortion clinic could also be not sufficient in terms of medical services, medical staff and psychological support. This added to the economic cost of travelling to a clinic makes the choice difficult for women to decide or not to abort and make abortion rate among the states unequal and disparate.

4 Data

In this section we will describe the data used in our empirical project as well as presenting summary statistics of the data.

4.1 Data sources and sample

Our final data are from two different databases. We have panal data, at a states level.

We used data from the Guttmacher institute, that is a research and policy organization aiming to improve sexual and reproductive health and rights worldwide. The dataset we used is containing information about abortion rate, pregnancy rate, birth rate, population of women, on a state level in United States from 1988 to 2017. We only work with data between 2010 to 2017. Data availability on abortion is limited so that is why we were not able to have access to individual data for abortion. We were therefore constrained to work with public-use data. We choose to keep for our project, the abortion rate level for the women aged between 20-24 years old, 25-29 years old, 30-34 years old, 35-39 years old, also we keep the abortion rate for the women aged between 15 years old and 44 years old, and the birth rate total. All the variables in this dataset are in percentage.

We also gathered data from Census; surveys of individual and economics characteristics for states in U.S from 2010 to 2017. These surveys include information on both men and women median earnings, poverty rate, ethnicity, marital status, level of education and level of employment. To make sure that we only have variable displaying characteristics for women we exclude variables containing information for men. For the economics characteristics we only kept the median earnings in dollars. For the individual characteristics we have all the variable in percentage, i.e., poverty rate, ethnicity... We merged all these datasets together to conduct our empirical work. The richness of the variables allows us to control for race, marital status,

level of education, poverty, and employment level.

In addition of all the variables that we have, we created a dummy variable that takes the value 1 if the state benefits from the expansion of Medicaid, and 0 if the state does not. We refer to this variable as the "treatment group" (if it takes the value 1) and the "control group" (if it takes the value 0). The "control group" and the "treatment group" are used to try to capture the effect of the expansion of Medicaid on the abortion rate in United States. We also create a second dummy variable which represents before and after the introduction of the Medicaid expansion. This variable named $\ll$ post $\gg$ is equal to 0 if it is "before the treatment" and 1 if it is "after the treatment", i.e., before and after the implementation of Medicaid expansion.

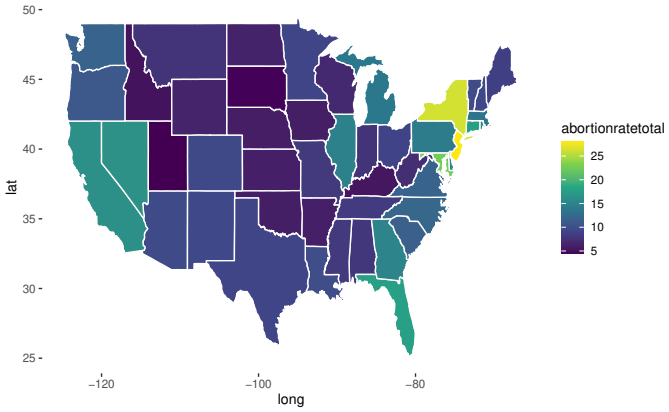
For the treatment group we have a total of 16 states which are: Alaska, Connecticut, California, Illinois, Massachusetts, Maryland, Minnesota, Hawaii, New Jersey, New York, Montana, New Mexico, Oregon, Vermont, West Virginia, and Washington. These states correspond to the states that implemented the Medicaid expansion. So we have in our control group 34 states, which are the remaining states. This gives us a sample size of 120 observations for the treatment group and 280 for the control group.

To summarize we have 400 observations and a total of 25 variables in our final merged total dataset and we are looking at 50 states between 2010 and 2017.

4.2 Summary statistics

The following map (figure 1) represents the abortion rate in the United States in 2017. We can see very clearly on this map that the abortion rates differ from state to state. We can notice that the states on the west coast, like California and Arizona for example, and the states on the east coast (New-York, Florida) have higher abortion rates than central states (Idaho, Montana). The state with the highest abortion rate is Washington (about 25%). On the contrary, if we take the example of Utah, the abortion rate is much lower (about 5%).

Figure 1: Abortion rate in United States in 2017

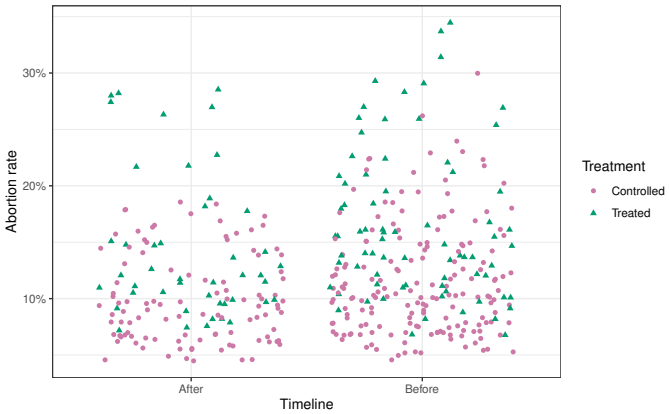


Notes: Data from the Guttmacher Institute. We have all states except Hawaii and Alaska. Abortion rate is in percentage. The variables are at a state level..

From table 1 in appendix, it shows that the abortion rate is decreasing with age. Indeed, for women aged 20-24 years, the abortion rate is higher than 20%, whereas for women older than 40 the abortion rate is approximately 2%.

From the figure 2 below, we can see the abortion rates for the states in the control group and the states in the treatment group before and after the implementation of the Medicaid expansion. We note that there is no major change after the Medicaid expansion for both groups. We can see, however, that for some states in the treatment group, their abortion rate decreased after the implementation of the Medicaid expansion.

Figure 2: Abortion rates after and before Medicaid expansion among all states



Note: Data from the Guttmacher Institute. Abortion rate is in percentage. We have 280 observation for the controlled states and 120 observations for the treated states. The variables are at a state level.

Table 2: Summary statistics

Variable	N	Controlled, N = 280	Treated, N = 120
abortionratetotal	400	10.96 (4.61)	15.71 (6.65)
eco_empl	400	54.78 (4.16)	56.06 (4.27)
ind_educ_g	332	5.15 (1.01)	6.95 (1.41)
(Missing)		36	32
ind_eth_b	332	6.44 (4.82)	4.92 (4.17)
(Missing)		36	32
ind_sta_m	332	24.83 (1.34)	24.38 (1.00)
(Missing)		36	32
ind_sta_n	332	15.91 (1.35)	17.28 (1.35)
(Missing)		36	32
ind_sta_d	332	6.95 (0.71)	6.24 (0.74)
(Missing)		36	32

Note: Data from the Guttmacher Institute and Census. All the variables are in percentage except women median earnings (dollars). Women marital status variables, women levels of education variables, women ethnicities variables where recalculated as the proportion of women. The variables are at a state level.We have 280 observation for the controlled states and 120 observations for the treated states.

The table 2 displays the summary statistics of our data. In average, women in states that benefited from the expansion of Medicaid have higher median wage and are more employed that women in the control group. Women in the treatment group are slightly more educated if we look at the percentage of women possessing a graduate degree; 6,95% for the women in the treatment group against 5,15% in the control group.

In the states that benefited from the Medicaid expansion, women in average have a higher abortion rate (15,71%) than the women in the control group (10,96%).

However, we noticed that the poverty rate for female householder is higher for states that didn't profit from the Medicaid expansion. Indeed, the poverty rate for female householder is 30,71% in the control group and 25,84% in the treatment group.

5 Methodology

In this part we will present the methodology we followed to conduct our empirical project.

5.1 Estimation

To estimate whether the introduction of the Medicaid expansion had an impact on the level of abortion, we used a difference-in-difference approach as our identification strategy. Our treatment group corresponds to states that have implemented the Medicaid expansion while our control group is composed of states that have not chosen to implement the Medicaid expansion. This leads to a total of 16 states for the treatment group and 34 states for the control group. The identification strategy is a difference-in-difference pool of both cross-sectional and time series data. The year corresponding to the implementation of the treatment is September 2014, but we choose to take 2015 as a reference. In the difference-in-difference approach, we make a comparison of both groups of treated and untreated condition before and after the treatment period. Our main estimation is:

$$abortionratetotal_{s,t} = \beta + \beta 1 Post_t + \beta 2 Treatment_s + \beta 3 Treatment_s * Post_t + \epsilon_{s,t} \quad (1)$$

where abortionratetotal is the abortion rate in percentage for women aged 15-44 years for each state s in each period t, Post is a dummy variable that indicates 0 for the pre-treatment period in year t (2010-2014) and 1 for the post-treatment period in year t (2015-2017), Treatment is a dummy variable and it indicates in which group the state belongs to, if treatment is 1, these are the states belonging to the treatment group, and if treatment is 0, these are the states in the control group. Our final estimation corresponds to the same equation, but we used time and state fixed effects instead of post and treatment variables. Thus, we take into account that our states do not necessarily have the same laws, the same public expenditures, the same political party, the same number of clinics or differences between them. It is the same for time fixed effects, we introduce this effect to consider the differences through years and the hazards that characterize them. The equation is:

$$abortionratetotal_{s,t} = \alpha + \gamma 1 Year_t + \gamma 2 State_s + \beta 3 Treatment_s * Post_t + \epsilon_{s,t} \quad (2)$$

where abortionratetotal is the percentage abortion rate for women aged 15-44 years for each state s in each time period t, post is a dummy variable that indicates 0 for the pre-treatment period in year t (2010-2014) and 1 for the post-treatment period in year t (2015-2017), treatment is a dummy variable and that takes the value 1 if the state belongs to the treatment group and 0 otherwise i.e. the control group. Year is the fixed effect for time t, and state is the fixed effect for all 50 states s.

To test the validity of our model, in a second step we performed a difference-in-difference equation with the control variables for each state and for each period. In this case, we know that our model is not significant, we sought to confirm the non-validity of our results

and to explain the outcome. In this second step, the number of states is restricted to 41 states because of missing variables, which are state missing variables. This led us to a treatment group composed of 12 states whereas the control group is composed of 29 states. For the validity of our results, we also redo the difference-in-difference equation (1) with the same number of states, i.e., by removing the states with missing values. Our estimation for the difference in difference with the control variables is:

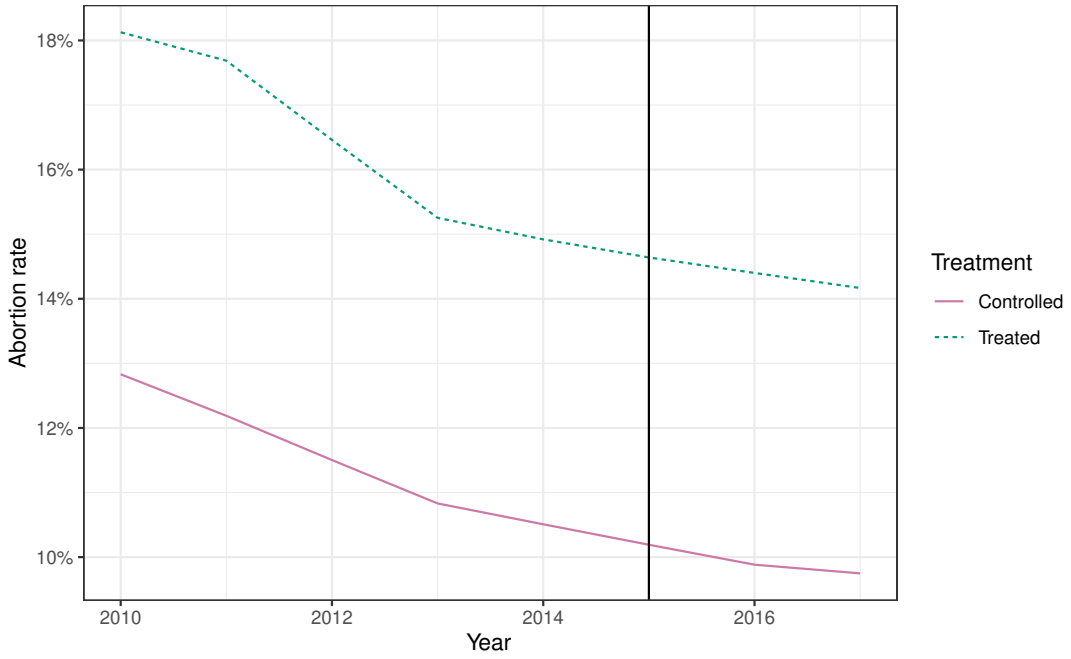
$$abortionratetotal_{s,t} = \alpha + \gamma 1 Year_t + \gamma 2 State_s + \beta 3 Treatment_s * Post_t + \beta 4 X_{s,t} + \epsilon_{s,t} \quad (3)$$

where abortionratetotal is the abortion rate in percentage for women aged 15-44 years for each state s in each period t, year is a fixed effect for each year between 2010 and 2017, state is the fixed effect for all 50 states in our dataset. Post is a dummy variable that indicates 0 before treatment and 1 after treatment, and Treatment, a dummy that takes the value 1 for states that benefit from the expansion and that takes the value 0 for states in control group, i.e., that do not benefit from the expansion of Medicaid. We have the control variables, which are X's for each state s at each year t. As control variables we have household income in percentage, education level in percentage, type of ethnicity of the population in percentage, type of relationship status in percentage, median earnings in dollars, women employment in percentage and poverty rate for female householder in percentage.

5.2 Parallel trend

In figure 3, we have both groups, treatment and control. The treatment and control groups before 2015 do not have the same type of trend, however they have the same trend after 2015 that is : decreasing. Since our assumption of parallel trend is not met, our model must suffer from endogeneity. Endogeneity can explain the same trend of both groups, as said in introduction, it must be missing variables in the model. Because of this figure we can conclude that our results must be not significant.

Figure 3: Parallel trend of the abortion rate for the women aged 15-44 years old

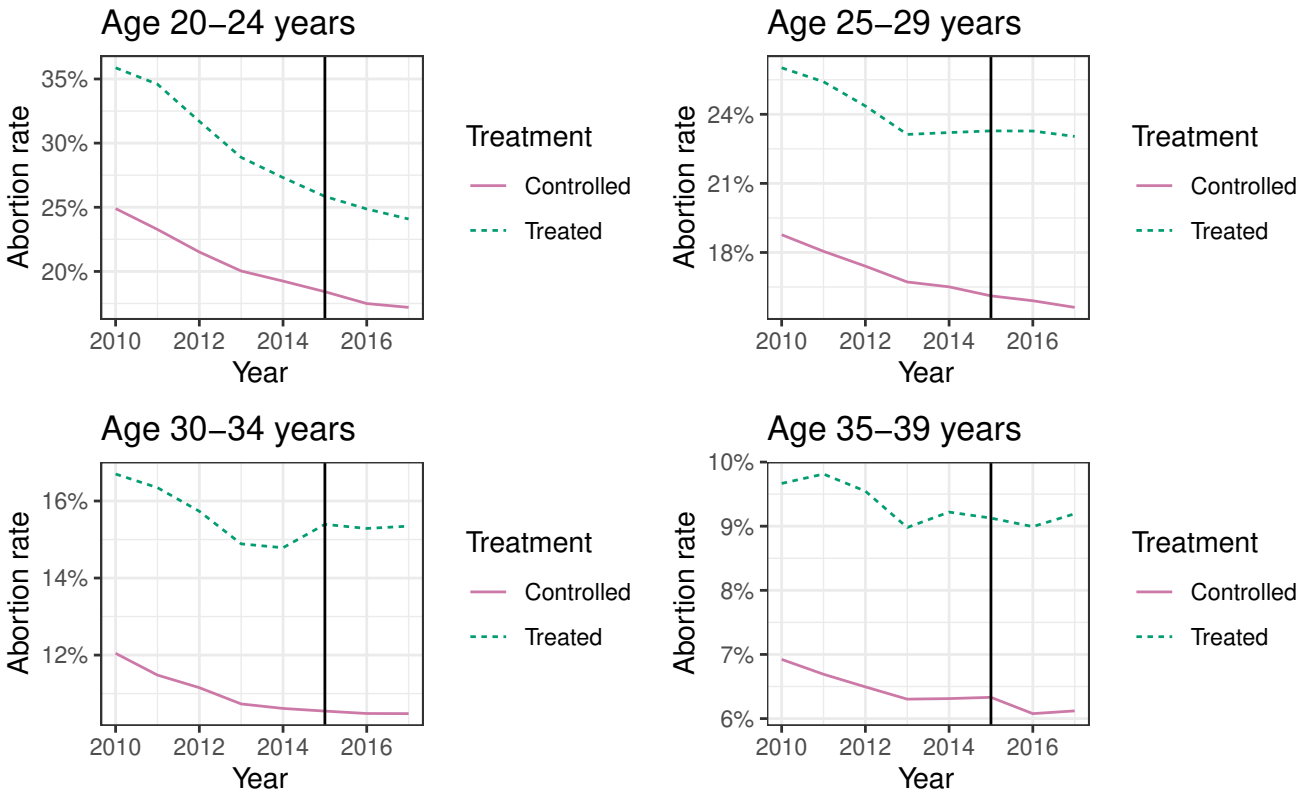


Note: Data from the Guttmacher Institute. Abortion rate is in percentage. We have 280 observation for the controlled states and 120 observations for the treated states. The variables are at a state level..

If we look at the different age groups in figure 4, our results are like the general abortion rate, we do not have a correct parallel trend. For the age group between 20 and 24 years, we have a general decrease in both groups. This decrease disappears in the other age groups. Women aged 25-29 years do not have the same trends for both groups, treated women have a decline until 2013 and the abortion rate suddenly increases again. For the control group, we only have a decrease in the abortion rate along the years. For women between 30 and 34 years old we have for the control group a drop in the abortion rate, then a plateau between 2013 and 2014. This rate increases again until 2015 and declines afterward. As for the previous age group, we have for the control group a general decrease. Finally for the treatment group of women aged 35-39 years, we have a non linear rate of abortion. For the control group we have a decrease in the abortion rate until 2013, an increase until 2015, a drop after 2015 again an increase from 2016.

In general, we can note that the parallel trend assumption is violated. We can conclude that we have omitted variable bias.

Figure 4: parallel trend of the abortion rate for different aged group



Note: Data from the Guttmacher Institute. All the abortion rate variables are in percentage. The variables are at a state level.

6 Results

6.1 Main result

Our main results are presented in table 3. The implementation of the expansion in some states does not have a significant impact on the abortion rate for women aged between 15-44 years old. A state that has implemented the Medicaid expansion should have a decrease in the abortion rate of 0.455%-point. Since these results are not significant, we cannot take its results for granted.

Table 3: Difference in Difference estimates

	Dependent variable:
	Age 20-24
Treatment	4.917***
	(0.724)
TreatmentXPost	−0.455
	(1.183)
Post	−1.632**
	(0.648)
Constant	11.573***
	(0.397)
Observations	400
R^2	0.167
Adjusted R^2	0.161
Residual Std. Error	5.247 (df = 396)
F Statistic	26.507*** (df = 3; 396)

*Note: Data from the Guttmacher Institute. Abortion rate is in percentage. The variables are at a state level.*p<0.1; **p<0.05; ***p<0.01*

We can support this result with the parallel trend assumption, which is not met. In figure 3 we can see that both groups have the same trend despite the implementation of the Medicaid expansion, which confirms our non-significant results.

If we focus on age groups and level of abortion, we obtain results that correspond mainly to our main estimates (table 4). Nevertheless, there is a significant decrease of 2.652%-point in the abortion rate for women aged 20 to 24 years, everything else being equal. For the rest of the sample, i.e., women over 25 years of age, in general we found no significant results. For women aged 25 to 29 years old who lived in the states where Medicaid was implemented, there is a 0.384%-point increase in the abortion rate, all else being equal. Then for women aged 30 to 34 years old, we found an increase in the abortion rate of about 0.354%-point, all else being equal. This is smaller than for women aged 25 to 29 years old. And for women aged 35 to 39 years old, we found a 0.027%-point

increase in the abortion rate following the implementation of the Medicaid expansion, all else being equal. All these results are not significant, so the coefficients cannot be reliably interpreted.

Table 4: Difference in Difference estimates by age groups

	Dependent variable:			
	Age 20-24	Age 25-29	Age 30-34	Age 35-39
	(1)	(2)	(3)	(4)
TreatmentXPost	-2.652^{***}	0.384	0.354	0.027
	(0.476)	(0.396)	(0.235)	(0.135)
Constant	22.169^{***}	16.079^{***}	9.867^{***}	4.907^{***}
	(0.799)	(0.664)	(0.395)	(0.226)
Observations	400	400	400	400
R^2	0.968	0.966	0.973	0.975
Adjusted R^2	0.963	0.960	0.969	0.970
Residual Std. Error (df = 342)	2.113	1.756	1.044	0.598
F Statistic (df = 57; 342)	182.231^{***}	171.047^{***}	216.862^{***}	229.939^{***}

Note: Data from the Guttmacher Institute. All abortion rate variables are in percentages. The variables are at the state level. We also have state and time fixed effects in the regression. $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

6.2 Robustness

In our second estimation step, for difference-in-difference estimation with the 11 missing states, we obtained that the implementation of the Medicaid extension in some states resulted in a decrease of 0.419%-point in the abortion rate, all else being equal, with state fixed effects and time fixed effects. These results are not significant and does not contradict our first results as we can see in table 5.

Table 5: Difference in difference estimates (accounting for missing values)

	Dependent variable:
	Abortion Rate
TreatmentXPost	−0.419
	(0.283)
Constant	11.095***
	(0.423)
Observations	332
R^2	0.971
Adjusted R^2	0.966
Residual Std. Error	1.104 (df = 282)
F Statistic	190.617*** (df = 49; 282)

*Note: Data from the Guttmacher Institute. All abortion rate variables are in percentages. The variables are at the state level. We also have state and time fixed effects in the regression. We do not have the states: Alaska, Maine , Montana, North Dakota, South Dakota, Vermont, West Virginia, Wyoming and Mississipi (only for 2010, 2012, 2013, 2016) for the individuals characteristics data. They are exclude from the regression for the robustness check (total of 68 missing values excluded). *p<0.1; **p<0.05; ***p<0.01*

Table 6: Difference in Difference estimates by age groups with controls

	Dependent variable:			
	Age 20-24	Age 25-29	Age 30-34	Age 35-39
	(1)	(2)	(3)	(4)
TreatmentXPost	−2.840***	0.607	0.334	0.245
	(0.568)	(0.484)	(0.275)	(0.149)
Constant	22.387***	16.165***	9.970***	5.003***
	(0.848)	(0.722)	(0.411)	(0.223)
Observations	332	332	332	332
R^2	0.968	0.964	0.974	0.978
Adjusted R^2	0.962	0.958	0.969	0.974
Residual Std. Error (df = 282)	2.211	1.883	1.072	0.581
F Statistic (df = 49; 282)	171.723***	153.663***	213.321***	253.282***

*Note: Data from the Guttmacher Institute. All abortion rate variables are in percentages. The variables are at the state level. We also have state and time fixed effects in the regression. We do not have the states: Alaska, Maine , Montana, North Dakota, South Dakota, Vermont, West Virginia, Wyoming and Missipi (only for 2010, 2012, 2013, 2016) for the individuals characteristics data. They are exclude from the regression for the robustness check (total of 68 missing values excluded). *p<0.1; **p<0.05; ***p<0.01*

When we look at the group age (table 6), we found that for the abortion rate for women aged between 20 and 24 years old, there is a decrease of 2.840% point of the abortion rate for the states in which they implemented the Medicaid expansion, other things being equal. This result is significant at the 1% significance level. For the women aged above 25 years old, all the other results are not significant. We found that in general we have an increase in the abortion rate, which is less important with the age, but this increase is not significant.

If we replicate the difference-in-difference but adding the control variables, we found that states with the Medicaid expansion have a 0.062%-point increase in the abortion rate, all else being equal (appendix: table 7). Also, we can see that being employed increases the abortion rate by 0.293%-point, significantly at 5%, everything else being equal.

If we look by age groups, we have different results. In table 8 in appendix , we have the regression by age groups. For women aged 20 to 24 years, following the implementation of the Medicaid expansion we have a decrease in the abortion rate of about 1.449%-point, all else equal. This result is significant at 5%. For the women aged between 35 and 39 years old, we have an increase of 0,267%-point, at 10% significant. We found not significant results for the age group of 25-29 years old, and the age group of 30-34 years old. Women aged between 25-29 years old, have an increase of the abortion rate of 0.791%-point in the states where the Medicaid expansion was took place, other things being equal. And the women aged between 30-34 years old also have an increase of 0.417%-point in these states.

Looking at the control variables we found that being employed increases significantly the abortion rate level for the women age more than 25 years old. We have other results, for the group age 20-24 years, being an hispanic woman significantly decrease the abortion rate. Married women for the groups age 25-29, 30-34 and 35-39 have a decreasing abortion rate at 10%, 1%, 1% significance level.

In general, we did not find significant results for our estimates, except for the age group of women between 20 and 24 years. We confirm our results with the robustness test, which also shows us non-significant results. We obtained very different results when we used the control variables, although our main variable, the abortion rate for women aged

15 to 44, remains the same, i.e., not significant. The differences in results appear in the 20-24 and 35-39 age groups, where we have some significance and a decrease or increase in abortion rate for the states with the expansion Medicaid. Thus, we cannot conclude on the impact of Medicaid expansion on the abortion rate.

7 Discussion

From the presentation of our results, we can conclude that we do not know what effect the implementation of the Medicaid expansion had had on the rate of abortion in the states involved. There are several possible explanations for these results.

The first reason to raise is the failure to follow the parallel trend assumption. In figure 3, we see both groups and their changes in abortion rates over time. We see that despite the implementation of the treatment in 2015, we have the same trend. Thus, this non-compliance also seems to indicate that we are facing an endogeneity problem, which could also be part of the explanation that we have the same trend between both groups. Before the implementation of the Medicaid expansion in 2015, in 2012 the United States had implemented the free pill, it is also possible that with the implementation of the Medicaid expansion was implemented more contraceptive assistance for younger people, which could explain the significant decrease in abortion in the 20-24 age group. In general, we can assume that the failure to follow the parallel trends assumption and the similar trend after 2015 in both groups is an endogeneity problem : an omitted variable. Secondly, we face the problem of our data, by having data by states, we cannot have a large variance between states, which may participate in the explanation of the non-significance of our results. Moreover, not having individual data led us to an undeniable lack of information. As we didn't have access to the data, we couldn't make a case-by-case analysis and actually consider the individual characteristics of women which essentially impact the choice to abort or not, according to the social level, the place of life. This is not the case in articles with individual data.

In general, we can conclude that the insignificance of our results is the product of an omitted variable or of the non-presence of individual variables.

8 Conclusion

Reproductive's right of women in the United States is still today a battle and is even more difficult for a certain type of women regarding disparities and inequalities across states. These inequalities can be caused by the socioeconomic background of women but also du to disparities in having access to medical insurance and having access to clinics where abortion can be performed with medical and psychological support. We found no statistical evidence of the Medicaid expansion of 2014 on the abortion rate across States except for a certain range of age.

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9 Appendix

9.1 Summary Statistics

Table 1: Abortion rate among women by different age categories

Variable	N	N = 400
abortionrate2024	400	22.92 (10.96)
abortionrate2529	400	19.01 (8.83)
abortionrate3034	400	12.33 (5.89)
abortionrate3539	400	7.28 (3.47)
abortionrate40plus	400	2.69 (1.43)

Note: Data from the Guttmacher Institute. All abortion rate variables are in percentages. The variables are at the state level.

9.2 Main result

Table 7: Difference in difference estimates with controls

	Dependent variable:
	Abortion Rate
TreatmentXPost	−0.062
	(0.297)
Women employed	0.293**
	(0.124)
Women ethnicity: white	0.340
	(0.239)
Woment ehnicity black or african american	−0.734
	(0.711)
Women ethnicity asian	0.429
	(0.836)
Women ethnicity hispanic of latino	−0.885
	(0.548)
Women marital status: never married	−0.859
	(0.914)
Women marital status: married	−2.326**
	(0.924)
Women marital status: divorced or separated	−1.550
	(1.004)
Women marital status: widowed	−2.970**
	(1.202)
Women level of education: High school graduate	−0.496
	(0.387)
Women level of education: Some college or associate's degree	0.002
	(0.411)
Women level of education: Bachelor's degree	−0.453
	(0.552)
Women level of education: Graduate or professional degree	0.162
	(0.661)
Women median earnings	−0.0003**
	(0.0001)
Poverty rate for female householder	−0.080
	(0.055)
Birthrate among women aged 15 to 44	0.082
	(0.064)
Constant	107.289***
	(39.571)
Observations	332
R^2	0.976
Adjusted R^2	0.970
Residual Std. Error	1.036 (df = 266)
F Statistic	163.974*** (df = 65; 266)

*Note: Data from the Guttmacher Institute and Census. All variables are in percentages except median earnings women in dollars. The variables are at the state level. We also have state and time fixed effects in the regression. We do not have the states: Alaska, Maine , Montana, North Dakota, South Dakota, Vermont, West Virginia, Wyoming and mississippi (only for 2010, 2012, 2013, 2016) for the individuals characteristics data. They are exclude from the regression (total of 68 missing values excluded). *p<0.1; **p<0.05; ***p<0.01*

Table 8: Difference in Difference estimates by age groups with controls

	Dependent variable:			
	Age 20-24	Age 25-29	Age 30-34	Age 35-39
	(1)	(2)	(3)	(4)
TreatmentXPost	-1.449^{**}	0.791	0.417	0.267^{*}
	(0.591)	(0.505)	(0.292)	(0.159)
Women employed	0.310	0.575^{***}	0.292^{**}	0.232^{***}
	(0.247)	(0.211)	(0.122)	(0.066)
Women ethnicity: white	0.487	0.325	0.403^{*}	0.246^{*}
	(0.474)	(0.405)	(0.234)	(0.127)
Woment ehnicity black or african american	-1.436	-2.159^{*}	0.040	-0.101
	(1.412)	(1.207)	(0.697)	(0.379)
Women ethnicity asian	-0.338	0.685	0.361	0.146
	(1.662)	(1.420)	(0.820)	(0.446)
Women ethnicity hispanic of latino	-4.416^{***}	0.299	0.206	0.440
	(1.089)	(0.931)	(0.538)	(0.292)
Women marital status: never married	-0.644	-0.513	-1.093	-1.122^{**}
	(1.816)	(1.552)	(0.896)	(0.487)
Women marital status: married	-2.725	-2.980^{*}	-2.518^{***}	-1.661^{***}
	(1.836)	(1.569)	(0.906)	(0.493)
Women marital status: divorced or separated	-1.678	-2.375	-1.788^{*}	-1.344^{**}
	(1.994)	(1.704)	(0.984)	(0.535)
Women marital status: widowed	-3.926	-3.902^{*}	-3.619^{***}	-1.647^{**}
	(2.388)	(2.041)	(1.179)	(0.641)
Women level of education: High school graduate	-0.344	-1.660^{**}	-0.354	0.055
	(0.769)	(0.657)	(0.380)	(0.206)
Women level of education: Some college or associate's degree	0.720	-0.749	-0.159	0.307
	(0.816)	(0.697)	(0.403)	(0.219)
Women level of education: Bachelor's degree	-0.098	-1.553^{*}	-0.328	-0.077
	(1.097)	(0.938)	(0.542)	(0.294)
Women level of education: Graduate or professional degree	-0.463	-0.392	0.584	0.419
	(1.313)	(1.122)	(0.648)	(0.352)
Women median earnings	-0.0005^{**}	-0.0005^{**}	-0.0003^{**}	-0.0001
	(0.0002)	(0.0002)	(0.0001)	(0.0001)
Poverty rate for female householder	-0.209^{*}	-0.123	-0.047	0.021
	(0.109)	(0.093)	(0.054)	(0.029)
Birthrate among women aged 15 to 44	-0.115	0.285^{***}	0.142^{**}	0.080^{**}
	(0.128)	(0.109)	(0.063)	(0.034)
Constant	149.717^{*}	173.463^{**}	96.105^{**}	50.707^{**}
	(78.623)	(67.187)	(38.803)	(21.094)
Observations	332	332	332	332
R^2	0.974	0.970	0.978	0.981
Adjusted R^2	0.967	0.963	0.972	0.976
Residual Std. Error (df = 266)	2.058	1.759	1.016	0.552
F Statistic (df = 65; 266)	150.334^{***}	133.665^{***}	179.739^{***}	211.904^{***}

Note: Data from the Guttmacher Institute and Census. All the variables are in percentage except women median earnings. Women marital status variables, women levels of education variables, women ethnicities variables where recalculated as the proportion of women. We also have state and time fixed effects in the regression. We do not have the states: Alaska, Maine , Montana, North Dakota, South Dakota, Vermont, West Virginia, Wyoming and Missipi (only for 2010, 2012, 2013, 2016) for the individuals characteristics data. They are exclude from the regression for the robustness check (total of 68 missing values excluded). All the variable are in state level.